ENVIRONMENTAL IMPACT ASSESSMENT PROJECT REPORT FOR THE PROPOSED KABARAK UNIVERSITY 33/11KV SUBSTATION IN RONGAI CONSTITUENCY

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JANUARY 2012
CERTIFICATION:

Client: The Kenya Power & Lighting Company Limited

Assignment: To carry out an Environmental Impact Assessment of the Proposed Kabarak 33/11 KV Substation in Rongai Constituency.

Project Cost: KES 250 Million

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## LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>BOD</td>
<td>Biological Oxygen Demand</td>
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<tr>
<td>BS</td>
<td>British Standard</td>
</tr>
<tr>
<td>CBD</td>
<td>Convention on Biological Diversity</td>
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<tr>
<td>CO₂</td>
<td>Carbon dioxide</td>
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<tr>
<td>CSR</td>
<td>Corporate Social Responsibility</td>
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<tr>
<td>DAO</td>
<td>District Agricultural Officer</td>
</tr>
<tr>
<td>DO</td>
<td>District Officer</td>
</tr>
<tr>
<td>DC</td>
<td>District Commissioner</td>
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<tr>
<td>EA</td>
<td>Environmental Audit</td>
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<tr>
<td>EHS</td>
<td>Environment Health and Safety</td>
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<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<tr>
<td>ERC</td>
<td>Energy Regulatory Commission</td>
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<tr>
<td>ESIA</td>
<td>Environmental &amp; Social Impact Assessment</td>
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<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
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<tr>
<td>EMCA</td>
<td>Environmental Management and Coordination Act, 1999</td>
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<tr>
<td>EMP</td>
<td>Environment Management Plan</td>
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<tr>
<td>ESMP</td>
<td>Environmental and Social Management Plan</td>
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<tr>
<td>ESMMP</td>
<td>Environmental and Social Monitoring Plan</td>
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<tr>
<td>GHGs</td>
<td>Green House Gases</td>
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<td>Ha</td>
<td>Hectare</td>
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<tr>
<td>HEP</td>
<td>Hydro Electric Power</td>
</tr>
<tr>
<td>HOD</td>
<td>Head Of Department</td>
</tr>
<tr>
<td>HVF</td>
<td>Heavy Vehicle Fuel</td>
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<tr>
<td>IDO</td>
<td>Industrial Diesel Oil</td>
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<tr>
<td>KenGen</td>
<td>Kenya Energy Generating Company</td>
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<tr>
<td>KPC</td>
<td>Kenya Pipeline Corporation</td>
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<tr>
<td>KPLC</td>
<td>Kenya Power &amp; Lighting Company</td>
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<tr>
<td>KP</td>
<td>Kenya Power</td>
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<tr>
<td>KETRAC O</td>
<td>Kenya Electricity Transmission Company</td>
</tr>
<tr>
<td>kV</td>
<td>Kilo Volt</td>
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<tr>
<td>MVA</td>
<td>Mega Volt Amps</td>
</tr>
<tr>
<td>KW</td>
<td>Kilo Watt</td>
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<tr>
<td>KWS</td>
<td>Kenya Wildlife Service</td>
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<tr>
<td>L.R</td>
<td>Land Registration</td>
</tr>
<tr>
<td>MOA</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>MSDS</td>
<td>Material Safety Data Sheet</td>
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<tr>
<td>NEMA</td>
<td>National Environment Management Authority</td>
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<tr>
<td>NFPA</td>
<td>National Fire Protection Association</td>
</tr>
<tr>
<td>NOx</td>
<td>Oxides of Nitrogen</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Health and Safety Act</td>
</tr>
<tr>
<td>PM</td>
<td>Particulate Matter</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>SEM</td>
<td>Sustainable Environmental Management</td>
</tr>
<tr>
<td>SOx</td>
<td>Oxides of Sulphur</td>
</tr>
<tr>
<td>SHE</td>
<td>Safety Health and Environment</td>
</tr>
<tr>
<td>STD</td>
<td>Sexually Transmitted Diseases</td>
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EXECUTIVE SUMMARY

Introduction
The KPLC intends to construct commission and operate 33/11 kV substation at Kambi ya Moto Location in Rongai district, Nakuru County. The proposed Sub-station will have one overhead 33 kV medium voltage incoming feeders which will come from the existing 33 kV line and also two overhead 11 kV outgoing feeders. It should be noted that no way leave will be required since we will use the road reserve for the two 11 kV outgoing feeders. Currently, Kenya suffers from unreliable and unstable power grid infrastructure that is unable to keep pace with a demand for electricity at 5.3% annually. Power outages are common occurrence hence if the Kabarak University substation is not constructed the problem will be persistent hence unreliable power supply for major upcoming light industries, Universities/Colleges and other clients in catchment areas.

Under The Least Cost Power Development Plan 2010-2030, KPLC customer base is expected to grow by 200,000 connections every year creating an annual demand growth of about 150MW. The national economic growth for Kenya is on upward trajectory as exemplified by the economic performance of 2010 which recorded 4% as compared to 2.6% in 2009. The country’s economy is projected to grow by 5.7 percent for 2011 financial year. It is anticipated that the economic growth pattern will surpass the economic growth pattern witnessed before December 2007 of 7.1 percent as the country gears towards the realization of vision 2030. Significant effect of this growth is notable in agriculture, tourism and construction among others. Considering that electricity demand is demand driven that is heavily influenced by the economic performance of the country, there is need to plan for sufficient electricity capacity additions to meet the growth aspirations of the Vision 2030.

Project Background
Currently, national access to electricity is estimated at 18%. The Government of Kenya, as part of the 2030 Vision aims, to raise access to electricity to 20% by end of 2010 and to 40% by 2020. This increased level of electrification will result in increased demand for electricity which will require major expansion in power generation and transmission infrastructure in the country.

The interconnected system has an installed capacity of 1,375 MW comprising: 757 MW of hydro; 198 MW of geothermal; 0.4 MW of wind; 279 MW of thermal; 26 MW of co-generation; and 60 MW provided by emergency diesel generators. This power is transmitted countrywide through the transmission network, which comprises of 1,323 kilometers (km) of 220 kV transmission line, 2,122 km of 132 kV transmission line and 632 km of 66 kV transmission line. Kenya is currently interconnected with Uganda through a 132 kV double circuit transmission line rated at 2x86 MVA.

The existing transmission and distribution system capacity is constrained particularly during peak hours when system voltages in parts of Nairobi, West Kenya and Mount Kenya drop below acceptable levels, causing occasional load shedding despite the availability of generation capacity.

To address these constraints, Kenya Power & Lighting Company (KPLC) has identified the need for a number of substations across the country which is now at various stages of development. The Kabarak area accounts for sizeable percent of the country’s demand for electricity within Nakuru county. The distribution network around this region will therefore require major expansion and reinforcement in order to deliver power to the main load centers.
To ensure that the above project is implemented in an environmentally and socially sound and sustainable manner, KPLC has engaged the services of environmental experts registered by NEMA to conduct an environmental and Social Impact Assessment ESIA for the proposed project. The ESIA will be conducted as per the Environmental Management and Coordination Act 1999, and the subsequent Kenya Gazette Supplement No. 56 of 1st June 2003.

**Scope and Criteria of the Environmental & Social Impact Assessment**

The Government of Kenya policy on all new projects, programs or activities requires that an Environmental Impact Assessment is carried out at the planning stages of any proposed undertaking. The scope of this Environmental Impact Assessment, therefore, covers:

- The baseline environmental and Socio-economic conditions of the area,
- Description of the proposed project,
- Provisions of the relevant environmental laws,
- Public participation
- Identification and discussion of any adverse impacts to the environment anticipated from the proposed project,
- Appropriate mitigation measures,
- Development of an Environmental Management Plan outline.

The scope of assessment covers various activities related to; construction works of the proposed development which includes all works of civil, mechanical, electrical or other nature necessary to construct, commission, operation and decommissioning of the substation project.

**Terms of reference:**

- Establish the suitability of the proposed location to construct substation sustainably, efficiently and effectively supply power within Rongai and its catchment areas.
- A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
- A description of the technology, procedures and processes to be used, in the implementation of the project.
- A description of materials to be used in the construction and implementation of the project, the products, by-products and wastes to be generated by the project.
- A description of the potentially affected environment.
- A description of environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
- To recommend a specific environmentally sound and affordable wastes' management system.
- Provide alternative technologies and processes available and reasons for preferring the chosen technology and processes.
- Analysis of alternatives including project site, design and technologies.
- Development of Environmental Management Plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.
- Provide an action plan for the prevention and management of the foreseeable hazardous activities in the cause of the project cycle.
- Propose measures to prevent health hazards and to ensure security in the working environment for the employees, residents and for the management of emergencies.
- An identification of gaps in knowledge and uncertainties which were encountered in compiling the information.
Proposed Kabarak University 33/11 kV Substation in Rongai Constituency

- An economic and social analysis of the project area.

**Study Methodology**
Methods of data collection included desktop studies, field investigations, reconnaissance survey, Public Participation, administration of structured questionnaires, photography, and objective inference.

**Project Description**
The proposed project is for constructing and commissioning Kabarak University Substation with the following Specifications.

<table>
<thead>
<tr>
<th>Substation</th>
<th>Proposed Kabarak University Substation</th>
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<tbody>
<tr>
<td>Voltage levels</td>
<td>33/11 kV</td>
</tr>
<tr>
<td></td>
<td>1X 33kV Incoming feeders</td>
</tr>
<tr>
<td></td>
<td>2 X 11 kV Outgoing feeders</td>
</tr>
<tr>
<td>TRANSFORMER RATING</td>
<td>7.5 MVA</td>
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</table>

The substation shall also consist of a yard area complete with transformers, switch yards, steel support structures, cabling units, in-coming & out-going power lines, lightning arrestors, breakers and protection equipment. The substation will have a transformer bay, a control room, in roads, a parking bay and a guard house with its utilities. Water from the Mains supply line shall be connected, and the sanitary conveniences will be constructed to available sewer line. The Guard House and associated utilities will be secluded from the Main Switch yard and control room for safety in accordance with the Company's electrical safety procedures. The design of the substation shall provide room for rain water harvesting that will be used various operations in the substation.

**Project objectives**
The main objective is to construct a new 33/11kV substation. Specific objectives include;
- Designing and constructing of a 33/11kV Substation in compliance with electric generation regulatory authorities (ERC, Ministry of energy)
- Ensure sustainability of the project by complying with national laws especially those touching on environment

**Project Justification**
The project is justifiable in that it will stabilize power supply, improve on distribution line security hence cushioning against losses occasioned by power failures and blackouts and enhanced public safety. This will facilitate investments hitherto constrained by lack of electric power. It is important to note that this has been occasioned by the ongoing infrastructural development within rongai area (Nakuru county) and its environs which will require high voltage power. Furthermore, the use of steel support structures will be beneficial to the environment because it will greatly reduce deforestation and illegal logging for electric wooden poles. Although wood structures are relatively cheap compared to concrete pole structures the performance of wooden poles has proved poor due to their short life time and subsequent poor reliability and very high operational and maintenance costs.
Project cost
The project cost Two hundred and fifty million shillings only (Kshs. 250 million).

Baseline information / description of project area environment
Project Regional Location

The proposed project is located within Nakuru (Rongai), Nakuru County. The proposed project is located in kambi ya moto Location, Nakuru (Rongai) district, Nakuru County. The project will be constructed within the one acre out of the land belonging to Stima Sacco. The area is also surrounded by different infrastructural developments.

Topography

The main topographic features in the district are the Mau Escarpment covering the Western part of the district, the Rift valley floor, Menegai crater with its drainage and relief system and the various inland lakes on the floor of the rift valley form drainage for nearly all the permanent rivers in the district.

The district is home to Lake Nakuru, famous for its flamingoes. The Mau escarpment with an average altitude of 2500m above sea level is very important as most of the forests are located there the forest do influence rainfall pattern in the district while most of the rivers originate from the same escarpment. The catchment of Lake Nakuru is Molo River. The topography has influenced economic activities. Where there volcanic soils crop and dairy farming are common. In the drier parts livestock keeping, poultry and other activities linked to tourism are practiced.

Climatic conditions

The climatic conditions of the district are influenced by altitude and physical features. Area in the district with altitude between 1800m and 2400m above the sea level receive average rainfall of between 760mm and 1270mm per year. This is a sub-humid equatorial climate. These areas are found on upper parts of Rongai and Mbogoini divisions. Areas within the rift valley floor with altitudes between 1520m-1890m above the sea level receive rainfall of less than 760mm annually. These are the marginal areas of the district found in the lower parts of Rongai and Lanet.

The natural resources found in Nakuru include forests (Menengai crater, Mbogoini Solai), rivers, escarpments, lakes and tourist attraction in addition to good soils for farming gives the district a firm economic base. Lake Nakuru with its saline water is a major tourist attraction centre inhabited with flamingoes. The forests within escarpment are a major source of timber and firewood employing high numbers of Nakuru's population. The same forests do generate income to the government in form of revenue and income to saw millers too.
Legal and Regulatory Framework

Kenya has over 77 statutes which relate to environmental concerns. Most of these statutes are sector specific, covering issues such as land use, occupational health and safety, water quality, wildlife, public health; soil erosion, air quality etc. Previously, environmental management activities were implemented through a variety of instruments such as policy statements, permits and licences and sectoral laws.

There was however need for stronger enforcement machinery to achieve better standards in environmental management. The enactment of the environmental Management and Coordination Act in 1999 provided for the establishment of an appropriate legal and institutional framework for the management and protection of the environment.

Laws of particular concern to this project are:

- The Environment Management and Coordination Act, 1999
- Public Health Act (Cap. 242)
- Land Planning Act (Cap. 303)
- Physical Planning Act, 1996
- Local Government Act (Rev. 1998)
- Water Act, 2002
- Energy Act of 2006
- The Standards Act Cap 496
- Penal Code Act (Cap.63)
- The Wildlife Conservation and Management Act, Cap 376
- The Lakes and Rivers Act Chapter 409 Laws of Kenya:
  - The Forestry Services Act, 2005
  - Occupational Safety and Health Act, 2007
  - Work Injury and Benefits Act, 2007
  - Occupiers Liability Act (Cap. 34)

- The Radiation Protection Act (Cap 243 Laws of Kenya)
- The Traffic Act Chapter 295 Laws of Kenya
- The Public Roads and Roads of Access Act (Cap 22 Laws of Kenya)
- The Way leaves Act Cap 292
- The Agriculture Act, Cap 318 of 1980 (revised 1986)
- Antiquities and Monuments Act, 1983 (Cap 215)
- The Registration of Titles Act Cap 281
- The Land Titles Act Cap 282
- The Land Acquisition Act Chapter 295 Laws of Kenya
- The Civil Aviation Act Cap 394
- World Bank /IFC Environment and Social Safeguards Policies
- Environment Assessment (Operational Policy, OP/BP 4.01)

Public Consultation

The purpose of public participation is to identify Project Affected Persons (PAPs) and to allow such parties the opportunity to provide input and comment on the EIA process, including issues and alternatives that are to be investigated, thereby facilitating informed decision-making.

Consultations were undertaken as part of the ESIA in order to obtain the views of stakeholders, their concerns and suggestions towards sustainable implementation of the project. Members of the immediate community, interested and affected persons within the immediate area to be affected by the project were consulted. The consultation was done through structured project forms/key informant interview schedule, household visits and administration of Public participation questionnaires.

The following were the major concerns that were raised up by various stakeholders in regard to the proposed project
Positive Issues
- Employment opportunities
- Improvement of local and national economy
- Boosting of the informal sector
- Improved Security
- Improved Electricity Supply
- Increased protection from Possible lightning strikes

Negative Issues
- Visual Impacts
- Increased dust pollution
- Increased Noise Level and Vibration
- Accidents during Construction
- Possibility of Sexually transmitted diseases
- There would be electromagnetic radiations
- Electrocution and vandalism

Public stakeholder consultation was undertaken in order to obtain the above views and concerns of the stakeholders. The stakeholders raised a number of pertinent issues which some were responded to during the consultation while the rest have been addressed in the environmental management plan. Generally the stakeholders consulted were in support of the proposed project.

Project Potential Environmental and Social Impacts
Both positive and negative impacts that are associated with the proposed substation during the construction, operation and decommissioning phases were identified. The following positive and negative impacts are associated with the proposed project.

Anticipated Positive Impacts
- Reduction in environmental degradation because of use of stainless steel pylons.
- Direct and indirect skilled and non-skilled employment opportunities.
- Gains in the local and national economy and increase in revenue.
- Provision of market for supply of construction materials.
- Informal sectors benefits.
- Acceleration of the investment process in the region.
- Reduction in pressure on biomass which comes from forest resources.
- Improved communication

Anticipated Negative Impacts
Against the background of the above positive impacts, there will be negative impacts emanating from the construction, operation and subsequent decommissioning activities of the substation. The negative impacts will include:
- Air quality (Dust and fugitive emissions pollution)
- Solid waste generation
- Noise and Vibrations (Increase in noise levels)
- Visual intrusion and aesthetic impacts
- Impacts of construction material sourcing(e.g. quarrying)
- Traffic congestion and Road tear and wear
Proposed Kabarak University 33/11 kV Substation in Rongai Constituency

- Occupational health and safety impacts – Increased risk of accidents, Occupational hazards & Fire Outbreaks
- Hazardous waste materials
- Impacts of fuel, lubricating oil and chemical storage
- Impacts on public Health - Possibility of increased incidence of disease transmission
- Stress on local infrastructure

Proposed Mitigation measures
- During construction, any stockpiles of earth should be enclosed /covered /watered during dry or windy conditions to reduce dust emissions;
- Construction trucks removing soil from the site, delivering dusty construction materials to the site should be covered to prevent material dust
- Drivers shall be instructed to drive at low speeds
- During construction, where water is available, sprinkle the construction area with water to keep dust levels down.
- Dust masks should be provided to all personnel in areas prone to dust emissions throughout the period of construction.
- Drivers of construction vehicles must be supervised so that they do not leave vehicles idling and they limit the vehicular speeds so that dust levels are lowered.
- No burning of any waste materials whatsoever should be permitted within the site during construction
- Areas cleared of vegetation at the substation site, and where no substation structures are, shall be rehabilitated by grass to prevent soil erosion. Drainages shall be constructed to control storm water.
- Noise pollution shall be mitigated by ensuring that noisy operations are done during the day only and also by properly maintaining construction machinery.
- HIV/AIDS awareness campaigns shall be carried out for employees and the surrounding members of public.
- Solid wastes generated, shall be carted away as soon as possible for appropriate disposal.
- Occupational safety measures shall be put in place, including provision of suitable and adequate personal protective clothing and equipment to construction employees.
- Emergency response measures shall be put in place
- Only qualified authorized operational staff shall work at the substation
- Danger/Caution warning notices shall be placed where necessary
- The site shall be rehabilitated to its original state as far as is reasonably practical.
- Minimize the need to construct new access tracks wherever possible by using existing access roads and tracks wherever available.
- Ensure minimum clearance distances between conductors and ground, waterways, road crossings, buildings, communication systems etc. are incorporated into design.
- String conductors under tension to minimize potential damage to remaining ground vegetation.
- Scaffolding to be placed over roadways at locations conductors are being strung to ensure traffic flow is maintained and public safety is provided.
Project alternatives
The possible options are available for the proposed substation as follows:

- The ‘Do-nothing’ Option – based on utilizing existing facilities as it is without undertaking any new works.
- Alternative Structure Types and Designs will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements
- Analysis of Alternative Construction Materials and Technology
- Alternative Substation Sites
- Alternative energy source

Summary of Environmental and Social Management Plan (ESMP)
The Environmental and Social management and monitoring plans address specific concerns and mitigation measures encountered during the engineering, procurement and construction phases of the proposed substation project.

To ensure that the negative environmental impacts can be controlled and mitigated effectively, a stringent and scientific management and monitoring plan has been prepared. The ESIA proposes to utilize existing structures with KPLC management, including Safety, Health and Environment (SHE) department and the KPLC Project Implementing Unit (KPIU), be responsible for ensuring that the overall environmental and social targets are achieved and that the environmental responsibilities and obligations of the ESIA are satisfied during the life of the project.

The project manager shall conduct quarterly inspections/audits to ensure that the system for implementation of the ESMP and ESMoP is operating effectively. This ESIA therefore requires that the ESMP be integrated into the Design Report with appropriate allocation of funds in the Bills of Quantities. The contract for construction should bear clauses binding the contractor to implement impact mitigation as part of the civil works. The KPLC will mount own internal monitoring to ascertain environmental and social sensitivity at all stages of project development.

Conclusion and Recommendations
Conclusion
It is quite evident from this study that the construction and operation of the proposed Kabarak University substation will bring positive effects in the study area including creation of employment, Increase in power to the Nakuru county local grid, stabilize power in the region, increase in revenue and the resulting improvement of the welfare of Kenyans among others. However, although the project will come with various positive impacts, negative impacts will also be experienced hence the need to assess them and put in place appropriate mitigations. The negative impacts of this project include: Increased population in the project area, increased pressure on infrastructure and possible social crime among others.

Both in the short term as well as in the long term, we do not envisage any adverse changes that would warrant the non-implementation of the project. The long term benefits of the project justify its commission.

The team of experts’ wishes to document the following based on the above conclusion:-
The proposed project will generate socio-economic benefits which would not be realized if the no development of option is considered.

The potential adverse impacts associated with the proposed project are possible to mitigate successfully. The impacts before implementation of mitigation measures are assessed as very low to medium low and the ratings are expected to improve further with the implementation of the proposed mitigation measures.

The project will be designed, constructed, and operated according to the acceptable industry norms and standards. Successful implementation of the proposed EMP will minimize or reduce the environment impacts to the acceptable levels.

The negative impacts that will arise during the project cycle will be mitigated.

The impacts that will be adverse will be temporary during the construction phase and can be managed to acceptable levels with the implementation of the recommendation of the mitigation measures for the project.

**Recommendations**

It is our recommendation that the project be allowed to go on provided the following recommendation have been made:

i. Mitigation measures outlined in this report should be adhered to and the Environmental Management Plan (EMP) implemented to the letter. The implementation of this EMP in the entire life cycle of the proposed project (i.e. construction, operation and de-commissioning) is considered to be key in achieving the appropriate environmental management standards as detailed in this study report.

ii. KPLC should undertake environmental audits (EA) of the project after every 12 months after completion of the project to confirm the efficiency and adequacy of ESMP.

iii. KPLC should carry out a survey and demarcate the boundaries shown on the proposed line to identify those who will be affected.

iv. KPLC should promote re-forestation within Nakuru (Rongai) district by providing seedlings to the council to retain the aesthetic value.

In view of this study, the project as currently proposed it’s environmentally sound. This report has disclosed all potential adverse impacts most of which have readily available means to effective mitigation as already discussed, and to be implemented as part of the project design. Overall, the project enjoys a net positive regime which will greatly improve upon pursuit of the ESMMMP as proposed.
CHAPTER ONE: INTRODUCTION AND PROJECT BRIEF

1.1 Introduction
The KPLC intends to construct and commission a 33/11kV substation at Kambi ya Moto Location in Rongai district Nakuru county. The proposed Sub-station will have two overhead 33 kV incoming feeders which will come from the existing 33kV line. The Substation will also have two overhead 11 kV outgoing feeders. Currently, Kenya suffers from unreliable and unstable power grid infrastructure that is unable to keep pace with a demand for electricity at 5.3% annually. Power outages are common occurrence hence if the Kabarak University substation is not constructed the problem will certainly result in unreliable power supply for major upcoming light industries and other clients in catchment areas.

Under The Least Cost Power Development Plan 2010-2030, KPLC customer base is expected to grow by 200,000 connections every year creating an annual demand growth of about 150MW. The national economic growth for Kenya is on upward trajectory as exemplified by the economic performance of 2010 which recorded 4% as compared to 2.6% in 2009. The country’s economy is projected to grow by 5.7 percent for 2011 financial year. It is anticipated that the economic growth pattern will surpass the economic growth pattern witnessed before December 2007 of 7.1percent as the country gears towards the realization of vision 2030. Significant effect of this growth is notable in agriculture, tourism and construction among others. Considering that electricity demand is demand driven that is heavily influenced by the economic performance of the country, there is need to plan for sufficient electricity capacity additions to meet the growth aspirations of the Vision 2030.

The national energy key stakeholders, who include amongst others, the Ministry of Energy, The KPLC, Kenya Electricity Transmission Company (KETRACO), Kenya Energy Generating Company (KenGen) and Energy Regulation Commission (ERC) have carried out the country’s power-demand projections for the medium term. The results indicate a need for capacity enhancement to satisfy the projected demand.

1.2 Project Background
Currently, national access to electricity is estimated at 18%. The Government of Kenya, as part of the 2030 Vision aims, to raise access to electricity to 20% by end of 2010 and to 40% by 2020. This increased level of electrification will result in increased demand for electricity which will require major expansion in power generation and transmission infrastructure in the country.

The interconnected system has an installed capacity of 1,375 MW comprising: 757 MW of hydro; 198 MW of geothermal; 0.4 MW of wind; 279 MW of thermal; 26 MW of co-generation; and 60 MW provided by emergency diesel generators. This power is transmitted countrywide through the transmission network, which comprises of 1,323 kilometres (km) of 220 kV transmission line, 2,122 km of 132 kV transmission line and 632 km of 66 kV transmission line. Kenya is currently interconnected with Uganda through a 132 kV double circuit transmission line rated at 2x86 MVA.

The existing transmission and distribution system capacity is constrained particularly during peak hours when system voltages in parts of Nairobi, West Kenya and Mount Kenya drop below acceptable levels, causing occasional load shedding despite the availability of generation capacity. To address these constraints, Kenya Power has identified the need for a number of distribution substation projects across the country which is now at various stages of development. The distribution network around Nakuru County will therefore require major expansion and reinforcement in order to deliver power to the main load centres.

Construction of a substation to serve the part of kabarak and its environs will significantly reduce the current high losses and poor supply quality by overstrained 33kV lines in the region. Furthermore,
construction of a 33/11 kV Substation with a 33 kV bus-bar will provide additional flexibility as it will be possible to add more 33 kV lines in future if required.

To ensure that the above project is implemented in an environmentally and socially sound and sustainable manner, KPLC has engaged the services of environmental experts registered by NEMA to conduct an environmental and Social Impact Assessment ESIA for the proposed project. The ESIA will be conducted as per the Environmental Management and Coordination Act 1999, and the subsequent Kenya Gazette Supplement No. 56 of 1st June 2003.

1.3 Scope and Objectives of the Study

The National Environment Management Authority (NEMA) Policy on all new projects, programs or activities requires that an Environmental Impact Assessment is carried out at the planning stages of any proposed undertaking that is out of character with the host environment to ensure that Potential environmental and social impacts are taken into consideration during the design, construction, operation and decommissioning of the facility.

1.3.1 Scope

The main objective of this assessment was to identify significant potential impacts of the project to environmental and social aspects, and formulate recommendations to ensure that the proposed project takes into consideration appropriate measures to mitigate any adverse impacts to the environment and people’s health through all phases of its implementation.

The assessment was undertaken in full compliance with the Environmental Management and Coordination Act 1999 and also the Environmental Impact Assessment and Audit Regulations, 2003. In addition, appropriate sectoral legal provisions relevant to such projects have also been referred to for the necessary considerations during the construction, commissioning, operation and decommissioning of the proposed substation and associated lines.

Specific objectives of the study included the following:

- Present an outline of the project background,
- Establish the environmental baseline conditions of the project area and review all available information and data related to the project,
- Identify key areas for environmental, health and safety concerns as well as the anticipated impacts associated with the proposed project implementation and commissioning,
- Establish a comprehensive environmental management plan covering the construction, operation and decommissioning phases of the project,
- Preparation of a comprehensive Project Report in accordance with the local environmental legislation and submission to NEMA for further instructions and/or approval.

The ESIA scope largely covered the following areas:

1.3.2 Baseline Conditions:

- Environmental setting (climate, topography, geology, hydrology, ecology, water resources sensitive areas, baseline noise levels, air quality and soil quality analysis.
- Socio-economic activities in the surrounding areas (land use, human settlements, economic activities, institutional aspects, water demand and use, health and safety, public amenities, etc.),
- Infrastructural issues (roads, water supplies, drainage systems, electricity distribution system, etc.).

1.3.3 Legal and policy framework:

- Focusing on the relevant national environmental laws, regulations and by-laws and other laws and policies focusing on allied activities relative to the proposed project.
Interactive approach was adopted for the immediate neighbourhood in discussing relevant issues including among others:

- Land use aspects,
- Neighbourhood issues,
- Project acceptability,
- Social, cultural and economic aspects,
- Environmental Impacts
  - Physical impacts,
  - Biological impacts,
  - Legal Compliance.

1.3.4 Terms of Reference (ToR) for the ESIA Process

The ESIA Experts were assigned the task of carrying out Environmental and Social Impact Assessment of the proposed Kabarak University substation. The scope covered various activities related to; construction works of the proposed development which included all works of civil, mechanical, electrical or other nature necessary to construct, commission and decommissioning of the substation project. The output of this work is a comprehensive Environmental and Social Impact Assessment Study Report which will aid NEMA in deciding whether to approve or disapprove installation and operation of the substation Project as well as meeting the requirements of the World Bank Environmental and Social Safeguard Policies.

The ESIA experts conducted the study guided by the following terms of reference:

- Establish the suitability of the proposed location to construct the 33/11kV Substation.
- A concise description of the national environmental legislative and regulatory framework, baseline information, and any other relevant information related to the project.
- A description of the technology, procedures and processes to be used, in the implementation of the project.
- A description of materials to be used in the construction and implementation of the project, the products, by-products and waste to be generated by the project.
- A description of the potentially affected environment.
- A description of environmental effects of the project including the social and cultural effects and the direct, indirect, cumulative, irreversible, short-term and long-term effects anticipated.
- Analysis of alternatives including project site, design and technologies.
- Development of an Environmental Management Plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment, including the cost, timeframe and responsibility to implement the measures.
- Provide an action plan for the prevention and management of the foreseeable accidents and hazardous activities in the course of project construction, operation and decommissioning.
- Propose measures to prevent health hazards and to ensure safety in the working environment for the employees and the neighbouring community.
- An identification of gaps in knowledge and uncertainties which were encountered in compiling the information.
- An economic and social analysis of the project.

1.4 ESIA Approach and Methodology

The approach chosen in undertaking this study was careful to take into account EMCA, 1999 requirements as well as the Environmental Impact Assessment and Audit Regulations, 2003. It involved largely an understanding of the project background, the preliminary designs and the implementation plan. The approach and methodology applied during the study enabled collection of both primary and secondary data. Qualitative and quantitative methods of data collection were employed. Secondary data was obtained through literature reviews while primary data was obtained through physical observations, photography, interviews and stakeholders’ consultation.
The initial stage of this assessment was project screening. Screening of the project sought to ascertain whether or not this project falls within a category that requires EIA prior to commencement. Other considerations made during this stage included a preliminary assessment of the environmental sensitivity of the areas within the proposed site through assessment of project maps. This screening indicated that the proposed power substation is among the listed projects under Schedule 2 of EMCA, 1999 thus requires an EIA study.

Project scoping was the next stage which was done to delineate project issues that required detailed analysis. This step involved collection of primary and secondary data through field visits and literature review respectively.

Key activities undertaken during the assessment included the following:

- Physical inspections of the proposed project area
- Literature review of relevant documents
- Stakeholder consultations with the line ministries and project affected persons
- Report writing

Below is an outline of the basic ESIA steps that were followed during this assessment:

**Step 1: Project Concepts**

The project details, scope, design, implementation, tests, commissioning were first analyzed.

**Step 2: Terms of Reference (ToR)**

The terms of Reference were developed guided by EMCA 1999 and The Environmental Impact Assessment/Audit regulations 2003. Any new developments out of character with their surrounding must have an EIA undertaken; for review, Approval and Licensing by NEMA.

**Step 3: Project Screening**

Details about baseline conditions and potential environmental and social impacts were collected through desktop study, stakeholder consultations, site visits, photography, and inductive methods.

**Step 4: Identification of Potential Environmental and Social Impacts**

The Potential Environmental impacts were identified, classified and magnitude determined.

**Step 5: Impact Assessment and Consultations**

The Environmental and Social Impacts were analyzed, assessed and discussed in details involving consultations with the Proponent and other stakeholders.

**Step 6: Formulation of Mitigation measures**

Mitigation measures to ameliorate or minimize the potential Environmental and Socio-economic impacts were formulated for the entire project life.

**Step 7: Development of an Environmental & Social Management and Monitoring Plan:**

An E&SMMP for the project life was developed indicating parameters to be monitored, persons responsible, timing and costs involved.

Specific issues covered in the project report include but are not limited to:

- Name of the proponent, address and contact person
- Title of the project
- Objectives and scope of the project
- Nature of the project;
- Location of the proposed project, including the physical area that may be affected by the project’s activities;
- Types of activities that will be undertaken during the project construction, operation and decommissioning phases;
- Design of the project;
- Proposed Project budget;
- Materials to be used, products and by-products, including waste to be generated by the project and the method(s) of their disposal;
- Potential environmental impacts of the project;
- Economic and social impacts to the local community and the nation in general;
- Views of the public/potentially affected people about the project; and
- An Environmental and Social Management Plan (E&SMP) for the entire project cycle to include mitigation measures to be taken during and after implementation of the project and an action plan for the prevention and management of foreseeable accidents during the project cycle.
- An Environmental and Social Monitoring Plan (ESMP)

![Flowchart Diagram]

**Flowchart Diagram:**

1. **Project Conception** → **Project Screening** → **Scoping** → **ToR** → **Identification of Potential Impacts**
   - **Project Report**
   - **Development of ESMP** → **Formulation of Mitigation Measures** → **Impact assessment and analysis**
CHAPTER TWO: DESCRIPTION OF PROPOSED DEVELOPMENT PROJECT

2.0 Introduction
This chapter provides an overview of the proposed substation as currently designed. The description borrows largely from documentation availed by the Kenya Power.

2.1 Site Location Characteristics
The proposed project is located at Kambi ya Moto Location in Nakuru (Rongai) district, Nakuru County. The project will be constructed within the one acre land within Stima Sacco’s land.

![Figure 1: Currently the project site is almost bare with no significant vegetation or fauna.](image)

2.2 Nature of the Project
The proposed project is for constructing and commissioning Kabarak University Substation with the following Specifications.

<table>
<thead>
<tr>
<th>Substation</th>
<th>Proposed Kabarak University Substation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage levels</td>
<td>33/11 kV</td>
</tr>
<tr>
<td></td>
<td>1 X 33kV Incoming feeders</td>
</tr>
<tr>
<td></td>
<td>2 X 11 kV Outgoing feeders</td>
</tr>
<tr>
<td>Transformer ratings</td>
<td>1 x 7.5 MVA</td>
</tr>
</tbody>
</table>
A typical Transformer and bund wall and oil holding dam

The substation shall also consist of a yard area complete with transformers, switch yards, steel support structures, cabling units, in-coming & out-going power lines, lightning arrestors, breakers and protection equipment. The substation will have a transformer bay, an office, a control room, inroads, a parking bay and a guard house with its utilities. Water from the Mains supply line shall be connected, and the sanitary conveniences will be constructed to available sewer line. The Guard House and associated utilities will be secluded from the Main Switch yard and control room for safety in accordance with the Company’s electrical safety procedures.

2.3 Typical Substation Design

The Substation will be up to approved design and Standard with the following features:

a) Substation yard with: – incoming 1 X 33 kV line, outgoing 2 X 11 kV lines, switch gear, steel structures, protection equipment, 7.5 MVA transformer mounted on a concrete plinth, with oil containment pits, an oil separator at the edge point from which drainage channels connect to storm water drainage system, a vehicle drive way & parking bay and cable trenches

b) Control equipment house with: - control panels’ room, switch gear room, communication room, battery room, office, toilet, pantry, cable trenches

c) Guard house with toilet both secluded from the main Substation yard

d) Stone perimeter wall with a gate

The substation will be using modern distribution and control equipment. The works shall conform to current best practice in the international Energy industry in all respects.
2.3 Site Ownership
The proposed Substation will be built on a one acre land within Stima Sacco land.

2.4 Project Justification
Transmission and distribution of electricity within the country has not been addressed adequately. This has created a gap in planned power system development which now needs to be addressed. National load forecast projects rapid load growth over the 2009-2029 planning period with projected power peak demand expected to be 2038 MW in 2015, 3970 MW in 2020 and 15065 MW in the year 2030.

For optimal power transmission and Distribution around the country, Substations will be required at suitable locations in addition to enabling achievement of the KPLC’s target of increasing customer connection from 29% (May 2011) to 40% by the year 2020. Therefore, there is need to boost the
capacity of available electrical energy through more Transmission and distribution lines and associated 
Sub stations.

2.5 Project Activities

It is expected that the proposed site will undergo alteration during the construction process to install the 
substation and associated structures. Safety protocol, established National and International 
Environmental Protection Regulations/ Standards shall guide the Contractor and project operator 
throughout the project lifecycle.

2.5.1 Construction activities Outline

Construction activities will involve the following:
(i) The Contractor shall perform any site investigations in good time as may be necessary for the progress of 
design and construction on a sound engineering basis.
(ii) Site preparation (preparation of a site office and store, Construction of a toilet, Guard house, fencing and 
Gate installation).
(iii) Supply of Civil work parts, transformers, tools, electrical equipment and delivery to project site.
(iv) Civil works on site including construction of access road and concrete works.
(v) Steel structures assembly, fitting, transformer installation, wiring, testing, Substation electrification, 
evacuation of Electricity through distribution and further testing.
(vi) Remedy of defects after functional tests.
(vii) Throughout execution of the works, the contractor shall observe Safety and shall as appropriate, erect 
warning signs to warn on any potential hazards, ensure proper and efficient use of Personal Protective 
equipment (PPE) for all on site and observe safe work procedures.
(viii) Provision of spare parts, special tools and test equipment.
(ix) Training of the proponents Operating and maintenance personnel.
(x) Post construction clean – up, restoration and landscaping of site followed by commissioning of the 
Substation.
(xi) Throughout the project life, the Proponent and Contractor shall adhere to all requirements of National 
Environmental Management Authority (NEMA) and any other applicable legislation regarding 
Environmental and Socio – economic impacts mitigation.

2.5.2 Input Materials

The 33/11kV Sub-Station will be constructed using locally sourced construction materials and imported finished 
structures of approved quality and construction procedures that are not expected to compromise the safety of the 
neighbouring communities as well as the general environment. The following inputs will be required for 
construction:
(i) Raw construction materials e.g. sand, cement, natural building stone blocks, hard core, ballast, gravel, 
timber, nails, Pavement slabs etc.
(ii) Paints, solvents, white wash, etc.,
(iii) One 7.5 MVA transformer.
(iv) Busbars.
(v) Switch gears.
(vi) Circuit breakers.
(vii) Capacitors.
(viii) Lightning arrestors.
(ix) Steel structure members.
(x) A construction labour force (of both skilled and unskilled workers).
(xi) Water.

The first construction activity will be construction of a site office, toilet, and erection of a perimeter wall 
and a gate. This will be followed by concrete construction of foundations for supporting steelwork, 
transformers and other switchgear, storm water drainage pipes, slabs, containment pits and bund walls, 
the control room, small buildings and storage areas that are needed.

All open areas between the transformer plinths and other switchgear foundations will be covered with 
ballast to suffocate vegetation growth and enhance drainage. Before ballasting the ground surface will
be intensively treated to strict specification with insecticide and herbicide to prevent insect activity and the growth of weeds and other plants in the high voltage yard. A PVC sheet of approved gauge will be laid before ballasting. The steelwork will then be erected. The transformers, circuit breakers, reactors and other high voltage equipment will be delivered to site, erected and then commissioned.

2.6 Project Budget
The total project cost for constructing Substation is approximately KES. 250,000,000.00. (Two hundred and fifty million Kenyan shillings). 0.05% of the project cost has to be paid to NEMA as EIA fees.

2.7 Target Group for the EIA Report
The EIA Report has been prepared for use by different stakeholders to be involved in the construction and operation of the proposed Substation. The report contains useful information on policies and procedures to be adhered to, implementation modalities, analysis of potential environmental and social impacts and suggested mitigation measures at various stages of project activities. The information will be useful in planning, implementation, management and maintenance of the Substation.

In this regard, the report is useful to the following stakeholders:

- The Proponent (The KPLC)
- Funding agencies and donors;
- Relevant government ministries and agencies;
- Affected and Interested persons;
- Planners and Engineers to be involved in preparation of designs and plans for the Substation
- Contractor to be engaged in the construction works
- People to be involved in the management and operation of the Substation and associated infrastructures.
CHAPTER THREE: BASELINE INFORMATION OF THE STUDY AREA

3.1 Introduction
This chapter describes the site area in kambi ya moto location, Rongai constituency Nakuru district broadly in terms of physical features, size, administrative and political features, physiographic and natural conditions. The project site has no structure and is used as grazing area.

3.2 Administrative and political units
The district is divided into eight administrative divisions namely; Nakuru municipality, Lanet, Baruti, Rongai, Kampi ya moto, Ngata, Mbogoini and Solai. There are two constituencies in the district i.e. Nakuru town and Rongai while the two local authorities are Nakuru municipality with nineteen wards and Nakuru county county with thirty five wards giving a total of fifty four wards.

Figure 0-1: Administrative units and area of district by division

<table>
<thead>
<tr>
<th>Division</th>
<th>Area in km²</th>
<th>location</th>
<th>Sub location</th>
<th>No. of households</th>
<th>Population (1999)</th>
<th>Population (2012 projection)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nakuru municipality</td>
<td>187.6</td>
<td>-</td>
<td>6</td>
<td>56269</td>
<td>185,665</td>
<td>287,006</td>
</tr>
<tr>
<td>Lanet</td>
<td>38.1</td>
<td>1</td>
<td>3</td>
<td>10119</td>
<td>36,428</td>
<td>56,311</td>
</tr>
<tr>
<td>Baruti</td>
<td>36.8</td>
<td>1</td>
<td>4</td>
<td>2048</td>
<td>9,169</td>
<td>14,174</td>
</tr>
<tr>
<td>Rongai</td>
<td>261.4</td>
<td>2</td>
<td>6</td>
<td>3415</td>
<td>35,726</td>
<td>55,226</td>
</tr>
<tr>
<td>Kampi ya moto</td>
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<td>Ngata</td>
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<td>Mbogoini</td>
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</tr>
<tr>
<td>Solai</td>
<td>253.8</td>
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<td>6</td>
<td>6281</td>
<td>29,710</td>
<td>45,926</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,484.1</strong></td>
<td><strong>15</strong></td>
<td><strong>41</strong></td>
<td><strong>102,304</strong></td>
<td><strong>369,560</strong></td>
<td><strong>571,276</strong></td>
</tr>
</tbody>
</table>

Source: district statistic office, Nakuru, 2008
3.3 Settlement Patterns
The district’s settlement consists of people spread across the country. The town has a sizeable population of Kenyan of Indian origin and a few of the original settler families who remained in the area. The settlement pattern is guided by natural resource availability, rainfall patterns and economic opportunities in the urban centres. Municipality division has the highest population density attributable to rural urban migration as a result of a well developed physical infrastructure, industrial establishments and proximity to both the district and provincial headquarters.

3.4 Biophysical Description of the Project Environment
This section provides a description of the receiving biophysical and socio-economic environments of the area in which the proposed substation will be constructed.

3.5 Physiological and natural conditions
3.5.1 Topographic features
Topography is an important consideration when selecting a line route as the layout and slope of the land restricts the transportation and operation of heavy construction equipment and also has implications in terms of clearance distances which may result in the need for expensive design alterations. Furthermore, steep slopes facilitates the potential for erosion during construction.

The main topographic features in the district are the Mau Escarpment covering the Western part of the district, the Rift valley floor, Menegai crater with its drainage and relief system and the various inland lakes on the floor of the rift valley form drainage for nearly all the permanent rivers in the district.

The district is home to Lake Nakuru, famous for its flamingoes. The Mau escarpment with an average altitude of 2500m above sea level is very important as most of the forests are located there the forest do influence rainfall pattern in the district while most of the rivers originate from the same escarpment. The catchment of Lake Nakuru is Molo River. The topography has influenced economic activities. Where there volcanic soils crop and dairy farming are common. In the drier parts livestock keeping, poultry and other activities linked to tourism are practiced.

3.5.2 Biodiversity
Ecological and avifaunal assessment undertaken for the project during the Assessment Phase of the EIA indicates that the vegetation within the proposed site is characterized by less dense, low scrub bushland interspersed with grassland areas. Subsistence agricultural fields occur intermittently within the environs and as a result, the vegetation has been cleared in places and is denuded in some areas due to overgrazing by livestock. The area characterized by tall trees may provide important habitat for avifauna.

3.5.3 Drainage, Geohydrology and Wetlands
The project study area is not located in a major catchment area, the area through which the proposed substation. There are also a number of small depressions created by flooding due the loose soil located within the study area, but generally the study area is characterized by well drained soils with no flooding.

3.5.4 Geology and Soils
The geology of the district consists of volcanic rocks, which influences formation of magnificent man made features such as Menengai crater and natural forms. The area is dominated by two types of
quaternary deposits, one of it is lacustrine and the other volcanic in origin. The oldest rocks found in situ in the area are tertiary. Geology is mainly volcanic rocks of various compositions, volcanic/pyroclastic sediments and alluvial or reworked sediments. These have major implications for the distribution and properties of the (majorly young) soils.

3.5.5 Climate
The climatic conditions of the district are influenced by altitude and physical features. Area in the district with altitude between 1800m and 2400m above the sea level receive average rainfall of between 760mm and 1270mm per year. This is a sub-humid equatorial climate. These areas are found on upper parts of Rongai and Mbogoini divisions. Areas within the rift valley floor with altitudes between 1520m-1890m above the sea level receive rainfall of less than 760mm annually.

Forests, rivers, escarpments, lakes form part of tourist attraction within the county. Lake Nakuru with its saline water is a major tourist attraction centre inhabited with flamingoes. The forests within escarpment are a major source of timber and firewood employing high numbers of Nakuru’s population.

3.6 Socio –Economic Environment description
3.6.1 Agriculture and rural development
Agriculture and tourism are the back bone of the economy of Nakuru. The area surrounding the town is known for its fast agricultural potential with numerous small and fast agricultural enterprises. The main crops grown around Nakuru and marketed within the town include coffee, wheat, barley and beans. Industries like flour milling and grain ginneries are found in Nakuru. Dairy farming is a key economic activity and provides the inputs for various milk processing plants around the town.

The rich volcanic soils of Nakuru give great potential for crops as well as livestock production in the drier parts of the district. The climate and reliable rainfall in most parts of nakuru offers adequate conditions for horticulture production in the district.

3.6.2 Trade tourism and Industry
Nakuru is endowed with vast resources that make tourism a key income generating activity. The Nairobi-Uganda highway crosses the district right in the middle thus promoting contacts within the three East African countries thorough the highway. Nakuru is home to Lake Nakuru, one of the Rift valley soda lakes which forms part of the lake Nakuru national park. The park is 3km from the central business district. The national park surrounding the lake is home to several fauna and flora species. The park also has many wild animals that can be seen during a safari. Other sites of interest are accessible from Nakuru include Menegai crater and small fumaroles and steam vents. The second largest surviving volcanic crater in the world plunges 483m down from the rim and the summit is accessible by foot or vehicle 8km from the main road to Nyahururu. Hyrax Hill prehistoric site discovered by the Leakey in 1926 is considered a major Neolithic and Iron age site.

3.6.3 Physical infrastructure
About 90% of the roads in the district are either earth or gravel. Only 10% are Bitumen status. Most bridges are wooden and in bad condition. The roads become impassible during the rainy seasons. There is an observed rise in unplanned settlements in many urban centres’ thus limiting provision of water and electricity to most households.

3.6.4 Environment, water and sanitation
This sector involves the water, irrigation and environment and mineral resources subsectors. The district economy depends on the natural resource base and the activities include agriculture, industry,
livestock production, mining and quarrying. The natural resource in the district include land, water, forestry, wildlife and commercial minerals which include building sand, limestone, granite and gypsum. Inhabitants in the district depend on two permanent rivers and dams. The number of households with access to piped water is 46,568 while the number with access to portable water is 63,417. Other sources of water include earth dams, earth pans, shallow wells, rock catchment and boreholes.
CHAPTER FOUR: RELEVANT LEGISLATIVE AND REGULATORY FRAMEWORKS

4.1 Introduction
There are many environmental problems and challenges in Kenya today. Among the cardinal environmental problems include: loss of biodiversity and habitat, land degradation, land use conflicts, human animal conflicts, water management and environmental pollution. This has been aggravated by lack of awareness and inadequate information amongst the public on the consequences of their interaction with the environment.

There is a growing concern in Kenya and at global level that many forms of development activities cause damage to the environment. Development activities have the potential to damage the natural resources upon which the economies are based. Environmental Impact Assessment is a useful tool for protection of the environment from the negative effects of developmental activities. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound.

Kenya has over 77 statutes which relate to environmental concerns. Most of the statutes are sector specific, covering issues such as land use, occupational health and safety, water quality, wildlife, public health, soil erosion, air quality among others.

4.2 Environmental Policy Framework
Environmental Impact Assessment (EIA) critically examines the effects of a project on the environment. An EIA identifies both negative and positive impacts of any development activity or project, how it affects people, their property and the environment. EIA also identifies measures to mitigate the negative impacts, while maximizing on the positive ones. EIA is basically a preventive process. It seeks to minimize adverse impacts on the environment and reduces risks. If a proper EIA is carried out, then the safety of the environment can be properly managed at all stages of a project—planning, design, construction, operation, monitoring and evaluation as well as decommissioning. The assessment is required at all stages of project development with a view to ensuring environmentally sustainable development for both existing and proposed public and private sector development ventures. The National EIA regulations were issued in accordance with the provisions of Environmental Management and Coordination Act (EMCA) of 1999. The EIA Regulations must be administered, taking into cognizance provisions of EMCA 1999 and other relevant national laws.

4.3 Institutional Framework
At present there are over twenty (20) institutions and departments which deal with environmental issues in Kenya. Some of the key institutions include the National Environmental Council (NEC), National Environment Management Authority (NEMA), the Forestry Department, Kenya Wildlife Services (KWS) and others.

In Kenya, the Environmental Management and Coordination Act (EMCA) of 1999 is the main legislation that deals with ESIA studies. In retrospect, the EMCA established various administrative bodies to operationalize EMCA. These include among others:

National Environment Council (NEC) – Is the apex body which among other things is charged with the responsibility of developing the national environmental policy in Kenya and setting annual environmental goals and standards.

The National Environment Management Authority (NEMA) – exercises general supervision and coordination over all matters relating to environment in Kenya.
The Public Complaints Committee (PCC) – investigates environmental complaints against any person, submit their findings/recommendations to NEC

The Standards and Enforcement Review Committee (SERC)—advises the NEMA on the criteria and procedures for the measurement of environmental quality in Kenya. Environmental quality relates to air quality, wastewater quality, waste quality, noise quality, land use quality, etc. The institutional framework for EMCA is shown in Figure 3.1

![INSTITUTIONAL FRAMEWORK FOR THE EMCA](image)

**Figure 0: Institutional Framework under the EMCA**

### 4.3.1 National Environment Management Authority (NEMA)

The objective and purpose for which NEMA was established was to exercise general supervision and co-ordinate 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. However, NEMA's mandate is designated to the following committees:

### 4.3.2 Provincial and District Environment Committees

According to EMCA, 1999 No. 8, the Minister by notice in the gazette appoints Provincial and District Environment Committees of the Authority in respect of every province and district respectively. The Provincial and District Environment Committees are responsible for the proper management of the environment within the Province and District in respect of which they are appointed. They are also to
perform such additional functions as are prescribed by the Act or as may, from time to time be assigned by the Minister by notice in the gazette. The decisions of these committees are legal and it is an offence not to implement them.

4.3.3 Public Complaints Committee
The Committee performs the following functions:

- Investigate any allegations or complaints against any person or against the authority in relation to the condition of the environment in Kenya and on its own motion, any suspected case of environmental degradation and to make a report of its findings together with its recommendations thereon to the Council.
- Prepare and submit to the Council periodic reports of its activities which shall form part of the annual report on the state of the environment under section 9 (3) and
- To perform such other functions and excise such powers as may be assigned to it by the Council.

4.3.4 National Environment Action Plan Committee
This Committee is responsible for the development of a 5-year Environment Action Plan among other things. The National Environment Action Plan shall:

- Contain an analysis of the Natural Resources of Kenya with an indication as to any pattern of change in their distribution and quantity over time.
- Contain an analytical profile of the various uses and value of the natural resources incorporating considerations of intergenerational and intra-generational equity.
- Recommend appropriate legal and fiscal incentives that may be used to encourage the business community to incorporate environmental requirements into their planning and operational processes.
- Recommend methods for building national awareness through environmental education on the importance of sustainable use of the environment and natural resources for national development.
- Set out operational guidelines for the planning and management of the environment and natural resources.
- Identify actual or likely problems as may affect the natural resources and the broader environment context in which they exist.
- Identify and appraise trends in the development of urban and rural settlements, their impact on the environment, and strategies for the amelioration of their negative impacts.
- Propose guidelines for the integration of standards of environmental protection into development planning and management.
- Identify and recommend policy and legislative approaches for preventing, controlling or mitigating specific as well as general diverse impacts on the environment.
- Prioritize areas of environmental research and outline methods of using such research findings.
- Without prejudice to the foregoing, be reviewed and modified from time to time to incorporate emerging knowledge and realities and; binding on all persons and all government departments, agencies, States Corporation or other organ of government upon adoption by the national assembly.

4.3.5 Standards and Enforcement Review Committee
This is a technical Committee responsible for environmental standards formulation methods of analysis, inspection, monitoring and technical advice on necessary mitigation measures.

4.3.6 National Environment Tribunal
This tribunal guides the handling of cases related to environmental offences in the Republic of Kenya.
4.3.7 National Environment Council (NEC)

EMCA 1999 No. 8 part III section 4 outlines the establishment of the National Environment Council (NEC). NEC is responsible for policy formulation and directions for purposes of EMCA; set national goals and objectives and determines policies and priorities for the protection of the environment and promote co-operation among public departments, local authorities, private sector, non-governmental organizations and such other organizations engaged in environmental protection programmes.

4.3.8 Kenyan Environmental Legal Framework

Previously, environmental management activities were implemented through a variety of instruments such as policy statements, permits and licenses and sectoral laws. There was however need for a stronger enforcement machinery to achieve better standards in environmental management. The enactment of the Environmental Management and Coordination Act (EMCA) in 1999 provided for the establishment of an appropriate legal and institutional framework for the management and protection of the environment.

4.3.9 The Environment Management and Co-ordination Act, 1999

The Environmental Management and Coordination Act (EMCA) 1999 is an Act of Parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto.

The main objective of the Act is to:

- Provide guidelines for the establishment of an appropriate legal and institutional framework for the management of the environment in Kenya;
- Provide a framework legislation for over 77 statutes in Kenya that contain environmental provisions;
- Provide guidelines for Environmental Impact Assessment, environmental audit and monitoring, environmental quality standards and environmental protection orders.

The Act empowers the National Environment Management Authority (NEMA) to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of government in the implementation of all policies related to the environment.

Part II of the Environment Management & Coordination Act, 1999 states that every person in Kenya is entitled to a clean and healthy environment and has the duty to safeguard and enhance the environment. In order to partly ensure this is achieved, Part VI of the Act directs that any new programme, activity or operation should undergo Environmental Impact Assessment and a report prepared for submission to the National Environmental Management Authority (NEMA), who in turn may issue a license as appropriate.

Part VIII section 72 of the Act prohibits discharging or applying poisonous, toxic, noxious or obstructing matter, radioactive or any other pollutants into aquatic environment. Section 73 require that operators of projects which discharges effluent or other pollutants to submit to NEMA accurate information about the quantity and quality of the effluent. Section 74 demands that all effluent generated from point sources be discharged only into the existing sewerage system upon issuance of prescribed permit from the local authorities or from the licensee. Finally, section 75 requires that parties operating a sewerage system obtain a discharge license from NEMA to discharge any effluent or pollutant into the environment.

Section 87 Sub-section 1 states that no person shall discharge or dispose of any wastes, whether generated within or outside Kenya, in such a manner as to cause pollution to the environment or ill health to any person, while section 88 provides for acquiring of a license for generation, transporting or operating waste disposal facility. According to section 89, any person who, at the commencement of this Act, owns or operates a waste disposal site or plant or generate hazardous waste, shall apply to the NEMA for a licence. Sections 90 through 100 outline more regulations on management of hazardous and toxic substances including oils, chemicals and pesticides.

Finally the Environmental Impact Assessment Guidelines require that a study be conducted in accordance with the issues and general guidelines spelt out in the Second and Third schedules of the Environmental Regulations (2003). These include coverage of the issues on Schedule 2 (ecological, social, landscape, land use and water considerations) and general guidelines on Schedule 3 (impacts and their sources, project details, national legislation, mitigation measures, a management plan and environmental auditing schedules and procedures.)
Under EMCA 1999 NEMA has developed regulations to establish guidelines for better management of the environment and promote sustainable development. To date, the regulations presented in the following sections have been gazetted.

a) Environmental Impact Assessment and Audit Regulations (2003) Legal Notice No. 101
The Environmental Impact Assessment and Audit Regulations state in Part III Rule No. 6 that an Environmental Impact Assessment study shall be conducted in accordance with the terms of reference developed.

Part III Rule 16, takes into account environmental, social, cultural, economic, and legal considerations, and shall:

- Identify the anticipated environmental impacts of the project and the scale of the impacts;
- Identify and analyze alternatives to the proposed project;
- Proposed mitigation measures to be taken during and after the implementation of the project; and
- Develop an environmental management plan with mechanisms for monitoring and evaluating the compliance and environmental performance which shall include the cost of mitigation measures and the time frame of implementing the measures

The Proponent has commissioned the Environmental Impact Assessment study in compliance with the Act. The environmental management and monitoring plan laid out in this report shall be adhered to by the Proponent.

b) Environmental Management and Coordination (Water Quality) Regulation 2006
These regulations are described in Legal Notice No. 120 of the Kenya Gazette Supplement No. 74, September 2006. The regulation applies to drinking water, water used for agricultural purposes, water used for recreational purposes, water used for fisheries and wildlife and water used for any other purposes. This includes the following:

- Protection of sources of water for domestic use;
- Water for industrial use and effluent discharge;
- Water for agricultural use.

The regulations outline:

- Quality standards for various sources of domestic water;
- Quality monitoring for sources of domestic water;
- Standards for effluent discharge into the environment;
- Monitoring guide for discharge into the environment;
- Standards for effluent discharge into public sewers;
- Monitoring for discharge of treated effluent into the environment.

This Legal Notice on Water Quality provides that anyone who discharges effluent into the environment or public sewer shall be required to apply for Effluent Discharge License. The license for discharge is Ksh 5,000 while annual license fee for discharge into the environment will be Ksh. 20,000 or Ksh 100,000 depending on the facility. Non compliance with the regulations attracts a fine not exceeding Ksh 500,000 and the polluter pay principle may apply depending on the court ruling. Table 4, gives Waste Water Discharge Guidelines from NEMA.
Table 0-1: NEMA Waste Water Discharge Guidelines

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Discharge into public sewers</th>
<th>Discharge into open water bodies</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH</td>
<td></td>
<td>6.0 - 9.0</td>
<td>6.0 - 9.0</td>
</tr>
<tr>
<td>BOD (5 days at 20° C) not to exceed</td>
<td>mg/l</td>
<td>500</td>
<td>20</td>
</tr>
<tr>
<td>COD not to exceed</td>
<td>mg/l</td>
<td>1000</td>
<td>50</td>
</tr>
<tr>
<td>Total suspended solids not to exceed</td>
<td>mg/l</td>
<td>500</td>
<td>30</td>
</tr>
<tr>
<td>n-hexane extract not to exceed</td>
<td>mg/l</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Oils(mineral, animal &amp; vegetable)</td>
<td>mg/l</td>
<td>1.0</td>
<td>0.05</td>
</tr>
<tr>
<td>Total phenol not to exceed</td>
<td>mg/l</td>
<td>1.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Copper (Cu) not to exceed</td>
<td>mg/l</td>
<td>0.2</td>
<td>0.002</td>
</tr>
<tr>
<td>Zinc (Zn) not to exceed</td>
<td>mg/l</td>
<td>0.05</td>
<td>0.005</td>
</tr>
<tr>
<td>Lead (Pb) not to exceed</td>
<td>mg/l</td>
<td>0.01</td>
<td>0.001</td>
</tr>
<tr>
<td>Arsenic (As) not to exceed</td>
<td>mg/l</td>
<td>Nil</td>
<td>Nil/ no trace</td>
</tr>
<tr>
<td>Total Mercury (Hg) not to exceed</td>
<td>mg/l</td>
<td>Nil</td>
<td>0.05</td>
</tr>
<tr>
<td>Alkyl mercury not to exceed</td>
<td>mg/l</td>
<td>0.01</td>
<td>0.001</td>
</tr>
<tr>
<td>PCB (Polychlorinated biphenyl) not to exceed</td>
<td>mg/l</td>
<td>Nil</td>
<td>0.003</td>
</tr>
<tr>
<td>Pesticides residues not to exceed</td>
<td>mg/l</td>
<td>Nil</td>
<td>0.05</td>
</tr>
<tr>
<td>Sulphates not to exceed</td>
<td>mg/l</td>
<td>1000</td>
<td>500</td>
</tr>
<tr>
<td>Dissolved manganese (Mn)</td>
<td>mg/l</td>
<td>-</td>
<td>1.0</td>
</tr>
<tr>
<td>Chromium (total)</td>
<td>mg/l</td>
<td>1.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Chloride not to exceed</td>
<td>mg/l</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Fluoride not to exceed</td>
<td>mg/l</td>
<td>-</td>
<td>2.0</td>
</tr>
<tr>
<td>Coliform bacteria</td>
<td></td>
<td></td>
<td>1000/100ml</td>
</tr>
<tr>
<td>Free ammonia not to exceed</td>
<td>mg/l</td>
<td>2.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Sulphides (S) not to exceed</td>
<td>mg/l</td>
<td>2.0</td>
<td>0.1</td>
</tr>
<tr>
<td>Cadmium (Cd) not to exceed</td>
<td>mg/l</td>
<td>0.5</td>
<td>0.05</td>
</tr>
<tr>
<td>Cyanide (CN) total not to exceed</td>
<td>mg/l</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Organic phosphorous not to exceed</td>
<td>mg/l</td>
<td>30</td>
<td>1.0</td>
</tr>
<tr>
<td>Chromium six (Cr 6) not to exceed</td>
<td>mg/l</td>
<td>0.5</td>
<td>0.005</td>
</tr>
<tr>
<td>Total dissolved solids not to exceed</td>
<td>mg/l</td>
<td>3000</td>
<td>1200</td>
</tr>
<tr>
<td>Selenium (Se) not to exceed</td>
<td>mg/l</td>
<td>1.0</td>
<td>0.05</td>
</tr>
<tr>
<td>Nickel (Ni) not to exceed</td>
<td>mg/l</td>
<td>3.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Barium (Ba) not to exceed</td>
<td>mg/l</td>
<td>10</td>
<td>2.0</td>
</tr>
<tr>
<td>Temperature not to exceed</td>
<td></td>
<td>+/- 2° of the ambient temperature of the sewer</td>
<td>+/- 2° C of ambient temperature of the water body</td>
</tr>
<tr>
<td>Oil/ grease</td>
<td>mg/l</td>
<td>No trace</td>
<td>Nil/ no trace</td>
</tr>
<tr>
<td>Toxic substances</td>
<td>mg/l</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Odour</td>
<td></td>
<td>-</td>
<td>Not objectionable to the nose</td>
</tr>
<tr>
<td>Colour</td>
<td></td>
<td>-</td>
<td>Not objectionable to the eye or not to exceed 5 mg Pt/l</td>
</tr>
</tbody>
</table>

C) Environmental Management and Coordination (Waste Management) Regulation 2006

These regulations are described in Legal Notice No. 121 of the Kenya Gazette Supplement No. 69, September 2006. These Regulations apply to all categories of waste as provided in the regulations. These include:

- Industrial wastes;
- Hazardous and toxic wastes;
- Pesticides and toxic substances;
- Biomedical wastes
Radio-active substances.

These Regulations outline requirements for handling, storing, transporting, and treatment/disposal of all waste categories as provided therein.

The regulation provides that a waste generator shall use cleaner production methods, segregate waste generated and the waste transporter should be licensed. The notice further states no person shall engage in any activity likely to generate any hazardous waste without a valid Environmental Impact Assessment licence issued by the National Environment Management Authority.

a) Environmental Management and Coordination, (Conservation of Biological Diversity) (BD) Regulations 2006

These regulations are described in Legal Notice No. 160 of the Kenya Gazette Supplement No. 84, December 2006. These regulations apply to conservation of biodiversity which includes conservation of threatened species, inventory and monitoring of BD and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties.

Additionally, these links provide for the local enforcement of the International Convention on Biological Diversity (CBD).

The proposed site has no rich biodiversity and there is no known rare or endangered species in the site.

b) Environmental Management and Coordination, (Fossil Fuel Emission Control) Regulations 2006

These regulations are described in Legal Notice No. 131 of the Kenya Gazette Supplement No. 74, October 2006. These regulations include internal combustion engine emission standards, emission inspections, the power of emission inspectors, fuel catalysts, licensing to treat fuel, cost of clearing pollution and partnership to control fossil fuel emissions. The fossil fuels considered are petrol, diesel, fuel oils and kerosene.

This legislation gives caution to proponent and contractor on careless handling of fuels and possible consequences for failing to observe.

c) Environmental Management and Coordination, (Wetlands, Riverbanks, Lake Shores and Sea Shore Management) Regulations 2009

These regulations are described in Legal Notice No. 19 of the Kenya Gazette Supplement No. 9, February 2009. These regulations include management of wetlands, wetland resources, river banks, lake shores and sea shores. Specific sections have requirements that apply to wetlands in Kenya either in private or public land. These regulations empower the District Environment Committee to coordinate, monitor and advise on all aspects of wetland resource management within the district.

d) Environmental Management and Coordination, (Noise and Excessive Vibration Pollution) Regulations 2009

These regulations are described in Legal Notice No. 31 of the Kenya Gazette Supplement No. 21, May 2009. These regulation prohibit any person from making or causing to be made any loud, unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. It also prohibits excessive vibration which annoys, disturb, injure or endanger the comfort, repose, health or safety of others and the environment or excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source.
Part 11 section 6(1) provides that no person shall cause noise from any source which exceeds any sound level as set out in the First Schedule of the regulations.

Rules 5 and 6 of the regulations define noise levels for various types of activities that generate noise. The first schedule to the regulations defines permissible noise levels and is reproduced below.

**Zone Sound Level Limits**

The regulation in addition specifies that a noise license will be required during the construction and operational phase of a project if such equipment that will produce noise during these two phases will be used.

There will be need for the contractor to apply for a noise license from the NEMA during the construction phase of the project.

**Table 0-2: Permissible Noise Levels**

<table>
<thead>
<tr>
<th>Zone</th>
<th>Sound Level limits(dBA) (leq, 14h)</th>
<th>Noise Rating Level (NR) (leq, 14h)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>A. Silent Zone</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>B. Places of Worship</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>C. Residential: Indoor</td>
<td>45</td>
<td>35</td>
</tr>
<tr>
<td>Outdoor</td>
<td>50</td>
<td>35</td>
</tr>
<tr>
<td>D. Mixed residential (with</td>
<td>55</td>
<td>35</td>
</tr>
<tr>
<td>some commercial and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>places of entertainment)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E. Commercial</td>
<td>60</td>
<td>35</td>
</tr>
</tbody>
</table>

This regulation guides on permissible noise levels during construction, operation and decommissioning phases.

**4.4 Public Health Act (Cap. 242)**

This is an Act of Parliament to make provisions for securing and maintaining health. Sections include those dealing with notification of infectious diseases; inspection of infected premises and examination of persons suspected to be suffering from infectious diseases; rules for prevention of diseases; venereal diseases and infection by employees, among others. The proposed project will encourage the movement of people in search of jobs and opportunities, and with this, the risk associated with spread of diseases.

Part IX, section 115, of the Act states that no person/institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Section 116 requires that Local Authorities take all lawful, necessary and reasonably practicable measures to maintain their jurisdiction clean and sanitary to prevent occurrence of nuisance or condition liable to be injurious or dangerous to human health. Such nuisance or conditions are defined under section 118 and include nuisances caused by accumulation of materials or refuse which in the opinion of the medical officer of health is likely to harbour rats or other vermin.

The environmental management plan (EMP) advises the Proponent on safety and health aspects, potential impacts, personnel responsible for implementation and monitoring, frequency of monitoring, and estimated cost.

**4.5 Local Government Act (Rev. 1998)**

This Act provides for the establishment of authorities for local government, to define their functions and to provide for matters connected therewith and incidental thereto. In all areas where the project shall be undertaken, the local authorities will require to be informed.
Section 160 helps local authorities ensure effective utilization of the sewages systems. Section 170, allows the right to access to private property at all times by local authorities, its officers and servants for purposes of inspection, maintenance and alteration or repairs of sewers.

The Act under section 176 gives powers to local authority to regulate sewage and drainage, fix charges for use of sewers and drains and require connecting premises to meet the related costs. According to section 174, any charges so collected shall be deemed to be charges for sanitary services and will be recoverable from the premise owner connected to the facility. Section 20 also requires that all charges due for sewage sanitary and refuse removal shall be recovered jointly and severally from the owner and occupier of the premises in respect of which the services were rendered. This in part allows for application of the "polluter-pays-principle".

Section 163 allows the County Council to prohibit all business, which may be or become a source of danger, discomfort, or annoyance due to their noxious nature through smoke, fumes, dust, noise, or vibrations. Section 165 allows the local authority to refuse to grant or renew any license which is empowered in this act or any other written law on the grounds that the activity does not conform to the requirements of any by-laws in force in the area of such local authority the granting of the license would be contrary to the public interest.

Part XI section 168 provides that every municipal council, town council or urban council may establish and maintain sewerage and drainage works within or without its area of jurisdiction. For purposes of the land required for such development, section 144 states in part “A local authority may, subject to the approval of the Minister, apply to the government or any other authority having power to acquire land required for purposes of any of its functions, to be acquired compulsorily for and on behalf of, and at the expense of the local authority”. The Act, however, does not indicate the repercussions of impacts on landowners.

Section 160 helps local authorities ensure effective utilization of the sewerage systems. It states in part that municipal authorities have powers to establish and maintain sanitary services for the removal and destruction of, or otherwise deal with all kinds of refuse and effluent and where such service is established, compel its use by persons to whom the service is available. However, to protect against illegal connections, section 173 states that any person who, without prior consent in writing from the council, erects a building on: excavate or opens: or injures or destroys any sewers, drains or pipes shall be guilty of an offence. Any demolitions and repairs thereof shall be carried out at the expense of the offender.

For maintenance of such sewerage systems, the following relevant clauses have been drawn from section 169 of the Act that reads in part “A municipal council may for purposes of carrying out any drainage or sewerage works--

"-----cause such sewers, drains and pipes to be made, altered, deepened, covered, laid and maintained either within or without as may be necessary for effectively disposing of the sewage and draining of its area -----

"-----carry such sewers, drains and pipes through, across, or under any public road, street, square or open place laid out for public road, street, square or open space without paying compensation and after giving 30 days notices in writing to the owner or occupier of the intention to do so -----

"-----from time to time alter, enlarge, divert, discontinue, close-up or destroy any sewers, drains, or pipes under its control -----

Section 170, allows the right of access to private property at all times by local authorities, its officers and servants for purposes of inspection, maintenance and alteration or repairs. In addition, the municipal Council may establish and maintain sewage farms or disposal works, and dispose of the effluent therefrom, but shall not be liable for any nuisance or damage as a consequence of proper and ordinary conduct of the sewage farms or disposal works (section 171). To ensure sustainability in this regard, the local authority is empowered to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of health, safety and wellbeing of the inhabitants of its area as provided for under section 201 of the Act.

To ensure sustainability in this regard, the local authority is empowered to make by-laws in respect of all such matters as are necessary or desirable for the maintenance of health, safety and wellbeing of the inhabitants of its area as provided for under section 201 of the Act.
The Proponent shall observe the guidelines as set out in the environmental management and monitoring plan laid out in this report as well as the recommendations provided for mitigation/minimisation/avoidance of adverse impacts arising from the project activities.

4.6 Physical Planning Act, 1996

The Local Authorities are empowered under section 29 of the Act to reserve and maintain all land planned for open spaces, parks, urban forests and green belts. The same section, therefore allows for the prohibition or control of the use and development of land and buildings in the interest of proper and orderly development of an area.

Section 24 of the Physical Planning Act gives provision for the development of local physical development plan for guiding and coordinating development of infrastructure facilities and services within the area of authority of County, municipal and town council and for specific control of the use and development of land. The plan shows the manner in which the land in the area may be used.

Section 29 of the physical Planning Act gives county councils power to prohibit and control the use of land, building, and subdivision of land, in the interest of proper and orderly development of its area. The same section also allows them to approve all development applications and grant development permissions as well as to ensure the proper execution and implications of approved physical development plans. On zoning, the act empowers them to formulate by-laws in respect of use and density of development.

Section 30 states that any person who carries out development within an area of a local authority without development permission shall be guilty of an offence and the development shall be invalid. The act also gives the local authority power to compel the developer to restore the land on which such development has taken place to its original conditions within a period of ninety days. If no action is taken, then the council will restore the land and recover the cost incurred thereto from the developer. In addition, the same section also states that no person shall carry out development within the area of a local authority without development permission granted by the local authority. At the same time, sub-section 5, re-enforce it further that, no licensing authority shall grant under any written law, a license for commercial use for which no development permission had been granted by the respective local authority.

Section 36 states that if in connection with development application a local authority is of the opinion that, the proposed activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an Environmental Impact Assessment report. The Environmental Impact Assessment report must be approved by the National Environmental Management Authority (NEMA) and followed by annual environmental audits as spelled out by EMCA 1999. Section 38 states that if the local authority finds out that the development activity is not complying to all laid down regulations, the local authority may serve an enforcement notice specifying the conditions of the development permissions alleged to have been contravened and compel the developer to restore the land to it's original conditions.

The Proponent has applied for Development Permission from the local authority and has also commissioned an Environmental Impact Assessment study for approval by NEMA.

4.7 Land Planning Act (Cap. 303)

Section 9 of the subsidiary legislation (The Development and Use of Land Regulations, 1961) under this Act requires that before the local authorities submit any plans to the Minister for approval, steps should be taken as may be necessary to involve the owners of any land affected by such plans.

The proponent is liaising with Nakuru District Planning officer to get clearance as concerns the intended project and existing development plans.
4.8 Water Act, 2002

The Act vests the water in the State and gives the provisions for the water management, including irrigation water, pollution, drainage, flood control and abstraction. It is the main legislation governing the use of water especially through permit system.

Part II, section 18, of the Water Act 2002 provides for national monitoring and information system on water resources. Following on this, sub-section 3 allows the Water Resources Management Authority (WRMA) to demand from any person or institution, specified information, documents, samples or materials on water resources. Under these rules, specific records may require to be kept by a facility operator and the information thereof furnished to the authority.

The Water Act Cap 372 vests the rights of all water to the state, and the power for the control of all body of water with the Minister, the powers is exercised through the Minister and the Director of water resources in consultation with the water catchments boards, it aims at provision of conservation of water and appointment and use of water resources.

Part II Section 18 provides for national monitoring and information systems on water resources. Following on this, Sub-section 3 allows the Water Resources Management Authority to demand from any person, specified information, documents, samples or materials on water resources. Under these rules, specific records may be required to be kept and the information thereof furnished to the authority on demand.

Section 20 of the Act requires a permit to be obtained for among others any use of water from a water resources, discharge of a pollutant into any water resource. According to section 29 of the same Act, application for such a permit shall be subject to public consultation as well as an Environmental Impact Assessment as per the Environmental Management and Coordination Act, 1999. The conditions of the permit may also be varied if the authority feels that the water so used is causing deterioration of water quality or causing shortage of water for other purposes that the authority may consider has priority. This is provided for under section 35 of the Act.

Section 73 of the Act allows a person with a license to supply water (licensee) to make regulations for purposes of protecting against degradation of sources of water which he is authorised to take. Under the Act, the licensee could be a local authority, a private Trust or an individual and the law will apply accordingly under the supervision of the Regulatory Board.

Section 76 states that no person shall discharge any trade effluent from any trade premises into sewers of a licensee without the consent of the licensee upon application indicating the nature and composition of the effluent, maximum quantity anticipated, flow rate of the effluent and any other information deemed necessary. The consent shall be issued on conditions including the payment rates for the discharge as may be provided under section 77 of the same Act.

Construction of access road will ensure leveling and soil erosion prevention measures. All construction, operation and decommissioning phases will take caution to contain oil spills to prevent soil and water pollution.

4.9 Energy Act of 2006

This is an Act of Parliament passed to amend and consolidates the law relating to energy, to provide for the establishment, powers and functions of the Energy Regulatory Commission and the Rural Electrification Authority and for connected purposes. The Energy Act of 2006 replaced the Electric Power Act of 1997 and The Petroleum Act, Cap 116. The Energy Act, amongst other issues, deals with all matters relating to all forms of energy including the generation, transmission, distribution, supply and use of electrical energy as well as the legal basis for establishing the systems associated with these purposes.

The Energy Act, 2006, also established the Energy Regulatory Commission (ERC) whose mandate is to regulate all functions and players in the Energy sector. One of the duties of the ERC is to ensure compliance with Environmental, Health and Safety Standards in the Energy Sector, as empowered by Section 98 of the Energy Act, 2006.
In this respect, the following environmental issues will be considered before approval is granted:

1. The need to protect and manage the environment, and conserve natural resources;
2. The ability to operate in a manner designated to protect the health and safety of the project employees; the local and other potentially affected communities.

Licensing and authorization to generate and transmit electrical power must be supported by an Environmental Impact Assessment Report (EIA) approved by NEMA.

Part IV Section 80(1) provides that a person shall not conduct a business of importation, refining, exportation, whole sale, retail, storage or transportation of petroleum, except under and in accordance with the terms and conditions of a valid licence.

Part IV Section 90 (1) stipulates that a person intending to construct a pipeline, refinery, bulk storage facility or retail dispensing site shall before commencing such construction, apply in writing to the Energy Regulatory commission for a permit to do so. The application shall: specify the name and address of the proposed owner; be accompanied by three (3) copies of plans and specifications and be accompanied by an Environmental Impact Assessment (EIA) Report.

Part IV section 91(1) stipulates that the Energy Regulatory Commission shall, before issuing a permit under section 90, take into account all relevant factors including the relevant government policies and compliance with Environment Management and Coordination Act, 1999 and in particular EIA report as per Impact Assessment and Audit Regulations 2003, the Physical Planning Act, 1996 and the Local Government Act.

Part iv section 100 (1) provides that it is an offence if a person being the owner or operator of a refinery, pipeline, bulk liquefied Petroleum gas or natural gas facility, service station, filling station or storage depot, fails to institute appropriate environmental, health or safety control measures. The offence if convicted, he/she shall be liable to a fine not exceeding two million shillings or to a maximum term of imprisonment of two years, or to both.

*The proposed project will be required to follow the guidelines set out in this Act.*

**4.10 The Standards Act Cap 496**

The Act is meant to promote the standardization of the specification of commodities, and code of practice; to establish a Kenya Bureau of Standards, to define its functions and provide for its management and control.

The proponent will ensure that commodities and codes of practice utilized in the project adhere to the provisions of this Act.

*All materials and spares used to construct the substation will comply with the Standardized specifications and Certification.*

**4.11 Penal Code Act (Cap.63)**

Section 191 of the penal code states that if any person or institution that voluntarily corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence. Section 192 of the same Act says a person who makes or vitiates the atmosphere in any place to make it noxious to health of persons /institution, dwelling or business premises in the neighborhood or those passing along public way, commits an offence.

*The Proponent shall observe the guidelines as set out in the environmental management and monitoring plan laid out in this report as well as the recommendation provided for mitigation/minimisation/avoidance of adverse impacts arising from the project activities.*
4.12 The Wildlife Conservation and Management Act, Cap 376


This Act provides for the protection, conservation and management of wildlife in Kenya. The provisions of this Act should be applied in the management of the project.

Part III Section 13 subsection (i) stipulates that any person who not being an officer of Kenya Wildlife Service hunts any animal in a National Park shall be guilty of a forfeiture offence and liable to a fine or imprisonment. Subsection 2 of the Act likewise provides that any person who, without authorisation conveys into a National Park, or being within the area thereof, in possession of, any weapon, ammunition, explosive, trap or poison, shall be guilty of a forfeiture offence.

The Act provides that no person is allowed to use any aircraft, motor vehicle or mechanically propelled vessel in such a manner as to drive, stampede or unduly disturb any protected animal or game animal. Therefore it will be prudent that the construction workforce is conversant with the provisions of this Act.

The proposed project is not located within a conservation/protected area and this act will not be triggered by the project at the stages.

4.14 The Lakes and Rivers Act Chapter 409

This Act provides for protection of rivers, lakes and associated flora and fauna. The provisions of this Act may be applied in the management of the project.

4.15 The Forestry Services Act, 2005

The Act led to the establishment of Kenya Forest Service which is charged with management of forests in consultation with the forest owners. The body enforces the conditions and regulations pertaining to logging, charcoal making and other forest utilization activities. To ensure community participation in forest management, the service collaborates with other organizations and communities in the management and conservation of forests and for the utilization of the biodiversity. Section 43 (1) provides that if mining, quarrying or any other activity carried out in the forest, where the activity concerned is likely to result in forest cover depletion, the person responsible shall undertake compulsory re-vegetation immediately upon the completion of the activity.

The proposed project does not traverse any Gazetted forest nor any conservation area hence the Act will not be triggered but the proponent will adhere to recommendations in the EMP in regards to vegetation clearance and the provisions of this act will be observed where applicable.

4.16 Occupational Safety and Health Act, 2007

This is an Act of parliament to provide for the safety, health and welfare of all workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. It applies to all workplaces where any person is at work, whether temporarily or permanently.

The purpose of the Act is to:

- Secure the safety, health and welfare of persons at work;
• Protect persons other than persons at work against safety and health arising out of, or in connection with the activities of persons at work.

The Act provides that before any premises are occupied, or used as a workplace, a certificate of registration must be obtained from the Director of Occupational Safety and Health Services. The Act provides for the health, safety and welfare for employees at workplaces. This shall be considered at the construction, implementation and decommissioning phases of the project. The following are other provisions of the Act.

4.16.1 Health
The premise must be kept clean; a premise must not be overcrowded. The circulation of fresh air must secure adequate ventilation of workrooms. There must be sufficient and suitable lighting in every part of the premise in which persons are working or passing. There should also be sufficient and suitable sanitary conveniences separate for each sex, must be provided subject to conformity with any standards prescribed by rules. Food and drinks should not be partaken in dangerous places or workrooms. Provision of suitable protective clothing and appliances including where necessary, suitable gloves, footwear, goggles, gas masks, and head covering, and maintained for the use of workers in any process involving exposure to wet or to any injurious or offensive substances.

4.16.2 Safety
Fencing of premises and dangerous parts of other machinery is mandatory. Training and supervision of inexperienced workers, protection of eyes with goggles or effective screens must be provided in certain specified processes. Floors, passages, gangways, stairs, and ladders must be soundly constructed and properly maintained and handrails must be provided for stairs. Special precaution against gassing is laid down for work in confined spaces where persons are liable to overcome by dangerous fumes. Air receivers and fittings must be of sound construction and properly maintained. Adequate and suitable means for extinguishing fire must be provided in addition to adequate means of escape in case of fire must be provided.

4.16.3 Welfare
An adequate supply of both quantity and quality of wholesome drinking water must be provided. Maintenance of suitable washing facilities, accommodation for clothing not worn during working hours must be provided. Sitting facilities for all female workers whose work is done while standing should be provided to enable them take advantage of any opportunity for resting.

Every premise shall be provided with maintenance, readily accessible means for extinguishing fire and person trained in the correct use of such means shall be present during all working periods.

Regular individual examination or surveys of health conditions of industrial medicine and hygiene must be performed and the cost will be met by the employer. This will ensure that the examination can take place without any loss of earning for the employees and if possible within normal working hours.

The (OSH) Act provides for development and maintenance of an effective programme of collection, compilation and analysis of occupational safety. This will ensure that health statistics, which shall cover injuries and illness including disabling during working hours, are adhered.

The environmental management plan (EMP) advises the Proponent on safety and health aspects, potential impacts, personnel responsible for implementation and monitoring, frequency of monitoring, and estimated cost.
4.17 Work Injury and Benefits Act, 2007
This Act provides for compensation to employees for work related injuries and disease contracted in the course of their employment and for connected purposes. Key sections of the Act include the obligations of employers; right to compensation; reporting of accidents; compensation; occupational diseases; medical aid etc. In case of any accidents or incidents during the project cycle, this Act will guide the course of action to be taken.

4.18 Occupiers Liability Act (Cap. 34)
This Act provides that it's the duty of occupier of the premises owes to his visitors in respect of danger and risk due to the state of the premises or to things omitted or attributes an affliction on his/her health to a toxic materials in the premises.

4.19 The Radiation Protection Act (Cap 243 Laws of Kenya)
This is an Act of Parliament to provide for the protection of the public and radiation workers from the dangers arising from the use of devices or material capable of producing ionizing radiation and for connected purposes.

Since 1982, Kenya decided to join in the global movement for the use of nuclear energy for peaceful purposes, a movement lead by the International Atomic Energy Agency (IAEA). Most of such uses are in the fields of medicine, agriculture, energy and environmental monitoring. The dangers of injury to the public prompted the adoption of the Radiation Protection Act (Cap 243) in November 1984 to provide according to its citation, protection of the public and radiation workers from the dangers arising from the use of devices or materials capable of producing ionizing radiation and for connected purpose.

The Act prohibits the unauthorized manufacture, production, possession or use, sale, disposal, lease, loan or dealership, import, export of any irradiating device or radioactive material. All authorized buyers, sellers, users, of such device must be properly licensed. The Act is administered by the Chief Radiation Protection Officer assisted by a Radiation Protection Board.

The proposed project won’t emit/produce ionizing radiations.

4.20 The Traffic Act Chapter 295 Laws of Kenya
This Act consolidates the law relating to traffic on all public roads. Key sections include registration and licensing of vehicles; driving licenses; driving and other offences relating to the use of vehicles on roads; regulation of traffic; accidents; offences by drivers other than motor vehicles and other road users.

Many types of equipment and fuel shall be transported through the roads to the proposed site. Their registration and licensing will be required to follow the stipulated road regulations.

The Act also prohibits encroachment on and damage to roads including land reserved for roads. The project will observe the provisions of the Act.

4.21 The Public Roads and Roads of Access Act (Cap 22 Laws of Kenya)
Section 8 and 9 of the Act provides for the dedication, conversion or alignment of public travel lines including construction of access roads adjacent lands from the nearest part of a public road. Section 10 and 11 allows for notices to be served on the adjacent landowners seeking permission to construct the respective roads.

The project design concept has left the required road reserves and relevant road widening surrenders.
This Act consolidates the law relating to traffic on all public roads. The Act also prohibits encroachment on and damage to roads including land reserved for roads.

The proposed facility location complies with the provision of the Act. It is not on road reserves.

4.22 The Way leaves Act Cap 292

According to the Way leaves Act cap 292 Section 2, Private land does not include any land sold or leased under any Act dealing with Government lands. Section 3 of the Act states that the Government may carry any sewer, drain or pipeline into, through, over or under any lands whatsoever, but may not in so doing interfere with any existing building. Section 8 further states that any person who, without the consent of the Permanent Secretary to the Ministry responsible for works (which consent shall not be unreasonably withheld), causes any building to be newly erected over any sewer, drain or pipeline the property of the Government shall be guilty of an offence and liable to a fine of one hundred and fifty shillings, and a further fine of sixty shillings for every day during which the offence is continued after written notice in that behalf from the Permanent Secretary; and the Permanent Secretary may cause any building erected in contravention of this section to be altered, demolished or otherwise dealt with as he may think fit, and may recover any expense incurred by the Government in so doing from the offender.

The proposed substation will not trigger the act. No compensation will arise because the land has been purchased through open tender on willing seller willing buyer basis hence all aspects of the act have been adequately addressed.

4.23 The Agriculture Act, Cap 318 of 1980 (revised 1986)

This Act has stated objectives to promote and sustain agricultural production, provide for conservation of the soil and its fertility, and stimulate the development of agricultural land in accordance with accepted practices of good land management and good husbandry.

The proposed project will not trigger the act. Any aspects which may affect the site area, recommendations to mitigate the impacts have been adequately addressed in the ESMP.

4.24 Antiquities and Monuments Act, 1983 (Cap 215)

This Act aims to preserve Kenya’s national heritage. Kenya is rich in its antiquities, monuments and cultural and natural sites which are spread all over the country. The National Museums is the custodian of the country’s cultural heritage. Through the National Museums many of these sites are protected by law by having them gazette under the Act.

The Act will not be triggered because there are no known monuments, cultural and natural sites within the proposed project area.

4.25 The Registration of Titles Act Cap 281

This Act provides for the transfer of the land by registration of titles. Parts within the Act elaborate on mechanisms of bringing lands under the Act, and for related purposes. The Act also elaborates on the incorporation of group representatives and the administration of groups.

Section 34 of this Act states that when land is intended to be transferred or any right of way or other easement is intended to be created or transferred, the registered proprietor or, if the proprietor is of unsound mind, the guardian or other person appointed by the court to act on his/her behalf in the matter, shall execute, in original only, a transfer in form F in the First Schedule, which transfer shall, for description of the land intended be dealt with, refer to the grant or certificate of title of the land, or shall
give such description as may be sufficient to identify it, and shall contain an accurate statement of the
land and easement, or the easement, intended to be transferred or created, and a memorandum of all
leases, charges and other encumbrances to which the land may be subject, and of all rights-of-way,
easements and privileges intended to be conveyed.

The Act will be applicable because the Proponent has already purchased land from the owner on willing
seller willing buyer basis. The land title has already been transferred to stima sacco.

4.26 The Land Acquisition Act Chapter 295 Laws of Kenya

The Act provides for the compulsory or otherwise acquisition of land from private ownership for the
benefit of the general public. Section 3 states that when the Minister is satisfied on the need for
acquisition, notice will be issued through the Kenya Gazette and copies delivered to all the persons
affected. Full compensation for any damage resulting from the entry onto land to do things such as
survey upon necessary authorization will be undertaken in accordance with section 5 of the Act:

(i) Area of land acquired
(ii) The value of the property in the opinion of the Commissioner of land (after valuation),
(iii) Amount of the compensation payable,
(iv) Market value of the property,
(v) Damages sustained from the severance of the land parcel from the land,
(vi) Damages to other property in the process of acquiring the said land parcel,
(vii) Consequences of changing residence or place of business by the land owners,
(viii) Damages from diminution of profits of the land acquired.

Part II of the Act allows for the temporary acquisition of the land for utilisation in promotion of the public
good for periods not exceeding 5 years. At the expiry of the period, the Commissioner of Land shall
vacate the land and undertake to restore the land to the conditions it was before. Any damages or
reduction of value shall be compensated to the landowners.

4.27 The Civil Aviation Act Cap 394

Under this act, the Kenya Civil Aviation Authority (KCAA) has to authorize and approve the height of
substation when they are on or proximal to flight Paths so as to ensure the safety of flying aircraft.

Under Section 9 of this act, notwithstanding the provisions of any written law, or terms of any deed,
grant, lease, or license concerning the use and occupation of land, the minister may, where he
considers it to be necessary in the interests of air navigation, by order published in the Gazette,
prohibit the erection within a declared area of any structure above height specified in the order.

Failure to adhere to the provisions of this act, one commits an offence and upon conviction shall be
liable to a fine not exceeding two million shillings or to imprisonment for a term not exceeding three
years or to both.

4.28 International Environmental Guidelines

Kenya is a signatory to a number of conventions on sustainable development and is a member of
various bilateral and multilateral organizations. Some of the relevant International treaties and
conventions include:

- Vienna Convention for the Protection of the Ozone Layer. Inter-governmental negotiations for
  an International agreement to phase out ozone depleting substances concluded in March 1985
  with The adoption of this convention to encourage Inter-governmental co-operation on research,
systematic observation of the ozone layer, monitoring of CFC production and the exchange of information;

- Montreal Protocol on Substances that Deplete the Ozone layer: Adopted in September 1987 and intended to allow the revision of phase out schedules on the basis of periodic scientific and technological assessment, the Protocol was adjusted to accelerate the phase out schedules and has since been amended to introduce other kinds of control measures and to add new controlled substances to the list;

- The Basel Convention: Sets an ultimate objective of stabilizing greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system;

- Kyoto Protocol: Drawn up in 1997, pursuant to the objectives of the United Nations Framework Convention on Climate Change, in which the developed nations agreed to limit their greenhouse gas emissions, relative to the levels emitted in 1990;

- Convention on Biological Diversity (CBD, 1992): This Convention entered into force on 29 December 1993, and its objectives are to: conserve biological diversity; use biological diversity in a sustainable fashion and share the benefits of biological diversity fairly and equitably. This Convention governs Kenya's international obligations regarding biological diversity;

- UNESCO Convention for the protection of the World Cultural and Natural Heritage (World Heritage Convention, 1972): This Convention aims to encourage the identification, protection, and preservation of Earth's cultural and natural heritage. It recognizes that nature and culture are complementary and that cultural identity is strongly related to the natural environment in which it develops;

- Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention): The Convention was signed in Iran in 1971 and came into force in 1975. It represents the first attempt to establish a legal instrument providing comprehensive protection for a particular type of ecosystem. The Ramsar parties agree to implement their planning so as to promote conservation of the wetlands included in the list. There is no Ramsar site near the proposed site.

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): This convention seeks to control the trade in species of wild animals and plants that are, or may be, threatened with extinction as a result of International trade. CITES is an important line of defense against the threat posed to diversity by invasive species.

- The Africa-Eurasia Migratory Water Bird Agreement (AEWA, 1995): The goal of the agreement is to protect migratory waterfowl by ensuring that they are protected for the entire length of their migratory routes. The list of birds protected under the AEWA Convention covers 235 species of birds.

- African Convention on Conservation of Nature and Natural Resources (1968): This Convention of the African Union is ratified by 40 African countries, including Kenya. The fundamental principle requires contracting states to adopt the measures necessary to ensure conservation, utilization and development of soil, water, flora and fauna resources in accordance with scientific principles and with due regard to the best interests of the people.

Kenya has a duty under these multilateral agreements. The project should adhere to strict guidelines and procedures to ensure the agreements are not violated.
4.29 World Bank Environment and Social Safeguards Policies

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

The Safeguard Policies aims at improving decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted.

4.29.1 Environment Assessment (Operational Policy, OP/BP 4.01)

The objective of this policy is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision-making is improved through appropriate analysis of actions and of their likely environmental impacts. This policy is considered to be the umbrella policy for the Bank’s environmental ‘safeguard policies’.

*The proposed project triggers this policy because although there is justification of the proposed substation, there are environmental and social concerns associated with the construction and operation of the proposed project.*

4.29.2 Natural Habitats (Operational Policy, OP/BP 4.04)

This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-term sustainable development. The Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. Natural habitats are land and water areas where most of the original native plant and animal species are still present. Natural habitats comprise many types of terrestrial, freshwater, coastal, and marine ecosystems. They include areas lightly modified by human activities, but retaining their ecological functions and most native species.

*The proposed project doesn't trigger this policy because the project won’t cause significant conversion (loss) or degradation of natural habitats, whether directly (through construction) or indirectly (through human activities induced by the project). The substation will pose insignificant environmental impacts.*

4.29.3 Indigenous Peoples (Operational Policy 4.10)

The objective of this policy is to (i) ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples; (ii) ensure that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and (iii) ensure that indigenous peoples receive culturally appropriate, gender and intergenerationally inclusive social and economic benefits.

*The policy is not triggered for this sub-project as there are no Indigenous Peoples (defined in the Project Appraisal Document for KEEP as the Sengwer, Ogiek, Waata, and Boni peoples) that are affected in the project area.*
4.29.4 Physical Cultural Resources (Operational Policy 4.11)

The objective of this policy is to assist countries to avoid or mitigate adverse impacts of development projects on physical cultural resources. For purposes of this policy, “physical cultural resources” are defined as movable or immovable objects, sites, structures, groups of structures, natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above ground, underground, or underwater. The cultural interest may be at the local, provincial or national level, or within the international community.

*The policy will not be triggered because the proposed project is not in the vicinity of any recognized cultural heritage, archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance sites.*

4.29.5 Involuntary Resettlement (Operational Policy, OP/BP 4.12)

The objective of this policy is to (i) avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs; (ii) assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them; (iii) encourage community participation in planning and implementing resettlement; and (iv) provide assistance to affected people regardless of the legality of land tenure.

*The policy will not be triggered because no household will be relocated since the substation will not be constructed close to any community houses, businesses or any industrial establishments within the locality.*

4.29.6 Forests (Operational Policy, OP/BP 4.36)

The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development and protect the vital local and global environmental services and values of forests. Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists borrowers with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The Bank assists borrowers with the establishment of environmentally appropriate, socially beneficial and economically viable forest plantations to help meet growing demands for forest goods and services.

*This policy will not be triggered because proposed site is not next to any gazette forest or any National Park (Forest).*

4.30 Environmental Conventions and Treaties

4.30.1 World Commission on Environment and Development

The Commission commonly referred to as “the Brutland Commission” focused on the environmental aspects of development, in particular, the emphasis on sustainable development that produces no lasting damage to biosphere, and to particular ecosystems. In addition, environmental sustainability is the economic and social sustainability. Economic sustainable development is development for which progress towards environmental and social sustainability occurs within available financial resources. While social sustainable development maintains the cohesion of a society and its ability to help its members work together to achieve common goals, while at the same time meeting individual needs for health and well-being, adequate nutrition, and shelter, cultural expression and political involvement.
4.30.2 Convention on Biological Diversity (1992)
This was ratified on 11th September 1994. Agenda 21 – a programme of action for sustainable development worldwide, the Rio Declaration on Environment and Development was adopted by more that 178 governments at the United Nations Conference on Environment and Development, known as the Earth Summit, held in Rio de Janeiro, Brazil from 3rd to 14th June 1992. Principle No. 10 of the declaration underscore that environmental issues are best handled with participation of all concerned citizens at all the relevant levels. At the national level, each individual shall have appropriate access to information that is concerning environment that is held by public authorities. States shall encourage and facilitate public participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy shall be provided. The foregoing discussion is relevant to the proposed development because EMCA demands that public must be involved before any development project that is likely to have adverse impacts to the environment is initiated by a proponent. The Act has further established Public Complaints Committee (PCC) where the issues raised by the public in regard to any proposed development can be addressed.

4.30.3 Montreal Protocol, 1987
The Montreal Protocol on Substances that deplete the ozone layer (1987) was ratified on November 9, 1988. This treaty was designed to protect the ozone layer by phasing out the production of a number of substances believed to be responsible for ozone depletion.

4.30.4 United Nations Convention to combat Desertification (1994)
An agreement to combat desertification and mitigate the effects of drought through national action programs that incorporate long term strategies supported by international cooperation and partnership arrangements.

4.30.5 United Nations Framework Convention on Climate Change (1992)
International environmental treaty produced at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro in 1992. The treaty is aimed at reduced emissions of greenhouse gas in order to combat global warming.

4.30.6 Bamako Convention (1991)
A treaty of African nations prohibiting the import of any hazardous (including radioactive) wastes.

An amendment to the international treaty on climate change, assigning mandatory emission limitations for the reduction of greenhouse gas emissions to the signatory nations

4.31 Environmental Policy

4.31.1 Sessional Paper No. 6 of 1999 on Environment and Development
Every person in Kenya is entitled to a clean and healthy environment and has a duty to safeguard and enhance the environment. As envisioned in Sessional Paper No. 6 of 1999 on Environment and Development, Kenya should strive to move along the path of sustainable development to meet the needs of the current generation without compromising the ability of the resource base to meet those of future generations. The overall goal is hence to integrate environmental concerns into the national planning and management processes and provide guidelines for environmentally sustainable development. The policy paper emphasizes that environmental impact assessment must be undertaken
by the developer as an integral part of a project preparation. It also proposed for periodic environmental auditing to investigate if developer is fully mitigating the impacts identified in the assessment report.

### 4.31.2 National Environmental Action Plan (NEAP)

The NEAP for Kenya was prepared in 1994. It was a deliberate policy to integrate environmental considerations into the country’s social and economic development process. The integration was achieved through multi-sectoral approach and a comprehensive framework to ensure that environmental management and conservation of natural resources is an integral part of societal decision-making process.

### 4.31.3 Poverty Reduction Strategy Paper (PRSP)

The PRSP has the twin objectives of poverty reduction and economic growth. The paper articulates Kenya’s commitment and approach to fighting poverty, with the basic rationale that the war against poverty cannot be won without the participation of the poor. The proposed project, during and after implementation, will offer jobs to many Kenyans as a way of contributing to this noble objective of reducing poverty.
CHAPTER FIVE: PUBLIC CONSULTATION AND PARTICIPATION

5.0 Public Stakeholder Consultation

Public participation is an essential and legislative requirement for environmental authorization. The ESIA team undertook the public stakeholder consultation (PSC) for the proposed project in accordance with the requirements for an EIA Study stipulated in the EMCA, 1999 and EIA/EA Regulations 2003.

The purpose of public participation is to identify PAPs and to allow such parties the opportunity to provide input and comment on the EIA process, including issues and alternatives that are to be investigated, thereby facilitating informed decision-making. In complying with the public participation process (PPP) for the EIA, consultations were carried out to ensure that issues, concerns and potential impacts identified by PAPs, including the authorities, proponents, technical specialists and the public are addressed fully.

5.1 Sources of Information

Public participation was a key component of the ESIA of the Proposed Kabarak University 33/11 kV Substation. Positive and negative views and comments of the immediate neighbours were sought as from 4th to 12th November 2011. Public consultations were conducted through the use of pre-designed questionnaires and one on one interviews with neighbour.

Figure 0: school neighbouring the site

5.2 Objective of Public Stakeholder Consultation

The objectives of public participation in an EIA are to provide sufficient and accessible information to Interested and Affected Parties (I&APs) in an objective manner to assist them identify issues of concern, and provide suggestions for enhanced benefits and alternatives.
5.3 Site Visit and Consultation with Relevant Authorities

5.3.1 Meeting with District commissioner’s team (HODs)
The DC and his team were in support of the project and added that it of great importance to ensure that the public is widely consulted and awareness created.

5.3.2 Local community consultation
Public consultations through interviews, public baraza and pre designed questionnaires were done which included visits to different neighbours to solicit views and inputs from them on the proposed 33/11kV substation.

5.3.3 Stakeholders Comments
During consultations the Scope of activities associated with project were presented by ESIA expert to the stakeholders and community members. The audience was then asked to make suggestions, comments and ask questions for clarifications. All comments received on the consultation were incorporated into the Final Impact Assessment Report and submitted to the NEMA for the issuance of a decision on the proposed development.

Detailed Public Participation and Consultation was envisaged as part of the EIA exercise as required under EMCA 1999 regulations. The consultations were undertaken as part of the ESIA in order to obtain the views of stakeholders, their concerns and suggestions towards sustainable implementation of the project. The summary of the various stakeholders concerns and suggestions are summarized below.

The following were the major concerns that were raised up by various stakeholders in regard to the proposed project

5.3.3.1 Positive Issues
- Employment opportunities
- Improvement of local and national economy
- Boosting of the informal sector
- Improved Security
- Improved Electricity Supply
- Increased protection from Possible lightning strikes

5.3.3.2 Negative Issues
- Visual Impacts
- Increased dust pollution
- Increased Noise Level and Vibration
- Accidents during Construction
- Possibility of Sexually transmitted diseases
- There would be electromagnetic radiations

Detailed discussions and outcome of the Public Participation process is found in the annexed questionnaires at the back of this report. Generally the stakeholders consulted were in support of the proposed project.
CHAPTER SIX: IDENTIFICATION AND ASSESSMENT OF POTENTIAL IMPACTS AND PROPOSED MITIGATION MEASURES

6.1 Introduction
This Section identifies and discusses both negative and positive impacts associated with the proposed construction of 33/11kV Substation. The impacts are identified across the three phases namely: Construction Phase, Operational Phase and Decommissioning Phase.

<table>
<thead>
<tr>
<th>Environmental &amp; Social Impact</th>
<th>Positive/ Negative</th>
<th>Direct/ Indirect</th>
<th>Temporary/ Permanent</th>
<th>Major/ Minor</th>
<th>Occurrence</th>
<th>Construction</th>
<th>Operation</th>
<th>Decommissioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment Opportunities</td>
<td>Positive</td>
<td>Direct &amp; Indirect</td>
<td>Permanent</td>
<td>Major</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Gains in the Local and National Economy</td>
<td>Positive</td>
<td>Direct</td>
<td>Permanent</td>
<td>Major</td>
<td>/</td>
<td>/</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Provision of Market for Supply of Building Materials</td>
<td>Positive</td>
<td>Direct</td>
<td>Temporary</td>
<td>Major</td>
<td>/</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Informal Sectors Benefits</td>
<td>Positive</td>
<td>Direct &amp; Indirect</td>
<td>Temporary</td>
<td>Minor</td>
<td>/</td>
<td>x</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Environmental Benefits - Reduction in pollution from kerosene and Wood fuel</td>
<td>Positive</td>
<td>Indirect</td>
<td>Permanent</td>
<td>Major</td>
<td>x</td>
<td>/</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Noise pollution &amp; increased vibration</td>
<td>Negative</td>
<td>Direct</td>
<td>Temporary/ Permanent</td>
<td>Major</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>Generation of Exhaust Emissions</td>
<td>Negative</td>
<td>Direct</td>
<td>Temporary</td>
<td>Minor</td>
<td>/</td>
<td>x</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>Dust Emissions</td>
<td>Negative</td>
<td>Direct</td>
<td>Temporary</td>
<td>Minor</td>
<td>/</td>
<td>x</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Increased water demand</td>
<td>Negative</td>
<td>Direct</td>
<td>Temporary</td>
<td>Minor</td>
<td>/</td>
<td>x</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Workers accidents and hazards</td>
<td>Negative</td>
<td>Direct</td>
<td>Permanent</td>
<td>Minor</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Extraction and Use of Building Materials</td>
<td>Negative</td>
<td>Direct</td>
<td>Temporary</td>
<td>Minor</td>
<td>/</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Solid Waste Generation</td>
<td>Negative</td>
<td>Direct</td>
<td>Temporary</td>
<td>Minor</td>
<td>/</td>
<td>x</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Possible Exposure of Workers to Diseases</td>
<td>Negative</td>
<td>Direct</td>
<td>Permanent</td>
<td>Minor</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td></td>
</tr>
<tr>
<td>Increased Storm Water Runoff from New Impervious Areas</td>
<td>Negative</td>
<td>Direct</td>
<td>Permanent</td>
<td>Major</td>
<td>/</td>
<td>/</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Soil Erosion</td>
<td>Negative</td>
<td>Direct</td>
<td>Temporary</td>
<td>Minor</td>
<td>/</td>
<td>x</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Destruction of</td>
<td>Negative</td>
<td>Direct</td>
<td>Temporary</td>
<td>Minor</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>x</td>
</tr>
</tbody>
</table>
6.2 Positive Impacts during Construction Phase

The positive impacts associated with the proposed Substation project during construction phase are as discussed below:

6.2.1 Employment Opportunities

With the construction of the Proposed 33/11 kV Substation, there will be employment opportunities especially for casual workers from the local community. Creation of employment opportunities has both economic and social benefit. Skilled and unskilled labour will be used in economic production while socially these young and energetic otherwise poor people will be engaged in productive employment other than remaining idle. Employees with diverse skills are expected to work on the site during the construction period. Unskilled Employees will gain work experience and Professionals will be engaged in manning and attending to issues within the Substation.

6.2.2 Gains in the Local and National Economy

There will be gains in the local and national economy as a result of the construction of the proposed Substation, through consumption of locally available materials including: cement, ballast and available labour. The consumption of these materials in addition to fuel oil and others will attract taxes including Value Added Tax (VAT) which will be payable to the government. The cost of the materials will be payable directly to the producers.

6.2.3 Provision of Market for Supply of Building Materials

The project will require supply of small quantities of building materials most of which can be sourced locally like cement, doors and windows, Fencing materials. This provides ready market for local enterprises with such materials.

6.2.4 Boosting of the informal sector

During the construction phase of the proposed Substation; it is expected that the other businesses in the informal sector will flourish. These include activities such as hotel and accommodation, shops, artisan industries and may be food vending which will be benefiting directly from the construction, operational and decommissioning staff members who will be buying commodities from such. This will promote the informal sector in securing some temporary revenue and hence livelihood.

6.2.5 Environmental Benefits

Landscaping during and after construction and re-vegetation of open places where possible will boost aesthetics and environmental conservation.

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**Table 5: Summary of Project Potential Impacts**

<table>
<thead>
<tr>
<th>Impact Description</th>
<th>Magnitude</th>
<th>Duration</th>
<th>Frequency</th>
<th>Nature</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive Impacts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Outbreaks</td>
<td>Positive</td>
<td>Direct</td>
<td>Permanent</td>
<td>Minor</td>
<td>/</td>
</tr>
<tr>
<td>Increase in electricity supply</td>
<td>Positive</td>
<td>Direct</td>
<td>Permanent</td>
<td>Major</td>
<td>x /</td>
</tr>
<tr>
<td>Increased Population around the project area</td>
<td>Negative</td>
<td>Direct</td>
<td>Permanent</td>
<td>Minor</td>
<td>/</td>
</tr>
<tr>
<td>Visual Intrusion</td>
<td>Negative</td>
<td>Direct</td>
<td>Permanent</td>
<td>Minor</td>
<td>/</td>
</tr>
<tr>
<td>Education Opportunities</td>
<td>Positive</td>
<td>Direct</td>
<td>Permanent</td>
<td>Major</td>
<td>/</td>
</tr>
<tr>
<td>Oil Spills Hazards</td>
<td>Negative</td>
<td>Direct</td>
<td>Permanent</td>
<td>Major</td>
<td>/</td>
</tr>
</tbody>
</table>

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*Environmental Impact Assessment Project Report*
6.3 Negative Impacts during Construction Phase

The following negative impacts are associated with the construction phase of the proposed 33/11 kV Substation.

6.3.1 Noise pollution

The construction works is most likely to be noisy especially during movement of materials to and from site and also from the construction activities and workers. Though such noise from Substation construction activities may be minimal and undetectable due to existing baseline noise levels, it is worth noting that it will cumulatively contribute to total weighted noise in the area and any noise control measures during construction need to be applied. Such noise will be temporary and insignificant.

6.3.2 Generation of Exhaust Emissions

Exhaust emissions are likely to be generated by Motor vehicles that will be used to ferry construction materials and the impacts will be direct, Temporary and not significant.

6.3.3 Dust Emissions

Particulate matter pollution is likely to occur during the site excavation, construction and transportation activities. This impact is going to be direct, temporary, and significant if not mitigated.

6.3.4 Disposal of Excavated Soil

Though little excavation is likely to take place especially during foundation setting; the excavated material will be used for levelling and there will be no cart away of soil or cleared vegetation from site. The impact will be direct, temporary and minor.

6.3.5 Increased water demand

Water will be used during the construction of support structures foundations, general construction of control room and other utilities, as well as sprinkling to minimize dust pollution etc. This may lead to increased demand of the resource and possible competition. The increase in water demand will be direct, temporary and minor.

6.3.6 Energy Consumption

Fossil fuels (mainly diesel) will be used to run transport vehicles and construction machinery. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. Exhaust emissions also have deleterious effect to the environment. The impact will be direct, temporary and minor.

6.3.7 Extraction and Use of Building Materials

Building materials such as hard core, ballast, cement, rough stone and sand required for the construction of guard house, control room and other utilities will be obtained from hardware shops and NEMA approved quarries. The impact of extraction will be direct, temporary and minor. The concreted pads will have direct, permanent and minor environmental impacts.

6.3.8 Solid Waste Generation

Very minimal solid waste will be generated and will include small quantities of cleared vegetative matter, a few bags of cement and probably food packagings. This will be disposed off appropriately and no burning of litter will be allowed on site. This impact will be direct, temporary and minor.
6.3.9 Workers accidents and hazards during construction

It is expected that construction workers especially unskilled temporary employees are likely to have accidental injuries as a result of exposure to workplace hazards if supervision, training and use of Personal Protective Equipment is not adequate. Because of these intensive engineering and construction activities including erection of steel structures, welding, metal grinding and cutting and concrete work among others, construction workers will be exposed to risks of accidents and injuries. Injuries can result from trips & falls and other physical and mechanical hazards.

6.3.10 Increased Storm Water Runoff from New Impervious Areas

Construction of the proposed 33/11 kV Sub-Station, buildings and pavements within the proposed project site will lead to additional runoff through creation of impervious areas and compaction of soils. Impervious areas and compacted soils generally have higher runoff coefficients than natural area, and increased flood peaks are a common occurrence in developed areas.

6.3.11 Soil Erosion

There are possibilities of soil erosion occurring during the construction of the proposed 33/11 kV Sub-Station especially during rainy and windy sessions. The impact will however be minimal as the area to be disturbed is small. Roadways and footpaths will be paved with impervious material to minimize soil erosion. Drainages will be constructed to drain storm rain water and harvesting of rain water will be factored. The impacts will be direct, temporary and minor.

6.3.12 Social Vices

Construction activities will attract an influx of people to the project area. This may lead to social vices like drug abuse, spread of diseases including HIV and insecurity. Sensitization and awareness creation need to be done before and during the construction works.

6.4 Potential Impacts during Operation Phase

6.4.1 Reduction of pollution associated with thermal Power Generation, kerosene and wood fuel:

Electricity supplied from National Grid would ensure less or no people use diesel gensets for domestic power generation, reduced reliance on kerosene both for lighting and cooking. This will be an alternative to wood fuel and charcoal because of better and effective electrical appliances like cookers and electric irons. This would mean less carbon dioxide is released to the environment and destruction of forests leading to decreased green house gases production while conserving and increasing carbon sinks.

6.4.2 Employment opportunities

Employees with Electrical Engineering background will operate the substation and control rooms. The security and cleaning job opportunities will be available during the operation phase of the Substation to non skilled employees.

6.4.3 Improvement of local and national economy

With stabilized and reliable source of Electricity, it is expected that small scale industries will increase self employment opportunities like Welding, Salons among others. More customers would be connected with reliable electricity by Kenya Power which will attract tax revenue to the country.
6.4.4 Improved Electricity Supply
Stable and quality electricity supply will be achieved and there will be reduction of technical losses from long distance distribution feeders.

6.4.5 Education
Stabilized power would also facilitate development and equipping of Laboratories in schools and Hospitals. Increased lighting in schools can also lead to academic excellence.

6.4.6 Improved Security
With the establishment of the proposed 33/11 kV Sub-Station at the proposed site, the level of security will be improved around the project areas. This is as a result of more security lights and security personnel being employed to guard Sub-Station. The project site will also be well fenced.

6.5 Negative Impacts during Operation Phase
6.5.1 Visual Impacts:
Visual intrusion caused by the construction of the Substation may cause alteration to the natural scenery of the project area. However considering the low level of Substation structures, it is expected that it is going to be insignificant.

6.5.2 Noise Pollution
No significant noise pollution is anticipated from substation operation, except the humming of transformers which could be detected from within the Substation premises which will be minimal.

6.5.3 Waste Generation
The proposed 33/11 kV Sub-Station is not expected to generate wastes during the operation phase, transformation of electricity is a relatively clean process. Minimal waste from compound clearing and cleaning will need to be handled in an environmentally sustainable manner.

6.5.4 Water Use
The operation activities during the operation phase of the proposed 33/11 kV Sub-Station will use minimal quantities of water mainly in the washrooms. This may not increase the strain on water resources in the area.

6.5.5 Increased Storm Water Flow
The building roofs and pavements of the proposed Sub-Station will lead to increased volume and velocity of storm water or run-off flowing across the area covered by the proposed Sub-Stations during operation phase. Storm runoff should be directed to existing storm drainage system.

6.6 Positive Impacts during Decommissioning Phase
6.6.1 Site Rehabilitation:
Upon decommissioning of the proposed Sub-Station, rehabilitation of the project site will be carried out to restore the site to its original status or to a better state than it originally was. This will include replacement of topsoil and re-vegetation which will lead to restoration of the visual, vegetative and aesthetic quality of the site.
6.6.2 Employment Opportunities

For demolition to take place properly and in good time, several people will be involved. As a result, several employment opportunities will be created for the demolition staff during the demolition phase of the proposed 33/11 kV Sub-Station. People employed to do landscaping and re-vegetation of the decommissioned site.

6.7 Negative Impacts during Decommissioning Phase

6.7.1 Noise and Vibration

The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas. This will be as a result of the noise and vibration that will be experienced as a result of demolishing, loading and transport of the Sub station and associated structures. The impact will be direct, temporary and minor.

6.7.2 Solid Waste Generation

Demolition of the Sub Station, control room, fence, guard house, toilet and associated structures will lead to generation of solid waste comprised of concrete, metal, stones, wood, glass, paints, adhesives, sealants and fasteners. Such demolition waste is generally considered to be less harmful to the environment since it is composed of inert materials, and is mostly recyclable. The impact will be direct, temporary and minor.

6.7.3 Generation of Dust

Some dust will be generated during demolition works of the Substation and associated structures. This will affect demolition staff as well as the neighbours. The impact will be direct, temporary and minor.

6.7.4 Loss of employment and Livelihood

The staff previously employed to man and operational controls within the Substation and Control room will lose employment and livelihood. Decreased power supply will also lead to employment loss in the informal sector.
CHAPTER SEVEN: MITIGATION MEASURES AND MONITORING PROGRAMMES

This section highlights the mitigation measures for potential negative impacts of the proposed 33/11 kV Substation. The negative impacts and the possible mitigation measures have herein been analyzed under three categories: Construction, Operational and Decommissioning.

7.1 Mitigation of Construction Related Negative Impacts

The following measures can be applied to minimize the negative impacts associated with the construction of the proposed Substation during construction phase.

7.1.1 Noise and Vibration

The following noise-suppression techniques will be employed to minimise the impact of temporary construction noise at the project site. It is also necessary to comply with the Noise and Vibration Regulations of 2009.

- Install portable barriers to shield compressors and other small stationary equipment where necessary.
- Use quiet equipment (i.e. equipment designed with noise control elements).
- Co-ordinate with relevant agencies regarding all construction.
- Limit vehicles to a minimum idling time and observe a common-sense approach to vehicle use, and encourage drivers to switch off vehicle engines whenever possible.

7.1.2 Exhaust Emissions

- Vehicle idling time shall be minimized
- Alternatively fuelled construction equipment shall be used where feasible
- Equipment shall be properly tuned and maintained
- Emissions of other contaminants (NO\textsubscript{x}, CO\textsubscript{2}, SO\textsubscript{x}, and diesel related PM\textsubscript{10}) that would occur from Vehicle exhaust emissions could be reduced by maintaining vehicles in good state of service, fuel and lubricants to be of standardized quality and sourced from approved suppliers.

7.1.3 Dust Emissions and Air quality

- During construction, any stockpiles of earth should be enclosed / covered / watered during dry or windy conditions to reduce dust emissions;
- Construction trucks moving materials to site, delivering sand and cement to the site should be covered to prevent material dust emissions into the surrounding areas;
- All personnel working on the project will be trained prior to starting construction on methods for minimizing air quality impacts during construction.
- During construction, where necessary, sprinkle loose surface earth areas with water to keep dust levels down.
- Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling, and they limit their speeds so that dust levels are lowered.
- Maintain all machinery and equipment in good working order to ensure minimum emissions including carbon monoxide, NO\textsubscript{x}, SO\textsubscript{x} and suspended particulate matter;
7.1.4 Excavated Soil during Construction

The Excavated soil during site preparation will be minimal and will be used for backfilling, levelling and landscaping.

7.1.5 Minimization of increased Water Demand

The proponent and contractor shall ensure that water is used efficiently at the site by sensitizing construction staff to avoid irresponsible water use. Where possible water recycling will be done.

7.1.6 Minimization of Worker accidents and hazards during Construction phase

To reduce the workers accidents and hazards during the construction phase, the contractor and proponent are expected to adhere to the provisions of the Occupational Safety and Health Act, 2007 and its subsidiary legislations. It is the responsibility of the project proponent and contractor to provide a safe and healthy environment for construction workers as outlined in the EMP. An emergency Response and Evacuation Plan must be in place in addition to safety education and training to be provided to the employees. The contractor should follow safe work procedures and obtain permits to work as appropriate. Provision and proper use of Personal Protective Equipment should be maintained throughout the project lifecycle where workers could be exposed to work related hazards.

7.1.7 Reduction of Energy Consumption

The Contractor should ensure proper planning and transportation of materials to ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts and no unnecessary trips to and from site. Construction Work should be carried out during the day from 8.00 a.m to 5.00 p.m to ensure maximum use of available natural light.

7.1.8 Extraction Sites and Efficient Use of Raw Materials

Building materials such as sand, ballast and hard core will be sourced from NEMA approved sites. Proponent and Contractor will ensure accurate budgeting and estimation of actual construction requirements to ensure that materials are not extracted or purchased in excessive quantities. Moreover, the proponent will ensure that wastage, damage or loss (through run-off, wind, etc) of materials at the construction site is kept minimal, as these would lead to additional demand for and extraction or purchase materials.

In addition to the above measures, the proponent shall consider reuse of construction materials and use of recycled building materials.

7.1.9 Minimization of Solid Waste during Construction Phase

Main solid waste expected is material packaging's, and any cut offs from timber and wood materials.

i. Use of durable, long-lasting materials that will not need to be replaced often, thereby reducing the amount of construction waste generated over time

ii. Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements

iii. Purchase of perishable construction materials such as paints incrementally to ensure reduced spoilage of unused materials

iv. Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste

v. Use of construction materials containing recycled content where possible and in accordance with accepted standards.
7.1.10 Possible exposure of workers to diseases

Possible exposure of workers to diseases from building materials at construction site shall be mitigated by compliance with occupational health and safety standards. Proper work procedures and efficient use of PPEs will be observed. Sensitization and awareness of HIV/AIDs will be done.

7.1.11 Minimization of Storm Water Run-off and Soil Erosion

Proper drainage channels and landscaping of the Substation will be done to reduce run-off velocity and increase infiltration of rain water into the soil. Within the project site, construction vehicles will be restricted to designated areas to avoid soil compaction, while any compacted areas will be ripped to reduce run-off. Caution will be required during construction at times of heavy rains. Re-vegetate exposed areas around the site so as to mitigate erosion of soil by storm water runoff. Minimization of disturbances and scarification of the surface should be observed to reduce erosion impacts.

7.1.12 Surface and Underground Water Quality Degradation

Vehicle maintenance and service should be done away from project site in approved garages or service stations to avoid any possible oil and fuel spills that could contaminate soils and possibly ground water quality. The project proponent will prepare a hazardous substance control and an emergency response plan that will include preparations for quick and safe clean up of accidental leaks. It will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response programme to ensure quick and safe cleanup of accidental contaminations. The plan will identify areas where refuelling and vehicle maintenance activities and storage of hazardous materials, if any, will be permitted. Oil absorbent material, traps and storage drums will be used to contain and control any minor releases of engine and other equipment oil.

7.2 Mitigation of Operation Phase Negative Impacts

The negative impacts of the proposed 33/11 kV Substation during operation phase will be mitigated as discussed below:

7.2.1 Occupational Hazards

Safe work procedures should be observed. Trained and skilled personnel should man and maintain the Substation. Protection of the workers from Substation operations work related hazards should be factored from the Machine and Equipment design stage where transformers with less humming should be procured, transformers that use gas cooling system instead of oil and automation of the Substation. Use of appropriate PPEs should be observed where necessary. Necessary medical tests to check the health of workers should be done annually. The Transformers and associated equipment should be serviced regularly and as appropriate by qualified Personnel.

7.2.2 Noise

With Modern technology no significant noise will be expected from the 7.5 MVA Transformer and considering the locality of the Substation, buffer space left round the Substation, land scapping and proper maintenance and service, the project is expected to cause no noise pollution during its operation phase.

7.2.3 Accidental Oil Spills or leaks

Transformers will be maintained in a good state of repair, regular service as necessary and any change or addition will be done cautiously to avoid any oil leaks but in case of any, contaminated top soil should be scooped and disposed of appropriately. The transformers will be mounted on stands with a
below Containment pit able to accommodate one and half times the oil it contains in case of any incident.

7.2.4 Solid Waste

The project proponent of the proposed 33/11 kV Sub-Station will be responsible for efficient management of any solid waste generated by the project during its operation. In this regard, the proponent will provide waste handling facilities such as labelled waste bins and enclosed receptacles for temporarily holding any solid waste generated at the site. In addition, the project proponent will ensure that such wastes are disposed of regularly and appropriately. It is recommended that the proponent puts in place measures to ensure that the Sub-Stations’ operating personnel manage the waste efficiently through segregation, recycling, reuse and proper disposal procedures.

The proponent will put in place an integrated solid waste management system and give priority to reduction at source of the materials. This option will demand a solid waste management awareness programme in the management and the operator employees. Solid wastes shall be disposed of in a manner that is acceptable to NEMA and Environmental Regulations.

7.2.5 Ensure Efficient Water Use

The project proponent will install water-conserving automatic taps and toilets. Moreover, any water leaks through damaged pipes and faulty taps will be fixed promptly by qualified staff. The project will adopt the policy of harvesting rainwater for use in the washrooms. Any storm water will be harvested or directed to storm drainage system and never to sewer systems.

7.2.6 Fire hazards:

The proposed Sub-Station will be equipped with adequate fire fighting equipment of high standards and in key strategic points all over the project site. Fire/smoke detection alarm systems and portable fire extinguishers (dry powder and Carbon dioxide) shall be installed. A fire evacuation plan must be posted in various points of the construction site including procedures to take when a fire is reported. All substation operators must be trained on fire management. Regular fire drills shall be undertaken. A fire Assembly point should be identified and marked and no smoking signs mounted on conspicuous sites.

7.2.7 Hazardous waste

The amount of hazardous waste generated will be little and scarce, mostly waste lead-acid batteries and waste oil. The mitigation measure is to provide training to site operation staff and to follow the Company’s waste disposal procedures. The hazardous wastes shall be well labeled, stored and collected by registered agents for proper disposal with the aid of waste tracking documents.

7.3 Mitigation of Decommissioning Phase Impacts

Just as in the case during the construction and operation phase, the negative impacts of the decommissioning phase can be mitigated as follows:

7.3.1 Minimization of Noise and Vibration

The following noise-suppression techniques will be employed to minimise the impact of temporary demolition noise at the project site.

- Install portable barriers to shield compressors and other small stationary equipment where necessary.
- Use sound attenuated equipment designed with noise control elements.
- Install sound barriers for pile driving activity.
- Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use, and encourage workers to switch off vehicle engines whenever possible.
- Demolishing works to be daytime from 8.00 a.m to 5.00 p.m.

### 7.3.2 Efficient Solid Waste Management

Solid waste resulting from demolition of substation structures, fence, guard house, toilet and associated structures will lead to generation of solid waste comprised of concrete, metal, stones, wood, glass, paints, adhesives, sealants and fasteners. Such demolition waste is generally considered as less harmful to the environment since it is composed of inert materials, and is mostly recyclable. The following measures should be applied:
- Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements
- Use of materials that have minimal packaging to avoid the generation of excessive packaging waste
- Adequate collection and storage of waste on site and safe transportation to the disposal sites and disposal methods at designated area shall be provided.
- Any recyclables should be sold to recyclable waste dealers and any that can be donated to the community for their livelihood should be given out.

### 7.3.3 Reduction of Dust emissions

High levels of dust concentration resulting from demolition or dismantling works will be minimized as follows:
- Watering all active demolition areas as and when necessary.
- Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard.
- Pave, apply water when necessary, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at demolition sites.

### 7.3.4 Site Rehabilitation after Decommissioning

The project operator shall, on decommissioning of the project, restore the site to its original status as far as practicable and plant suitable grass and trees at the site.

### 7.3.5 Loss of employment and Livelihood

The staff previously employed to man and maintain the Substation will loss employment and livelihood. The proponent should deploy them in suitable positions elsewhere and if not feasible adequate lay off compensation packages should be paid.
CHAPTER 8: ANALYSIS OF PROJECT ALTERNATIVES

8.1 Consideration of Project Alternatives
This chapter describes and examines the various alternatives available for the project. Including the “no-go / do nothing” alternative, alternative construction materials and technology, the alternative substation site and alternative sources of energy.

8.2 Alternative Structure Types and Designs
Overhead incoming and outgoing feeders’ power lines have been determined to be the most feasible option for the 33/11 kV Substation for the following reasons:
- Underground cabling will incur significantly higher installation and maintenance costs given the length of the power line;
- Overhead lines are far quicker and easier to repair should faults occur; and
- Relative to overhead lines, underground cables requires a larger area to be disturbed during construction and maintenance operations.

8.3 Analysis of Alternative Construction Materials and Technology
The proposed substation will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. Equipment that guarantees efficient use of locally available materials will be encouraged to ensure reliability in supply with minimum power loss and good design to allow efficient distribution of power within kabarak.

The support structures in a substation can be wooden or steel. Because of its durability and strength, steel is the best choice and all support structures will be steel. Perimeter fence can be a reinforced wire mesh fixed to support structures that can be wooden, concrete or steel. Alternatively a stone perimeter wall can be constructed and this is the option of choice since it is more durable, offer better protection and requires less maintenance.

The design of the 33/11kv substation will be easy to install and dismantle with minimum labour requirements and maintenance costs will be minimal.

8.4 Alternative Sources of Energy
During the EIA study; alternative sources of energy other than relying on the KPLC’s National Grid were analyzed. Some of the possible options included relying on small diesel generators at household / individual level. This would lead to increased noise and emission of green house gases. Other sources of energy include Biogas and Biofuel which have not yet been fully explored towards electricity generation. Other alternatives would include use of firewood to generate energy at individual levels. It is worth noting that most of these alternatives are not sustainable and some have adverse environmental impacts like desertification and increased concentration of green house gases in the atmosphere. Other alternatives would be Generating solar power which is not yet adequately explored for commercial purposes in Kenya. Solar Power is green energy with minimal maintenance costs but it is capital intensive. Many people still opt to being connected to the National power grid for domestic and commercial power supply.

8.5 The ‘Do-nothing’ Option
The no-project scenario will mean the status quo of the area remains and no occurrence of adverse impacts as well as positive impacts posed by the project implementation.
The no project option will have the forgone costs and benefits including
- The targeted consumers will forgo improved electricity supply
• Generation of employment opportunities through expansion of business activities that would have been spurred by availability of electric power will not occur
• The country won’t meet its energy requirement
• The objectives of the right issue, as well as the Governments efforts towards achieving Vision 2030 will not be realized.

It is thereby concluded that the ‘do-nothing’ option is not a viable or acceptable option, and should therefore be discounted.

8.6 Alternative Substation Site
The 33/11 kV substation will be constructed on a KPLC’s plot. Relocation option to a different site is an option available for the project implementation. The project proponent can look for alternative land to accommodate the scale and size of the project. This will be a costly venture, may take a long time although there is no guarantee that the land would be available. Fresh Project design and planning before the stage of implementation will cost the developer additional money. Technical studies have also revealed that the Substation should be located as close as possible to the customer base to minimize on technical power losses associated with long distribution lines. It is recommendable that the proponent be allowed to install the project on the proposed site.
CHAPTER NINE: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

9.0 Environmental Management Plan

Environmental and Social Management Plan (ESMP) for development projects provides a logical framework within which identified negative environmental and socio-economic impacts can be mitigated and monitored. In addition, the ESMP assigns responsibilities of actions to various actors and provides a timeframe within which mitigation measures and monitoring can be done. ESMP is a vital output of an Environmental Impact Assessment as it provides a checklist for project monitoring and evaluation. The ESMP outlined below addresses the identified potential negative impacts and mitigation measures of the proposed substation during construction, operational and decommissioning phases, based on the Chapter of Environmental Impacts and Mitigation Measures of the expected Negative Impacts.
## ENVIRONMENT MANAGEMENT PLAN

**Table 6 Possible Impacts and Recommended Mitigation Measures**

<table>
<thead>
<tr>
<th>Possible Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Duration</th>
<th>Responsibility</th>
<th>Cost (Kshs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil and Geological impacts (soil erosion, soil contamination, soil instability)</td>
<td>• Areas susceptible to erosion shall be properly sloped &amp; compacted to reduce the effect of runoff, and shall be seeded immediately; • Rehabilitation of exposed sites as soon as practicable • In case of contamination, scoop and dispose off soil appropriately • Ensure that the proposed project does not cause increase in erosion and sedimentation. • The site preparation activities should be scheduled to take place in dry season.</td>
<td>Construction</td>
<td>Contractor</td>
<td>Included in the Contract</td>
</tr>
<tr>
<td>Air quality &amp; dust</td>
<td>• The Contractor to protect stockpiles of friable material subject to wind-throw by wetting, or with a barrier • Cover loads of friable material during transportation; • Restrict speed on loose surface roads during dry or dusty conditions; • Suppress dust during dry periods by use of water sprays; • Maintain equipment in good running condition • Enforce vehicle load restrictions to avoid excess emissions from engine overloading; • Burning of woody debris &amp; construction waste to be prohibited within the site • The Contractor to minimize/control emission of dust due to traffic movement and wind erosion of stockpile material and exposed soil • The Contractor to ensure that all equipment used and all facilities erected on site are designed and operated to control the emission of smoke, dust, fumes into the atmosphere;</td>
<td>Construction and decommissioning</td>
<td>Contractor &amp; proponent</td>
<td>Included in the contract</td>
</tr>
</tbody>
</table>
## Mitigation of Impacts

<table>
<thead>
<tr>
<th>Possible Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Duration</th>
<th>Responsibility</th>
<th>Cost (Kshs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollution from waste generation</td>
<td>• Develop and implement procedures for safe and appropriate disposal of waste for all project phases.&lt;br&gt;• Any service/Repair of vehicles to be done offsite in approved garages or service stations</td>
<td>Construction, Operation and Decommissioning</td>
<td>Contractor &amp; proponent</td>
<td>500,000</td>
</tr>
<tr>
<td>Water resources and Water quality</td>
<td>• Measures shall be instituted to minimize erosion and sediment transport, especially during construction activities. These measures should include: limiting areas cleared of vegetation, stabilizing the soils on the sloppy areas with stone pitching and planting of grass.&lt;br&gt;• Remedial measures shall be implemented by the Contractor in the event of erosion resulting in the sedimentation of surrounding areas after due consideration of the costs and benefits of such removal activity.&lt;br&gt;• Infrastructure shall be designed to ensure that contaminated run-off does not reach watercourses. In the event of an oil spill the procedures contained in the emergency response plan will come into effect.</td>
<td>Construction</td>
<td>Contractor Proponent</td>
<td>Part of the contract</td>
</tr>
<tr>
<td>Noise &amp; vibration</td>
<td>• The Contractor shall comply with the legal requirements for the management of noise impact specified in the recently gazetted noise quality regulations.&lt;br&gt;• The Contractor shall formulate noise management plan for minimizing the generation of noise and vibration from construction activities occurring on site and its impact on surrounding residents, businesses and workers.&lt;br&gt;• All internal combustion equipment will have properly functioning silencers or mufflers;&lt;br&gt;• Landowners near the site to be notified about the construction schedule &amp; activities.&lt;br&gt;• Noise generating activities that take place near residential or sensitive institutional receptors will be restricted to between 0600 and 1800hrs.</td>
<td>Construction, operation and Decommissioning</td>
<td>Contractor and Proponent</td>
<td>200,000</td>
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## Mitigation of Impacts

<table>
<thead>
<tr>
<th>Possible Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Duration</th>
<th>Responsibility</th>
<th>Cost (Kshs.)</th>
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</thead>
</table>
| Visual & aesthetic impacts           | • Review visual intrusiveness of current substation design;  
  • Plant trees around the substation to blend with existing environment  
  • Where possible, locate the new line incoming and outgoing feeders adjacent to existing power lines                                                                                     | Operation phase           | Contractor and proponent | Included in the contract  |
| Fire Hazards                         | • The Contractor shall take all necessary precautions to prevent fires caused either deliberately or accidentally during construction process.  
  • The Contractor shall prepare a fire prevention and fire emergency plan as a part of the Environmental Plan to be submitted to KPLC  
  • The Contractor shall provide adequate fire fighting appliances at specified localities on the worksite to meet any emergency resulting from ignition of a fire.  
  • No burning of any litter/cleared vegetation on site  
  • Avoid Careless handling of cigarette butts                                                                                                                                             | Construction & operation  | Proponent & Contractor   | Included in the contact   |
| Construction Material Sourcing       | • Ensure accurate budgeting to ensure only Necessary material is ordered  
  • Proper storage to ensure minimal loss  
  • Strip & store topsoil separate from subsoil for major site excavations;  
  • Restrict movement of heavy equipment during wet-soil conditions to prevent subsoil compaction;  
  • Rehabilitation of exposed sites as soon as practicable  
  • Source Raw Materials from NEMA approved sites  
  • Use recycled and recyclable materials where possible                                                                                                                                 | Construction phase        | Contractor               | Included in the contract  |
| Traffic congestion / road Tear and wear | • KPLC and contractor should choose traffic routes to reduce the impact in the neighbourhood avoiding, as far as practical any sensitive areas  
  • Where traffic is anticipated, the contractor in close consultation with KPLC should ensure:                                                                                         | Construction              | Contractor               | Part of the contract      |
<table>
<thead>
<tr>
<th>Possible Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Duration</th>
<th>Responsibility</th>
<th>Cost (Kshs.)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>• Effecting of traffic routes depending on delivery and dispatch to reduce the congestion impact in the neighborhood.</td>
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<td></td>
<td>• Due regard of drivers to traffic regulations which should be insisted upon at all times, with courtesy shown to other road users</td>
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<tr>
<td></td>
<td>• Employment of a road safety coordinator to oversee implementation of the traffic controls</td>
<td></td>
<td>Proponent &amp; contractor</td>
<td>Part of the contract</td>
</tr>
<tr>
<td></td>
<td>• Regular maintenance of delivery and dispatch trucks.</td>
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<td></td>
<td></td>
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<tr>
<td>Occupational Health &amp; Safety</td>
<td>• Staff Training and regular equipment service and testing</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>• Only trained &amp; certified workers to install, maintain or repair electrical equipment;</td>
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<tr>
<td></td>
<td>• Use of signs, barriers and education/public outreach to prevent public contact with potentially dangerous equipment;</td>
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<tr>
<td></td>
<td>• Community policing to be encouraged to reduce vandalism</td>
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<tr>
<td></td>
<td>• Ensure provision and proper use of Personal protective Equipments</td>
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<tr>
<td></td>
<td>• Follow safe work procedures</td>
<td></td>
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<tr>
<td></td>
<td>• Maintain a fully stocked and accessible first aid kit</td>
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<td></td>
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<tr>
<td>Hazardous Materials</td>
<td>• The Contractor shall comply with all applicable laws, regulations, permit and approval conditions and requirements relevant to the storage, use, and proper disposal of hazardous materials.</td>
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<td></td>
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<tr>
<td></td>
<td>• The Contractor shall manage all hazardous materials and waste in a safe and responsible manner, and shall prevent contamination of soils, pollution of water and/or harm to people or animals as a result of the use of these materials.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The Contractor shall prepare a hazardous materials and waste management plan for inclusion in the site specific environmental plan to be submitted to the Proponent prior</td>
<td></td>
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</tbody>
</table>
## Mitigation of Impacts

<table>
<thead>
<tr>
<th>Possible Impacts</th>
<th>Recommended Mitigation Measures</th>
<th>Duration</th>
<th>Responsibility</th>
<th>Cost (Kshs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>to establishment on site. The plan shall include, but not limited to, measures to prevent: (a) contamination of soils; (b) pollution of water; (c) safe siting and storage</td>
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</tr>
<tr>
<td></td>
<td>- The contractor shall place on-site tools and equipment, such as compressors on bermed impermeable sheeting to prevent oil spills/leaks from causing subsurface contamination.</td>
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</tr>
<tr>
<td></td>
<td>- The contractor shall ensure oil spills/leaks are prevented or minimized. This can be achieved through: instructing employees to avoid spills and regular auditing to verify that no leaking or defective equipment is brought/used onsite;</td>
<td></td>
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<tr>
<td></td>
<td>- The Contractor shall ensure that fueling and repairs are carried out by trained personnel familiar with spill containment and clean-up procedures.</td>
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<tr>
<td></td>
<td>- The Contractor shall ensure that all the employees working onsite are trained on good housekeeping practices</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Fuel &amp; chemical storage on site</td>
<td>• KPLC &amp; the Contractor shall initiate storage &amp; routine handling of fuels and lubricants in a weather-protected area equipped with a secondary containment system for spills;</td>
<td>Construction, operation and decommissioning</td>
<td>Proponent and contractor</td>
<td>100,000</td>
</tr>
<tr>
<td></td>
<td>• KPLC personnel will be educated on proper use and disposal of hazardous materials</td>
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<tr>
<td></td>
<td>• Need to develop and accidental spill management plan</td>
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</tbody>
</table>
9.1 Environmental and Social Monitoring Plan (ESMP)

The Environmental and Social Monitoring Plan (ESMP) will provide the basis for monitoring of Potential environmental Impacts associated with the substation Project. The implementation of the Monitoring Plan together with the Environmental and Social Management Plan will provide a benchmark for future environmental audits. The ESMP provides effective observation and documentation of monitorable parameters that will help in analyzing the effectiveness of the proposed mitigation measures with the advantages of improving operational efficiency, promoting competitive advantage, improving risk management, reducing liabilities and improving business performance. The environmental and social parameters monitoring procedures and techniques for proposed project are summarized in table 10-2.

Table 7: Environmental and Social Monitoring Plan (ESMP)

<table>
<thead>
<tr>
<th>Potential Environmental /Social impact</th>
<th>Parameter to be monitored</th>
<th>Timing</th>
<th>Cost</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise</td>
<td>Measure the Noise Level within the Project area and at distances of 30 from the substation</td>
<td>During Construction, Operation and Decommissioning phases</td>
<td>Included in Construction contract and Operating costs</td>
<td>The KPLC and Contractor</td>
</tr>
<tr>
<td>Vegetation and Habitat Loss</td>
<td>Quantify the weight of cleared Vegetation</td>
<td>During Operation phase</td>
<td>Included in the Construction Contract</td>
<td>Contractor</td>
</tr>
<tr>
<td>Soil erosion</td>
<td>Assess size of rills or Gulleys forming from accelerated run off from compacted areas</td>
<td>During operation phase</td>
<td>Included in Operation costs</td>
<td>The KPLC</td>
</tr>
<tr>
<td>Dust</td>
<td>Monitor the surfaces and record magnitude of Dust generated during windy weather, moving vehicles etc.</td>
<td>During Construction, operation and decommissioning phases.</td>
<td>Included in the Construction Contract</td>
<td>The KPLC and Contractor</td>
</tr>
<tr>
<td>Increased water Demand</td>
<td>Record amount of Litres used</td>
<td>During Construction and Decommissioning Phases</td>
<td>Included in the Construction costs. Demolition to be determined</td>
<td>The KPLC and Contractor</td>
</tr>
<tr>
<td>Oil Spills</td>
<td>Record any leakages from Transformers. Record all accidental spills and number of litres</td>
<td>During Operation phase</td>
<td>Included in the Operating costs</td>
<td>The KPLC</td>
</tr>
<tr>
<td>Fire hazards</td>
<td>Record any Fire incidences and investigate on possible causes</td>
<td>Throughout project cycle</td>
<td>Included in contract and Operating costs</td>
<td>The Contractor and The KPLC</td>
</tr>
<tr>
<td>Exhaust Emmissions</td>
<td>Monitor colour of smoke from Vehicle exhaust systems</td>
<td>During Construction, Operation and decommissioning phases</td>
<td>Included in the Construction Contract</td>
<td>The KPLC and Contractor</td>
</tr>
<tr>
<td>Occupational Health and Safety Issues</td>
<td>Record any accidents and Possible hazard scenarios</td>
<td>Throughout Project Cycle</td>
<td>Included in Contract and operating Costs</td>
<td>The Contractor and The KPLC</td>
</tr>
</tbody>
</table>
CHAPTER TEN: CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions
The analysis of the EIA has evidenced that the construction and operation of the proposed substation would have positive impacts to the Proponent and Kenyan society at large. The impacts will include Increase in reliable and sustainable clean energy, employment to local community members, increase in the national/local investment, increase in Government revenue and improvement of standards of living of residence within the district.

A monitoring plan will be developed and highlights some of the environmental performance indicators that should be monitored. Monitoring creates possibilities to call to attention changes and problems in environmental quality. It involves the continuous or periodic review of operational and maintenance activities to determine the effectiveness of recommended mitigation measures. Consequently, trends in environmental degradation or improvement can be established, and previously unforeseen impacts can be identified or pre-empted.

The proposed project design has integrated mitigation measures with a view to ensuring compliance with all the applicable laws and procedures. The substation and associated structures will be installed to the required planning/architectural/structural designs and standards. During project implementation, operation and decommissioning stages sustainable environmental management (SEM) would be ensured; avoiding inadequate use of natural resources, conserving nature sensitively and guaranteeing a respectful and fair treatment of all people working on the project, general public at the vicinity and the expected beneficiaries of the project.

In relation to the proposed mitigation measures that will be incorporated during construction, operational and decommissioning phases; the development’s input to the society and environment; the project is considered beneficial and important.

10.2 Recommendations
It is quite evident from this study that the construction and operation of the proposed substation will bring positive effects in the project area including Reduction of environmental degradation, improved supply of electricity, creation of employment opportunities, gains in the local and national economy, provision of market for supply of building materials, Informal sectors benefits, Increase in national industrial production, Increase in revenue, Improvement in the quality of life for the workers and residents, Optimal use of land and Improved security.

Recommendations for the prevention and mitigation of adverse impacts are as follows:
- All solid waste materials and debris resulting from construction of the substation must be disposed off at approved dumpsites.
- Construction activities must be undertaken only during the day i.e. between 0800 hours to 1800 hours. This will minimize disturbance to the general public within the proximity of the site/project.
- The proponent and contractor should follow the guidelines as set by relevant authorities to safeguard and envisage environmental management principles during installation, operation and decommissioning of the project.
• Maintenance activities for vehicles must be carried out in service bays and garages off site to reduce chances of oils or grease or other maintenance materials, from coming into contact with environment (water or soil).
• Once construction of substation is done, restoration of the worked areas should be carried out immediately by backfilling, landscaping/leveling and planting of low grass (in open areas) and suitable tree species.
• Ensure proper water usage during construction phases.
• Proper and regular maintenance of construction machinery and equipment will reduce emission of hazardous fumes and noise resulting from friction of rubbing metal bodies.
• Workers must be provided with complete protective and safety gear. They must have working boots, complete overalls, helmets, gloves, earmuffs, nose-masks, goggles etc.
• Fully equipped first aid kits must be provided within the site.
• Environmental Audits should be carried annually or as prescribed by the Authority during the operational phase and invitation of Inspectors and Experts from NEMA to ascertain compliance with the provided ESMP and set NEMA regulations and Standards.

In conclusion, the expert is of the opinion that on purely ‘environmental' grounds (i.e. the project’s potential socio-economic and biophysical implications) the application as it is currently articulated in the applicant’s proposal should be approved provided the essential mitigation measures are implemented. It is in the opinion of the Environmental Consultant that the anticipated negative impacts can readily and effectively be mitigated and on the whole the proposed project does not pose any significant threat to the Environment and may be licensed to proceed.
REFERENCES

The following list of references was referred to in preparing this Project Report:

- Environmental Assessment Source Book, 1999 (World Bank),
- George, C. and Lee, N., 2000 Environmental Assessment in Developing and Transitional Countries, Willey: Chichster, UK
- Government of Kenya (GoK), Building code, Building order 1968 and Grade 11 Building Order 1968
- Government of Kenya: Medical Examination Rules 2005
- The Way Leaves Act, Cap. 292,
- The Survey Act, Cap. 299,
- Nakuru District Development Plan, 2008 – 2012
ANNEXES

Annex 1: Proposed Kabarak University 33/11 kV Substation Map Layout
Annex 2: Lead Experts NEMA Practicing License
Annex 3: Samples of Filled Public and stakeholders and Questionnaires

ENVIROMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 KV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: 27/10/2011

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?

   - Mass Housing
   - Expansion/Improvement of market grounds
   - Local Employment

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?

4. Do you support the construction and operation of the proposed Kabarak University substation?

   Yes [ ] No [ ]

NAME OF RESPONDENT: [Partial name]
DISTRICT: [Partial name]
LOCATION/AREA: [Partial name]
ID NO.: [Partial number]
TELEPHONE NO.: [Partial number]
ENVIRONMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 KV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: 11/11/2021

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabaruk University substation?

   - [ ] Provide excess energy
   - [ ] Improve quality of life
   - [ ] Provide employment
   - [ ] Improve availability of clean energy
   - [ ] Good for environment
   - [ ] Provide energy for all households in the area

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabaruk University substation?

   [ ] Negative

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?

   [ ] Mitigation measures

4. Do you support the construction and operation of the proposed Kabaruk University substation?

   - [ ] Yes
   - [ ] No

NAME OF RESPONDENT: MARK T. CHENGA

DISTRICT: Rongai

LOCATION/AREA: RAFIKI

ID NO.: 321618656C

TELEPHONE NO.: 0723171528 (5028872887)
ENVIRONMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 KV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: .................................................................

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?

4. Do you support the construction and operation of the proposed Kabarak University substation?

- Yes [ ] - No [ ]

NAME OF RESPONDENT: Joshua Muyاور

DISTRICT: Rongai District

LOCATION/AREA: Kamporo

ID NO. .................................................................

TELEPHONE NO. ..................................................
ENIRONMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 kV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: 7/11/2011

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?
   - Create employment for many people
   - There will be electricity 24 hrs

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?
   - It is risky to children
   - In case of theft there will be blackout

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?
   - None

4. Do you support the construction and operation of the proposed Kabarak University substation?
   - Yes [ ]
   - No [ ]

NAME OF RESPONDENT: [Signature]
DISTRICT: Rongai
LOCATION/AREA: RAIKI
ID NO.: 231456925
TELEPHONE NO.: 0727-078804
ENIRONMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 KV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: .................................................................

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?
   - Domestic supply of electric
   - Job Employment

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?

4. Do you support the construction and operation of the proposed Kabarak University substation? [ ] Yes [ ] No

NAME OF RESPONDENT: Cherkoech
DISTRICT: Kabarage
LOCATION/AREA: Kabarag Sub
ID NO: 27217987
TELEPHONE NO: 0722079624
ENVIROMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 KV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: 9th November 2011

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?

   1. Improved Supply of Electricity
   2. Easy Access of Electricity
   3. Greater Response in case of Emergency

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?

   N/A

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?

   N/A

4. Do you support the construction and operation of the proposed Kabarak University substation? [ ] tick as appropriate

   Yes [ ]
   No [ ]

NAME OF RESPONDENT:

DISTRICT: KONGARI

LOCATION/AREA: NAHERI

ID NO.: 13121247

TELEPHONE NO.: 0724-974108
ENVIRONMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 kV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: ........................................................

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?

4. Do you support the construction and operation of the proposed Kabarak University substation?

?-tick as appropriate

Yes [ ] No [ ]

NAME OF RESPONDENT ...........................................

DISTRICT .....................................................

LOCATION/AREA ..............................................

ID NO. .........................................................

TELEPHONE NO. ..............................................
Proposed Kabarak University 33/11 kV Substation in Rongai Constituency

ENVIRONMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 kV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: 8TH NOVEMBER 2011

1. What are the positive impacts you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?

   - Employment of the people around the area on carving roads for construction.
   - School out of Moi High School Kabarak and its summary.

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?

   - Pollution of the environment by noise, dust etc.
   - Drying at the construction of the project. The yard knowing how also put pressure on no fencing around.
   - Trees. Can be electric towers believe of high voltage.

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?

   - Put a nursery near around the project site. Educate the locals on the dangers of the project if not properly handled.

4. Do you support the construction and operation of the proposed Kabarak University substation?

   - Yes [ ] No [ ]

NAME OF RESPONDENT: ________________________________

DISTRICT: ________________________________

LOCATION/AREA: ________________________________

MOBILE No.: 0725324787, 0723303419

MOI HIGH SCHOOL - KABARAK

P.O. BOX 10 - 20157
KABARAK
ENVIROMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 kV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: 28/11/2011

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?
   a. Improved electricity delivery to the area
   b. Increased employment opportunities
   c. Reduced electricity prices to neighboring schools

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?
   a. Pollution from construction and operation of the substation
   b. Noise from construction and operation of the substation

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?
   a. Minimize noise and dust during construction
   b. Implement noise reduction techniques

4. Do you support the construction and operation of the proposed Kabarak University substation?
   - Yes [ ]
   - No [ ]

NAME OF RESPONDENT: [Sign]

DISTRICT: Rongai

LOCATION/AREA: Kabarak

ID NO: [Sign]

TELEPHONE NO: [Sign]
ENVIRONMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 kV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: 8th November 2021

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?

4. Do you support the construction and operation of the proposed Kabarak University substation? [ ] Yes  [ ] No

NAME OF RESPONDENT [ ]

DISTRICT:

LOCATION/AREA:

ID NO.:

TELEPHONE NO.:

KABARAK UNIVERSITY
P. O. PRIVATE BAG - 20157
KABARAK.
KENYA POWER

ENVIRONMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 kV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: 11/12/2011

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?
   - D. Quality power supply that is steady and reliable
   - E. Sufficient provisions of power to cater for expanding population
   - G. Emergency of certain areas due to power supply issues development
   - I. Lighting to improve on security

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?
   - C. The substation could pose an environmental hazard if all the environmental requirements are not adhered to
   - D. Constant noise from the project if it affects land using way leaves

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?
   - D. Involvement of local people in the project by ensuring for instance that it does not pose any security threat in the area
   - E. The developer should involve NEEMA to ensure that the project is safe to the environment, i.e., environmental assessment should be done for its suitability

4. Do you support the construction and operation of the proposed Kabarak University substation?
   - Yes [ ] No [ ]

NAME OF RESPONDENT: [ ]
DISTRICT: [ ]
LOCATION/AREA: [ ]
ID NO.: [ ]
TELEPHONE NO.: [ ]
ENVIRONMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 KV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: 6/12/2022

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?

4. Do you support the construction and operation of the proposed Kabarak University substation?

   - Yes [ ]
   - No [ ]

NAME OF RESPONDENT: [Name]

DISTRICT: [District]

LOCATION/AREA: [Location/Area]

ID NO.: [ID Number]

TELEPHONE NO.: [Phone Number]
ENVIRONMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY SUBSTATION 33/11 kV

RESPONDENTS: MEMBERS OF THE PUBLIC/NEIGHBOURING THE SITE

DATE: 09/11/2011

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?

   During construction, we expect 1 employment for locals to be created and a generation of foreign currency for locals. We expect that the contractor to source for higher materials from the local shops and companies. During operation, we expect the substation to stabilise power in blockouts.

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?

   During construction, there will be damaging of our local fences and homes. There will be the noise from the work.

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?

   To mitigate damages to the road we propose the contractor to refill the water and water the dirty road so as to stop the soil from dust.

4. Do you support the construction and operation of the proposed Kabarak University substation?

   Yes [ ]  No [ ]

NAME OF RESPONDENT: JOSUA KANDIE CHEPPI

DISTRICT: RONGAI

LOCATION/AREA: KAMBRA KEBEI - KABARAK

ID NO.: 1479875

TELEPHONE NO.: 0723702666
ENVIRONMENTAL IMPACT ASSESSMENT QUESTIONNAIRE FOR THE PROPOSED KABARAK UNIVERSITY 33/11 kV SUBSTATION

RESPONDENTS: MEMBERS OF THE PUBLIC NEIGHBOURING THE SITE

DATE: .................................................................

1. What are the positive impacts do you anticipate during the construction, operation and decommissioning of the proposed Kabarak University substation?
   - [List of positive impacts]

2. What are the negative impacts that could result from the construction, operation and decommissioning of the proposed Kabarak University substation?
   - [List of negative impacts]

3. Propose various mitigation measures that the proponent/project developer should put in place to address the negative impacts you have mentioned?
   - [Proposed mitigation measures]

4. Do you support the construction and operation of the proposed Kabarak University substation?
   - [Tick as appropriate]
     Yes [ ]  No [ ]

NAME OF RESPONDENT: [Name]
DISTRICT: [District]
LOCATION/AREA: [Location/Area]
ID NO.: [ID Number]
TELEPHONE NO.: [Contact Number]