



**ENVIRONMENTAL IMPACT ASSESSMENT
STUDY REPORT FOR PROPOSED
REROUTING OF A SECTION OF 132KV
DUAL CIRCUIT TRANSMISSION POWER
LINE AT LAKE NAKURU NATIONAL PARK,
IN NAKURU EAST SUB-COUNTY, NAKURU
COUNTY**



Latitude 0°18'20.34S
Longitude 36°06'31.56E

TO

Latitude 0°18'47',38S
Longitude 36°04'11.39E

DECEMBER

2023



**EIA STUDY
REPORT**

Environmental Impact Assessment Study Report

CERTIFICATION:

Assignment: To carry out an Environmental Impact Assessment Study of the Proposed Rerouting of a section of Dual Circuit 132kV Transmission Power Line at Lake Nakuru National Park, in Nakuru East Sub-County, Nakuru County.

Project Cost: KES 250,000,000

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LIST OF ABBREVIATIONS

Table 0-1: List of Abbreviations

BOD	Biological Oxygen Demand
BMPs	Best Management Practices
BS	British Standard
CBD	Convention on Biological Diversity
CO ₂	Carbon dioxide
CSR	Corporate Social Responsibility
ACC	Assistant County Commissioner
CC	County Commissioner
DCC	Deputy County Commissioner
EA	Environmental Audit
SHE	Environment Health and Safety
EIA	Environmental Impact Assessment
ERC	Electricity Regulatory Commission
ESIA	Environmental & Social Impact Assessment
EIS	Environmental Impact Statement
EMCA	Environmental Management and Coordination Act, 1999
EMP	Environment Management Plan
ESMP	Environmental and Social Management Plan
<i>ESMP</i>	Environmental and Social Monitoring Plan
GHGs	Green House Gases
GIIP	Good International Industry Practices
HEP	Hydro Electric Power
HVF	Heavy Vehicle Fuel
IDO	Industrial Diesel Oil
KenGen	Kenya Energy Generating Company
KPLC	Kenya Power & Lighting Company
KETRACO	Kenya Electricity Transmission Company
kV	Kilo Volt
KVA	Kilo Volt Amps
KW	Kilo Watt
KWS	Kenya Wildlife Service
L.R	Land Registration
MOA	Ministry of Agriculture
MSDS	Material Safety Data Sheet
NEMA	National Environment Management Authority
NFPA	National Fire Protection Association
NO _x	Oxides of Nitrogen
OSHA	Occupational Health and Safety Act
PM	Particulate Matter
PPE	Personal Protective Equipment
SEM	Sustainable Environmental Management
SO _x	Oxides of Sulphur
SHE	Safety Health and Environment
STD	Sexually Transmitted Diseases
TX	Transformer
WCK	Wildlife Clubs of Kenya

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EXECUTIVE SUMMARY

Introduction

Lake Nakuru water levels have been gradually rising since 2009 which has led to destruction of park infrastructure including access roads, buildings and even the main revenue collection gate. A section of the Kenya Power and lighting Company 132KV double circuit high voltage power transmission line that passes through the park have also been significantly affected by the rising water levels.

In a recent assessment by KWS the depth at the lake center recorded on 1st December 2020 was 10 meters. The lake level has risen from 4 meter recorded in 2010 while the lake area has increased from 35.6km² in 2009 to 63.6km² in December 2020

The power line was installed before the lake and its surrounding was designated as a national Park and the line has been in operation since 1957 as the main transmission line for the Western Kenya region. The power line transmission route enters the park at the fence line at Free Area in the Northern side of the park and runs southwards towards Wildlife Clubs of Kenya (WCK) hostel and adjacent to the old main gate and exits the park at Honeymoon area.

The current situation of the a section of power lines running over water pose great danger in case of any miss up within the submerged section. The flooded section of the line remains a safety concern and will affect the reliability, durability and maintenance of the line. It is also a threat to biodiversity of the lake in case of any short circuiting because current will flow through the entire flooded area before breaking. The extent to which the rising water levels may go is unclear and the period for which the lake will remain flooded or even when it is likely to return to normal is unpredictable at the moment. It is therefore imperative that the transmission line is rerouted to high grounds to mitigate against potential risks posed by the submerged section of the line. This has therefore necessitated rerouting a section of the line to recover the submerged towers. KPLC and KWS has jointly identified a new route for the powerline and this report outlines the line alignment and the ecological implications of the new wayleave through the park.

Project Description

The project shall be implemented in Lake Nakuru National Park (LNNP) with one pylon sited on Nakuru Water and Sewarage Company (NAWASCO) premises which are in the vicinity of the park. Administratively, Lake Nakuru National Park is in Langalanga sub location, Bondeni location, Municipality Division, Nakuru East Sub-County, Nakuru County. The rerouted section shall be approximately 5kms and a total of 20 pylons shall be constructed. The transmission line shall be routed along the northern periphery of the park with 19 pylons sited inside the park and 1 pylon sited at NAWASCO premises past the sewer treatment ponds. The wayleave trace for 132KV double circuit power line is forty (40) meters and the height of the towers shall be forty five (45) to guarantee a minimum ground clearance of the lowest conductor of twenty (20) meters. The phase to phase clearance up to the earthing shall be four 4 meters. The line shall traverse mostly open grassland on the northern periphery of the park except a few Accacia Xanthophlea trees to be affected around the gate and a Eucalypt neat the sewer treatment ponds.

The project shall involve construction of an approximately 6 km 132 kV Double Circuit transmission line from the existing line Teed off at Tower no 747 to tower 764. The line will be constructed in self-supporting Lattice steel towers and ACSR-175 mm² "Lynx" conductor with a single overhead OPGW shield wire. The design shall include tee- off of the power line from Pylon 747 and design of subsequent Angle Point Pylons (APP) up to terminal Pylon 765. The design of the APPs shall take into consideration the degree of the

angles, the ground terrain, elevation, soil conditions to guarantee structural strength and stability of the Powerline as well as guaranteeing minimum ecological damage and ecosystem disturbance. Construction activities of the proposed project shall involve

- Construction site: Construction site will be sited in areas where least disturbance to potentially sensitive environments will be caused.
- Batching Plants: If Ready mix Steel is not available, small mobile batching plants will have to be established in the area close to the power line.
- Access: Use of available access to the project area to the extent possible in liaison with KWS and NAWASCO.
- Vegetation clearance: A 40m (20m on either side of the power line) servitude is required for the proposed 132kV power line. Tall trees which are very few will be cleared where required along the entire length of the servitude. Shrubs and grass will be left untouched
- Surveying, pegging and soil nominations: During construction the route will be surveyed, pegged and the soil nominations undertaken for each of the potential pylon foundations.
- Pylon footings: Foundations will be laid for the footings of the pylons. The first step is the excavation of the foundations, then reinforcing and finally the concreting of the foundations. The excavation will be done manually and with small machines with low noise levels.
- Steelwork structures: The pylons will be erected in segments. After the foundations and footings have been installed the construction team will transport the various steel parts of the towers to the site and start erection of the towers. This process again requires a lot of manual labour and often mobile cranes are used to assist with the erection of the towers.
- Stringing: Once the pylons have been erected, cables will be strung attached to the steel structures using insulators. Bird guards will be installed on the insulators to prevent birds from perching and defecating on the insulators which may compromise the protection offered by the insulators.
- Rehabilitation of disturbed areas and protection of erosion sensitive areas
- Testing and commissioning

The actual construction period will be to a maximum of six months.

Operational Phase Activities

During the operational and maintenance phase of the project, KPLC requires access to the servitude/ wayleaves for maintenance activities which may include repairs and replacement of various hardware on the towers and the conductor and in very rare cases, repairs to the foundations.

Decommissioning Phase Activities

The physical removal of the power line infrastructure would entail the reversal of the construction process.

- A rehabilitation programme would need to be agreed upon with the landowners (if applicable) before being implemented.
- Materials generated by the decommissioning process will be disposed of according to the Waste Hierarchy i.e. wherever feasible, materials will be reused, then recycled and lastly disposed of. Materials will be disposed of in a suitable manner, in a suitably licensed facility.

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 licenses 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:

1. The Poverty Reduction Strategy Paper (PRSP) of 2001
2. National Environmental Action Plan (NEAP) of 1994
3. Environmental and Development Policy (Session Paper No.6 1999)
4. The National Energy and Petroleum Policy 2015
5. The Gender and Development Policy (Sessional paper no.2 2019)
6. The HIV/ AIDS Policy 2009
7. Environmental Management And Coordination Act, 1999 (And The Amendments Of 2015)
8. L.N. 101: EIA/EA Regulations, 2003 And 2016 Amendments
9. L.N. 120: Water Quality Regulations, 2006
10. L.N. 121: Waste Management Regulations, 2006
11. L.N. 61: Noise And Excessive Vibration Control Regulations, 2009
12. Licenses And Permits Required Under The EMCA 1999
13. Occupational Health And Safety ACT, 2007
14. L.N. 31: The Safety and Health Committee Rules, 2004
15. L.N. 24: Medical Examination Rules, 2005
16. L.N. 25: Noise Prevention and Control Rules, 2005
17. L.N. 59: Fire Risk Reduction Rules, 2007
18. The Energy Act, 2019
19. The Public Health Act (Cap. 242)
20. HIV /AIDS Prevention And Control (CAP 246A)
21. The Physical And Land Use Planning Act, 2019
22. The Wildlife Conservation And Management Act, 2013
23. The Civil Aviation Act CAP 394
24. National Museums and Heritage Act, 2006

Public Consultation

Consultations were undertaken as part of the study 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 public consultative meetings, 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

- The project will improve businesses in the area and also create job opportunities to the local Youth during construction phase.
 - There would be interaction with other cultures especially during construction phase.
-

- There would be increased pollution from transport vehicles during construction.
- There would be electromagnetic radiations and risk of electrocution that may affect those residing near the way leave.
- The project will lead to cutting down of trees which are very important in micro –climatic effect of the area and trapping of dust from flour millers.

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 transmission line during the construction, operation and decommissioning phases were identified. The following positive and negative impacts are associated with the proposed project.

Anticipated Positive Impacts

Creation of employment opportunities

Provision of Market for Supply of Building Materials

Boosting of the informal sector

Environmental and Safety Benefits

Increase in Revenue

PROJECT POTENTIAL IMPACTS AND MITIGATION MEASURES

Against the background of the above positive impacts, there will be negative impacts emanating from the construction, operation and subsequent decommissioning activities of the proposed transmission line. The negative impacts will include:

Impact on Biodiversity and Habitat disturbance

The proposed rerouting of the said section will lead to disturbance of wildlife habitat and also biodiversity. This is due to vegetation clearance that will take place especially at the tower foundation points and also where the trees will be cut.

Mitigation

- Use human labour as opposed to heavy machinery to reduce noise and disturbance from machinery to wildlife
- Undertake selective clearance by clearing only necessary areas

Impacts on Vegetation Cover

The proposed selected route alignment has no major trees except a few scattered *Acacia xanthophlea* where the line crosses the park entrance gate. There are also shrubs and the dominant vegetation cover is open grassland. Impacts to vegetation will consist of disturbance

to vegetation linked to construction equipment and vehicles, removal of vegetation to pave way for the tower foundations and cutting of the tall tree along the said section. Short shrubs will not be cleared.

Mitigation measures

During construction, the contractor will avoid unnecessary vegetation clearing and ensure proper demarcation and delineation of the project area as required within the prescribed width of 40m along the Right-of-Way (RoW). This is to ensure vegetation clearance is kept at minimum.

Solid waste

Solid waste anticipated to be produced during construction include spoil from excavations, conductor remains, food wrappings and pieces of steel remains.

Mitigation Measures

- Ensure soil from excavations is reused for back filling to the extent possible. Any remains should be disposed off appropriately.
- Segregate waste and dispose of appropriately
- No waste shall be left on site
- Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time
- Proper budgeting to avoid waste generation

Impacts to soil

Soil erosion is likely to occur mainly linked to the excavation of the tower foundations. Erosion would easily occur in the event the holes are dug and left for long without backfilling. Vegetation clearance will also make it easy for erosion to take place.

Mitigation measures

- Plan work appropriately to back fill the tower foundations in the shortest time possible to avoid exposure of the soil to wind and water erosion
- Soils excavated for the erection of Steel towers should be used for backfilling and should not be left exposed
- Avoid excavation during rainy season

Noise pollution

There is potential for increase in noise levels during construction works originating from vehicles that will bring materials, construction equipment and also from workers.

Mitigation measures

Keep vehicles well maintained to avoid noise

Contamination of Soil from Fossil Fuels

The potential sources of soil contamination during construction phase are oil /fuel leaks or spills from machinery used in construction and trucks used in transporting construction materials. Depending on the size and source of the spill, liquid and gaseous state, petroleum hydrocarbons may remain mobile for long periods of time, threatening to contaminate the soil. The significance of the impact to the soil will be minor due to the nature of the works and the fact that construction activities will be confined in the small project area.

Mitigation Measures

- Construction vehicles must be maintained in good state and proper servicing to ensure no oils are likely to leak
- Care must be exercised not to spill any fossil fuels
- Any contaminated soil shall be scooped and disposed-off appropriately.

Impacts on wildlife

The selected route is within the park which is a habitat for a diverse of wildlife. Key among them in the area include buffalos, zebra, gazelles and warthogs. The wildlife will be affected in different ways such as disturbance due to presence of workers, noise form construction vehicles and workers, vegetation clearance and also by the excavated tower foundations in the event they are not backfilled appropriately.

Mitigation measures

- Construction vehicles should be well serviced to avoid noise
- Workers should maintain low tones to the extent possible
- Supervision of workers

Impact on water resources:

Clearing of vegetation and trees to pave way for the project may impact on water sources (lake) if soil erosion takes place. In addition another source of impact would be poor disposal of solid waste from construction activities. This impact is expected to be minimal due to strict adherence of rules expected from workers while working in the park.

Mitigation measures

- Clear only necessary areas
- Do not live any soil exposed

Generation of exhaust emissions

During construction, there will be vehicles moving along the route delivering materials and staff. Such vehicles are likely to generate exhaust fumes and especially if they are not well serviced. The impacts will be direct, temporary and not significant.

Mitigation measures

- Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered.
- Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NOX, SOX and suspended particulate

Dust Emissions

Initial activities such as site clearing, excavation if done in dry weather conditions will result in dust pollution. Dust emission is regarded as a nuisance when it reduces visibility and is aesthetically displeasing. This is expected during construction works. Dust will be generated from construction activities, transportation activities and aggregate mixing.

Mitigation measures

- Sprinkle loose surface earth areas with water to keep dust levels down.
- Construction trucks moving materials to site, delivering sand and cement to the site should be covered to prevent material dust emissions
- Masks should be provided to all personnel
- Excess soil from excavations should be carried away for proper disposal after back filling
- Drivers of construction vehicles must be sensitized so that they limit their speeds so that dust levels are lowered.

Impacts on archaeological, Cultural and Historic sites

Field observations and discussions indicates that where the line will be rerouted, there were no archeological, cultural or historic resource likely to be disturbed. No cultural shrine was noted during the route survey. However in case of chance find the same will be discussed with KWS and the Kenya national museums.

Impacts to Avifauna

The assessment revealed that there are bird species around the vicinity of the selected route. They includethe impact that may arise from construction activities include loss of habitat and perching areas. The birds can also be affected by presence of workers and construction vehicles and equipment

Mitigation measures

- Clear only the designated areas
-

- Maintain low tones while working in the park

Risk of fire outbreak

Fires can occur during the construction period mainly linked to carelessness by construction staff. Throwing of live cigarette butts within the project route may pose a risk of fire.

Mitigation measures

- Create awareness to the construction workers on potential fire hazards
- Provision of firefighting equipment (extinguishers) on site during construction.
- No smoking shall be done on construction site

Water demand

The proposed project will not affect local water resources during both construction of the project. During construction, water demand will be minimal as it will be used only for tower foundations. The amount of needed during construction will during tower foundation construction.

Mitigation Measures

- Prudent use of available water
- Consultations with the KWS on water supply options
- Avid wastage of water

Occupational safety

During construction workers are exposed to some level of occupation hazards. The main risky activities are transportation, digging of power foundations, handling and erection of towers, stringing of the conductors and energizing the line. Injuries to workers can range from injury from working tools, fall into excavation foundations and fall from height. There could also be a risk of attack by wildlife while working.

Mitigation measures

- All work schedules must be prepared in consultation with KWS for appropriate support while working within the park
 - The contractor should allocate jobs according to skills
 - Awareness creation/Tool box talks on safety to workers while at construction site and documentation kept
 - Workers coming to the site should be knowledgeable on safety precautions to take
 - Appropriate PPE (helmet, safety harness, gloves, safety shoes, masks, climbing irons among others)
-

- Adherence to occupational Safety and Health Act 2007

Labour influx and its associated impacts

There will be labour Influx of course on a small scale because the project is small in size and most of the works from outside will be semiskilled and skilled workers. Movement of workers in the project area and interactions with the local community has potential for social risks such as risk of illicit behavior like crime & substance abuse, risk of communicable and sexually transmitted diseases and HIV & AIDs spread, pressure on accommodations and rents and gender based violence. Due to the fact that works will be done within the park which is a controlled and protected area to a large extent these impacts are very unlikely.

- Reduction of labour influx by tapping into the local workforce to the extent possible
- Sensitization/awareness to workers regarding engagement with local community and the need to respect community values.

Sanitary waste

It will be prudent prior to construction to put plans in place to deal with sanitary waste. This is waste from construction workers. This is both welfare and a health issue.

Mitigation measures

The contractor will make arrangements to have mobile toilet on site throughout the construction period.

Operation phase impacts

Fire Risk

During operation, voltage power can cause a fire risk in the event of electrical faults with equipment. Fire risks may emanate from arcing from loose joints connections or sparks from power line short-circuiting especially during turbulent weather and this is rare for transmission lines. In the event underlying growth is left unchecked, or slash from routine maintenance is left to accumulate within right of way an accidental spark can cause ignition and result in fire.

Mitigation measure

Timely maintenance of the way leave trace

Power line associated avifauna mortalities

Collision and electrocution incidences are species specific and depend on the species behaviour. Raptor for instance are known to have territories which may restrict their ranging behaviour therefore reducing chances of power line mortalities compared to waterfowls e.g. the cranes. Eagles are at low risk due to their solitary behaviour compared to flocking birds like the storks, cranes and vultures. However, eagles frequently use towers for roosting, feeding and hunting resulting to electrocution. Flight performance is an important factor determining the chances of

collision with power line where for instance birds with low wing loading are less exposed to electrocution risk, due to their agility. Poor visibility also increases possibility of collision and electrocution accidents. The avifauna found in the vicinity of the selected section of the route include

Mitigation features.

- To minimize collision, undertake wire-marking to alert birds to the presence of power line, allowing them time to avoid the collision.
- Build raptors platforms on top of Steel towers for roosting and nesting
- Undertake surveillance in consultation with KWS along the section for data collection on avifauna

Aircraft Navigation Safety

In Kenya, KCAA gives approval for tower/towers heights to ensure safety of aircraft. Power transmission towers, if located near an airport, air strip, or known flight paths, can impact aircraft safety directly through collision, or indirectly through radar interference. The towers heights to be erected are approximately m. Initial consultation pointed out that there are no airports or airstrips within the study area; additionally there are no military installations also. Furthermore the area has already existing power line and no incident has ever been reported.

Mitigation measures

The transmission line design features will be used to reduce a variety of potential impacts, including the use of 'aviation' ball markers to reduce airplane collisions with the line;

Impacts to wildlife

Once complete, the section will be connected to the main line and its function will be to transmit (carry electricity). Therefore, the line can pose risk to the health and safety of the wildlife in case of poor installations and if proper maintenance, and safety are not observed. Tree branches especially during the wet seasons can cause short circuiting of the line, incase trees/branches fall on power line although this is very rare because of the allowed wayleave trace. If wildlife comes into contact with live conductors/line they may experience shock, burns and even electrocution. This is a rare occurrence because the conductors are installed bearing in mind the highest height of the wildlife. Another risk would arise because of breaking of conductors and falling down while live but this is extremely rare.

Mitigation measures

Timely maintenance of the line to ensure its safety at all times

Air quality impacts

No negative impacts are expected during operation phase because once energized the KPLC staff will only visit during routine maintenance. Inspection of the line at this phase is done by walking through the entire section and the line at large.

Mitigation measures

- Regular maintenance of vehicles to reduce emissions of vehicles coming to site
- Control speed of vehicles to minimize generation of dust

Visual Intrusion and aesthetic impacts

There will be visual intrusion once the proposed section is rerouted. However, as already noted, it is a section of an existing line that is being rerouted and so it is compatible with most sections of the line. There is also a distribution line near the said section. Therefore the line will not be a new feature in the park.

Mitigation measures

Generally, the proposed project will not affect the overall aesthetic effect of the area. This is due to the fact that the project is a section rerouting, it is expected that it is going to be insignificant in terms of visual intrusion.

Occupational hazards

During operation and maintenance works, there is potential for falls from heights if precaution is not observed.

The impacts associated with maintenance works include physical hazards such as injuries sustained from the tools/equipment, ergonomics problems from poor working posture, fall from height, shocks and electrocution and attack from wild life.

Mitigation measures

- All works planned must be done in consultation with KWS for appropriate support while working within the park
- A maintenance plan must be put in place to ensure the physical integrity of structures is maintained at all times
- Ensuring that live-wire work or any work is conducted by trained workers with strict adherence to safety requirements and precautions
- All maintenance work must be supervised
- All workers doing any work must be in appropriate personal protective equipment while doing maintenance work.

Solid waste

Very little waste is expected during operation phase and waste can only be generated during maintenance works. The main waste would be replaced conductors and metal from the tower structures.

Mitigation measures

All waste generated shall be carried off for proper disposal by KPLC.

Conclusion

The analysis of the ESIA has evidenced that the construction and operation of the proposed transmission Line 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, improvement of standards of living for Nakuru county and western counties residents. However, despite the outlined positive impacts, the proposed development will cause some negative impacts such as alteration of land use for way leave trace, Noise Pollution, dust generation, Soil erosion, solid waste generation, Vegetation clearance, Occupational health and safety hazards among others.

From the findings of this study, the following conclusions are made:

- The proposed project will generate socio-economic benefits which would not be realized if the no development 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 ensure environmental sustainability.
- No displacement and relocation is anticipated from the project.
- 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

The proposed project design has integrated mitigation measures with a view to ensuring compliance with all the applicable laws and procedures. The transmission Line 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.

Recommendations

Recommendations for the prevention and mitigation of adverse impacts are as follows:

- All solid waste materials and debris resulting from installation of the transmission Line must be disposed off at approved dumpsites.
- Construction activities must be undertaken only during the day i.e. between 0600 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 proposed transmission Line.
- Maintenance activities for vehicles must be carried out in service bays and garages off site to reduce chances of oils or grease or other contaminants from coming into contact with environment (water or soil).
- Once towers are erected and stringing is done, restoration of the worked areas should be carried out immediately by backfilling, landscaping/levelling 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. Maintenance should be conducted in a designated area and in a manner not to interfere with the environment.
- 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.

It is recommended that for the successful implementation of this project; support and cooperation from all relevant stakeholders is profound; and KPLC and the contractors should adhere to all the proposed mitigation measures outlined in this study and the various relevant guidelines and legislations governing projects of this nature.

It is in the opinion of the Environmental team 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.

Diligence on the part of the contractor and proper supervision by the proponent is crucial for mitigating the predicted impacts and ensuring structural strength, safety, and efficient operation of the power-line.

1 CHAPTER ONE: INTRODUCTION AND PROJECT BRIEF

1.1 Project Background

Lake Nakuru water levels have been gradually rising since 2009 which has led to destruction of park infrastructure including access roads, buildings, main revenue collection gate and habitat loss. This is in addition to other challenges faced by the park which include habitat loss, deforestation in the catchment areas, and pollution from solid and liquid waste, human wildlife conflict, accidental fires, invasive species, disease outbreaks and the population fluctuations of some species. The Kenya Power and lighting Company 132KV double circuit high voltage power transmission line that passes through the park has also been significantly affected by the rising water levels.

In a recent assessment by KWS the depth at the lake center recorded on 1st December 2020 was 10 meters. The lake level has risen from 4 meter recorded in 2010 while the lake area has increased from 35.6km² in 2009 to 63.6km² in December 2020 as shown in the figure below.

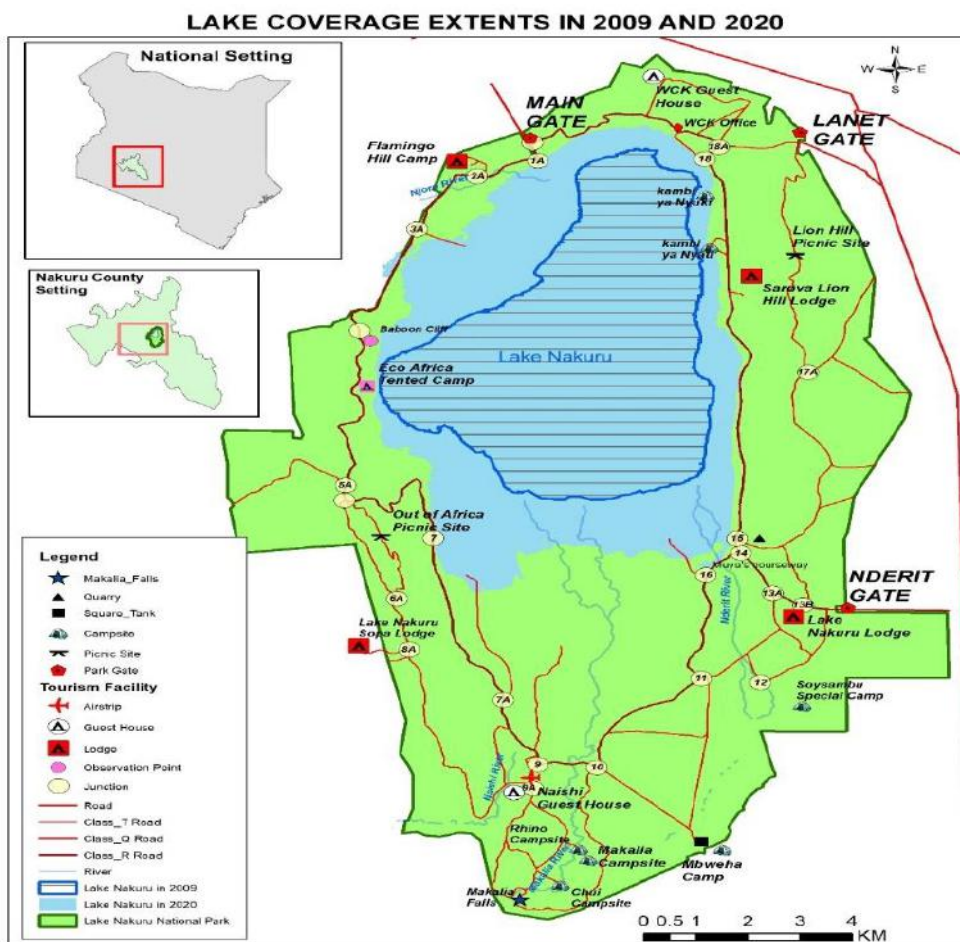


Figure 1: Change in Lake Nakuru area 2009 & 2020

The power line was installed before the lake and its surrounding was designated as a National Park and the line has been in operation since 1957 as the main transmission line for the Western Kenya region. The power line transmission route enters the park at the fence line at Free Area in the Northern side of the park and runs southwards towards Wildlife Clubs of Kenya (WCK) hostel and adjacent to the old main gate and exits the park at Honeymoon area.

A section of the line about 6km has been affected by the rising water levels in the lake and this section's towers are currently in water.

The current situation of the power line being in water poses great danger in case of any miss up within the flooded section. The flooded section of the line remains a safety concern and will affect the reliability, durability and maintenance of the line. It is also a threat to biodiversity of the lake in case of any short circuiting because current will flow through the entire flooded area before breaking. The extent to which the rising water levels may go is unclear and the period for which the lake will remain flooded or even when it is likely to return to normal is unpredictable at the moment. It is therefore imperative that the flooded section of the transmission line is rerouted to high grounds to mitigate against potential risks posed by the submerged section of the line. This has therefore necessitated rerouting of the line to recover the submerged towers. KPLC, NAWASCO and KWS has jointly identified a new route for the said section power line and this report outlines the line alignment and the ecological implications of the new way leave through the park. The line will be installed prior to decommissioning of the submerged section to ensure continuity of power supply. In addition, stakeholders have raised concerns on the safety of the submerged line including impacts to the park biodiversity.

Lake Nakuru National Park (LNNP) is one of Kenya's premier parks and is one of the highly visited parks in Kenya. It is known for its high abundance of waterfowls especially flamingo and large mammals including black and white rhino, Rothschild giraffe, eland and hippopotamus among others. The park has a high international conservation profile being recognized as a Ramsar site, an Important Bird Area (IBA) and is part of the Kenya Lakes System UNESCO World Heritage Site jointly with Lakes Elementaita and Bogoria.

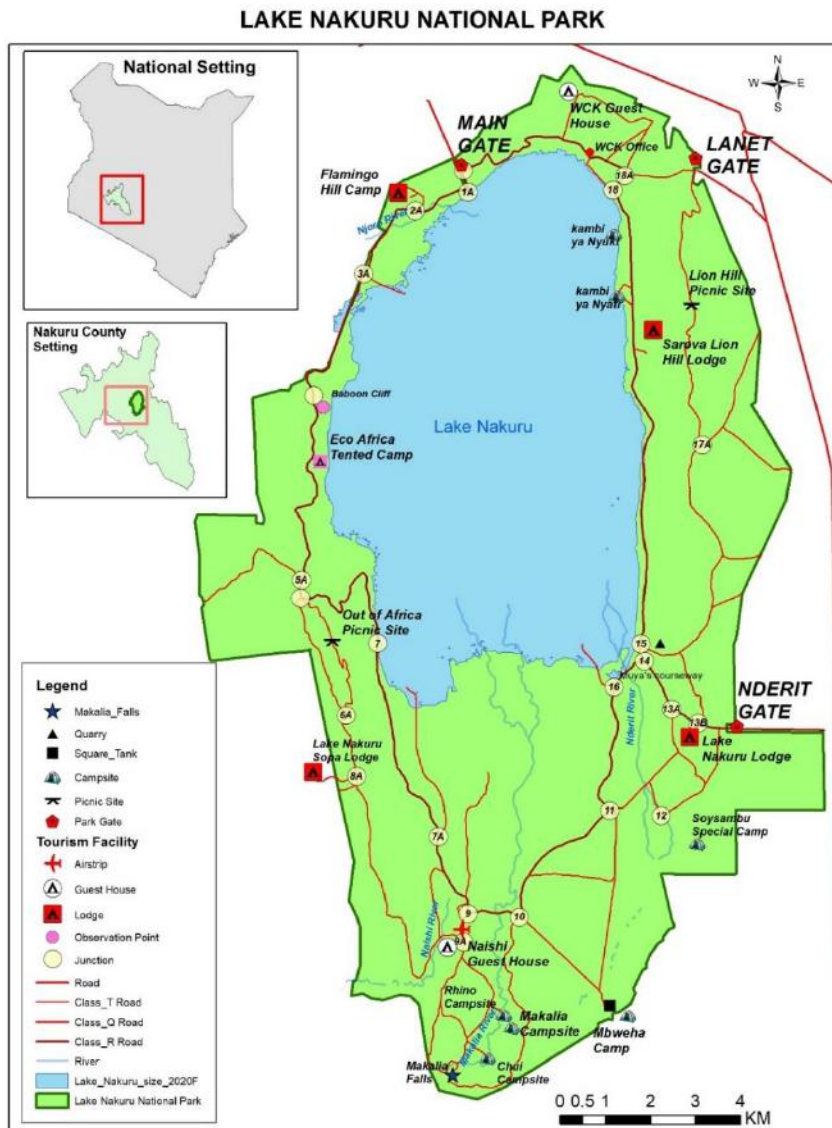


Figure 2: Lake Nakuru National park

1.2 Scope and Objectives of the Study

The National Environment Management Authority (NEMA) requirements on all new projects or major repairs and maintenance project that are out of character with the host environment programs or activities undergoes an Environmental Impact Assessment. This should be carried out at the planning stages of any proposed undertaking/project 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 project.

1.2.1 Scope

The main objective of this assessment was to describe the baseline conditions of the affected environment and undertake stakeholder engagement in order 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 project.

Specific objectives of the study included the following:

- Present a detailed description of the project
- 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 full study 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:

Detailed description of the project.

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 project.

Baseline Conditions:

- ✓ Environmental setting (climate, topography, geology, hydrology, ecology, water resources sensitive areas.
- ✓ 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 transmission system, etc.).

Legal and policy framework:

- ✓ Focusing on the relevant national environmental laws, regulations and by-laws and other laws and policies related to the proposed project.

Stakeholder engagement

Participatory approach was adopted for the immediate neighbourhood in discussing relevant issues including:

- Legal Compliance
 - Land use aspects
 - Neighborhood issues
 - Project acceptability
 - Social, cultural and economic impacts
-

- Environmental Impacts
 - Physical impacts
 - Biological impacts

1.3 Terms of Reference (ToR) for the EIA Process

The ESIA experts were assigned the task of carrying out the environmental impact assessment of the proposed project. The output of this work is a comprehensive environmental impact assessment report which will aid NEMA in deciding whether to approve or disapprove installation and operation of the project. The ESIA experts conducted the study guided by the following terms of reference:

- Establish the suitability of the proposed line route to relocate the said section of the existing 132KV line.
- Detailed description of the Baseline information including the physical, biological social and cultural aspects of the project area likely to be affected
- Conduct wider stakeholder engagements
- A concise description of the national environmental legislative and regulatory framework,
- A description of the technology, procedures and processes to be used, in the implementation of the project.
- A description of the potentially affected environment.
- 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.
- Analysis of alternatives including project site, design and technologies.
- 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.
- Development of an Environmental Management Plan proposing the measures for avoiding, 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.

1.4 EIA Approach and Methodology

In undertaking this study, the approach chosen 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 in collecting data provided for an opportunity to gather information from a wide respondents/stakeholders. Qualitative and quantitative methods of data collection were employed to collect secondary and primary data. Secondary data was obtained through literature reviews while primary data was obtained through physical observations, photography, interviews and stakeholders' consultation.

The first 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 along the proposed route through assessment of the route physically. This screening indicated that the proposed line is among the listed projects under Schedule 2 of EMCA, 1999 and 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 route and surrounding areas
- Literature review of relevant documents
- Stakeholder consultations with the project engineers and from persons living near the proposed route
- Report writing

1.5 Desk study/literature review

A critical literature review of secondary data was done to establish the following:

- ✓ Relevant legislations and institutional framework governing the proposed project
- ✓ Licenses and permits requirements and conditions;
- ✓ Baseline information of the project area
- ✓ Types of waste likely to be generated.

1.6 Public Consultations

Section 17 of the Environmental (Impact Assessment and Audit) Regulations of 2003, requires that all EIA Studies undertake Public Consultation (PC) as part of the study. The aim of the PC is to ensure that all stakeholders affected and interested in a proposed project such as project beneficiaries and the general public in the vicinity of the proposed project be identified and their opinion considered during project planning, design, construction, operation and decommissioning phase. Consequently, public consultations were carried out along the proposed route in a bid to inform the public and other interested parties on the proposed project and obtain their views on the same. The consultations also presented an opportunity for the community to raise issues and concerns pertaining to the project.

Two rounds of consultations were carried out during the project report phase and the full study phase.

Key stakeholders mainly corporates and institutions were consulted through face to face interviews and questionnaires were provided for them to write their inputs/views in regard to the project. KWS and NAWASCO are directly affected by the project and several meetings were carried with KPLC to identify impacts of the project and in selection of a new route for relocating the affected section of the 132kV line.

Public consultations were carried out for the communities and schools living near the park through face to face interviews during the first round of consultations. In the second round of consultations a public meeting was carried out for the entire Flamingo ward to allow the public get information about the project and to allow them give their inputs into the project. Public consultation meeting was organized through the chiefs office and the ward administrator.

Baseline conditions of the project area.

In addition, baseline information was obtained through physical investigation of the site and the surrounding areas, photography, informal interviews, discussions with other stakeholders and from secondary data. The key activities undertaken during the assessment were:

- Physical inspection of the proposed route and photography
- Interviews and discussions with KWS and NAWASS scientists and surveyors
- Literature review of relevant documents in regard to the Lake Nakuru national park ecosystem
- Ecological study
- Evaluation of the activities around the site and the environmental setting of the wider area. This was achieved through existing information, literature and physical observations
- Report writing and submission.

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

Step 1: Project Concepts

The project details, scope, preliminary proposed route, implementation, schedule were first analyzed.

Step2: Project Scoping

The project was first screened to establish whether an ESIA was necessary. Scoping was then done to establish project details that needed detailed analysis. Details about baseline conditions and potential environmental and social impacts were collected through desktop study, stakeholder consultations, site visits, photography, and inductive methods.

Step 3: Terms of Reference (ToR)

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

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;
 - Baseline conditions
 - 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 that will 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*)
-

1.7 IEIA Procedure

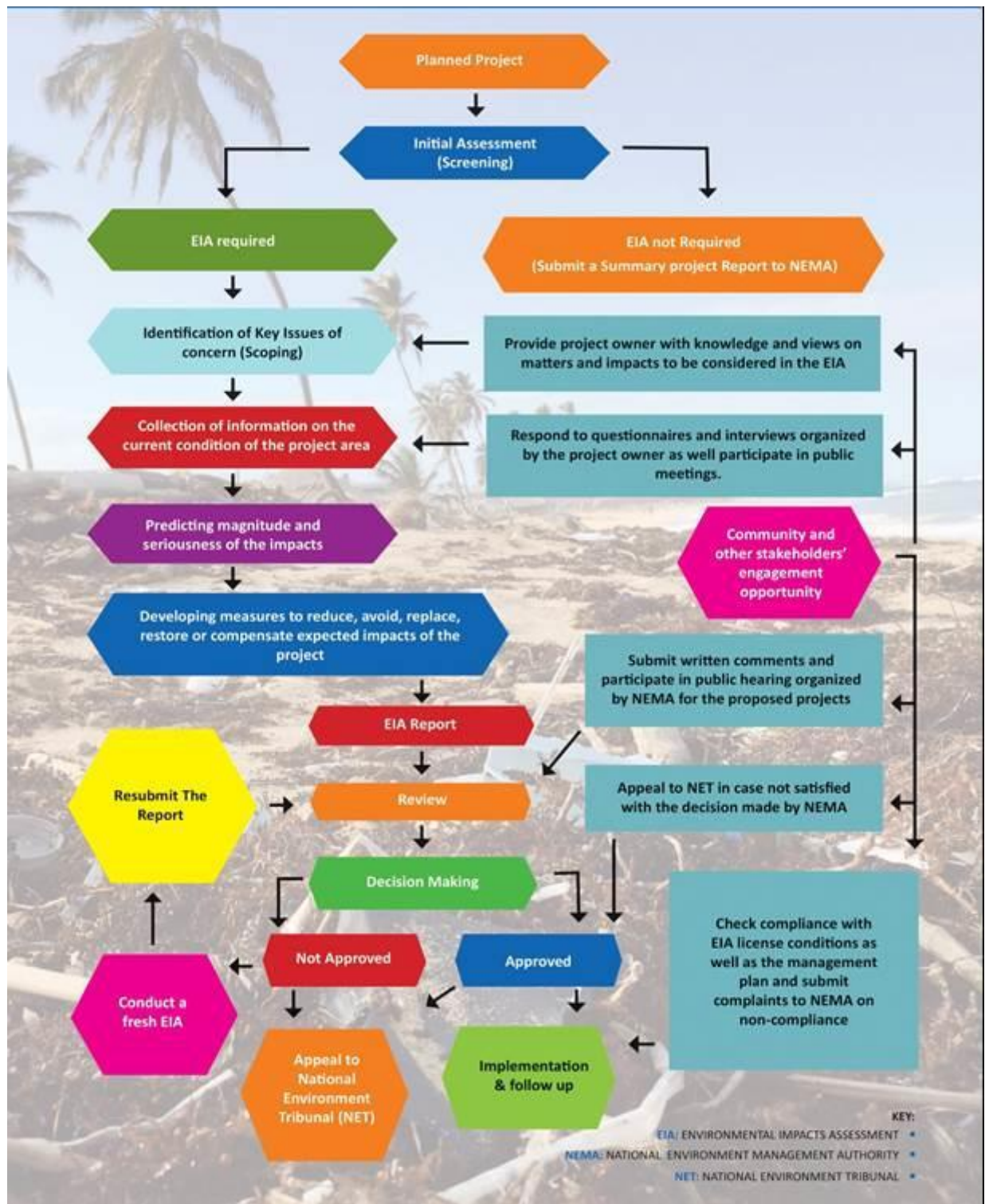


Figure 1-1 : Summary of IEIA procedure

1.8 Study Team

This IEIA study was conducted by a team of experts that comprised the following professionals

S/No.	NAME	NEMA Registration	Specialization
1.	Wilfred Koech	Lead Expert, NEMA Reg. No. 0259	Environmental health; Occupation health and safety
2.	Simon Mwangangi	Lead Expert, Reg. No. 2046	Environmental science; Occupational Safety & Health
3.	David Murage	Lead Expert, Reg. No. 6230	Environmental science
4.	Pius Ngari	Associate Expert, Reg. No. 1862	Environmental science
5.	Roseline Njeru	Associate Expert Reg. No. 2548	Sociology and Economics
6.	Samuel Mbugua	Lead Expert, NEMA Reg. No. 8147	Environmental studies and community development
7.	Samuel Abaya	Lead Expert, NEMA Reg.1245	Environment planning and management
8.	Joseph Korir	Associate Expert, Reg. No. 8743	Lead surveyor
9.	Julius Mwaniki	-	Electrical Engineer (Transmission Network)
10	Joseph Korir	-	Surveyor
11	James Sacho	-	Wayleaves Officer
12	Julius Marete	-	Chief Wayleaves Officer
13	Eng. George Korir	-	Chief Transmission Engineer

2 CHAPTER TWO: DESCRIPTION OF PROPOSED DEVELOPMENT PROJECT

2.1 Overview

This chapter provides an overview of the proposed project of re-routing a section of Lessos-Lanet Nakuru 132kV double Circuit transmission power line to take care of increasing water levels of Lake Nakuru. Currently nine towers are inside the lake and their bases under water upto a height of about 3 meters and this compromises the structural strength and durability of the power line. This calls for intervention hence the proposed rerouting of a section of the transmission line to elevated grounds and along the periphery of the park to minimize on the impacts of the project on the conservation activities of the park.

2.2 Project Location and Land Ownership

The project shall be implemented in Lake Nakuru National Park (LNNP) with one pylon sited on Nakuru Water and Sewerage Company (NAWASCO) premises which are in the vicinity of the park. Administratively, Lake Nakuru National Park is in Langalanga sub location, Bondeni location, Municipality Division, Nakuru East Sub-County, Nakuru County. The rerouted section shall be approximately 5kms and a total of 20 pylons shall be constructed. The transmission line shall be routed along the northern periphery of the park with 19 pylons sited inside the park and 1 pylon sited at NAWASCO premises past the sewer treatment ponds. The wayleave trace for 132KV double circuit power line is forty (40) meters and the height of the towers shall be forty five (45) to guarantee a minimum ground clearance of the lowest conductor of twenty (20) meters. The phase to phase clearance up to the earthing shall be four 4 meters. The line shall traverse mostly open grassland on the northern periphery of the park except a few *Accacia Xanthophlea* trees to be affected around the gate and a *Eucalypt* neat the sewer treatment ponds.

Lake Nakuru National Park is situated approximately 164 kilometres from Nairobi, a two hours' drive from Nairobi city. It is dominated by a gentle undulating terrain with open bush and woodlands, typical of the dry rift valley vegetation. Twenty seven percent (27%) of the park is composed of the Lake Nakuru waters. The lake is 2km north of Nakuru town at grid reference 0°19'- 0°24' S/36°04'-36°07' E, and covers 49,00ha (9km long and 5.5km wide maximum) at an altitude of 1758m asl. The area around the lake is exclusively used for wildlife conservation while the land in the catchment area is intensively used for agriculture, forestry and ranching.

2.3 Description of the Proposed Development

The project shall involve construction of an approximately 6 km 132 kV Double Circuit transmission line from the existing line Teed off at Tower no 747 to tower 764. The line will be constructed in self-supporting Lattice steel towers and ACSR-175 mm² "Lynx" conductor with a single overhead OPGW shield wire.

The scope of the Transmission line works shall involve;

2.3.1 Design of the section of 132KV Double circuit to be constructed:

The design shall include tee- off of the power line from Pylon 747 and design of subsequent Angle Point Pylons (APP) up to terminal Pylon 765. The design of the APPs shall take into consideration the degree

of the angles, the ground terrain, elevation, soil conditions to guarantee structural strength and stability of the Powerline as well as guaranteeing minimum ecological damage and ecosystem disturbance. The key pylons' coordinates is as listed below:

PYLON	Easting	Northing
1	173798.516	9965560.32
2	174024.349	9965621.42
3	174117.728	9965732
4	175124.977	9966181.94
5	175644.795	9966628.45
6	175805	9966651
7	175934.774	9966778.094
8	176121.56	9967040.84
9	177808.987	9967885.766
10	179498.517	9967202.359
11	179819.393	9967335.475
12	180155.592	9967473.11
13	174582.586	9965185.141

The proposed line shall be teed off from pylon 745 and APP1 is located on the foot of honey moon hill on the southern part. The ground terrain is gently sloping with open grassland and some scattered acacia bushes that are short and only the area where the pylon shall be constructed will be cleared.

APP2 is sited on top of honey moon hill and the area is open with herbs and grass. APP2 will be the highest feature in the area and aircraft safety shall be a concern. The pylon shall be painted reflective red and white and shall be fitted with a warning light to enhance visibility. The whole section of the transmission line that shall be constructed will be fitted with reflector balls for enhanced visibility to protect air craft and bird collisions with the power line.

In between APP 2 and APP3, the line will cross an existing low voltage line and the clearance between the lowest conductor and the low voltage line shall be well factored to ensure no induction of the low voltage line which is an electrical risk.

APP3 is located at the periphery of the park near the main gate offices on the upper side. The area has *Accacia Xanthophlea* trees and some will be cut.

APP4 is at the edge of the park near Nakuru Water Sewerage ponds and the area is open grass land and there is one mature Eucalptus tree that may be affected. The line shall then be routed to the right to APP5 then it will cross to the ponds area to APP6. The line will then turn to the left to APP7 through open grass land to APP 8 which is on a hill towards the East of the park on the upper side of Wildlife clubs Guest house, it will then progress to terminal pylon. The total length of the line is approximately 6 kilo meters and twenty (20) pylons shall be installed.



Google earth map of the area showing the routing of the proposed section to be constructed in red. The existing transmission line in black, and pipeline purple

2.3.2 Wayleaves acquisition:

This shall entail getting approvals from all the stakeholders who shall be affected and approvals shall be pursued from:

- ✓ Kenya World Life service
- ✓ Nakuru Water and Sewerage Company
- ✓ Kenya Pipeline
- ✓ County government of Nakuru

2.3.3 Survey works:

This shall entail getting the cadastral maps of the general area, identifying all utilities and infrastructure that may be affected and doing route marking and profiling. The actual positions of the angle point towers are geo-referenced and digitized. The end result of the survey works shall be to provide the shortest route while guaranteeing minimal ecological damage and ecosystem disturbance.

2.3.4 Geotechnical investigations and baseline studies

The Civil Engineer shall carry out land formation surveys, ground stability, nature of soils, drainage and topography in order to determine the extend of civil works to guarantee structural strength of the powerline. Other considerations to be factored include the height of the towers that will determine considerations of air craft safety and the spacing between the conductors including visibility of the powerline infrastructure in order to guarantee aviation and birds safety.

2.4 Actual construction and decommissioning works

This shall include site clearance, delivery of materials to site, foundation excavations, civil and concrete works for tower bases, backfilling, steel fixing, tower erection works, conductor stringing, wayleave clearance/ trimming of tree branches, testing/quality assurance, site restoration, commissioning of the line, decommissioning of submerged section/recovery of materials, insurance and post defects monitoring.

Other pre-construction activities shall include training of the Employer's personnel (if specified) to all works associated with the transmission line in accordance with the specification, standards, schedules and accompanying drawings and maps for the transmission line.

Other key considerations during the construction works include:

- ❖ The maximum duration for the construction works shall be six (6) months to minimize on the duration of ecosystem disturbance.
- ❖ The tower to be installed on top of honeymoon hill shall result to the highest elevated feature of the area and for increased visibility a warning light shall be installed at the top as well as painting reflecting colours on the upper part for aircraft and birds safety.
- ❖ Reflector / Aviation balls and bird guards will be installed to protect air craft and birds and that the spacing of the conductors shall be at least four meters to ensure big wing span birds are protected
- ❖ Anti-climb installations shall be fitted in all towers three meters from the ground to deter primates and human access to the energized conductors
- ❖ To blend the transmission line with the landscape, the pylons shall be painted forest green or to specifications of KWS up to a height of ten meters

The transmission line shall be constructed completely in accordance with the specifications and associated design and general arrangement/outline drawings as provided by KPLC.

A decommissioning plan shall be developed in liaison with KWS to recover the abandoned section of the line. All steel structures and conductors shall be recovered and disturbed areas reinstated.

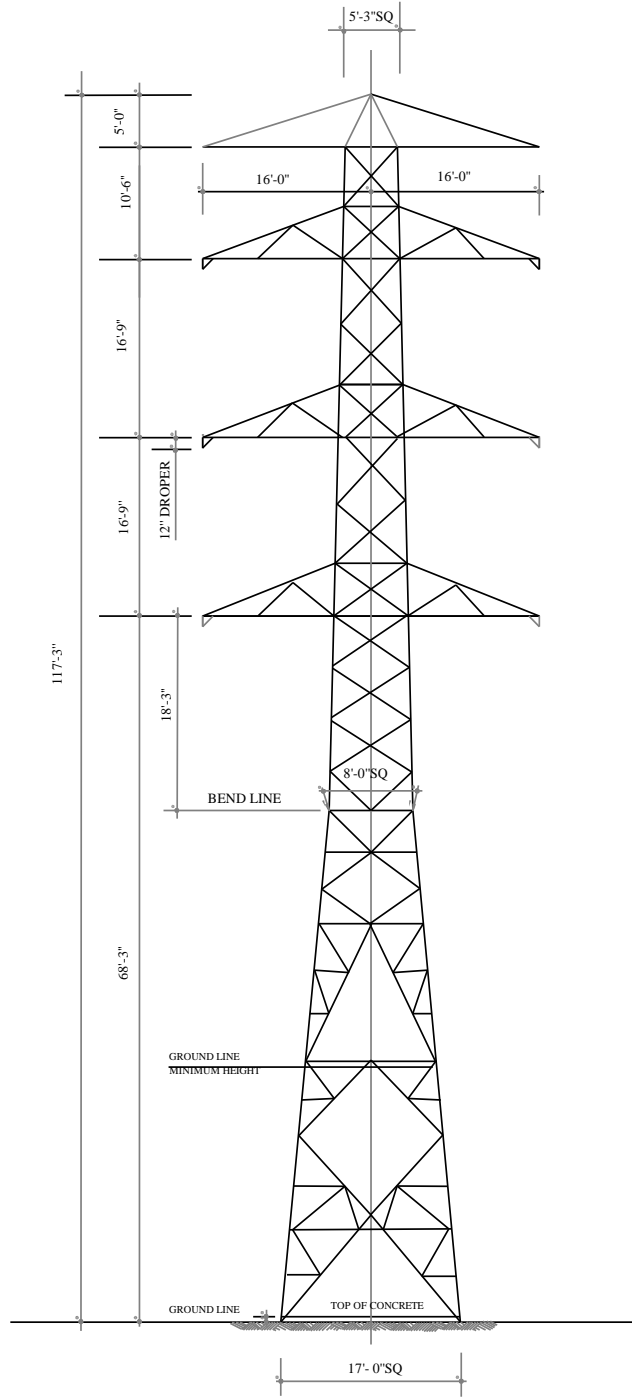


Photo showing a Section of the transmission line that shall be decommissioned and recovered.

2.5 Technical Characteristics of the proposed 132kV Transmission line section.

The proposed 132kV power-line will be designed and constructed according to KPLC transmission's Standard Specifications.

The pylons will be approximately 40 m in height and servitude/ wayleave width of 40m will be required for the power line. The power line will have a Delta phase configuration. "Kingbird" ACSR (greased) phase conductors and St 7/3.35mm earthwires will be used. Silicon composite (132kV) insulators will also be used for the line and the tower foundations will comprise reinforced Steel piles. Traditional Steel foundations will also be required.



STANDARD HEIGHT
G/A OF 132KV STEEL TOWER
SUSPENSION TOWER

	DATE	SIGN
APPROVED		
CHECKED ENGINEER I/C		
CHECKED HEAD D'MAN		
DRAWN	13/Sep./06	J.M.Kahare
TRACED		

REF	REVISION	DATE	SIGN

TITLE
GENERAL ARRANGEMENT OF TOWER

TITLE
APPENDIX 1.A.1

2.6 Project activities: Power line Design, Construction and Operation Activities

2.6.1 Design Phase Activities

- Environmental survey of study area
- Selection and analysis of alternative power line routes
- Determination of technically feasible alternatives:
- ESIA input into route selection and licensing by NEMA
- Route survey and Corridor walk-down: To ensure that all site-specific sensitivities are avoided. During this process the exact co-ordinates of the proposed towers will be established.
- Final design of line and siting of towers

2.6.2 Construction Phase Activities

The construction phase for the proposed project will include the following activities post-authorization:

- Construction site: Construction site will be sited in areas where least disturbance to potentially sensitive environments will be caused.
- Batching Plants: If Ready mix Steel is not available, small mobile batching plants will have to be established in the area close to the power line.
- Access: Use of available access to the project area to the extent possible in liaison with KWS and NAWASCO.
- Vegetation clearance: A 40m (20m on either side of the power line) servitude is required for the proposed 132kV power line. Tall trees which are very few will be cleared where required along the entire length of the servitude. Shrubs and grass will be left untouched
- Surveying, pegging and soil nominations: During construction the route will be surveyed, pegged and the soil nominations undertaken for each of the potential pylon foundations.
- Pylon footings: Foundations will be laid for the footings of the pylons. The first step is the excavation of the foundations, then reinforcing and finally the concreting of the foundations. The excavation will be done manually and with small machines with low noise levels.
- Steelwork structures: The pylons will be erected in segments. After the foundations and footings have been installed the construction team will transport the various steel parts of the towers to the site and start erection of the towers. This process again requires a lot of manual labour and often mobile cranes are used to assist with the erection of the towers.
- Stringing: Once the pylons have been erected, cables will be strung attached to the steel structures using insulators. Bird guards will be installed on the insulators to prevent birds from perching and defecating on the insulators which may compromise the protection offered by the insulators.
- Rehabilitation of disturbed areas and protection of erosion sensitive areas
- Testing and commissioning

The actual construction period will be to a maximum of six months.

Construction Supervision

During the construction phase, close supervision shall be carried out to ensure:

- Safe working procedures are followed to the letter
- Workers put on necessary safety gear at all times (including hand gloves, helmets, safety shoes with metal tipped toes, ear muffs, overalls and dust coats). Provision of appropriate safety belts to those workers performing their duties at elevated heights

- Motorized equipment are checked and certified to ensure that they are in good working condition, safe to use and produce minimal noise levels not forgetting reduced smoke emission.
- First aid kit and firefighting equipment (portable cylinders) are provided and placed at strategic positions that can be easily accessed
- Proper disposal of waste material and toilet facilities are provided for construction workers
- Emergency response procedures are in place and all workers are trained in effecting them.

2.6.3 Operational Phase Activities

During the operational and maintenance phase of the project, KPLC requires access to the servitude/ wayleaves for maintenance activities which may include repairs and replacement of various hardware on the towers and the conductor and in very rare cases, repairs to the foundations. Wayleave trace maintenance will also be progressed through out the operation phase.

2.6.4 Decommissioning Phase Activities

- The section that will be cut off power supply after re-routing shall be decommissioned by removal of the power line infrastructure including steel structures, bolts, conductors and insulators.
- Materials generated by the decommissioning process will be disposed of according to the Waste Hierarchy i.e. wherever feasible, materials will be reused, then recycled and lastly disposed of. Materials will be disposed of in a suitable manner, in a suitably licensed facility.

2.7 Target Group for the IEIA Report

The ESIA Report has been prepared for use by different stakeholders to be involved in the construction and operation of the proposed transmission line project. 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 Transmission Line.

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

- Relevant government ministries and agencies including and not limited to NEMA, KWS, NAWASCO and other stakeholders
- Other Affected and Interested persons;
- Planners and Engineers to be involved in preparation of design and plans of the transmission line
- Contractor to be engaged in the construction works for the transmission line;
- Staff to be involved in the management and operation of the Transmission Line and associated infrastructures.
- The Kenya Power and Lighting Company PLC.

3 CHAPTER THREE: APPLICABLE AND REGULATORY FRAMEWORK

3.1 Introduction

This Chapter outlines the existing national and international environmental and social legislation, policies and institutions applicable to energy generation that guide the development of the Project.

As Kenya is a signatory to various international conventions and laws, national projects need to be aligned with their requirements; relevant international conventions and laws are therefore presented in this chapter.

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 licenses and sectoral laws.

The table below outlines the legislations policies and institutions that will guide the development of the project and their relevance to the project

No	Legislation/ Guidelines	Description of the Legislation/Guideline	Relevance of the legislation/regulations in terms of license, permits, and other requirements
1	Vision 2030	Kenya Vision 2030 is the current national blueprint for development from its inception in 2008 until the milestone year of 2030. This plan is the national long-term development policy that aims to transform Kenya into a newly industrialised, middle-income country by 2030. The Vision is comprised of three key pillars (economic, social, and political), two of which are projected to be positively affected by project implementation.	Under Vision 2030, Energy is identified as one of the key sectors that form the foundation for socio-political and economic growth. Promoting equal opportunities across the entire Kenyan territory and enhancing access to competitively priced, reliable, quality, safe and sustainable energy is essential to the achievement of this vision.
NATIONAL POLICY FRAMEWORK			
1	The Poverty Reduction Strategy Paper (PRSP) of 2001	The PRSP has the twin objectives of poverty reduction and enhancing 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 themselves.	<ul style="list-style-type: none"> • The proposed project aims at provision and access stable power supply of electricity geared towards improved economic performance and thus will contribute to poverty alleviation in the Western region economic block.
2	National Environmental Action Plan (NEAP) of 1994	The NEAP for Kenya was prepared in mid 1990s. It was a deliberate policy whose main effort is to integrate environmental considerations into the country's economic and social development. The integration process was to be achieved through multi-sectoral approach to develop a comprehensive framework to ensure that environmental management and the conservation of natural resources forms an integral part of societal decision-making.	<ul style="list-style-type: none"> • The NEMA does not approve a development project unless the impacts of the proposed project are evaluated and mitigation measures proposed for incorporation in the project's development plan, which is in line with the requirements of the NEAP. • The project will be reviewed by NEMA for approval before implementation.
3	Environmental and Development Policy (Session Paper No.6 1999)	As a follow-up to the foregoing, the goal of this policy is to harmonize environmental and developmental goals so as to ensure sustainability. The paper provides comprehensive guidelines and strategies for government action regarding environment and development. The Government will:	<p>The proponent:</p> <ul style="list-style-type: none"> • Is undertaking an Environmental Impact Assessment, Social Impact Assessment and Public participation as part of the planning and approval of infrastructural projects.

		<ul style="list-style-type: none"> • Ensure Strategic Environment Assessment (SEA), Environmental Impact Assessment, Social Impact Assessment and Public participation in the planning and approval of infrastructural projects. • Develop and implement environmentally-friendly national infrastructural development strategy and action plan. • Ensure that periodic Environmental Audits are carried out for all infrastructural projects 	<ul style="list-style-type: none"> • Will ensure that periodic Environmental Audits are carried out for the project
4	The National Energy and Petroleum Policy 2015	The overall objective of the energy and petroleum policy is to ensure affordable, competitive, sustainable and reliable supply of energy to meet national and county development needs at least cost, while protecting and conserving the environment. This policy stipulates the transformation of the Rural Electrification Authority (REA) to Rural Electrification and Renewable Energy Corporation (REREC) to be the lead agency for development of renewable energy resources.	The policy is relevant to the project in the sense that the project will provide sustainable and reliable energy supply and measures will be put in place to protect and conserve the environment during its development. Kenya Power will be in charge of the development of the rerouting of the power line and maintenance to ensure reliable and safe power supply.
5	The Gender and Development Policy (Sessional paper no.2 2019)	<p>The overall goal of this policy is to achieve gender equality by creating a just society where women, men, boys and girls have equal access to opportunities in the political, economic, cultural and social spheres of life.</p> <p>The anticipated outcome of this policy as enshrined in the Constitution that aligns to the project include:</p> <ol style="list-style-type: none"> a) Equality and economic empowerment will be of both genders, b) Women and men will have equality of opportunity to participate in decision making and to contribute to the political, social, economic and cultural development agenda; c) Sexual and Gender based Violence will abate and men, women, boys and girls will live with dignity 	<ul style="list-style-type: none"> • In the absence of appropriate measures, the project can exacerbate gender inequalities and sexual and gender based violence. In adherence to this policy, measures will be put in place to : <ul style="list-style-type: none"> • ensure gender inclusivity in decision making, employment opportunity and access to the energy generated from the Mini-Grid • mitigate social risks including sexual and gender based violence, and any form of discriminations
6	The HIV/ AIDS Policy 2009	In summary, the policy aims at:	<ul style="list-style-type: none"> • The proposed project is to be implemented in the National park which is a protected area. This policy

		<p>i. Establishing and promoting programmes to ensure non-discrimination and non-stigmatization of the infected;</p> <p>ii. Contributing to national efforts to minimize the spread and mitigate against the impact of HIV and AIDS;</p> <p>iii. Ensuring adequate allocation of resources to HIV and AIDS interventions;</p>	<p>shall provide a framework to both the project proponent and contractor to address issues related to HIV/AIDS during the entire project phase.</p>
7	ENVIRONMENTAL MANAGEMENT AND COORDINATION ACT, 1999 (AND THE AMENDMENTS OF 2015)	<p>The EMCA is a framework environmental law in Kenya. This Act (assented to on January 14, 2000) provides a structured approach to environmental management in Kenya. With the EMCA coming into effect, the environmental provisions within the sectoral laws were not superseded; instead, the environmental provisions within those laws were reinforced to better manage Kenya's ailing environment.</p>	<p>The proposed project will be undertaken in accordance with relevant sections of the EMCA, specifically Clauses 58 – 63. These sections of the Act are operationalised by subsidiary legislation promulgated under the Act and specifically Legal Notice (L.N.) 101: Environment (Impact Assessment and Audit) Regulations, 2003.</p>
8	L.N. 101: EIA/EA REGULATIONS, 2003 AND 2016 AMENDMENTS	<p>These regulations provide the framework for undertaking EIAs and EAs in Kenya by NEMA licensed Lead Experts and Firms of Experts. An EIA or EA Study in Kenya is to be undertaken by a firm duly licensed by the National Environmental Management Authority (NEMA). The EIA/EA Regulations also provide information to project proponents on the requirements of either an EIA or EA as required by the EMCA.</p>	<ul style="list-style-type: none"> • The proposed project is subject to relevant provisions of these regulations and subsequently, the ESIA has been undertaken in accordance with the requirements.
9	L.N. 120: WATER QUALITY REGULATIONS, 2006	<p>These regulation provides for the sustainable management of water used for various purposes in Kenya. For effluent discharges into the environment and aquatic environment, a Proponent needs to apply directly to the NEMA. For discharges into public sewers, a Proponent needs to apply for the license to the relevant county. The regulation contains discharge limits for various environmental parameters into public sewers and the environment.</p>	<ul style="list-style-type: none"> • These regulations will apply to the proposed project during the construction and operational phases. The contractor will be required to properly manage the effluent from construction activities in accordance with the above regulations prior to discharge into the environment.
10	L.N. 121: WASTE MANAGEMENT REGULATIONS, 2006	<p>These regulations are comprehensive and cover the management of various kinds of waste in Kenya. Generally, it is a requirement under the regulations that a waste generator segregates waste (hazardous and non-hazardous) by type and then disposes the them in an environmentally acceptable manner. Under the regulation, it is a requirement that waste is transported using a vehicle that has an approved "Waste Transportation License" issued by NEMA. Wastes generated in Kenya must be disposed of in a licensed disposal facility.</p>	<ul style="list-style-type: none"> • During the construction and operation phases, the proposed project will generate various streams of wastes. For the most part, it is expected that the wastes will be non-hazardous in nature and can be disposed of in accordance with these regulations.

		<p>Such a facility will require annual environmental audits to be undertaken by NEMA registered Lead Experts.</p> <p>The regulation requires that prior to generating any hazardous waste, a proponent shall undertake an EIA Study and seek approval from the NEMA. Labelling of hazardous wastes is mandatory under the regulation and the specific labelling requirements are provided in Rule 18. The treatment options for hazardous waste disposal provided in Rule 19 include incineration or any other option approved by the NEMA.</p>	
11	L.N. 61: NOISE AND EXCESSIVE VIBRATION CONTROL REGULATIONS, 2009	<p>The general prohibition of these regulations states that no person shall make or cause 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. The regulations further provide factors that will be considered in determining whether or not noise and vibration is loud, unreasonable, unnecessary, or unusual.</p>	<ul style="list-style-type: none"> • Rules 13 and 14 of the regulations define the permissible noise levels for construction sites. These noise limits will be applicable to the proposed project.
12	LICENSES AND PERMITS REQUIRED UNDER THE EMCA	<p>The subsidiary legislations under the EMCA are partially monitored through the use of permits and licenses. Subsequently all licenses and permits required during the construction phase shall be the responsibility of the individual contractors and their agents. During the operational phase, all permits and licenses required to operate the project will be the responsibility of the proponent.</p>	<p>The subsidiary legislations under the EMCA requires some or all the following types of permits to be available for inspection during the construction and operational phases of the project:</p> <ul style="list-style-type: none"> ✓ Effluent Discharge License under Legal Notice 120: The Environment Management and Coordination (Water Quality) Regulations 2006; ✓ Waste Transport License under Legal Notice 121: The Environment Management and Coordination (Waste Management) Regulations 2006 for disposal of all types of wastes; and ✓ Noise Permit under Legal Notice 61: The Environment Management and Coordination (Noise and Excessive Vibration Control) Regulations, 2009. ✓ EIA License as stipulated in the EIA/EA

<p>13</p>	<p>OCCUPATIONAL HEALTH AND SAFETY ACT, 2007</p>	<p>The Occupational Safety and Health Act (OSHA) was enacted to provide for the health, safety and welfare of persons employed in workplaces, and for matters incidental thereto and connected therewith.</p> <p>Part II of the Act provides the General Duties to which the occupier must comply with respect to health and safety in the workplace. Such duties include undertaking safety and health (S&H) risk assessments, S&H audits, notification of accidents, injuries and dangerous occurrences. A number of sections under this part shall be applicable to the proposed project.</p> <p>Part IV deals with the enforcement provisions that Directorate of Occupational Safety and Health Services (DOSHS) has under the Act. It discusses the instances when Improvement and Prohibition Notices can be issued as well as the powers of Occupational S&H officers. This part of the Act will be mandatory for the occupier to comply with for the proposed project.</p> <p>Part V of the Act requires all workplaces to be registered with the DOSHS. This part will be applicable for the proposed project as the Occupier will have to apply for registration of their project with the DOSHS on completion of the construction phase and before the operational phase of the project.</p> <p>Part VI of the Act lists the requirements for occupational health provisions which include cleanliness, ventilation, overcrowding, etc. This section of the Act will apply to the Occupier during the operational phase of the project.</p> <p>Part VIII of the Act contains provisions for general safety of a workplace, especially fire safety. This part of the Act will apply to the proposed project during the design, construction, and operational phases.</p> <p>Part X of the Act deals with the General Welfare conditions that must be present during the construction and operational phase of the project. Such conditions include first aid facilities, supply of drinking water, accommodation for clothing, ergonomics, etc. This part of the Act will apply to the proposed project during the construction and operational phases.</p> <p>Part XI of the Act contains Special Provisions on the management of health, safety, and welfare. These include work permit systems, PPE requirements and medical surveillance. Some sections of this part of the Act will be applicable to the proposed project during the construction and operational phase.</p>	<p>The proposed project will be undertaken in compliance with the OSHA-2007 during the construction, design, and operational phases.</p> <p>During the construction phase, the contractors will be required to fully comply with the requirements of Legal Notice 40 titled: Building Operations and Works of Engineering Construction Rules, 1984 (BOWEC). Each contractor will develop and implement a formal construction Environment, Social, health and safety plan for the entire construction phase duration in alignment with the OSHA and international health and safety best practices.</p>
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14	L.N. 31: The Safety and Health Committee Rules, 2004	<p>These rules came into effect on April 28, 2004, and require that an Occupier formalise a S&H Committee if there is a minimum of 20 persons employed in the workplace. The size of the S&H Committee will depend on the number of workers employed at the place of work. For the Proponent and Contractor, the OSHA and the S&H Committee Rules 2004 are important as they require compliance with the following measures:</p> <ul style="list-style-type: none"> ○ Posting of an Abstract of the Factories and Other Places of Work Act in key sections of each area of the factory or other workplace; ○ Provision of first aid boxes in accordance with Legal Notice No. 160 of 1977; ○ Ensuring that there are an appropriate number of certified first aiders trained by an approved institution and that the certification of these first aiders is current; ○ Provision of a General Register for recording, amongst other things, all incidents, accidents, and occupational injuries; ○ Appointment of a S&H Committee made up of an equal number of members from management and workers based on the total number of employees in the workplace; ○ Training of the S&H Committee in accordance with these rules; and ○ Appointment of a S&H management representative for the Proponent. 	<p>The contractor will be required to constitute Health and Safety Committee to oversee safety and health at the construction site. The number of the committee members will be dictated by the number of staff hired by the contractor. The S&H Committee must meet at least quarterly, take minutes, circulate key action items on bulletin boards, and may be required to send a copy of the minutes to the DOSHS Regional office.</p> <p>Appropriate recordkeeping including maintenance of all current certificates related to inspection of critical equipment such as cranes, air compressors, lifts, pulleys, etc. Such inspections need to be undertaken by an approved person registered by the Director of the DOSHS.</p>
15	L.N. 24: Medical Examination Rules, 2005	<p>These rules provide for Occupiers to mandatorily undertake pre-employment, periodic, and termination medical evaluations of workers whose occupations are stipulated in the Eighth Schedule to the OSHA and the First Schedule to this Rules. Workers that fall under the above two schedules are required to undergo medical evaluations by a registered medical health practitioner duly registered by the DOSHS.</p>	<p>Some construction activities such as metal cutting and grinding, repair or maintenance of construction equipment could expose the construction workers during construction phase and operations and maintenance workers during operation phase to physical and electrical hazards The contractor and the project proponent should ensure that the workers</p>

			exposed to such hazards undergo requisite medical examinations as required by these rules
16	L.N. 25: Noise Prevention and Control Rules, 2005	<p>The rules set the permissible level for occupational noise in any workplace (which includes construction sites) as follows:</p> <ul style="list-style-type: none"> • 90 dB(A) over an 8-hour time weighted average (TWA) period over 24-hours; and • 140 dB (A) peak sound level at any given time. <p>Additionally, the rules set permissible limits for community noise levels emanating from a workplace as follows:</p> <ul style="list-style-type: none"> • 50 dB(A) during the day; and • 45 dB(A) at night. <p>The Proponent is to ensure that</p> <ul style="list-style-type: none"> • Any equipment brought to the site for use shall be designed or have built-in noise reduction devices that do not exceed 90 dB (A). • Those employees that may be exposed to continuous noise levels of 85 dB (A) are medically examined as indicated in Regulation 16. If found unfit, the occupational hearing loss to the worker will be compensated as an occupational disease. 	It is expected that during the construction phase of the project, there may be plant equipment that exceeds the threshold levels of noise stipulated under the Rules. It will therefore be incumbent on the contractor and his or her sub-contractors to ensure that their equipment is serviced properly and/or use equipment that complies with the threshold noise values given above. Alternatively, each contractor will be required to develop and implement a written hearing conservation programme during the construction phase.
17	L.N. 59: Fire Risk Reduction Rules, 2007	<p>A number of sections of the rules apply to the proposed project as enumerated below.</p> <ul style="list-style-type: none"> • Regulation 5 requires Proponents to ensure that fire resistant materials are used for construction of new buildings. A number of minimum specifications of materials are provided in this rule. • Regulation 6 requires that all flammable materials be stored in appropriately designed receptacles. Some of the flammable materials anticipated at the project site including; fossil fuel using running construction equipment and vehicles (during construction phase) and stand by generator (operation phase) • Regulation 7 requires that all flammable storage tanks or flammable liquid containers be labelled with the words “Highly Flammable” in English or Swahili. It is therefore practical for the Proponent to use a system similar to the Hazardous Material Identification System of labelling their product containers. The regulation requires a Proponent to consult the product’s MSDS for appropriate labelling requirements. 	<p>The proponent is expected to comply with the requirements of L.N. 59: Fire Risk Reduction Rules, 2007 by</p> <ol style="list-style-type: none"> Carrying out, and record, a fire risk assessment identifying any possible dangers and risks. Reducing, or where possible remove, the risk of fire and take precautions to deal with the remaining risks. Developing an emergency plan should a fire occur which includes evacuation procedures etc

		<ul style="list-style-type: none"> • Regulation 8(3) requires a Proponent to have a Spill Prevention, Control, and Countermeasures (SPCC) plan. This may be important if there will be chemicals stored in the refuelling area at the construction site. • Regulation 16 requires Proponents to ensure that electrical equipment is installed in accordance with the respective hazardous area classification system. It is also a requirement that all electrical equipment is inspected every six months by a competent person and the Proponent is required to keep records of such inspections. • Regulation 22 provides a description of the functions of a fire-fighting team. • Regulation 23 requires Proponents to mandatorily undertake fire drills at least once a year. • Regulation 33 requires Proponents to have adequate fire water storage capacity. As a minimum this regulation requires Proponents to have at least 10 cubic meters of dedicated fire water storage capacity. • Regulation 34 requires Proponents to develop and implement a comprehensive written Fire Safety Policy. This policy should contain a Fire Safety Policy Statement signed by the CEO, a Fire Safety Policy Manual and a brief summary of the Fire Safety Policy of the company. • Regulation 35 requires a Proponent to notify the nearest Occupational S&H area office of a fire incident within 24 hours of its occurrence and a written report sent to the Director of DOSHS within 7 days. 	
18	THE ENERGY ACT, 2019	<p>The Energy Act deals with all matters relating to all forms of energy including the generation, transmission, transmission , supply, and use of electrical energy, as well as the legal basis for establishing the systems associated with these purposes. The Energy Act also established Energy and Petroleum Regulatory Authority (EPRA) in place of the Energy Regulatory Commission (ERC), whose mandate is to regulate all functions and players in the energy sector. One of the duties of the EPRA is to ensure compliance with environmental, health, and safety standards in the energy sector, as empowered by Section 99 of the Energy Act, 2019. In this respect, the following environmental issues will be considered before approval is granted:</p> <p>The need to protect and manage the environment and conserve natural resources; and</p>	<p>The proponent is in line with the Energy act regulations in the following ways;</p> <ul style="list-style-type: none"> • The proponent has identified an available site • alignment of the Transmission Power line Project to KWS Park development plans; • KPLC has the technical and financial capability to conduct the project • The proponent has conducted the necessary engagement with the stakeholders

		<p>The ability to operate in a manner designated to protect the health and safety of the project employees, the locals, and other potentially affected communities.</p> <p>An ESIA approved by NEMA must support licensing and authorisation to generate and transmit electrical power.</p> <p>Part VI Section 121 (1a) stipulates that the EPRA shall, before issuing a license, take into account the impact of the undertaking on the social, cultural or recreational life of the community.</p> <p>Part VI Section 121(1b) stipulates that the EPRA shall, before issuing a license, take into account the need to protect the environment and to conserve natural resources in accordance with the Environmental Management and Coordination Act.</p> <p>Part VI Section 136 (1a) stipulates that it shall be the duty of a transmission licensee to operate, maintain (including repair and replace if necessary) and protect its transmission grid to ensure the adequate, economic, reliable and safe transmission of electricity; and</p>	
19	THE PUBLIC HEALTH ACT (CAP. 242)	The Act prohibits the project proponents from engaging in activities that cause environmental nuisance or those that cause danger, discomfort or annoyance to inhabitants or is hazardous to human and environmental health and safety.	The proponent will be in line with the regulations of this act and will ensure suppression of infectious diseases and maintain proper sanitation during all the phases of the project.
20	HIV AIDS PREVENTION AND CONTROL (CAP 246A)	This Act is to promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS. It also seeks to positively address and seek to address conditions that aggravate the spread of HIV infection.	Like other projects, the proposed project is expected to attract new people to the project area seeking employment. This can lead to increased transmission of HIV/AIDS and other sexually transmitted diseases (STDs) as they engage in sexual relationships amongst themselves and/or local community members. In line with the requirements of this Act, the Contractors will create awareness and sensitize the

			workers and other persons on the risks of infections to foster prevention and control.
21	THE PHYSICAL AND LAND USE PLANNING ACT, 2019	<p>This Act of Parliament makes provision for the planning, use, regulation and development of land and for connected purposes.</p> <p>The objects of this Act related to the project include;</p> <p>(a) the principles, procedures and standards for the preparation and implementation of physical and land use development plans at the national, county, urban, rural and cities level;</p> <p>(b) the procedures and standards for development control and the regulation of physical planning and land use; (d) a framework for the co-ordination of physical and land use planning by county governments;</p> <p>(c) a framework for equitable and sustainable use, planning and management of land;</p>	<p>The proposed site is not in contravention of any Zoning regulations. The project site is within Lake Nakuru National Park land; necessary county approvals will be sought by the proponent e.g. Project design approval. The approvals shall be issued by the Physical planner in the department of Lands, Housing and Urban Development – Nakuru County.</p>
22	THE WILDLIFE CONSERVATION AND MANAGEMENT ACT, 2013	<p>The Wildlife Conservation and Management Act 2013 became operational on January 2014. An Act sought to consolidate and amend the law relating to the protection, conservation and management of wildlife in Kenya and for purposes connected therewith and incidental thereto.</p> <p>The new law has one of its guiding principles the devolution of conservation and management of wildlife to landowners and managers in areas where wildlife occurs; through in particular the recognition of wildlife conservation as a form of land use, better access to benefits from wildlife conservation, and adherence to the principles of sustainable utilization</p> <p>Wildlife Conservancies are now recognized under the Law as 'land set aside by an individual landowner, body corporate, group of owners or a community for purposes of wildlife conservation'. Wildlife conservation and management is recognized as a form of land use that has equal recognition with other land use types such as agriculture.</p>	<p>The power is inside Nakuru National Park hence it will be important to seek clearance from Kenya Wildlife Service during the rerouting of the power line. The Consultation with KWS has been ongoing.</p>

23	THE CIVIL AVIATION ACT CAP 394	<p>Under this act, the Kenya Civil Aviation Authority (KCAA) has to authorize and approve the height of transmission lines and masts when they are on or proximal to flight Paths so as to ensure the safety of flying aircraft.</p> <p>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.</p> <p>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.</p>	<p>The project area is a designated National park and route has been designed along the KWS park fence and the area has no known flight path or airstrip.</p>
24	National Museums and Heritage Act, 2006	<p>The Act seeks to consolidate the law relating to national museums and heritage; to provide for the establishment, control, management and development of national museums and the identification, protection, conservation and transmission of the cultural and natural heritage of Kenya; to repeal the Antiquities and Monuments Act and the National Museums Act.</p> <p>The Act requires that where a person discovers a monument or object of archaeological or palaeontological interest, the person shall, within seven days, give notice thereof, indicating the precise site and circumstances of the discovery, to the National Museums, and in the case of an object, shall deliver the object to the National Museums or to the District Commissioner to keep it for any particular purpose or for any particular period. Subject to section 27, no person shall move a monument 'Or object of archaeological or palaeontological interest from the place where it has been discovered otherwise than in such manner and to such place as may be allowed by an, exploration license, or by written permit from the Minister after consultation with the National Museums."</p>	<p>The project route has been designed deliberately to as no to interfere the cultural heritage and includes objects of archaeological or paleontological interest, objects of historical interest and protected objects.</p> <p><i>The Act will be triggered as a precaution and due process will be followed in case of chance find of cultural heritage along the proposed route.</i></p>

4 CHAPTER FOUR: BASELINE INFORMATION OF THE PROJECT AREA

4.1 Introduction

This baseline information is borrowed from a recent study by Kenya wildlife Service (Khayale et al 2020) that was designed to establish the impact of the rising water levels on large mammals in the lake. We present this information to enable KPLC understand the nature of the environmental receptors of the potential impacts of the power transmission lines.

4.2 Lake Nakuru National Park

The park lies in Central Kenya, 140km north-west of Nairobi, in Nakuru district of the Rift Valley Province. The ecosystem comprises of the lake, surrounded by mainly wooded and bushy grasslands. The park supports a wide ecological diversity with Flamingos (Greater and Lesser) and other water birds being the major attractions of the area. The ecosystem provides for about 56 different species of mammals including the white rhino and buffaloes and a variety of terrestrial birds numbering nearly 450 species.

4.2.1 Geology

The geology of LNNP watershed is comprised of volcanic rocks of tertiary-quaternary age which has been affected by faulting. The geology in the area is connected to activities linked with Rift Valley creation namely volcanic eruptions and faulting. The latest geology activity occurred in Menengai Crater and faulting that affected the recent tuff cones in Lake Elementaita as reported by (Barua, 1995) and (Hongo, 2020). The small rock particles that came from the lava flows took a larger part and formed the bed of the area. The rock particles were unnatural by faulting which happened parallel to the rift itself that runs in the north to south direction resulting into the formation of ridges and lowlands such as the ones in Lion Hill, Ronda, West Cliff and Mau Escarpment. The soils in the area comprise of porous and unconsolidated surface which are vulnerable to soil erosion as reported by (Barua, 1995) and (Hongo, 2020).

4.2.2 Rising Lake Levels

The rising water levels in Lake Nakuru National Park has increased and have reduced available grazing pastures for herbivores as reported by (Barua, 1995) and (Hongo, 2020). This has resulted into wildlife searching for new habitats away from their usual wildlife dispersal areas. The floods impacted negatively on both wildlife in terms of their habitats by expanding the shallow lake significantly from 35.6 km² in 2009 and 54.1 km² in 2018 to 64 Km² in 2020 (Hongo, 2020). The increase in water volume in the lake has altered the chemical solidity that was behind the lake's ecosystem. Unpublished documents of Rift Valley lakes' levels in Kenya showed a rise in water levels in 1901 and 1963 (Hongo, 2020).

4.2.3 Land Cover/Vegetation

There are different vegetation species found in the LNNP namely acacia woodland, open grassland, bushland, marshland grassland, and cliff vegetation (Young & Cynthia, 1997). For this report the Landsat image was acquired from the RCMRD and used to develop land cover using ArcGIS 10.8. The Landsat image had the properties as in the table 1 and was used

generate 5 different land cover categories namely Waterbody, Forest, Shrub land, Grassland and Bare ground as shown in figure 5.

Table 2: Landsat Image Properties

Landsat Images/properties	2020
Date of acquisition	10/8/2020 7:49:17 AM
The number of bands	8
Spatial resolution	30, 30
Coordinate system	WGS_1984_UTM_Zone_36S
Bit depth	16 bit

The main vegetation cover on the section along which the rerouting will follow is mainly shrubland interspersed with grass land. There are two spots along the route with scattered tree cover comprising *Acacia xanthophlea* and *Eucalyptus sp.*



Figure 2: Lake Nakuru National Park Land cover map

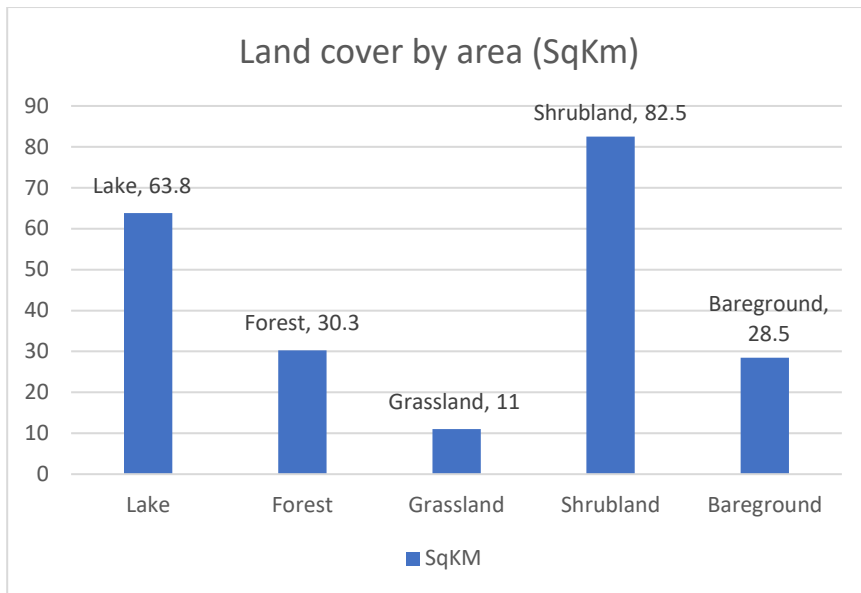


Figure 3: Percentage land cover categories

4.2.4 Wildlife transmission patterns

Data from aerial census conducted in January 2020 was used to develop wildlife transmission maps as showed in Table 10. A total of 15 mammals which were part of the wildlife in Lake Nakuru National Park were mapped. The Exploratory Spatial Data Analysis (ESDA) that involved the use of a number of techniques to describe and visualize spatial transmission, discover patterns of spatial association, and also to identify hotspots were used. The project used ArcGIS's select by attribute query as described by (ESRI, 2020) to select individual wildlife species for generation of mammal species transmission maps. To enhance clarity of the results that involved multiple layers, individual transmission maps were generated for some species using an exclusive type class interval as described by (Kothari, 2004) with natural breaks method and 5 classes as described by (Hongo, 2020). The graduation symbols were used to differentiate the availability and abundance of mammal species in the study area. Circle 2 multilayer, black, ESRI marker default was used as symbol to represent the wildlife numbers. Dissimilar colors were used to differentiate wildlife species where more than one species represented in one map (Hongo, 2020) .

Table 3: Wildlife numbers from aerial census of January 2020

Species	Population No
Baboon	3
Buffalo	6037
Colobus	7
Eland	83
Rothschild Giraffe	103
Grants Gazelle	150
Hippo	2
Hyena	3
Impala	1035

Lion	1
Ostrich	5
Warthog	134
Waterbuck	146
Zebra	1314

4.2.5 Common vegetation

The vegetation is mainly wooded and bushy grassland with a wide ecological diversity and characteristic habitats that range from the lake waters to the escarpment and ridges.

The normally water-covered surface of the lake occupies about a third of the park. The lake water supports a dense bloom of the blue-green Cyanophyte *Spirulina platensis* from which it derives its colour and which is the major food source for the flamingo.

The lake is fringed by alkaline swamps with areas of sedge, *Cyperus laevigatus* and typha marsh along the river inflows and springs. The surrounding areas support a dry transitional savanna with lake margin grasslands of *Sporobolus spicatus* salt grass moving into grasslands of *Hyparrhenia hirta* and rhodes grass *Chloris gayana* in the lower areas.

More elevated areas have dry forest with *Acacia xanthophloea*, olive *Olea hochstetteri* and *Croton dichogamus*; *Euphorbia candelabrum* forest; and bushland dominated by the composites, *Mulelechwa Tarchonanthus camphoratus* and *Psiadia arabica*.

Rocky hillsides on the Parks eastern perimeter are covered with *Tarchonanthus* scrub and a magnificent *Euphorbia candelabrum* forest.

4.2.6 Common avifauna

The area is characterized by a variety of water birds Yellow-billed Pelicans, Marabou Storks, Hammerkops, Fish Eagles, etc. the park originally protected as a bird sanctuary, it hosts over 400 bird species, including 5 globally threatened species, and is an important stop on the African-Eurasian Migratory Flyway. Some of the avifauna notice during the assessment is shown in the attached ornithological report.

4.2.7 Common Fauna

White Rhinos, African Buffalos, Rothschild Giraffes, Zebras, Impalas, Olive Baboons, Vervet Monkeys, Waterbucks, Hyenas, Jackals, Lesser Flamingos, Hippopotamus, Pythons, Lions, Leopards, Black Rhinos, Wild Dogs, Colobus Monkeys, Cheetahs etc some of the fauna common in are include but not limited to those shown below



Herds of African Buffalos



Rothschild Giraffes



Impalas



Hippopotamus



Zebras



Impalas



Leopard



Rhinoceros



Olive Baboons



Hyena



Vervet Monkeys



Lioness with cubs



Waterbuck



Oryx

4.3 Specific Flora and Fauna Located along the proposed project route

Attached Separately

5 CHAPTER FIVE: PUBLIC CONSULTATION AND PARTICIPATION

5.1 Introduction

Public consultation and 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 ESIA study stipulated in the EMCA, 1999 and EIA/EA Regulations 2003.

Timely stakeholder identification analysis and engagement is key as it provides opportunities for stakeholders to make significant contribution to the project design and implementation which results in enhanced project acceptance and timely implementation among other benefits. Stakeholders in this project are individuals or groups who will be affected or are likely to be affected by the project (project affected parties) and those that have interest in the project (interested parties).

5.2 Objective of Public/Stakeholder Consultation

The objectives of public participation is to provide sufficient and accessible information to potentially interested and affected parties in an objective manner to assist them make an informed decision in regard to the project. The objectives of consultation is;

- a) To assess the level of stakeholder interest and support for the project
- b) To enable stakeholder's views to be considered in project design and implementation
- c) To establish and maintain constructive relationships and means for effective and inclusive engagement with project affected and interested parties on issues that could affect them
- d) To ensure appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely manner

Public participation involves both disseminating information about the project as well as gathering primary data from stakeholders regarding the project and its potential impacts. Part of the key project information that was shared with the stakeholders to enable them understand the project included; nature of the project, route for the section to be relocated, potential positive and negative impacts and their mitigation measures among others. The project team also received valuable information in regard to the proposed route and further information which will enhance a good working relationship with various stakeholders during the construction and operational phase of the project.

5.3 Legal requirement for Public Participation

The overall objective and the spirit of the Kenya constitution is to involve citizens in project formulation and implementation at all the levels and across the phases of the project. This is enshrined in the Kenyan constitution in Article 35 which provides that 'every citizen has the right of access to information held by the state; and information held by another person and required for the exercise or protection of any right or fundamental freedom'.

Further, public participation is an essential and legislative requirement for environmental authorization. The ESIA team undertook the Public Participation for the proposed project in accordance with the requirements as stipulated in the EMCA, 1999, 2015 amendments and EIA/EA Regulations 2003. The main purpose of public participation is to provide project

information to stakeholders and allow them the opportunity to provide input and comment on the project, including issues and alternatives that are to be investigated, thereby facilitating informed decision-making.

5.4 Stakeholder Identification and Analysis

Stakeholder identification was done based on the nature of the project, location and potential impacts of the project to the different stakeholders. In addition, the ESIA team mapped out the area by walking along the entire proposed route, its alternatives and the neighborhood to identify the stakeholders. This assessment resulted in two broad categories of stakeholder's i.e.

1. Those who are affected and those who are likely to be affected by the project –project affected parties.
2. Those who have interest in the project –project interested parties

Identified stakeholders

	Project Affected persons/parties/organization's	Project interested parties
1	Kenya wildlife service -KWS	Community members neighboring the park
2	Nakuru water and sanitation services company- NAWASCO	National Environment Management Authority-NEMA
3	Water Resources Authority	Businesses along the road near the KWS gate
4	County Government of Nakuru	Kenya Pipe line
5	Wildlife clubs of Kenya; Lake Nakuru Environmental Education Center	Kenya Forest services
6	Park tenants –Park Action Committee	Kaloleni primary school
7	World Wildlife Fund	Flamingo primary school
8	Nature Kenya	
9	Institute of primate research	
10	Kenya Power	
11		

5.5 Sources of Information/methodology

Public participation involves gathering primary data from stakeholders regarding the project. Therefore, data collection was a key component of the ESIA study. The first source of information was literature review of project documents, site visit coupled with observations and discussion with the project engineers and project officers and key stakeholders (KWS and NAWASCO). Further information and views on the project were also sought from government agencies at the county level and national level and from the residents living near the proposed project.

5.6 Approach used in carrying out the consultations

Due to the fact that the stakeholders were different the approach used was different for each kind of stakeholders. Key government agencies where power line fall within their areas of Jurisdiction i.e. KWS and NAWASSCO were consulted through Key informant meetings while other agencies were consulted through one on one interviews and through self-administered questionnaires to capture their views.

5.7 Public/Stakeholder engagement schedule

Consultations for this project have been carried out basically in two phases namely;

- ✚ During preparation of EIA project report and
- ✚ During preparation of the full ESIA study.

5.8 Consultations carried out during preparation of EIA project report

Views about the project of the immediate neighbors/public and government officials were sought between September 2020 and December 2023. The exercise was conducted through a Key stakeholder’s forum and face to face interviews. Public and neighborhood consultation was also conducted through the use of pre-designed questionnaires administered by the EIA team. Four key informants meetings were held between KPLC, KWS and NAWASCO as shown in the table below.

	Date	Venue	Organizations involved
1	30/9/2020	KWS headquarters -Nairobi	KPLC & KWS
2	2/2/2021/23	At Lake Nakuru National park KWS offices	KPLC & KWS
3	15/4/2021/23	NAWASSCO Sewerage Treatment plant offices- Nakuru	KPLC & NAWASCO
4	27/4/2021/23	NAWASSCO Sewerage Treatment plant offices-Nakuru	KPLC & NAWASCO

The following are the minutes of the four meetings held.

5.8.1 Minutes of 1st Meeting and Site Visit held between KPLC and KWS in Nairobi

Since the project area falls under the jurisdictions of Lake Nakuru national park a meeting was held with KWS team in Nairobi and Nakuru to discuss and agree on the rerouting and realignment route of the submerged towers and assess the same route to identify any negative impacts and propose appropriate mitigation measures to minimize and eliminate any anticipated negative impact. The KPLC team gave an overview of the project including the proposed route. KWS teams both in Nairobi and Nakuru appreciated the enormity of the risk the submerged power line section are likely to cause to the wildlife and the public. The proceedings of the two meetings are captured in the minutes below



KWS and KPLC Meeting held on 30th September 2020 at KWS HQs Langata - Chui board room

Present members

	NAME	INSTITUTION	EMAIL	CELL PHONE
1	Waller Ochieng - Chair	KWS	wodira@kws.go.ke	0720883680
2	Collins Nthuni	KWS	cnthuni@kws.go.ke	0721763860
3	Judy Akinyi	KWS	jadipo@kws.go.ke	0722280183
4	Evans Omondi	KWS	eomondi@kws .go.ke	0720763239
5	Hellen Olwanda	KWS	holwanda@kws .go.ke	0721232752
6	Collins Ochieng	KWS	cochieng@kws.go.ke	0734201201
7	Dickson	KWS	dickson@kws.go,ke	0727990498
8	Eng. Ezra Ndenderu	KPLC	endenderu@kplc.co.ke	0714610089
9	Eng. George Korir	KPLC	gkorir@kplc.co.ke	0722246577
10	Julius Marete	KPLC	jmarete@kplc.co.ke	0722803072
11	Stephanie Odundo – Secretary	KPLC	SOdundo@kplc.co.ke	0703568290
12	Eng. Paul Mungai	KPLC	Pwmungai@kplc.co.ke	0722961444
13	Wilfred Koech	KPLC	wkoech@kplc.co.ke	0722690119

Agenda

1. Briefing on the project by Team Leaders of both KWS and KPLC
2. Deliberations on the proposed relocation of submerged KPLC infrastructure at Lake Nakuru
3. Meeting Recommendations and Conclusion
4. Any other business

MIN. NO	AGENDA ITEM	DELIBERATIONS
1	OPENING REMARKS	The meeting was called to order at 10:31hrs with the Chair welcoming members to the meeting on behalf of the Director General. The chair requested for a review of the previous minutes in respect of the meeting held between KPLC and KWS on 1 st October 2019. Eng. George Korir took the team through the previous minutes.

<p>2</p>	<p>DELIBERATIONS ON THE PROPOSED RELOCATION OF SUBMERGED KPLC INFRASTRUCTURE AT LAKE NAKURU</p>	<p>Following review of the previous minutes, The Chair raised the following Matters Arising out of the minutes:</p> <ul style="list-style-type: none"> a) Conservation Fee – which is a biodiversity offset requested by KPLC; b) Letter of Offer – KWS had forwarded the same to KPLC but the status of this document was pending. <p>Eng. George Korir introduced the team to the matters at hand. In his brief overview of the proposed project, he highlighted that KPLC wrote a letter to KWS in October 2019 requesting for wayleave access to enable KPLC access Lake Nakuru National Park for purposes of relocation of the Wayleave. He reiterated the critical importance of the line and hence the need to re-route the section of the line that has been submerged as a result of the flooding of Lake Nakuru.</p> <p>In turn, the Chair mentioned that KWS responded to KPLC’s letter highlighting the importance of the proposed project and the importance of preserving wildlife and maintaining the biodiversity of the park</p> <p>Eng. Ndenderu mentioned that the main issue to be tackled by both organizations was the conservation fee of Ksh. 13,000,000 which KWS requires KPLC to pay and the need by both organizations to comply with the provisions of the Energy Act 2019 and the Wildlife (Conservation and Management Act).</p> <p>He further indicated that KPLC was ready to restore any damage arising as a result of the proposed relocation and the same was indicated in KPLC’s letter of 5th June 2020.</p> <p>The Chair responded in the affirmative and highlighted the need for execution of the Letter of Offer and the Wayleave Agreement by both parties in order to outline the responsibilities of each organization.</p> <p>Eng. Korir explained that the presently, 9 structures have been submerged into the Lake and there was an urgent need for the same to be relocated to avert any damage.</p> <p>He further explained that there is a new proposed plan in place to cater for relocation of the 9 towers submerged within the Lake.</p> <p>Eng. Mungai informed the team that the new proposed plan/route for relocation had been discussed and approved by KPLC, KWS and NAWASCO (Nakuru Water & Sewerage Company)</p> <p>The Senior Warden at KWS observed that the new proposed plan will not interfere with the ecological integrity of the park.</p>
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		<p>It was recommended that a report should be compiled following the carrying out of a joint assessment of the new proposed route.</p>
<p>3</p>	<p>MEETING RECOMMENDATIONS AND CONCLUSION</p>	<p>The following was agreed:</p> <ol style="list-style-type: none"> 1. Both organizations are to carry out a site visit 2. A Rapid ecological assessment is to be carried out 3. Environmental Impact Assessment to be provided by KPLC. 4. Cadastral Survey to be carried out <p>Once the above are provided, KWS shall then provide their consent for the proposed wayleave and access to the park for the proposed relocation.</p> <p>The Asst. Director (Nakuru) briefed the team on the current situation in the park highlighting that the submerged towers pose a risk to the wildlife in the park. He reiterated the urgency for the relocation of the 9 towers.</p> <p>He further indicated that there is need for the wildlife to be protected hence the proposed relocation project should be expedited.</p> <p>Conservation Fee</p> <p>The chair highlighted that the Conservation Fee that is not a levy but a habitat restoration for the ecological disturbance during the infrastructure installation. He informed that KWS has been collecting the conservation fee from other institutions as well. He explained that the money is deposited to KWS endowment fund and supports control of invasive species among other restoration park programmes. The Chair added that the fee is a form of biodiversity offset to compensate for residual impacts of public infrastructure in wildlife conservation areas.</p>

		<p>Mr. Nthuni indicated that KPLC's request for waiver of the Conservation Fee would be discussed with the KWS Board and an update given on the same.</p> <p>Both organizations agreed on the tentative dates to carry out the joint site visit would be – 5th to 9th October 2020. that the tentative visit to the site</p>
5	A.O.B	There being no other business the meeting was adjourned at 12:30Hrs

5.8.2 Minutes of 2nd meeting between KWS and KPLC in regard to the project held at Lake Nakuru National Park



Minutes Of The Meeting Between KWS And KPLC Held On 2nd February 2021 At Lake Nakuru National Park On Re-Routing Of a 132 KV Double Circuit Transmission Line

MEMBERS PRESENT

	NAME	INSTITUTION	EMAIL	CELL PHONE
1.	Dickson Ritan -chair	KWS	dicksonr@kws.go.ke	0727990498
2.	Peter Njiiri Mwangi	KWS	pnjiiri@kws.go.ke	0722487341
3.	Judy Akinyi Adipo-secretary	KWS	jadipo@kws.go.ke	0722280183
4.	Collins Ochieng	KWS	cochieng@kws.go.ke	0734201201
5.	Joseph Edebe	KWS	edebej@kws.go.ke	0721491085
6.	Evelyn Silali	KWS	esilali@kws.go.ke	0723885090
7.	Eng. George Korir	KPLC	Gkorir@kplc.co.ke	0722246577
8.	Eng. Paul Mungai	KPLC	pwmungai@kplc.co.ke	0722961444
9.	Eng Henry Pwani.	KPLC	Hpwani@kplc.co.ke	0722164134
10.	Gerald Kwedho	KPLC	gkwedho@kplc.co.ke	0724495955
11.	Julius Marete	KPLC	jmatere@kplc.co.ke	0722803072
12.	Zadock Rotich	KPLC	Zkipkorir@kplc.co.ke	0725801346
13.	Acenactius Manyara	KPLC	Amanyara@kplc.co.ke	0724441867
14.	John Kuria	KPLC	jkihanya@kplc.co.ke	0722459649
15.	Joan Waweru	KPLC	jneriwaweru@kplc.co.ke	0720300707
16.	Peninah Njoki- co-secretary	KPLC	pnjokimungai@kplc.co.ke	0719671127

Agenda

1. Opening of the meeting and Introduction of Members
2. Review of last meeting minutes
3. Deliberation on the recommendations and conclusion
4. Site visit of the proposed route site visit
5. Any other business

MIN. NO	AGENDA ITEM	DELIBERATIONS
1	OPENING REMARKS & INTRODUCTION	<p>The meeting was called to order at 2.51hrs with a word of prayer from Mr. Wilfred Koech. The Chair welcomed members to the meeting and invited members to introduce themselves. The chair apologized for delayed meeting time and for members who were unable to attend the meeting due unavoidable circumstances. Eng.Korir on behalf of the KPLC thanked KWS team for their warm welcome and introduced Nakuru county business manager- Eng. Pwani. He affirmed that KPLC was keen to work with KWS on any concerns and encouraged for more engagement in the future.</p>
2	REVIEW OF LAST MEETING MINUTES	<p>The previous minutes of the meeting held on 30th September 2020 between KWS & KPLC were read through by Ms. Judy Akinyi. Members went through the minutes and corrected and added the erroneous mistakes. The minutes were proposed by Eng. Paul Mungai and seconded by Mr. Collins Ochieng.</p>
3	DELIBERATION ON THE PREVIOUS RECOMMENDATION AND CONCLUSION	<p>Following review of the previous recommendations and conclusions, the team agreed on the following:</p> <ol style="list-style-type: none"> 1. The team was informed that the proposed new route is approximately 5.2Km of double circuit 132KV Transmission line from tower 747-near Mwariki substation, passes behind KWS offices along the fence and joins-in at tower 763. The proposed line is parallel to the pipeline line which also runs along the fence. 2. On rapid ecological assessment reports, team was informed that the report will present all the issues and mitigations that is required by both organizations. Mr. Mwangi inquired on how many towers will be removed and how many are passing through the park. Mr. Rotich responded by indicating that the towers started from No. 747 to 762 which are about 15 towers of the old lines. The KPLC team indicated that it will be a heavy task to remove the towers while the water is still high and if possible wait till the water recedes. The Chair gave a deadline period of up to 12th February 2021 for the final report but all the information should be given by end of the week. 3. On environmental impact assessment, Mr. Koech informed the meeting that the process was already started in 2016 but not finalized. He confirmed that KPLC will take responsibility but requested that KWS will support KPLC on site visits and any inputs required. The report should be availed by 2nd March 2021. <p>Mr. Joseph informed the team that there are complaints from stake holders regarding bird's collision with power lines especially at Lake Elementaita area where several birds have been electrocuted. He requested and encouraged KPLC to adopt new technologies (e.g. use of reflectors) to design the new lines</p>

		<p>especially at sewage area. He advised that the joint ecological report carried out between KWS and KPLC will have greater impact in bird's protection.</p> <p>4. On cadastral survey of the new route, Mr. Kuria confirmed to the team that it was already done. This was to be a joint survey exercise but was carried out by the KPLC and the Nakuru area scientist in 2019. The team agreed to affirm the new route by conducting site visit. KPLC team informed the team that they had already approached NAWASCO on the issue and were in agreement although they had to consult with KWS.</p> <p>County business manager Mr. Pwani thanked KWS for the cooperation shown during the project. He reiterated that UEB line is very critical since it ties West Kenya to rest of the grid. He requested the participating teams to acknowledge the urgency of the project as time is of essence. He confirmed that all submerged transmission lines are energized. He informed the team that if water subsides, the lines will be recovered. The chair requested that honey moon hill line be considered during re-routing design. He also requested that the sub lines that are passing through the park should also be taken into consideration.</p>
4.	SITE VISIT OF THE NEW PROPOSED SITE	<p>The team had a site visit at 4.30 pm where they began by looking at the proposed new line and the first tower will Take-off from Tower 747 at an angle of 44 degrees towards honeymoon hill.</p> <p>At the gate into the park the team noted that general alignment of the line will passes parallel to Kenya pipe line infrastructure hence observing the way leave.</p> <p>At NAWASCO: The Team observed that there were some developments that took place after the route assessment that was carried out in 2019. The KPLC team agreed to look into the issue and re-align again.</p> <p>At the last tower, the Team arrived at Tower 764 and 765 being the last at the park towards the fence boundary. KWS team requested that they use Tower 765 instead of Tower 763 on the new route alignment. KPLC team agreed to redesign the line and advise accordingly.</p>
5.	A.O.B	<p>There being no other business, the chair thanked members for their patience and urged KPLC team to seriously consider the proposed project alternatives.</p> <p>Eng. Korir acknowledged the good team work and thanked KWS team for their participation and continued support since several KPLC infrastructures are passing through many parks.</p> <p>Having no other business the meeting was adjourned at 1848Hrs. The next meeting was being on 3rd February 2021 at KWS offices.</p>
6.	RECAP MEETING	<p>The meeting started at 1441hrs With a word of prayer from Ms Judy. The chair requested for an introduction since there was a new member to the team.</p> <p>The chair acknowledged that the team did a joint site visit to clearly understand the new route. The chair invited members to give their reviews on alignment and jointly own it so that the report will be all inclusive.</p> <p>The chair requested for an update on the proposed line termination at tower 765.</p>

		<p>Eng. Korir confirmed that a new design was done terminating at tower 765. He informed the meeting that new proposal will be 6.2KM and having 21 towers as compared to previous proposal being 5.2km. However, wayleaves clearance remains 40M. The designs were already shared with KWS surveyor.</p> <p>Mr. Mwangi thanked KPLC for seriously considering new route proposals.</p> <p>Mr Zaddock informed the meeting that KPLC paid a visit to NAWASCO as agreed. It was noted that there is a new technical manager thus they requested for a letter.</p> <p>Mr Mwangi advised that KPLC share new route alignment with NAWASCO and inform the warden in case of any changes on the proposed route. He also advised that KWS to be invited for any future meetings between KPLC and NAWASCO.</p> <p>There being no further business, the chair thank KPLC for supporting the process.</p> <p>Eng. Korir appreciated good will expressed by KWS and said KPLC was looking forward to an interactive future.</p>
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5.8.3 Minutes of the 3rd Key stakeholder consultation meeting held between NAWASSCO and KPLC at Nakuru

The meeting was held between NAWASSCO and KPLC team in two different occasions to discuss the project and agree on the route and wayleaves to ensure that safety is guaranteed. The team was able to agree on the route after surveying the area. The proceedings of the two sessions of deliberation are captured in the minutes below



Minutes Of The Meeting Between NAWASSCO And KPLC Held On 15th April 2021 At NAWASSCO Sewerage Treatment Plant On Re-Routing of 132 KV Double Circuit Transmission Line

Venue: NAWASSCO Sewerage Treatment plant offices

Members Present

	NAME	INSTITUTION	EMAIL	CELL PHONE
1.	Gerald Kwedho – Chair	KPLC	gkwedho@kplc.co.ke	0724495955
2.	Zadock Rotich	KPLC	zkipkorir@kplc.co.ke	0725801346
3.	John Kuria	KPLC	Jkihanya@kplc.co.ke	0712459649
4.	Pius Nyaga	KPLC	pngari@kplc.co.ke	0723581424
5.	Richard Kimani	KPLC	Rkagina@kplc.co.ke	0722892344
6.	John Irungu	NAWASSCO	Johnirungu50@gmail.com	0723910867
7.	Paul Kimani	NAWASSCO	kymepa@gmail.com	0724653969
8.	Erastus Maina	NAWASSCO	Gis.era92@gmail.com	0724051308
9.	Paul Mungai	KPLC	pwmungai@kplc.co.ke	0722961444
10.	Julius Mwaniki	KPLC	jkmwaniki@kplc.co.ke	0722396360
11.	Julius Marete	KPLC	jmarete@kplc.co.ke	0722803072
12.	Ali Yarrow	KPLC	ayarrow@kplc.co.ke	0722788658
13.	Charles Ruttoh	KPLC	CKipngenoRuttoh@kplc.co.ke	0722475822
14.	Peninah Njoki- Secretary	KPLC	pnjokimungai@kplc.co.ke	0719671127

Agenda

1. Opening of the meeting and Introduction of Members

2. Project overview and proposed route
3. Site visit of the proposed route
4. Any other business

MIN. NO	AGENDA ITEM	DELIBERATIONS
1	OPENING REMARKS & INTRODUCTION	The meeting was called to order at 1133hrs. The Chair welcomed members to the meeting and invited members to introduce themselves.
2	PROJECT OVERVIEW AND PROPOSED ROUTE	<p>Mr. Mungai informed the meeting that there are nine (9) towers submerged in Lake Nakuru thus the need to reroute to higher grounds. The rerouting project had started in 2017 and all stake holders were involved namely KPLC, KWS & NAWASSCO but was terminated due to delayed resolution of way leaves issue with KWS. However, the meeting was informed that the issue has since been resolved and KWS has approved the route.</p> <p>Meeting noted that the NAWASSCO team involved at the time had retired thus the need to introduce the new team to the proposed route.</p> <p>Meeting acknowledged that there are limited options to the proposed route since the lower side has NAWASSCO ponds and on the upper side, there are the pipeline and settlements.</p> <p>Mr. Zadock advised the meeting on the general orientation of the proposed route starting from Mwariki (tower 747), running parallel to Kenya pipeline infrastructure. He informed the meeting that two towers will be located on NAWASSCO land. Allowable way leaves clearance is thirty (30) meters hence there will be limitation of land use on the said path to avoid breaching of electrical clearance for example:</p> <ul style="list-style-type: none"> ● No construction under the line. ● No planting of trees. ● No raised soils. ● No excavation near the tower base. <p>NAWASSCO team informed the meeting that there were future expansion plans and requested for more time to consult directors.</p> <p>The team expressed concern in the event of a breakdown of the transmission line necessitating NAWASSCO staff to clear the site since sewage never stops flowing.</p> <p>KPLC team confirmed such cases are very rare to occur. However, meeting was informed that some design considerations can be done for example installing a guard net and raising tower height to allow for ten (10) meter ground clearance.</p>

4.	SITE VISIT OF THE PROPOSED ROUTE	<p>The Team observed that there were some developments that took place after the route assessment that was carried out in 2017.</p> <p>The proposed route center line was marked out. It was noted that NAWASSCOAL factory building and some greenhouses may have to relocate.</p> <p>The possibility of having the line on upper side of NAWASSCO offices was weighed and confirmed to be impossible due to pipeline infrastructure. This would also affect the office.</p> <p>Meeting agreed to peg the center lines and way leaves path of the proposed route for ease of identification by NAWASSCO team during site visit with top management.</p> <p>NAWASSCO committed to give a feedback on Wednesday 21st April 2021, listing recommendations/proposals/options/conditions to be adopted.</p>
5.	A.O.B	<p>There being no other business, the Chair thanked NAWASSCO team for attending the meeting and reiterated that the line is very critical as it ties West Kenya to the rest of the grid and any breakdown on the line will have far reaching effects. He reminded the meeting that some towers have been submerged in saline waters for more than ten years thus integrity of the line is highly compromised.</p> <p>The meeting was adjourned at 1348Hrs. The next meeting will be on 23rd April 2021 at NAWASSCO treatment plant offices.</p>

5.8.4 Minutes of the 4th meeting held between KPLC and NAWASSCO in Nakuru



Minutes Of The Meeting Between NAWASSCO And KPLC Held On 27th April 2021 At NAWASSCO Sewerage Treatment Plant On Re-Routing Of 132 KV Double Circuit Transmission Line

Venue: NAWASSCO Sewerage Treatment plant offices

Members Present

	NAME	INSTITUTION	EMAIL	CELL PHONE
1.	Gerald Kwedho – Chair	KPLC	gkwedho@kplc.co.ke	0724495955
2.	Zadock Rotich	KPLC	zkipkorir@kplc.co.ke	0725801346
3.	John Kuria	KPLC	Jkihanya@kplc.co.ke	0712459649
4.	Pius Nyaga	KPLC	pngari@kplc.co.ke	0723581424
5.	Richard Kimani	KPLC	Rkagina@kplc.co.ke	0722892344
6.	Simon Maina	NAWASSCO	maina@nakuruwater.co.ke	0722430071
7.	Paul Kimani	NAWASSCO	kymepa@gmail.com	0724653969
8.	Erastus Maina	NAWASSCO	emaina@nakuruwater.co.ke	0724051308
9.	Paul Mungai	KPLC	pwmungai@kplc.co.ke	0722961444
10.	Julius Mwaniki	KPLC	jkmwaniki@kplc.co.ke	0722396360
11.	Julius Marete	KPLC	jmarete@kplc.co.ke	0722803072
12.	Charles Ruttoh	KPLC	CKipngenoRuttoh@kplc.co.ke	0722475822
13.	Peninah Njoki- Secretary	KPLC	pnjokimungai@kplc.co.ke	0719671127

Agenda

1. Opening of the meeting and Introduction of Members
2. Deliberations on the recommendations by NAWASSCO
3. Site visit of the proposed route
4. Any other business

MIN. NO	AGENDA ITEM	DELIBERATIONS
1	OPENING REMARKS & INTRODUCTION	The meeting was called to order at 1506hrs with prayers from Mr. Kwedho. The Chair welcomed members to the meeting and invited members to introduce themselves.
2	DELIBERATIONS ON RECOMMENDATIONS BY NAWASSCO	<p>NAWASSCO team informed the meeting that based on previous meeting deliberations, the proposed route had not been clearly communicated to the previous regime. Meeting was informed that there are new constraints to be considered on possibility of expansion. He acknowledged that if route were to remain as previously proposed, many structures may have to move and such a disruption would not be welcome since sewage treatment is a continuous process that needs to be monitored closely.</p> <p>Mr Kimani (NAWASSCO) informed the meeting that an internal meeting and site visit with top management proposed a route further down towards the ponds since this will ensure no existing structures are affected. He also noted that in the event of a breakdown on the line, this will cause minimum interruptions in terms of service. This part of treatment does not require constant monitoring by humans unlike upper part.</p>
4.	SITE VISIT OF THE PROPOSED ROUTE	<p>The meeting was shown the general orientation of the proposed route. Sewer lines to be avoided were identified</p> <p>Meeting noted that there will be one additional tower and the span length will change, with also an additional span within KWS area.</p> <p>The chairman requested the designers/surveyors to pick coordinates of all existing structures in the area so as to have as much information to facilitate comprehensive design of the proposed route.</p> <p><u>RECOMMENDATIONS</u></p> <ol style="list-style-type: none"> 1. KPLC to share feedback on the proposed route by Wednesday 5th May 2021 (hard copy drawings and letter) for wayleave approval by NAWASSCO. 2. NAWASSCO to give feedback two days after delivery of the letter. 3. KPLC to carry out an environmental assessment of the area to confirm if the area is a bird path that can cause line interruptions. 4. KPLC to request for a meeting with KWS since there are slight changes in the route within KWS premises.
5.	A.O.B	<p>Mr. Marete thanked NAWASSCO team for providing suitable alternative for the route.</p> <p>There being no other business, the Chairman thanked NAWASSCO team for their considerations. He informed the meeting that the proposal will be analyzed fully and that KPLC will try to fit in the proposed area. He informed the meeting that KPLC is</p>

		looking forward to the next meeting that will include all stake holders (KWS, KPLC & NAWASSCO) The meeting was adjourned at 1558Hrs.
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5.8.5 Public consultations with Local community and other organizations that neighbour the Lake Nakuru National Park

The public especially businesses near KWS gate and those near KWS boundary were consulted. County 32 Hotel, Kaloleni Primary school and Flamingo Primary school were all engaged through face to face interviews using pre design questionnaire where questionnaires were distributed for the public to give their individual concerns and suggestions towards the project.

5.8.5.1 A sample of the comments collected through questionnaires which are attached at the annex section.

Name	Positive impacts	Negative impacts	Suggested mitigation
Nakuru Director Environment Natural Resources, Water and Energy – Kimotho Mungai	<ul style="list-style-type: none"> • Employment opportunities • Reduction of power related risks • Reduce loss of aquatic lives that may arise due to falling of electric power towers caused by rising of water levels 	<ul style="list-style-type: none"> • Vegetation clearance • Waste generated • Noise and air pollution • Disruption of wildlife ecosystem 	<ul style="list-style-type: none"> • Re-vegetation of disturbed areas with native plant species • Waste generated should be disposed by CGN and NEMA registered waste handlers • The contractor to adhere to EMCA noise and excessive vibration pollution control regulation of 2009. • Supports the project
NAWASSCO – Technical Manager	<ul style="list-style-type: none"> • Stable power supply and protection from damage by salty water of lake Nakuru 	<ul style="list-style-type: none"> • Infringement on the NAWASSCO sewage treatment plant 	<ul style="list-style-type: none"> • Need for wayleaves agreement between KPLC and NAWASSCO • Supports the project
Kenya Pipeline – Lanet	<ul style="list-style-type: none"> • Increase in Job opportunities for the residents • Reduction of Risk to the lake 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Supports the project

<p>E.K Bett Mechanical Engineer</p>	<ul style="list-style-type: none"> Continual provision of power supply to homes , institutions and industries 		
<p>Kenya forest Service (KFS) Mau Head of Forest Conservancy</p>	<ul style="list-style-type: none"> Reduce the risk which the line poses to the lake and the public Enhance reliability and security of power supply 	<ul style="list-style-type: none"> Reducing forest cover May interfere with the soil of the wayleave which may cause soil erosion 	<ul style="list-style-type: none"> The construction to be done during the right season (weather) Plant more site friendly tree species Supports the project provided the right procedures
<p>Samuel Wanguo</p>	<ul style="list-style-type: none"> Assured certainty of uninterrupted power in our business premises and homes Reduced (zero) risk of destruction in case the power line fell on the ground in water 	<ul style="list-style-type: none"> None because the line is outside the farming areas 	<ul style="list-style-type: none"> Fully support the proposed project
<p>KWS Central Rift Region</p>	<ul style="list-style-type: none"> Alleviate existing risks due to submerged power at Nakuru National Park 	<ul style="list-style-type: none"> Collision and electrocution of birds by power lines Destruction and modification of habitats through tree cutting and vegetation clearing Visual intrusion 	<ul style="list-style-type: none"> Installing underground cables Insulation of power line within the park side Use of elevated perches and diverters that discourage large birds of prey from perching Maintaining a distance of 30m from the fence line Keeping the power line away from the main tourist circuit Ensure decommissioning of the currently submerged line by removing all the power line infrastructure from the site. KWS staff to be

			<p>present during the removal</p> <ul style="list-style-type: none"> • Follow up with KWS headquarters on issues of way leave approval in some sections • Adhere to the routing proposed during field visit • Consult Kenya Pipeline on the safe distance from the pipeline • During operation phase ensure adequate routine maintenance of the power lines • KWS supports the project if all proposed mitigation measures and interventions outlined are put into consideration and implemented by Kenya Power
<p>Catherine Karime DHT- Kaloleni Primary school</p>	<ul style="list-style-type: none"> • Relocation of the line along the fence will reduce human/wildlife conflict 	<ul style="list-style-type: none"> • Electric shocks may occur • Short circuiting 	<ul style="list-style-type: none"> • Regular project monitoring • Support the project
<p>Head Teacher Flamingo primary school</p>	<ul style="list-style-type: none"> • Relocating the line will prevent accidents and outages in industries and in homes 	<ul style="list-style-type: none"> • In case of an emergency caused by snap breaking of the wires, it can cause death to wildlife in Lake Nakuru National park 	<ul style="list-style-type: none"> • Regular repair and maintenance of the power line
<p>Winnie Wayua</p>	<ul style="list-style-type: none"> • Enhance security of the animals 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Support the project
<p>Sarah Wangui</p>	<ul style="list-style-type: none"> • Employment opportunities especially during construction 	<ul style="list-style-type: none"> • Safety of power to be considered 	<ul style="list-style-type: none"> • Supports the project

Francis Njuguna	<ul style="list-style-type: none">• Vijana watapata Kazi	<ul style="list-style-type: none">• Don't know	<ul style="list-style-type: none">• Support the project
Moses Kabucho	<ul style="list-style-type: none">• Create employment for the residents	<ul style="list-style-type: none">•	<ul style="list-style-type: none">• Close association with wildlife experts to ensure that normal operation and use of the animals continues

View and comments collected through questionnaires

5.8.6 Summary of the consultations during preparation of EIA project report

Basically all the stakeholders consulted are in agreement that the section of the line that is in water need to be relocated as a matter of urgency. KPLC, KWS and NAWASCO jointly carried out survey works in order to agree on the most appropriate route for the new section to be relocated. The new section/route is still within the national park and has been pushed further away to the periphery/near the parks boundary and will cover a distance of 6.2km.

5.9 Consultations carried out during preparation of full ESIA study report

The EIA report as submitted to NEMA and the advice was that a full study should be carried for the project alongside further consultations. During this phase several consultations were carried out with various stake holders and the general public and are presented as follows;

- 1) Key informant interviews with key stake holders:
- 2) Public meeting with residents of Flamingo ward where the project lies
- 3) Consultations with key stakeholders alongside an ecological study.

5.9.1 Consultations with key stakeholders

The ESIA team engaged selected key stakeholders deemed to have various interests in the park and engaged them through face to face discussions and some through questionnaires. The stakeholders supports the rerouting of the said section and noted that mitigation measures need to be put in place so that minimum disturbance is occasioned to the Parks ecosystem.

The following table presents the views of the stakeholders as captured through questionnaires.

No	Organization	Views on the project	Positive impacts	Negative impacts	Suggested mitigation measures
1	Wildlife clubs of Kenya; Lake Nakuru Environmental Education centre Director –Anam Echakari	-Consultations with stakeholders to array any fears -supports the project	-Casual jobs -uninterrupted power supply -KPLC to participate in conservation	-Reduced grazing land during construction -Damages to environment during construction	-Designated different entrance to construction site -Sensitize workers on need to respect and care for environment -KPLC to compensate KWS
2	Park Action Committee-representing park tenants-Chairman Mr Kuria	Positive -supports the project	Isolation from the protected area safe for the animals	N/A	N/A
3	Director Environment Energy and natural resources; County Government of Nakuru–Madam Grace	-Project is ideal as it serves many sectors so rerouting is ideal -Supports the project	Continued power supply for development	-Accidents and loss of property	-Proper planning -Implementation of safety measures -Timely information sharing to the affected -all activities to be done in an environmentally manner

4	Water Resources Authority –Regional manager	-Rerouting will be useful as it will help safeguard property and life in the park and the marine life in the lake -Supports the project	-Reduction of dangerous exposure to electrocution and shocks to life in the park	-Clearance of vegetation -Noise pollution during construction	-Proper designs of the project to minimize vegetation clearance and noise pollution -Stakeholder sensitization
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5.9.2 Minutes of the Public participation/consultations meeting conducted with the public for Flamingo ward in Nakuru County

Further consultations with the general/public was conducted through a baraza for Flamingo ward to reach out to the public about the project and allow them give more views.

Minutes of the meeting held in regard to the proposed project on 6/12/2022 at Langa Langa Hospital ground.

Time -10.33 a.m.

Agendas:

- Opening remarks
- Project Brief
- Proposed route
- Role of Integrated Environmental Impact Assessment
- Feedback from the stakeholders

Minute 1-6/12/2022: Opening Remarks

The meeting began at 10.33 a.m. with a word of prayer from a pastor and was moderated by the Ward Administrator for Flamingo ward. He requested the attendants to briefly introduce themselves. He invited the Chief Langa Langa location to welcome the people and make remarks. The chief welcomed the people and asked them to participate in the deliberations.

The Ward Administrator also invited the sub county administrator to greet the people and make his remarks. The Sub county administrator greeted the people and noted that participation by the public is crucial as it allows different views to be brought on board and it enhances inclusive development.

The ward administrator then invited the MCA-Member of County Assembly for the Flamingo ward. The MCA greeted the people and said he is for development and is ready to work with the people to realize the development agenda for the ward.

Minute 2: 6/12/2022: Project Brief, Role of ESIA and Proposed route for the section to be relocated.

The ESIA team leader/Environmentalist noted that KPLC intends to reroute a section of its existing 132KV dual transmission power line that is within Lake Nakuru National park. He noted that the line was installed before the lake and its surrounding was designated as a national Park and the line has been in operation since 1957 as the main power supply

to Nakuru and Western Kenya region. He said that the Lake Nakuru water levels have been gradually rising which has affected infrastructure that is in the park including the power line whose section of about 3km is currently in water.

He noted that KPLC and KWS and NAWASCO have been in communication and had worked in partnership in choosing a new route for the section to be rerouted. He said that KPLC had carried out Environmental Impact Assessment and submitted a project report to National Environmental Management Authority (NEMA) in April 2022. He said that NEMA has advised KPLC to carry out an ESIA study which needs wider public consultations and an in-depth coverage of the impacts and mitigation measures to guide project planning and implementation and hence the need for the meeting to provide an opportunity for informing more stakeholders about the project and also give them a chance to give their views/ information that is crucial in making the project a success. He said that views will go a long way in informing the design and implementation phases of the project. He added that the role of ESIA is a planning tool that guides project planning and implementation so that projects are implemented in a manner not to adversely affect the environment.

Proposed Route

He noted that KPLC, KWS and NAWASCO jointly carried out survey works in order to agree on the most appropriate route for the new section to be relocated. The new section/route is still within the national park and has been pushed further away to the periphery/near the parks boundary and will cover a distance of 6km and so no private property will be affected. The area where the line will pass through is at the periphery of the park which has grass land, shrubs and few scattered acacia trees.

Minute 3: 6/12/2022: Role of IEIA and Positive Impacts

The ESIA team leader (Simon) explained that the public participation forum was held for various reasons key among them being; to ensure appropriate project information and environmental and social risks and impacts is disclosed to stakeholders in a timely and accessible matter, to establish and maintain constructive relationships and means for effective and inclusive engagement with stakeholders on issues that could affect them and to enable stakeholder's views to be considered in project design and implementation.

He noted that ESIA is being conducted in line with EMCA 1999; 2015 amendments and the Environmental Impact Assessment/Environmental Audit Regulations 2003. Members were informed that minutes for the meeting would be attached to the IEIA project report of the proposed project that would be submitted to NEMA for review and Licensing.

The ESIA expert went further to explain environmental management is currently a core consideration in any development projects. It was noted that any development must ensure environmental and social protection and so sustainable development was a major consideration.

It was explained that a project presents both positive and negative impacts. The positive impacts of the proposed project as discussed are listed below;

- Avert potential risks to the Nakuru National Park Ecosystem from the submerged portion of the transmission line
- Ensure reliable power supply to Nakuru county and the Western region
- Creation of employment
- Market for materials used in the project

Minute 4: 6/12/2022: Negative Impacts and Mitigation Measures

The negative impacts associated with the project were also discussed. The impacts were discussed alongside their mitigation measures as presented in the table.

Potential Impact	Proposed Mitigation
Vegetation clearance	<ul style="list-style-type: none"> • Re-vegetation of disturbed areas with native plant species; • Undertake selective clearance by removing tall woody species leaving shrubs for quick regeneration of vegetation along the way-leave.
Soil erosion	<ul style="list-style-type: none"> • Soils excavated for the erection of towers should be used for re-filling and should not be left exposed to wind or water for long periods • Avoid construction during heavy rain season
Air Pollution (dust, fuel emissions)	<ul style="list-style-type: none"> • Construction vehicles to drive at low speed • Water should be sprayed during the construction phase on excavated areas • Provision of dust masks for use when working in dusty conditions
Water Pollution	<ul style="list-style-type: none"> • Control soil erosion • No maintenance of construction vehicles within the park • Proper solid waste management
Power line related avifauna mortalities	<ul style="list-style-type: none"> • To minimize collision, undertake wire-marking to alert birds to the presence of power line, allowing them time to avoid the collision. • Build raptors platforms on top of towers for roosting and nesting.
Risk of fire	<ul style="list-style-type: none"> • Ensure no littering within the park • No smoking by workers is allowed in the park
Management of Solid Waste	<ul style="list-style-type: none"> • Proper disposal of solid waste.
Working at heights	<ul style="list-style-type: none"> • Work of this nature will be done only by skilled workers only • Use of helmets and other protective devices
Visual impact	<ul style="list-style-type: none"> • Considering height of the towers and blending them with the environment. • The realignment along the park fence has also avoided visual intrusion within the natural Park Landscape
Social impacts related to labour influx	<ul style="list-style-type: none"> • Employ many people from the community as much as possible • Stakeholder engagement with workers on appropriate interactions with the local community.

Minute 5: 6/12/2022: Feedback from stakeholders-Open forum for questions and suggestions

S/No	Name	Suggestions/Suggestions	Response from KPLC
<u>Questions</u>			
1.	Dickens Omondi	Will our houses be affected	The section to be constructed is being relocated within the Lake Nakuru national park and so no residential houses will be affected
2.	Barnabas	How shall we know that the contractor is on the ground	Thorough the chief's office. Contractors are instructed to report at the chief's office first.
<u>Suggestions</u>			
3.	Dickens	The project should be fast tracked to prevent the potential risks	Noted
4.	Joseph Mutahi	KPLC need to see how the bolts can be firmly fasted to keep of vandals	Noted
5.	The MCA Flamingo ward	80% of the unskilled jobs should be allocated to the local community	Noted

The people of Flamingo ward supports the project and noted that KPLC has a responsibility to fast track the project and ensure proper workmanship during construction. They also requested for job opportunities.

List of attendance



STAKEHOLDER ENGAGEMENT FOR INTERGRATED ENVIRONMENTAL IMPACT ASSESSMENT (IEIA) STUDY FOR THE PROPOSED REROUTING OF 132KV DUAL TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

MEETING VENUE... LANGATANGA HOSPITAL

DATE... 06/12/2022

LIST OF ATTENDANCE

No	NAME	Identification number -ID No	Mobile No.	Organization/Village	Gender	SIGN.
1.	Rodgers Oloo	35664024	0706830991	Environment Conservation	Male	
2.	George Kamukama	22047152	0707360228	KWAP Center	M	
3.	Veronica Kamau	8948539	0722375628	J.P.R.C	F	
4.	JOSEPH MUTAI	22654408	071120102	Flamingo	M	
5.	Loch Njugui	22848104	0724650912	Sec MCA	F	
6.	Alex Tuma	23235411	0721261852	Pa. mon	M	
7.	Grace J. Cheseri	22021280	0711070293	Environment Conservation / Langata	F	
	Samuel Mbugua	22288101	0720956314	KPLC NRB	M	
8.	Roseine Njeri	14676394	0720571017	KPLC NRB	F	
9.	Simon Mwangangi	14423210	0722595006	KPLC NRB	M	
10.	Loch Eiolu	22473223	0720702504	C.H.V	F	
11.	Kamau Njugui	22204755	0720157024	Glennan/ Langatanga Cheseri	M	
12.	Renneth Mwira	11899805	0715418108	Rw. D	M	



No	NAME	Identification number -ID No	Mobile No.	Organization/Village	Gender	SIGN.
31	BERNADE BNYTU	22019991	0716327289	Lakeview	FEMALE	
32	Mary Wanjare	1366666	0729 297850	Lakeview	Female	
33	Ranside Nais	6203955	0724550	Mt Kenya Club Lomani Gichuhyi	M	
34	Shella Wanjare G.	21784506	0723687535	Lang'langa	Female	
35	KINET KERUBO	23298339	072793950	Lakeview	Female	
36	ISAAC NDURITO	1077450	072386898	Lakeview	Male	
37	JOSEPH KIMANI	0403984	0737190947	Lakeview	male	
38	PERIN SYOMBWA	2791253	0793491026	B.O.M Kimati P.M	Female	
39	NATALI NTAMBWEA	20283342	0215536057	KOM-GWANGA	MALF	
40	JEFF M KARUKI	25608883	071804530	Flamingo	MALE	
41	SARAH W. KIMANI	27225704	0701609090	PARICANI	FEMALE	
42	Sammy J. Mwangi	32442156	071122030	PARICANI	MALE	
43	VICTOR LIUMPA L	27427278	070736966	W	MALE	
44	Isaac Njeru	30880772	0702539741	Jumuye	MALE	
45	JAMES K MUIOLA	24167166	0799902873	FLAMINGO	MALE	
46	CLEOPHAS MWANGI	21676984	0726110888	FLAMINGO	MALE	
47	MONICA NJERI	28840961	0726493986	FLAMINGO	FEMALE	
48	David Kiseyo	23690209	0729349985	Lakeview	Male	



No	NAME	Identification number -ID No	Mobile No.	Organization/V illage	Gender	SIGN.
49	JAMES SANCY	24190887	0702354154	FLAMINGO	MALE	
50	ANTONY KAMAU	20471530	0703671951	FLAMINGO	MALE	
51	JOHN KITHIKA	28261239	0718889333	FLAMINGO	MALE	
52	DAVID WACHIRA	20455564	0718253645	FLAMINGO	MALE	
53	EVANS MUMBI	25504846	0731237376	FLAMINGO	MALE	
54	AUGUSTINE MBUGUA	31855737	0768307477	KIRATI	MALE	
55	PETER MWANGI	26916821	0724252102	KIRATI	MALE	
56	DAVID KIRATI	2361736	0720477107	FRANCIS	MALE	
57	FRANCIS KARIUKI	31853196	0768195267	FLAMINGO	MALE	
58	JOHN MWANGI	0328248	0729932298	FRANCIS	MALE	
59	KORIR VICTOR R	3284514	0729440856	FRANCIS	MALE	
60	MURRAY MURRAY MURRAY	26688232	0794817193	FRANCIS	FEMALE	



STAKEHOLDER ENGAGEMENT FOR INTERGRATED ENVIRONMENTAL IMPACT ASSESSMENT (IEIA) STUDY FOR THE PROPOSED REROUTING OF 132KV DUAL TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

MEETING VENUE... LANGADAN HOSPITAL

DATE... 06/12/2022.

LIST OF ATTENDANCE

No	NAME	Identification number -ID No	Mobile No.	Organization/Village	Gender	SIGN.
1.	Samuel Mbugua	22288101	0720956314	KP/C MRS	M	[Signature]
2.	Lucy NJERI MACHARI	9858840	0729661082	-	F	[Signature]
3.	EMMA WANJIRO	34556474	070939888	CGN-ENVY	F	[Signature]
4.	EMMA WANJIRO	27557803	0710755310	CGN-Enviro	F	[Signature]
5.	FRANCIS KARIUKI	31853296	0768195267	Flamingo	M	[Signature]
6.	Wilson Ooro	36185037	0727567291	CGN Dept. locals	M	[Signature]
7.	Kevin Taabu	29661777	0715873453	Flamingo youth	M	[Signature]
	Naomi W. Wardeni	31811026	0703981049	langa PktD	F	[Signature]
8.	Betty Muterra	32469254	0725266690	School	F	[Signature]
9.	URSULA OBIRO	8616100	0721677258	SCHOOL	F	[Signature]
10.	JUDITH WANDAHWA	13787884	0712899831	MOAZF	F	[Signature]
11.	DICKSON KORIR	22902199	0710277176	School	M	[Signature]
12.	DORIS AWIMJA	3622852	0711657057	CHV	F	Doris



No	NAME	Identification number -ID No	Mobile No.	Organization/V illage	Gender	SIGN.
31.	WILSON KINYANJUI	20649139	0727848778	KIMATHI	MALE	<i>[Signature]</i>
32.	GEOFFREY KAMAU	13128915	0723870711	L-View	Male	<i>[Signature]</i>
33.	KEN MURIGAI KINYANJUI	38751500	0758593504	KIMATHI	MALE	<i>[Signature]</i>
34.	ROBERT KUNGU KAMAU	28156889	0717587683	FRAMINGO	MALE	<i>[Signature]</i>
35.	JACKSON OSINA	23296106	0798800606	L-View	Male	<i>[Signature]</i>
36.	DANIEL KIMANI NJOROGI	09810915	0700556645	L-View	MALE	<i>[Signature]</i>
37.	FRANCIS GIKARIA	5972662	0720279802	PANGANI	MALE	<i>[Signature]</i>
38.	HARIMU MUSINDI	20340500	072532650	GOVERNOR'S OFFICE	FEMALE	<i>[Signature]</i>
39.	DIANA GATHIGA	24587719	0724846698	M.E. COUNTY SUB-COUNTY	F	<i>[Signature]</i>
40.	IRIZAH MWENDE	20975193	0720655078	PANGANI	F	<i>[Signature]</i>
41.	Aristarchus mutua	24059373	0727759108	Dacecane	M	<i>[Signature]</i>
42.	JACOB N. MULUNZU	32621831	0714379886	MOALIF	M	<i>[Signature]</i>
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STAKEHOLDER ENGAGEMENT FOR INTERGRATED ENVIRONMENTAL IMPACT ASSESSMENT (IEIA) STUDY FOR THE PROPOSED REROUTING OF 132KV DUAL TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

MEETING VENUE...IN RESPECTIVE OFFICES

DATE...7-12/2022

LIST OF ATTENDANCE

No	NAME	Identification number -ID No	Mobile No.	Organization/Village	Gender	SIGN.
1.	Anan Echokan	10987849	0720209626	WCK	Male	[Signature]
2.	JOHN M. KURIA	3620845	0722701727	LAKESIDE WAKINDI	MALE	[Signature]
3.	David Mumo Murgosai	4695344	07-2542503	WRA	Male	[Signature]
4.	Paul Kimani	23926064	0724653969	NAIYAGGEO	MALE	[Signature]
5.	Grace Karanja	20392635	0734448000	C.G.-TOROKU	Female	[Signature]
6.	Roseine Njeri	14676394	0720571017	KPIC	FEMALE	[Signature]
7.	Simon Mwangangi	14623210	072255546	KPLC	Male	[Signature]
	Samuel Wabugua	22288101	0720786314	KPLC	Male	[Signature]
8.						
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10.						
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5.9.3 Consultations carried out during the Ecological studies

It was agreed that an ecological study needed to be carried out along the final route in order to gather baseline data that could inform the study of any impacts for appropriate mitigation measures to be put in place for the protection of the parks Ecosystem. The section below presents discussions held during the ecological study which also involved confirmation of the final route. The deliberations are captured in three different sets of meetings. These deliberations were undertaken in the month of December 2023.

5.9.3.1 Minutes of the Meeting Between KWS and KPLC held on 13th December 2023 at Lake Nakuru National Park On Re-Routing of A Section of Lakuru 132 Kv Double Circuit Transmission Line

MEMBERS PRESENT

	NAME	INSTITUTION	EMAIL
1.	Samuel Tokore -chair	KWS	stokore@kws.go.ke
2.	Collins Nthuni	KWS	cnthuni@kws.go.ke
3.	John Kariuki	KWS	jmacharia@kws.go.ke
4.	Titus Mitau	KWS	tmitau@kws.go.ke
5.	Anastasia Mwaura	KWS	amwaura@kws.go.ke
6.	Derrick Karinga	KWS	dkaringa@kws.go.ke
7.	Judy Adipo	KWS	jadipo@kws.go.ke
8.	Eng. George Korir	KPLC	Gkorir@kplc.co.ke
9.	Paul Mungai	KPLC	pwmungai@kplc.co.ke
10.	Joseph Korir.	KPLC	jkorir-kipngetich@kplc.co.ke
11.	Gerald Kwedho	KPLC	gkwedho@kplc.co.ke
12.	Julius Mwaniki	KPLC	jkmwaniki@kplc.co.ke
13.	Penina Njoki	KPLC	pnjokimungai@kplc.co.ke
14.	Samuel Mbugua-Secretary	KPLC	sgmbugua@kplc.co.ke
15.	Simon Mwangangi	KPLC	smwangangi@kplc.co.ke

Agenda

1. Opening of the meeting and Introduction of Members
2. Review on the progress of the project
3. Ecological Study
4. Site visit and walk through along the proposed routes
5. Confirmation of any other infrastructure along the route of traverse
6. Any other business
7. Recap meeting after field visit

MIN. NO	AGENDA ITEM	DELIBERATIONS
1	OPENING REMARKS & INTRODUCTION	<p>The meeting was called to order at 8.50am by the chair Samuel Tokore Deputy Director KWS. The Chair welcomed members to the meeting and invited members to introduce themselves.</p> <p>Eng. Korir on behalf of the KPLC thanked KWS team for their warm welcome, affirmed that KPLC was keen to work with KWS on any concerns, and encouraged for more engagement in the future.</p>
2	Review of the project progress	<p>Engineer George Korir explained that KPLC had conducted an EIA for the rerouting of the line and submitted the report to NEMA. NEMA reviewed the report and recommended that KPLC conduct a Study report with more in-depth details and wider consultations. Additional consultations were conducted in December 2022 and the only thing pending for the Environmental study report to be submitted to NEMA, was a rapid ecological assessment report for the affected project area..</p> <p>KWS was to provide KPLC with the ecological report for the finalization of the report</p> <p>Engineer Korir also confirmed that KPLC had received a no objection for the line routing from NAWASCO</p> <p>The chair explained that it was very important for the survey team to map existing utilities within the park and overlay with the proposed route to avoid routing the line within existing facilities</p> <p>Survey team from KWS and KPLC was tasked to carry out a cadastral survey of the transmission line route and provide overlay maps of the proposed routes and a justification for the chosen route.</p>
3	Ecological Survey	<p>KWS EIA team was tasked to conduct an ecological survey on the proposed route. Simon Mwangangi an Environmentalist from KPLC explained that the Ecological studies would entail:</p> <ul style="list-style-type: none"> a) Plant survey b) Mammals survey c) Birds Survey d) Herpetofauna Survey e) Baseline conditions f) Description of impacts of the proposed rerouting on the project area g) Description of impacts to the Lake Nakuru from the project scope of works

		<p>h) Description of Sensitive species of importance e.g endangered species and sensitive ecosystems</p> <p>i) Identification of risks and potential impacts and development of an Environmental Management plan for the project</p> <p>j) Identification of cumulative impacts associated with the project</p>
4.	Site visit and walk through along the proposed routes	<p>The chair proposed that the team makes a site visit from the first pylon tower 747 to the terminal pylon</p> <p>The Chair asked environmental team from KWS to take data necessary for the ecological report during the site visit</p> <p>The survey team led by Surveyors Judy Adipo of KWS and Mr Joseph Korir from KPLC led the team along the proposed route.</p>
5.	A.O.B	<p>There being no other business, the chair thanked members for their patience</p> <p>Eng. Korir acknowledged the good teamwork and thanked KWS team for their participation and continued support since several KPLC infrastructures are passing through many parks.</p> <p>The team then embarked on the site visit</p>
6.	Recap meeting after site visit	<p>The meeting started at 1431hrs</p> <p>The chair acknowledged that the team had done the joint site visit to clearly understand the route. He explained that the section within NAWASCO was not covered and would be visited the next day. The chair invited members to give their observations on the site visit</p> <p>Anastacia, a Senior Wildlife officer from KWS; informed the members that much of the route was open grassland except the area around the gate which had a number of Yellow backed Acacia trees.</p> <p>She also Noted that the area from the NAWASCO pond to the terminal pylon had significant number of trees and was ecologically sensitive for it falls under the parks rhino and Lions home range.</p>

Signed:

Eng. George Korir | Ag. Manager – Transmission Network

Date.....

5.9.3.2 Minutes of The Meeting Between KWS And KPLC Held On 14th December 2023 At Lake Nakuru National Park on Re-Routing of A Section of 132 KV Double Circuit Transmission Line

Members Present

	NAME	INSTITUTION	EMAIL
1.	Samuel Tokore -chair	KWS	stokore@kws.go.ke
2.	Collins Nthuni	KWS	cnthuni@kws.go.ke
3.	John Kariuki	KWS	jmacharia@kws.go.ke
4.	Titus Mitau	KWS	tmitau@kws.go.ke
5.	Anastasia Mwaura	KWS	amwaura@kws.go.ke
6.	Derrick Karinga	KWS	dkaringa@kws.go.ke
7.	Judy Adipo	KWS	jadipo@kws.go.ke
8.	Eng. George Korir	KPLC	Gkorir@kplc.co.ke
9.	Eng. Paul Mungai	KPLC	pwmungai@kplc.co.ke
10.	Joseph Korir.	KPLC	jkorir-kipngetich@kplc.co.ke
11.	Gerald Kwedho	KPLC	gkwedho@kplc.co.ke
12.	Eng. Julius Mwaniki	KPLC	jkmwaniki@kplc.co.ke
13.	Penina Njoki	KPLC	pnjokimungai@kplc.co.ke
14.	Samuel Mbugua-Secretary	KPLC	sbugua@kplc.co.ke
15.	Simon Mwangangi	KPLC	smwangangi@kplc.co.ke

Agenda

1. Opening of the meeting and Introduction of Members
2. Confirmation of the route
3. Ecological Study
4. Any other business

MIN.	AGENDA ITEM	DELIBERATIONS

1	Opening remarks & introduction	The meeting was called to order at 10.00am by the chair Samuel Tokore - Deputy director; KWS. The Chair welcomed members to the meeting and invited members to introduce themselves. He thanked member for participating in the field visit for the section inside NAWASCO
2	Confirmation of the route	<p>The chair explained to members that the entire route had been confirmed. He explained that two route options were identified within NAWASCO. One route running over the briquette making building and passing near the edge of NAWASCO boundary and the second one passing through the NAWASCO ponds</p> <p>The team agreed on the route passing through the NAWASCO ponds.</p> <p>The survey team was tasked to map the two routes and give reasons why the route through the ponds was the most preferred one.</p> <p>KWS to provide a Folio Register map which would be superimposed to the KPLC transmission line to give the final acreage of the project</p> <p>The Chair was concerned about the section from the NAWASCO ponds to the terminal Pylon stating that the section was ecologically sensitive. He stated that the section was a home range for lions and rhinos and generally the home range for the big five He tasked the team to revisit the section and seek an alternative route especially along the boundary</p>
3	Ecological Survey	Simon Mwangangi asked the KWS environment team to expedite the Ecological survey so that the EIA study report could be finalized. He recommended the ecological survey to capture the flora and fauna in chainage form. Anastacia asked KPLC to provide the EIA report done for the project and the NEMA issues letter. She also explained that they could not give the number of animals along the route in a linear form because the animals were migratory.
4.	A.O.B	<p>Samuel from KPLC was tasked to create a WhatsApp group for the team for sharing information and tracking progress.</p> <p>Simon from KPLC was to provide any information required by the KWS team regarding the ecological report</p> <p>There being no other business the meeting ended at 1255HRS</p>

Signed:

Date.....

Eng. George Korir | Ag. Manager – Transmission Network.

5.9.3.3 Minutes Of The Meeting Between KWS And KPLC Held On 15th December 2023 At Lake Nakuru National Park On Re-Routing Of A Section Of 132 Kv Double Circuit Transmission Line

MEMBERS PRESENT

	NAME	INSTITUTION	EMAIL
1.	Titus Mitau - Chair	KWS	tmitau@kws.go.ke
2.	John Kariuki	KWS	jmacharia@kws.go.ke
3.	Anastasia Mwaura	KWS	amwaura@kws.go.ke
4.	Derrick Karinga	KWS	dkaringa@kws.go.ke
5.	Judy Adipo	KWS	jadipo@kws.go.ke
6.	Joseph Korir.	KPLC	jkorir-kipngetich@kplc.co.ke
7.	Eng. Julius Mwaniki-Co Chair	KPLC	jkmwaniki@kplc.co.ke
8.	Penina Njoki	KPLC	pnjokimungai@kplc.co.ke
9.	Samuel Mbugua-Secretary	KPLC	sgmbugua@kplc.co.ke
10.	Simon Mwangangi	KPLC	smwangangi@kplc.co.ke
11.	James Sacho	KPLC	0722431704
12.	Joseph Dadacha	KWS	0720261047

Agenda

1. Opening of the meeting and Introduction of Members
2. Report on the site visit
3. Timelines for various reports

MIN. NO	AGENDA ITEM	DELIBERATIONS
1	OPENING REMARKS & INTRODUCTION	The meeting was called to order at 8.30am by the chair Titus Mitau –Assistant Director, Lake Nakuru National Park. The Chair welcomed members to the meeting and invited members for introductions.

2	Report on the site visit	The chair thanked members for the successful site visit the previous day. He explained that a new route from the NAWASCO ponds to the terminal pylon had been identified. The new route traverses near the park edge and avoids the ecologically sensitive Rhino and Lion home range. He tasked the survey team to come up with a map of the new proposed Route, and provide superimposed maps for the different routes and provide justification for settling on the chosen route.
3	Timelines for Reports	Final maps from joint Survey team-By Tuesday 19.12.2023 Detailed project scope of work from KPLC - By Tuesday 19.12.2023 Draft Ecological survey report by KWS environment team-By Thursday 21.12.23
4.	A.O.B	Mr Dadacha from KWS thanked members for the commendable job. He explained that he was supposed to be part of the exercise from the beginning but was unable due to other work commitments. He asked members to co-operate and work hard for the success of the project There being no other business the meeting ended at 10:04 hrs

Signed:

Eng. George Korir | Ag. Manager – Transmission Network

Date.....

5.9.4 CONCLUSION OF THE CONSULTATIONS

It is worth noting that stakeholder engagement is a continuous process and the stakeholders involved keep raising issues and the proponent responds to ensure smooth running of the project. KPLC in this planning phase of the project has received invaluable information from stakeholders and shall be open to more views and information even during project implementation.

Close partnership between KPLC, KWS and NAWASCO during construction has been underscored by the stakeholders to ensure the construction activities do not adversely affect the national parks ecosystem and any other infrastructure. It has also be noted that all mitigation measures must be put in place to ensure minimum disturbance to the park and its environs during construction phase and also operation phase of the project. All the stakeholders are in support of the project.

Note: The questionnaires and list of attendance used to collect information from stakeholders are attached in the annex section

List of attendance for the meetings



STAKEHOLDER ENGAGEMENT FOR INTEGRATED ENVIRONMENTAL IMPACT ASSESSMENT (IEIA) STUDY FOR THE PROPOSED REROUTING OF 132KV DUAL CIRCUIT TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

KWS CENTRAL RIFI CONSERVATION AREA HEADQUARTERS

LIST OF ATTENDANCE

DATE: 13/12/2023

No.	Name	ORGANIZATION	Contact Details Email/Mobile No	Signature
1	SAMUEL TOKOLE	KWS	Stokole@kws.go.ke	
2	Eng. George Kori	KPLC	G.Kori@kplc.co.ke	
3	Simon Mwangangi	KPLC	SMwangangi3@kplc.co.ke	
4	Samuel Mbugua	KPLC	Sgmbugua@kplc.co.ke	
5	JOSEPH K. KORIR	KPLC	J.Korir-K.Pnj@kplc.co.ke	
6	Gerald Kwedho	KPLC	G.Kwedho@kplc.co.ke	
7	Julius Mwaniki	KPLC	jkmwaniki@kplc.co.ke	
8	PERMUKU MUKI	KPLC	P.Muki.Mungai@kplc.co.ke	
9	PAUL W. MUNGUAI	KPLC	PwMungai@kplc.co.ke	
11	AKUTE ALISTAIR	KPLC	aaakute@kplc.co.ke	
12	TITUS MITAH	KWS	tmitah@kws.go.ke	
13	John Karuki	KWS	jkaruki@kws.go.ke	



STAKEHOLDER ENGAGEMENT FOR INTEGRATED ENVIRONMENTAL IMPACT ASSESSMENT (IEIA) STUDY FOR THE PROPOSED REROUTING OF 132KV DUAL CIRCUIT TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

LIST OF ATTENDANCE

DATE 13/12/2023

No.	Name	ORGANIZATION	Contact Details Email/Mobile No	Signature
1	COLLINS NTHUNI	KWS	cnthuni@kws.go.ke 0721763860	
2	JUDY ADIPO	KWS	jadipo@kws.go.ke 0722 250183	
3	Anastacia Mwarura	KWS	anwaura@kws.go.ke 0727456515	
4	JERRICK KARIMGA	KWS	dkarimga@kws.go.ke 0710588680	
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STAKEHOLDER ENGAGEMENT FOR INTEGRATED ENVIRONMENTAL IMPACT ASSESSMENT (IEIA) STUDY FOR THE PROPOSED REROUTING OF 132KV DUAL CIRCUIT TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

KWS Central Rift Conservation Area HQ

LIST OF ATTENDANCE

DATE: 14/12/2023

No.	Name	ORGANIZATION	Contact Details Email/Mobile No	Signature
1	SAMUEL TERKORE	KWS	storkor@kws.go.ke	
2	George Korir	KPLC	Gkorir@kplc.co.ke	
3	COLLINS NTHUNI	KWS	cnthuni@kws.go.ke	
4	John M. Kariuki	KWS	jmacharia@kws.go.ke	
5	TITUS MITAU	KWS	tmilau@kws.go.ke	
6	Anastacia Mwarua	KWS	amwaura@kws.go.ke	
7	Derrick Karinga	KWS	dkaringa@kws.go.ke	
8	Judy Adipo	KPLC	jadipo@kws.go.ke	
9	JOSEPH KORIR	KPLC	Jkorir.kipagetech@kplc.co.ke	
11	PERMUTH MUYO	KPLC	Pmuyomungai@kplc.co.ke	
12	PAUL W. MURRAY	KPLC	Pwumungai@kplc.co.ke	 14/12/2023
13	JULIUS K. MWANIKI	KPLC	Jkmwaniki@kplc.co.ke	



STAKEHOLDER ENGAGEMENT FOR INTEGRATED ENVIRONMENTAL IMPACT ASSESSMENT (IEIA) STUDY FOR THE PROPOSED REROUTING OF 132KV DUAL CIRCUIT TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

KWS Central Rift
Observation area HQ

LIST OF ATTENDANCE

DATE... 15/12/23

No.	Name	ORGANIZATION	Contact Details Email/Mobile No	Signature
1	TITUS MITAU	KWS	0722284406	
2	Anastacia Mwaure	KWS	0727486515	
3	JOHN KARIUKI	KWS	0720831513	
4	Simon Mwangangi	KPLC	0722 595046	
5	Samuel Mbugua	KPLC	0720956319	
6	PENINAH NYOKI	KPLC	0719671127	
7	James K. Sacho	KPLC	0722431704	
8	DERRICK KARINGA	KWS	0710 588680	
9	Joseph K. Korir	KPLC	0722566394	
10	Judith Achipo	KWS	0722280183	
11	Julius K. Mwaniki	KPLC	0722396360	
12	JOSEPH DASSAETH	KWS	0720261047	



STAKEHOLDER ENGAGEMENT FOR INTEGRATED ENVIRONMENTAL IMPACT ASSESSMENT (IEIA) STUDY FOR THE PROPOSED REROUTING OF 132KV DUAL CIRCUIT TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

LIST OF ATTENCANCE

DATE.....

No.	Name	ORGANIZATION	Contact Details Email/Mobile No	Signature
1	Samuel Mbugha	KPLC	0720956314	
2	Simon Mwangangi	KPLC	0722595096	
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6 CHAPTER SIX: IDENTIFICATION OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1 Introduction

This Section identifies and discusses both negative and positive impacts associated with the proposed Rerouting of 132 kV dual circuit transmission power lines in Nakuru National Park. The impacts are identified according to Phases namely: Construction Phase, Operational Phase and Decommissioning Phase.

The project being of national importance in the energy sector is vital for ensuring stable and reliable power supply especially in light of increased number of customers across the country. However, inadequate planning of the project could also affect the environment that supports millions of Kenyans through the project potential negative impacts. The project impacts are classified as positive or adverse.

This chapter focuses on the impacts likely to occur as a result of the proposed construction works on the Rerouting of a section of 132 kV dual circuit transmission power line within Lake Nakuru National Park. For ease of reference, the potential impacts during construction and operation and decommissioning of the line are also presented in matrix form in the Environmental and Social Management and Monitoring Plan

6.2 Activities to be Undertaken during Construction and Operation that could give rise to negative impacts on the identified section.

6.2.1 Land Survey, Tower Setting out and Site / Way-leave Clearance

Land survey is an essential component of the erection of the power line and involves the establishment of each tower position for the section being rerouted. There will be vegetation clearance at the tower positions, and also for the wayleave for the said section to pave way for the towers and the conductors. The power line way-leave will need to be kept cleared of vegetation throughout the life of the line. The primary impacts will therefore be potential loss of/damage to indigenous vegetation and fauna habitat.

6.2.2 Access to the site (section to be rerouted)

The proposed power line will be located parallel to existing KWS fence. The rerouted section will run at the periphery of the park hence will have minimal impacts. The vehicles and machinery will access the project site through the already existing road network. Consequently, no temporary access tracks may need to be created during the course of construction, of the power line route.

6.2.3 Transportation of Equipment, Materials to Site

The transportation of equipment, materials and personnel to the active construction area is required. Vehicle access within a short distance of the power-line route is generally available. The possibility exists, however, that vegetation clearing may be necessary in some instances to provide access to the construction (tower sites). The impacts associated with the

transportation of equipment, materials and workers to the site include disturbance of fauna, the loss of indigenous vegetation, noise to the wildlife and dust pollution.

6.2.4 Foundation Excavation

The work associated with the foundation excavation activities involves labourers working in a relatively small area whereby a base is dug for the foundation of each steel lattice tower. The excavated material (soil) will be deposited next to the foundation holes and will remain there until backfilling is complete. Surplus soil that remains subsequent to backfilling is usually spread out evenly around the site. In the event the site is rocky, compressors and pneumatic jackhammers may be used to break up the rock.

Potential environmental impacts include disturbance to vegetation and fauna, soil erosion, siltation of adjacent watercourses, noise and dust pollution resulting from the use of machinery (if required), as well as injury to people/animals accessing foundation excavations if left uncovered.

6.2.5 Casting of Foundations

When excavations are complete, each of the required foundations will be cast whereby concrete will be poured for the purpose of the foundation. The main potential impact is dust from the cement. Once the foundations are done and ready backfilling will take place and restoration of the area to its original condition to the extent possible.

During backfilling, all the soil will not be used up and some remains can be washed away in rainy season and so cause erosion. On the other hand such soil can cause dust pollution prior to the reestablishment of vegetation in the footprint area.

6.2.6 Tower Erection

This will involve the erection of the steel lattice towers. The erection of the tower structures will cause visual disruptions to wildlife. There are also risk of working at height and falling objects.

6.2.7 Tower Dressing and Stringing of Conductors

Stringing involves the unspooling of the conductor from rolls and laying this out approximately where it is to be attached to the structures. The conductor is then elevated, attached and tensioned before being secured at the next structure. This typically involves a team of labourers and vehicle movement between towers – route sites in as straight line as possible. This may cause noise and disruptions to wildlife.

6.2.8 Line Inspection and Maintenance

Line inspection is undertaken by KPLC when construction is complete. Routine line inspections are undertaken at regular intervals which generally involve one or two people moving from tower to tower and making a visual examination of the line from the ground. Line inspections are also undertaken after there has been a fault on the line to establish the fault location and to determine if any permanent damage has resulted from the fault. Actual repair and maintenance work carried out on overhead lines is generally infrequent and minor in nature i.e. the replacement of a damaged insulator set or the *in-situ* repair of a damaged conductor. It is seldom necessary to lower conductors to the ground for repairs.

6.2.9 Life of Operation

The power line will become a permanent feature of the landscape, visible from a number of vantage points, thereby having a potential visual impact/impact on aesthetics although the landscape is already crossed by existing power lines. The section to be routed has the potential to impact on birds, either through collisions or by electrocution.

The impact of corona (low 'buzzing' or 'crackling' noise) from the power line has been considered as a potential impact. Corona can be caused by water droplets forming on a conductor resulting in the breakdown of air molecules perceived as the crackling noise. However, corona rings are used by KPLC on conductors to stop this.

6.3 Impact Identification and Assessment

Several environmental impacts (positive and negative) associated with the proposed project were identified through stakeholder engagement and participation process and through the use of experts' judgment method. The following section highlights the impacts anticipated throughout the lifecycle of the proposed project. The associated impact assessment tables for each impact will be categorized according to project phases, prior to and post mitigation. Effects of activities are categorized as negative impact and or positive impact. The study goes further to categorize the impacts in terms of direct or indirect, temporary or permanent, major or minor.

The summary of the main potential impacts of the proposed project are listed in Table 6.1 and analyzed into different categories based on stakeholder's views and perceptions as well as the consultant's experience and trainings in undertaking EIA of similar nature.

6.3.1 Assessing significance of Impacts

The following criteria were used to assess the significance of potential impacts of the proposed project.

Table 6-1: Summary of magnitude of potential impacts

Magnitude of Impact	Rating
Negligible	1
Minor	2
Marginal	3
Significant	4
Catastrophic	5
Geographic Extent of Impact	Rating
<500M2	1
500m2-999m ²	2
1Km2-10Km ²	3
11Km2-100Km ²	4
>100km ²	

Magnitude of Impact	Rating
Duration of Impact	Rating
< 1month	1
1- 12 months	2
13-36 months	3
37-72 months	4
>72months	5
Frequency/duration of activity	Rating
Annually or less	1
6 monthly/temporary	2
Monthly/infrequent	3
Weekly/life of operation	4
Daily / permanent	5
Frequency of impact Rating	Rating
<11 events/year	1
11-50 events/year	2
51-100 events/year	3
101-200 events/year	4
>200 events/year	5

Table 6-2: Consequence tabulation table (Magnitude+ Geographic extent + Duration of the impact)

Consequence (Magnitude+ Geographic extent + Duration of the impact)															
Likelihood (Frequency of Activity) frequency of impact	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
5	5	10	15	20	20	30	35	40	45	50	55	60	65	70	75
6	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
7	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
8	8	16	24	32	40	48	56	64	72	80	88	96	104	102	120
9	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
10	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table 6-3: Impacts Significance rating, value and respective colour code

Significance rating	Value	Colour code	Negative impact Management Recommendation	Positive impact Management Recommendation
Very high	126-150		Propose mitigation measures	Maintain current management
High	100-120		Propose mitigation measures	Maintain current management
Medium high	77-105		Propose mitigation measures	Maintain current management
Low medium	52-75		Maintain current management	Improve current management
Low	20-50		Maintain current management	Improve current management
Very low	4-24		Maintain current management	Improve current management

6.4 Assessment of Impacts of the Proposed project (rerouting a section of the line)

The table below provides a snapshot view of the anticipated impacts (both positive and negative) of the proposed project:

Table 6-4: Summary of impacts

Environmental & Social Impact	Negative /Positive	Direct /Indirect	Temporary /Permanent	Major /Minor	Occurrence	
					Construction	Operation
Socio-Economic Impacts						
Electricity supply	Positive	Direct	Permanent	Major		X
Creation of employment	Positive	Direct & indirect	Temporary /Permanent	Major	X	X
Revenues to Government	Positive	Direct	Permanent	Major	X	X
Enhancement of business opportunities	Positive	Direct/indirect	Temporary /Permanent	Major	X	X
Growth of agro-based industries	Positive	indirect	Temporary /Permanent	Major		X
Visual Impact	Negative	Direct	Permanent	Major		X
Biophysical Impacts						
Need for way leave	Negative /Positive	Direct	Temporary/permanent	Major	X	

Environmental & Social Impact	Negative /Positive	Direct /Indirect	Temporary /Permanent	Major /Minor	Occurrence	
					Construction	Operation
Clearance of vegetation cover	Negative /Positive	Direct	Temporary/permanent	Major	X	
Solid waste	Negative	Direct	Temporary	Minor	X	X
Impacts to water resources	Negative	Direct	Temporary	Minor	X	
Water demand	Negative	Direct	Temporary	Minor	X	
Natural habitats and biodiversity disturbance	Negative	Direct	Permanent	Minor	X	X
Impacts to fauna and Avifauna	Negative	Direct	Permanent	Major	X	X
Risk of fire	Negative	Direct	Temporary	Major	X	X
Impact to soils	Negative	Direct	Temporary	Minor	X	
Aircraft navigation safety	Negative	Direct	Permanent	Major		X
Oil leaks /spill impacts	Negative	Direct	Permanent	Minor	X	
Health and Safety Impacts						
Air pollution from vehicles (exhaust emissions)	Negative	Direct	Temporary	Minor	X	
Noise and Vibrations	Negative	Direct	Temporary	Minor	X	X
Dust emissions	Negative	Direct	Temporary	Minor	X	
EMF	Scientific impacts on health not established and psychological impacts will be relative depending on project understanding					
Labour influx and associated issues	Negative	Direct	Temporary	Minor	X	
Occupational safety Hazards	Negative	Direct	Temporary	Minor	X	X
Stable power supply	Positive	Direct	Permanent	Major		X
Development of other sector such as health, education, industries among others	Positive	Direct/ Indirect	Permanent	Major		X

6.5 Potential Positive Impacts of the Proposed development (rerouting of a section of a transmission line)

The positive impacts associated with the proposed project during construction, operation and decommissioning phases are discussed in the following sections;

6.5.1 Creation of employment opportunities

The proposed project will generate job opportunities (skilled and unskilled labour) during construction and operation phases. Different types and level of employment opportunities are anticipated during construction, operation and decommissioning. Though the approximate number of workers to be employed by the proposed project is not yet known, it will contribute to easing unemployment level in the area. There is also trickledown effect to the economy resulting from the employment opportunities as well as services provided through this project.

6.5.2 Provision of Market for Supply of Building Materials

The project will require supply of construction materials most of which can be sourced locally in Nakuru town and its environs like cement, steel and sand. This provides ready market for local enterprises with such materials.

6.5.3 Boosting of the informal sector

During the construction phase, 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 food vending. This will promote the informal sector in securing some temporary revenue and hence livelihood.

6.5.4 Compatibility with existing land uses

As mentioned in the previous sections of this report, the proposed project site is located within Nakuru National park a stretch which is mainly dominated by short shrubs and grass and wildlife grazing field which is dominated by buffalos and impalas. In addition, the area is also characterized by some power line network within the park, residential and offices blocks and some hotels, camping sites and some houses near the terminal point. The proposed project is therefore compatible with the existing development as well as future land-uses. The proposed project will not conflict with the existing uses in the park because it is about rerouting of an existing line.

6.5.5 Environmental and Safety Benefits

The section of the 132kV transmission line that is submerged will be routed/aligned within the National Park.. Complete avoidance of the park is however not possible because the line is not new and only a section that is affected by the flooded lake is being rerouted. The relocation of the submerged lines will help alleviate any safety concern on wildlife in case the power line would collapse.

6.5.6 Increase in Revenue

There will be positive gain for the revenue system arising from stable and reliable power supply and transmission of the electricity power. This will in turn be supplied to various customers including businesses that create more revenue and pay taxes to the Government. The impact will be direct, permanent and major.

6.6 Potential Negative impacts

The potentially negative impacts have been discussed in greater detail in the following section:

6.6.1 Impact on Biodiversity and Habitat disturbance

The proposed rerouting of the said section will lead to disturbance of wildlife habitat and also biodiversity. This is due to vegetation clearance that will take place especially at the tower foundation points and also where the trees will be cut.

Mitigation

- Use human labour as opposed to heavy machinery to reduce noise and disturbance from machinery to wildlife
- Undertake selective clearance by clearing only necessary areas

6.6.2 Need for way leave.

Land will be required for the rerouting of said section. The estimated distance of the section is about 6km and a width of 40 metres i.e. 20 meters on each side from the center of the line. The transmission line is a long term capital investment and so will take long before decommissioning. This means that the land needed for the said section will not be available for other uses like buildings but the wildlife can graze under the transmission line since it is high enough. The submerged section would pose greater major risks to the park and its ecosystem if it was to fall. Therefore the land take negative impacts is a better option than allowing the status quo to remain with the attendant risks. This is especially so in cognizance of the international conservation profile of L.Nakuru N.Park as a Ramsar site, an Important Bird Area (IBA) and part of the Kenya Lakes System UNESCO World Heritage Site.

Mitigation measures

The section to be rerouted has been optimally selected in consultation with various stakeholders within the Park, so as to avoid affecting delicate areas with important natural features in the park. Most of the line will pass near the boundary of the park but inside the park. Complete avoidance of the park is however not possible because the line is not new and only a section that is affected by the flooded lake is being rerouted.

6.6.3 Impacts on Vegetation Cover

The proposed selected route alignment has no major trees except a few scattered *Acacia xanthophlea* where the line crosses the park entrance gate. There are also shrubs and the dominant vegetation cover is open grassland. Impacts to vegetation will consist of disturbance to vegetation linked to construction equipment and vehicles, removal of vegetation to pave way for the tower foundations and cutting of the tall tree along the said section. Short shrubs will not be cleared.

Mitigation measures

During construction, the contractor will avoid unnecessary vegetation clearing and ensure proper demarcation and delineation of the project area as required within the prescribed width of 40m along the Right-of-Way (RoW). This is to ensure vegetation clearance is kept at minimum.

6.6.4 Solid waste

Solid waste anticipated to be produced during construction include spoil from excavations, conductor remains, food wrappings and pieces of steel remains.

Mitigation Measures

- Ensure soil from excavations is reused for back filling to the extent possible. Any remains should be disposed off appropriately.
- Segregate waste and dispose of appropriately
- No waste shall be left on site
- Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time
- Proper budgeting to avoid waste generation

6.6.5 Impacts to soil

Soil erosion is likely to occur mainly linked to the excavation of the tower foundations. Erosion would easily occur in the event the holes are dug and left for long without backfilling. Vegetation clearance will also make it easy for erosion to take place.

Mitigation measures

- Plan work appropriately to back fill the tower foundations in the shortest time possible to avoid exposure of the soil to wind and water erosion
- Soils excavated for the erection of Steel towers should be used for backfilling and should not be left exposed
- Avoid excavation during rainy season

6.6.6 Noise pollution

There is potential for increase in noise levels during construction works originating from vehicles that will bring materials, construction equipment and also from workers.

Mitigation measures

Keep vehicles well maintained to avoid noise

6.6.7 Contamination of Soil from Fossil Fuels

The potential sources of soil contamination during construction phase are oil /fuel leaks or spills from machinery used in construction and trucks used in transporting construction materials. Depending on the size and source of the spill, liquid and gaseous state, petroleum hydrocarbons may remain mobile for long periods of time, threatening to contaminate the soil. The significance of the impact to the soil will be minor due to the nature of the works and the fact that construction activities will be confined in the small project area.

Mitigation Measures

- Construction vehicles must be maintained in good state and proper servicing to ensure no oils are likely to leak
- Care must be exercised not to spill any fossil fuels
- Any contaminated soil shall be scooped and disposed-off appropriately.

6.6.8 Impacts on wildlife

The selected route is within the park which is a habitat for a diverse of wildlife. Key among them in the area include buffalos, zebra, gazelles and warthogs. The wildlife will be affected in different ways such as disturbance due to presence of workers, noise form construction vehicles and workers, vegetation clearance and also by the excavated tower foundations in the event they are not backfilled appropriately.

Mitigation measures

- Construction vehicles should be well serviced to avoid noise
- Workers should maintain low tones to the extent possible
- Supervision of workers

6.6.9 Impact on water resources:

Clearing of vegetation and trees to pave way for the project may impact on water sources (lake) if soil erosion takes place. In addition another source of impact would be poor disposal of solid waste from construction activities. This impact is expected to be minimal due to strict adherence of rules expected from workers while working in the park.

Mitigation measures

- Clear only necessary areas
- Do not live any soil exposed

6.6.10 Generation of exhaust emissions

During construction, there will be vehicles moving along the route delivering materials and staff. Such vehicles are likely to generate exhaust fumes and especially if they are not well serviced. The impacts will be direct, temporary and not significant.

Mitigation measures

- Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered.
- Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO_x, SO_x and suspended particulate

6.6.11 Dust Emissions

Initial activities such as site clearing, excavation if done in dry weather conditions will result in dust pollution. Dust emission is regarded as a nuisance when it reduces visibility and is aesthetically displeasing. This is expected during construction works. Dust will be generated from construction activities, transportation activities and aggregate mixing.

Mitigation measures

- Sprinkle loose surface earth areas with water to keep dust levels down.
- Construction trucks moving materials to site, delivering sand and cement to the site should be covered to prevent material dust emissions
- Masks should be provided to all personnel
- Excess soil from excavations should be carried away for proper disposal after back filling
- Drivers of construction vehicles must be sensitized so that they limit their speeds so that dust levels are lowered.

6.6.12 Impacts on archaeological, Cultural and Historic sites

Field observations and discussions indicates that where the line will be rerouted, there were no archeological, cultural or historic resource likely to be disturbed. No cultural shrine was noted during the route survey. However in case of chance find the same will be discussed with KWS and the Kenya national museums.

6.6.13 Impacts to Avifauna

The assessment revealed that there are bird species around the vicinity of the selected route. They include Buffalos, Lions, Rhinos, Gazelles and Zebras. the impact that may arise from construction activities include loss of habitat and perching areas. The birds can also be affected by presence of workers and construction vehicles and equipment

Mitigation measures

- *Clear only the designated areas*
- *Maintain low tones while working in the park*

6.6.14 Risk of fire outbreak

Fires can occur during the construction period mainly linked to carelessness by construction staff. Throwing of live cigarette butts within the project route may pose a risk of fire.

Mitigation measures

- Create awareness to the construction workers on potential fire hazards
- Provision of firefighting equipment (extinguishers) on site during construction.
- No smoking shall be done on construction site

6.6.15 Water demand

The proposed project will not affect local water resources during both construction of the project. During construction, water demand will be minimal as it will be used only for tower foundations. The amount of needed during construction will during tower foundation construction.

Mitigation Measures

- Prudent use of available water
- Consultations with the KWS on water supply options
- Avid wastage of water

6.6.16 Occupational safety

During construction workers are exposed to some level of occupation hazards. The main risky activities are transportation, digging of power foundations, handling and erection of towers, stringing of the conductors and energizing the line. Injuries to workers can range from injury from working tools, fall into excavation foundations and fall from height. There could also be a risk of attack by wildlife while working.

Mitigation measures

- All work schedules must be prepared in consultation with KWS for appropriate support while working within the park
- The contractor should allocate jobs according to skills

- Awareness creation/Tool box talks on safety to workers while at construction site and documentation kept
- Workers coming to the site should be knowledgeable on safety precautions to take
- Appropriate PPE (helmet, safety harness, gloves, safety shoes, masks, climbing irons among others)
- Proper housekeeping and maintain good hygiene
- Close supervision of workers
- Engagement of trained first aider on site
- Provide safe drinking water for workers
- Availability of equipped first aid box on site
- Risk assessment by contractor of the construction activities and implement mitigation measures appropriately
- Adherence to occupational Safety and Health Act 2007
- The contractor must acquire insurance for the workers-WIBA cover
- All workers doing any work must be in appropriate personal protective equipment while doing maintenance work.

6.6.17 Labour influx and its associated impacts

There will be labour Influx of course on a small scale because the project is small in size and most of the works from outside will be semiskilled and skilled workers. Movement of workers in the project area and interactions with the local community has potential for social risks such as risk of illicit behavior like crime & substance abuse, risk of communicable and sexually transmitted diseases and HIV & AIDs spread, pressure on accommodations and rents and gender based violence. Due to the fact that works will be done within the park which is a controlled and protected area to a large extent these impacts are very unlikely.

- ❖ Reduction of labour influx by tapping into the local workforce to the extent possible
- ❖ Sensitization/awareness to workers regarding engagement with local community and the need to respect community values.
- ❖ Appropriate and timely pay for work done
- ❖ Respect for community values/culture
- ❖ Community engagement to create awareness on SEA/SH risk issues- done during consultations
- ❖ Creating awareness to workers on the need to refrain from SEA/SH incidences
- ❖ Mandatory awareness creation for workers on required lawful conduct in the community and legal consequences for failure to comply with laws
- ❖ Mandatory signing and implementation of code of conduct for the workers
- ❖ The contractor will provide public education/information about HIV/AIDS transmission and prevention measures to workers during tool box talks

6.6.18 Sanitary waste

It will be prudent prior to construction to put plans in place to deal with sanitary waste. This is waste from construction workers. This is both welfare and a health issue.

Mitigation measures

The contractor will make arrangements to have mobile toilet on site throughout the construction period.

6.7 Operation phase impacts

6.7.1 Fire Risk

During operation, voltage power can cause a fire risk in the event of electrical faults with equipment. Fire risks may emanate from arcing from loose joints connections or sparks from power line short-circuiting especially during turbulent weather and this is rare for

transmission lines. In the event underlying growth is left unchecked, or slash from routine maintenance is left to accumulate within right of way an accidental spark can cause ignition and result in fire.

Mitigation measure

Timely maintenance of the way leave trace

6.7.2 Power line associated avifauna mortalities

Collision and electrocution incidences are species specific and depend on the species behaviour. Raptor for instance are known to have territories which may restrict their ranging behaviour therefore reducing chances of power line mortalities compared to waterfowls e.g. the cranes. Eagles are at low risk due to their solitary behaviour compared to flocking birds like the storks, cranes and vultures. However, eagles frequently use towers for roosting, feeding and hunting resulting to electrocution. Flight performance is an important factor determining the chances of collision with power line where for instance birds with low wing loading are less exposed to electrocution risk, due to their agility. Poor visibility also increases possibility of collision and electrocution accidents.

Mitigation features.

- To minimize collision, undertake wire-marking to alert birds to the presence of power line, allowing them time to avoid the collision.
- Build raptors platforms on top of Steel towers for roosting and nesting
- Undertake surveillance in consultation with KWS along the section for data collection on avifauna

6.7.1 Aircraft Navigation Safety

In Kenya, KCAA gives approval for tower/towers heights to ensure safety of aircraft. Power transmission towers, if located near an airport, air strip, or known flight paths, can impact aircraft safety directly through collision, or indirectly through radar interference.. Initial consultation pointed out that there are no airports or airstrips within the study area; additionally there are no military installations also. Furthermore the area has already existing power line and no incident has ever been reported.

Mitigation measures

The transmission line design features will be used to reduce a variety of potential impacts, including the use of 'aviation' ball markers to reduce airplane collisions with the line;

6.7.2 Impacts to wildlife

Once complete, the section will be connected to the main line and its function will be to transmit (carry electricity). Therefore, the line can pose risk to the health and safety of the wildlife in case of poor installations and if proper maintenance, and safety are not observed. Tree branches especially during the wet seasons can cause short circuiting of the line, incase trees/branches fall on power line although this is very rare because of the allowed wayleave trace. If wildlife comes into contact with live conductors/line they may experience shock, burns and even electrocution. This is a rare occurrence because the conductors are installed bearing in mind the highest height of the wildlife. Another risk would arise because of breaking of conductors and falling down while live but this is extremely rare.

Mitigation measures

Timely maintenance of the line to ensure its safety at all times

6.7.3 Air quality impacts

No negative impacts are expected during operation phase because once energized the KPLC staff will only visit during routine maintenance. Inspection of the line at this phase is done by walking through the entire section and the line at large.

Mitigation measures

- Regular maintenance of vehicles to reduce emissions of vehicles coming to site
- Control speed of vehicles to minimize generation of dust

6.7.4 Visual intrusion and aesthetic impacts

There will be visual intrusion once the proposed section is rerouted. However, as already noted, it is a section of an existing line that is being rerouted and so it is compatible with most sections of the line. There is also a distribution line near the said section. Therefore the line will not be a new feature in the park.

Mitigation measures

Generally, the proposed project will not affect the overall aesthetic effect of the area. This is due to the fact that the project is a section rerouting, it is expected that it is going to be insignificant in terms of visual intrusion.

6.7.5 Occupational hazards

During operation and maintenance works, there is potential for falls from heights if precaution is not observed. The impacts associated with maintenance works include physical hazards such as injuries sustained from the tools/equipment, ergonomics problems from poor working posture, fall from height, shocks and electrocution and attack from wild life.

Mitigation measures

- All works planned must be done in consultation with KWS for appropriate support while working within the park
- A maintenance plan must be put in place to ensure the physical integrity of structures is maintained at all times
- Ensuring that live-wire work or any work is conducted by trained workers with strict adherence to safety requirements and precautions
- All maintenance work must be supervised
- All workers doing any work must be in appropriate personal protective equipment while doing maintenance work.

6.7.6 Solid waste

Very little waste is expected during operation phase and waste can only be generated during maintenance works. The main waste would be replaced conductors and metal from the tower structures.

Mitigation measures

All waste generated shall be carried off for proper disposal by KPLC.

7 CHAPTER EIGHT: ANALYSIS OF PROJECT ALTERNATIVES

7.1 Consideration of Project Alternatives

This chapter describes and examines the various alternatives available for the project. The following alternatives were identified and investigated during EIA study.

7.2 The ‘Do-nothing’ Option/ no project option

This option implies that the proponent does not undertake the project. The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. Specifically, the option will imply the section of the line in the lake will not be re-routed and the pylons will continue been exposed to the corrosive effects of the saline lake water. This will continue compromising the structural strength and will be a big risk to the lake and entire park ecosystem in case the support structures fail and the line collapses. Additionally there will be lost benefits to the proponent due to foregoing the improvement options and expensive maintenance costs. This implies increased operational costs and unreliable power supply to the customers in western region. This will consequently have a significant negative impact power transmission efficiency, power fluctuations and decreased electricity sales for the proponent. The customers will negatively be affected by power failures which may impact economic activities, health, education and the general living standards of the beneficiaries. The park will also lose the opportunity of improved conservation and disturbance of the park ecosystem would continue during the maintenance of the affected section

The no-projection option will generally lead to the following negative impacts

- The targeted populations (of electricity consumers) will continue to suffer from shortages of electricity and unstable supply of the same especially as population grows and power demand increases.
- Generation of employment opportunities through expansion of business activities that would have been spurred by availability of electric power will not occur.
- Institutions such as schools, hospitals, churches, industries, mosques etc will not function well without reliable electric power supply.
- Information flow and public education awareness through electronic media, especially the television, will have been hampered.
- The government will be seen to have reneged on its promise to provide electric energy to more of its citizens through and working towards achieving vision 2030.
- There will be loss of productivity and reduced ability to create wealth.

Comparison of the negative as well as the positive impacts of the proposed project clearly indicates that the long term positive effects of the proposed project would far outweigh the negative ones. The negative effects arising from the project can easily be mitigated.

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

7.3 Alternative Structure Types and Designs

Overhead power lines have been determined to be the most feasible option for constructing transmission power lines for the following reasons:

- Underground cabling will incur significantly higher installation and maintenance costs given the length of the power line;
- Overhead power lines have less impact on ecosystems since only the pylon bases will be worked upon and there is less vegetation clearance and ground excavations.
- Overhead lines are far quicker and easier to detect and repair faults

The structure types of the pylons will be different considering the angle of the line bends and as opposed to structures supporting a straight line formation.

There is also an option of using concrete or wooden poles to support the conductors but since the project traverses a conservation area, steel pylons will be best suited to guarantee ground clearance especially for girraffes. Steel pylons are more durable and can withstand weather conditions compared to concrete and wooden poles.

Steel is also more resistant to fire compared to wood and concrete. It is hereby conclude that steel pylons are the desired option for the proposed rerouting of the 132KV section in LNNP.

7.4 Alternative Power line Corridor Routes

The proposed relocation of 132kV dual circuit lines will be constructed along the Nakuru National Park fence adjacent to the park fire break. 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. It is recommendable that the proponent be allowed to install the project in the proposed area as agreed with KWS.

The route options were also weighed to ensured minimum ecosystem disturbance. This lead the team to agree on routing the line to the northern border of the national park running parallel to existing Kenya Pipeline. This ensured that the Rhino and lion home range areas were avoided and there would be less vegetation disturbance since the upper side of the park is more of open grassland and scattered shrubs. The different route options are as indicated in the following superimposed google earth map image.



A Superimposed google earth map image showing the different power line route options

7.5 Analysis of Alternative Construction Materials and Technology

The proposed relocation of 132kV dual circuit lines 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 transmission to Western region and its surrounding environments. The design of the 132kV dual circuit lines will be easy to install and dismantle with minimum labour requirements and maintenance costs will be minimal.

7.6 Proposed Development Justification

The experts have assessed the proposed development by KPLC for both positive and negative impacts. These have been compared to possible alternatives as discussed and it has broadly been agreed that re-routing and construction of the line is the best option, putting into consideration all factors. We do not envisage any serious adverse changes that would warrant the non-implementation of the project. The long term benefits of constructing the power line re mainly to ensures

its structural strength and reliable and sustainable power supply for the welfare and general economic growth of the citizens and the country as a whole. Re-routing the power line to the periphery of the park will also ensure minimum ecosystem disturbance and avoidance of the black rhino and lion home range and avoidance of massive vegetation clearance since the upper side is more of an open grass land area.

7.7 Alternative Fuel Sources

While the demand for electricity is high and has continued to grow, electricity supply is lacking in most rural areas and market centers while in urban areas there is inadequate and unreliable supply. The government is committed to the reforms in the power sector that would ensure a reliable supply of electricity. Electricity has a unique and important use for domestic as well as commercial purposes that cannot be provided by the other known and more commonly used energy sources in Kenya. Wood fuel, although more commonly used, is a very poor substitute for electricity and has many negative environmental and health effects on users. In fact the increased use of wood fuel in the country has led to the near total destruction of forest cover, with its attendant consequences of desertification and increased poverty. Petroleum is the next most commonly used energy type. It is mainly used in the transport sector and is mostly imported since Kenya is not producing and refining its own fuel. Although petroleum is of complimentary use relative to electricity, it is however of inferior value for commercial/industrial purposes when compared to electricity. Other energy alternatives e.g. biogas, are far less common and almost negligible in terms of their domestic and commercial utility in the country. The use of Generators, as an alternative to this project is less competitive in terms of running cost and possible negative impacts onto the environment. Use of generators has a higher pollution rate to the environment due to emission into the air during operation.

The contractor who will be engaged to construct the power line is encouraged to use up to date serviced and efficient fuel consuming equipment and motor vehicles. The use of equipment that reduce to less greenhouse gas emissions during construction is encouraged to address the challenge of climate change and global warming.

8 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Introduction

Following the desk studies, field investigations and public consultations undertaken in this study, an Environmental and Social Management Plan (ESMP) has subsequently been developed. The ESMP provides a general outlay of the environmental, safety and social issues potential impacts, mitigation measures, responsible party, and estimated costs.

The responsibility for the incorporation of mitigation measures for the project implementation lies with the KPLC project Engineer, who must ensure that the contractor implements all specified mitigation measures. In order for the contractor to carry out environmental management activities during construction, the Contractor should draw up an environmental management plan of his own to show how he will address the mitigation measures during the construction period to be shared with KPLC for concurrence prior to starting construction works.

8.2 Monitoring Environmental And Social Performance

Monitoring involves the continuous or periodic review of construction, operation and maintenance activities to determine the effectiveness of recommended mitigation measures. Monitoring is a process, which should begin once the construction begins and should continue throughout the construction period. Its purpose is to establish benchmarks so that the nature and magnitude of anticipated environmental and social impacts can be continually assessed. Consequently, trends in need for improvement can be established, and previously unforeseen impacts can be identified and addressed.

Appropriate monitoring schedule should be set up during construction and during operation so that potentially risks can be detected well in advance and the appropriate remedial action taken. This could simply be a checklist of items that need to be inspected as a matter of routine, or periodically, depending on the nature of the aspect.

The tables below/overleaf summarize the ESMP for the proposed project. It describes the potential impacts and their mitigation measures, responsible party for implementing the measures, parameters to be monitored, time frame and associated costs.

8.2.1 Design and Construction Phase

Potential Impact	Proposed Mitigation measures	Project phase	Responsibility for Implementation	Performance/monitoring Indicator	Cost (Ksh)
Impact on Biodiversity and Habitat disturbance	<ul style="list-style-type: none"> • Use human labour as opposed to heavy machinery to reduce noise and disturbance from machinery to wildlife • Undertake selective clearance by clearing only necessary areas • Re-vegetation of disturbed areas with native plant species; 	Construction	Contractor	Re-vegetation of disturbed areas	100,000.
Need for way leave	<ul style="list-style-type: none"> • Optimal selection of the route to ensure minimal impacts to the environment 	Pre-construction	KPLC Project Engineer	Consultations with various stakeholders	-
Impacts on Vegetation Cover	<ul style="list-style-type: none"> • proper demarcation of area to be cleared • Clear only necessary area 	Construction	Contractor	Number of trees cleared	-

Potential Impact	Proposed Mitigation measures	Project phase	Responsibility for Implementation	Performance/monitoring Indicator	Cost (Ksh)
Solid waste	<ul style="list-style-type: none"> • Ensure soil from excavations is reused for back filing to the extent possible. • No waste shall be left on site- dispose daily • Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time • Proper budgeting to avoid waste generation 	Construction	Contractor	Nil solid waste on site	-
Power line related avifauna mortalities	<ul style="list-style-type: none"> • To minimize collision, undertake wire-marking to alert birds to the presence of power line, allowing them time to avoid the collision. • Build raptors platforms on top of towers for roosting and nesting. 	Construction	KPLC Project Engineer and contractor	Physical structures	250,000
Impact on soil erosion	<ul style="list-style-type: none"> • . Soils excavated for the erection of Steel towers should be used for backfilling and should not be left exposed • Avoid excavation during rainy season 	Construction	Contractor	Status of ground cover around tower positions	-
Noise impacts	<ul style="list-style-type: none"> • Keep vehicles well maintained to avoid noise 	Construction	Contractor	Vehicle maintenance records	-
Impacts on wildlife	<ul style="list-style-type: none"> • Construction vehicles should be well serviced to avoid noise 	Construction	Contractor	Vehicle maintenance records	-

Potential Impact	Proposed Mitigation measures	Project phase	Responsibility for Implementation	Performance/monitoring Indicator	Cost (Ksh)
	<ul style="list-style-type: none"> Workers should maintain low tones to the extent possible Supervision of workers 				
Impacts on water resources	<ul style="list-style-type: none"> Clear only necessary areas to avoid soil erosion 	Construction	Contractor	Assess cleared area	-
Generation of exhaust émissions	<ul style="list-style-type: none"> Drivers of construction vehicles leave vehicles idling so that exhaust emissions are lowered. Maintain all machinery and equipment in good working order 	Construction	Contractor	Vehicle maintenance records	-
Dust Emissions	<ul style="list-style-type: none"> Construction trucks moving materials to site, delivering sand and cement to the site should be covered to prevent material dust emissions Masks should be provided to all personnel Excess soil form excavations should be carried away for proper disposal after back filling Drivers of construction vehicles must be sensitized so that they limit their speeds so that dust levels are lowered. 	Construction	Contractor	Musks for workers Vehicles carrying materials should have covers	-

Potential Impact	Proposed Mitigation measures	Project phase	Responsibility for Implementation	Performance/monitoring Indicator	Cost (Ksh)
Water Pollution from fossil fuels	<ul style="list-style-type: none"> Maintenance of construction vehicles to avoid leakages No maintaining vehicles on site 	Construction	Contractor	Observation on the site areas	-
Impacts on archaeological, Cultural resources	No cultural resource was identified during the study. In case of a chance find the project engineer shall report to the KWS and due process shall be followed	Construction	Contractor	Observations	-
Impacts on avifauna	<ul style="list-style-type: none"> Clear only the designated areas Maintain low tones while working in the park 	Construction	Contractor	Assess cleared areas	-
Risk of fire	<ul style="list-style-type: none"> Create awareness to the construction workers on potential fire hazards Provision of firefighting equipment (extinguishers) on site during construction. No smoking shall be done on construction site 	Construction	Contractor,	Records of fire incidents Presence of fire- fighting equipment	5000
Water demand	<ul style="list-style-type: none"> Prudent use of available water Consultations with the KWS on water supply options 	Construction	Contractor	Records of water usage	20000
Occupational health & safety – risks include injury from tools, fall from	<ul style="list-style-type: none"> All work schedules must be prepared in consultation with KWS for appropriate support while working within the park 	Construction	Contractor KPLC Project engineer	<ul style="list-style-type: none"> -Records of tool box talks -Observation of PPEs in use -Trained first aider 	500,000

Potential Impact	Proposed Mitigation measures	Project phase	Responsibility for Implementation	Performance/monitoring Indicator	Cost (Ksh)
height & attack by wild life	<ul style="list-style-type: none"> • The contractor should allocate jobs according to skills • Awareness creation/Tool box talks on safety to workers while at construction site and documentation kept • Workers coming to the site should be knowledgeable on safety precautions to take • Appropriate PPE (helmet, safety harness, gloves, safety shoes, masks, climbing irons among others) • Proper housekeeping and maintain good hygiene • Close supervision of workers • Engagement of trained first aider on site • Provide safe drinking water for workers • Availability of equipped first aid box on site • Risk assessment by contractor of the construction activities and implement mitigation measures appropriately • Adherence to occupational Safety and Health Act 2007 			<ul style="list-style-type: none"> -First aid box -Safe water for drinking on site -Risk assessment report 	

Potential Impact	Proposed Mitigation measures	Project phase	Responsibility for Implementation	Performance/monitoring Indicator	Cost (Ksh)
	<ul style="list-style-type: none"> The contractor must acquire insurance for the workers-WIBA cover All workers doing any work must be in appropriate personal protective equipment while doing maintenance work. 				
Labour influx and related impacts	<ul style="list-style-type: none"> Reduction of labour influx by tapping into the local workforce to the extent possible Sensitization/awareness to workers regarding engagement with local community and the need to respect community values. Appropriate and timely pay for work done Respect for community values/culture Community engagement to create awareness on SEA/SH risk issues- done during consultations Creating awareness to workers on the need to refrain from SEA/SH incidences The contractor will provide education/information about HIV/AIDS transmission and prevention measures to workers during tool box talks 	Construction	Contractor KPLC	Records of awareness creation to workers on the said issues	-

Potential Impact	Proposed Mitigation measures	Project phase	Responsibility for Implementation	Performance/monitoring Indicator	Cost (Ksh)
Sanitary waste	The contractor will make arrangements to have mobile toilet on site throughout the construction period.	Construction			
Visual impact	<ul style="list-style-type: none"> • Extensive stakeholder consultation during the planning of power line and power line right-of-way locations • The realignment along the park fence has also avoided visual intrusion within the natural Park Landscape 	Pre-construction (already done)	KPLC	Records of consultations	-

8.2.2 Operations and Maintenance Phase

Potential Impact/Aspect	Proposed Mitigation	Responsible party	Responsibility for Monitoring	Performance indicator	Cost (KSh)
Fire risk	Timely maintenance of the way leave trace	Transmission engineer	Manager – Transmission/network	Line maintenance records	Normal annual budget
Power line associated avifauna mortalities	<ul style="list-style-type: none"> • To minimize collision, undertake wire-marking to alert birds to the presence of power line, allowing them time to avoid the collision. • Build raptors platforms on top of Steel towers for roosting and nesting 	Transmission engineer	Manager – Transmission/network	Presence of the markers Surveillance records	Normal annual budget

Potential Impact/Aspect	Proposed Mitigation	Responsible party	Responsibility for Monitoring	Performance indicator	Cost (KSh)
	<ul style="list-style-type: none"> Undertake surveillance in consultation with KWS along the section for data collection on avifauna 				
Air craft safety	Installation of aviation' ball markers	Transmission engineer	Manager – Transmission/network		
Impact on wildlife	Timely maintenance of the line to ensure its safety at all times		Manager – Transmission/network		
Dust and exhaust emissions	<ul style="list-style-type: none"> Regular maintenance of vehicles to reduce emissions Control speed of vehicles to minimize generation of dust 		Manager – Transmission/network		
Occupational safety	<ul style="list-style-type: none"> All works planned must be done in consultation with KWS for appropriate support while working within the park A maintenance plan must be put in place to ensure the physical integrity of structures is maintained at all times Ensuring that live-wire work or any work is conducted by trained workers with strict adherence to safety requirements and precautions 	Transmission engineer	Manager – Transmission/network	Line maintenance records Appropriate PPE for staff	

Potential Impact/Aspect	Proposed Mitigation	Responsible party	Responsibility for Monitoring	Performance indicator	Cost (KSh)
	<ul style="list-style-type: none"> All maintenance work must be supervised All workers doing any work must be in appropriate personal protective equipment while doing maintenance work. 				
Solid waste	All waste generated shall be carried off for proper disposal by KPLC.	Transmission engineer	Manager – Transmission/network	No waste along the way leave trace	-

8.3 Decommissioning Phase

The project is a long term project but in the event of the need to decommission or remove the project then the following steps will be required;

- Kenya Power shall submit a decommissioning plan to NEMA in good time prior to decommissioning. The decommissioning plan shall be prepared in consultation with KWS should include a restoration plan.
- The plan shall indicate the impacts and their associated mitigation measures

9 ASSUMPTIONS, UNCERTAINTIES ENCOUNTERED AND GAPS IN KNOWLEDGE

9.1 Assumptions

The Experts made the following assumptions in preparing this EIA

- All the technical data and information provided by the Proponent and the specialists are accurate and up-to-date
- The design features will be put in place to minimize risks from external factors which could threaten the integrity of the facility which include: risks from landslides and other natural calamities; measures to minimize threats or damage from third parties e.g. Vandalism
- The public involvement and stakeholders process has been sufficiently effective in identifying the critical issues that needed to be addressed
- The Proponent and the Contractor will implement the measures in the proposed ESMP
- The Proponent will undertake monitoring to track the implementation of the ESMP to ensure that management measures are effective to avoid, minimize and mitigate impacts and that corrective action will be undertaken to address shortcomings and/or non-performances.

9.2 Uncertainty and Difficulties in Compiling Information

Uncertainty arises from a variety of aspects in any development, and for this particular study report has emanated from the following:

- The changes that may occur in baseline conditions, due to external factors over the lifetime of the project;
- Uncertainty related to Proponent's policy initiatives that might influence the assessment of future baseline and post-development conditions;
- Uncertainty in the National and International law with regard to energy projects and Environmental issues which may change with time

The difficulties in compiling the information for this study report have related principally to the above sources of uncertainty. To obviate these difficulties the lead Expert has used his past experience wherever possible and consultation with the proponent and relevant stakeholders to gauge and recommend appropriate mitigation measures in this study report.

9.3 Gaps in Knowledge

This study does not consider how the present global meltdown/ economic recession and funding may affect the construction and management of the proposed project.

10 CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

The analysis of the Study has evidenced that the construction and operation of the proposed transmission Line 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, improvement of standards of living for western region residents. However, despite the outlined positive impacts, the proposed development will cause some negative impacts such as alteration of land use for way leave trace, Noise Pollution, dust generation, Soil erosion, solid waste generation, Vegetation clearance, Wildlife and Avifauna impacts , Occupational health and safety hazards among others.

An Environmental Management Plan (EMP) outline has been developed to ensure sustainability of the project area activities from construction through operation to decommissioning. The plan provides a general outlay of the activities, associated impacts, mitigation action plans and appropriate monitorable indicators. Implementation timeframes and responsibilities are defined, and where practicable, the cost estimates for recommended measures are also provided.

A monitoring plan has been 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.

From the findings of this study, the following conclusions are made:

- The proposed project will generate socio-economic benefits which would not be realized if the no development 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 ensure environmental sustainability.
- No displacement and relocation is anticipated from the project as the line is entirely in the park
- 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
- Any damaged along the way leave trace or during stringing of conductors should be compensated by the proponent

The proposed project design has integrated mitigation measures with a view to ensuring compliance with all the applicable laws and procedures. The transmission Line 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

Recommendations for the prevention and mitigation of adverse impacts are as follows:

- All solid waste materials and debris resulting from installation of the transmission Line must be disposed off at approved dumpsites.
- Construction activities must be undertaken only during the day i.e. between 0600 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 proposed transmission Line.
- Maintenance activities for vehicles must be carried out in service bays and garages off site to reduce chances of oils or grease or other contaminants from coming into contact with environment (water or soil).
- Once towers are erected and stringing 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. Maintenance should be conducted in a designated area and in a manner not to interfere with the environment.
- 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.

It is recommended that for the successful implementation of this project; support and cooperation from all relevant stakeholders is profound; and KPLC and the contractors should adhere to all the proposed mitigation measures outlined in this study and the various relevant guidelines and legislations governing projects of this nature.

It is in the opinion of the Environmental team 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.

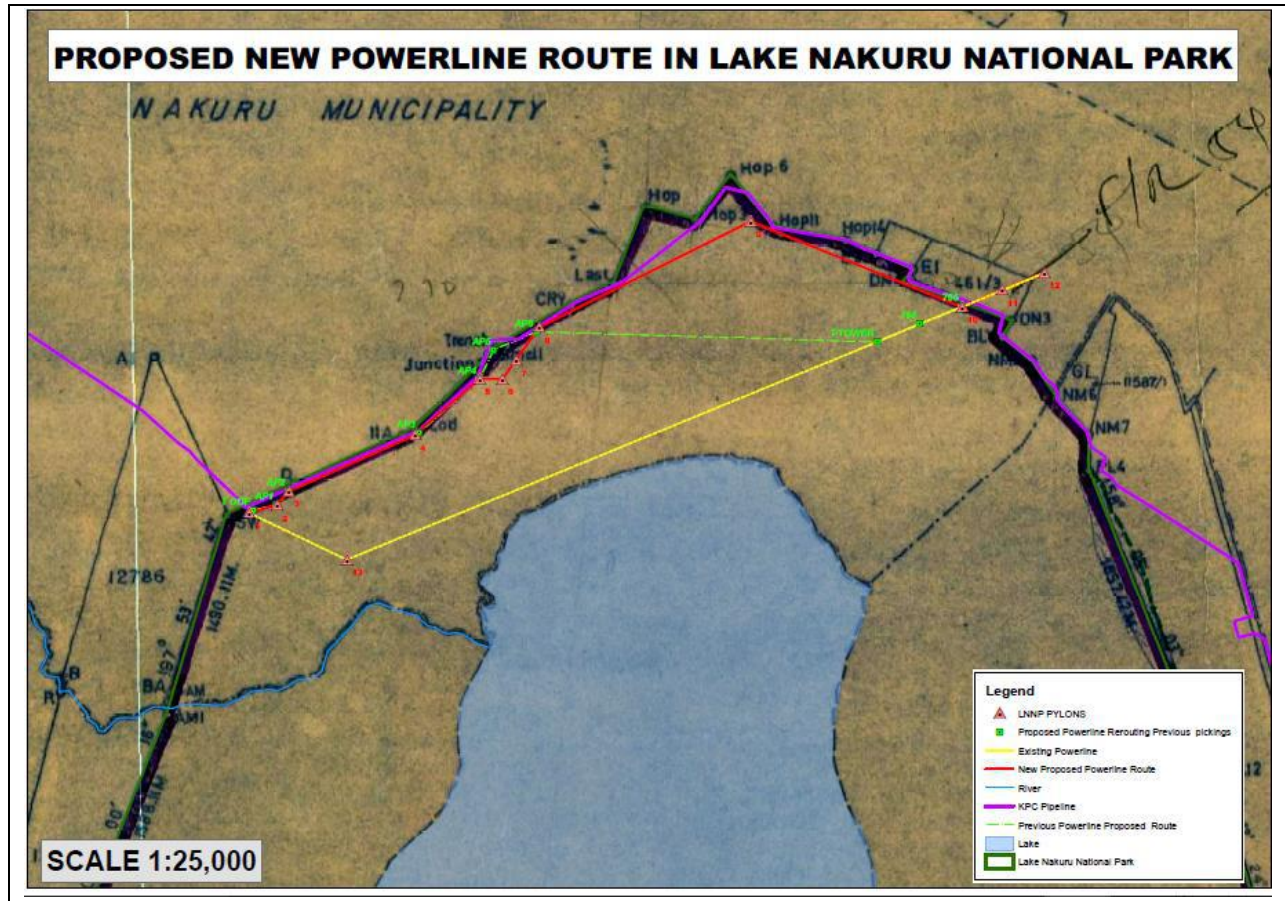
Diligence on the part of the contractor and proper supervision by the proponent is crucial for mitigating the predicted impacts and ensuring structural strength, safety, and efficient operation of the power-line.

11 REFERENCES

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12 ANNEXES

12.1 Annex 1: Proposed rerouting of dual circuit 132kV Power Line design Layout



12.2 Annex 2: Photo Plates



KWS and KPLC Consultative meeting



T-Off Tower near Honeymoon hill



Tower 764 near power line exit area from the Park



Section of the route on honeymoon hill



One section of the line near the main gate



Proposed route survey and reconnaissance to agree on the ideal location or positioning of towers



Proposed Re-routing of 2X132KV Distribution Power Lines at Nakuru National Park



Section of the route with fauna (Buffalo) and avifauna (Ibis and African crested crane)



A section of the line fully submerged power line in lake Nakuru



KPLC and KWS staff during field proposed route assessment and Consultation

12.3 Annex 3: Lead Experts NEMA Practicing License


nema
managing the natural world | sustainably

FORM 7 (r.15(2))

**NATIONAL ENVIRONMENT MANAGEMENT
AUTHORITY (NEMA)
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING
LICENSE**

License No: NEMA/EIA/ERPL/18662
Application Reference No: NEMA/EIA/EL/24588

M/S **SIMON NGUTA MWANGANGI**
(individual or firm) of address
P.O. Box 3885 - 00200 NAIROBI

is licensed to practice in the
capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
General
registration number **2046**

in accordance with the provision of the Environmental Management and Coordination
Act Cap 387.

Issued Date: 1/23/2023 Expiry Date: 12/31/2023

Signature.....

(Seal)
Director General
The National Environment Management Authority


P.T.O.
100 8896/2013 Certified

12.4: Annex4 Approval Letter and Conditions from NAWASSCO



Enriching Life

NAKURU WATER AND SANITATION SERVICES CO. LTD

Nakuru Water & Sanitation Services Co. Ltd.
Government Rd, Nawassco Plaza
Tel: 051- 2212269
Nakuru Water and Sanitation Services Company Ltd

P.O. Box 16314-20100 Nakuru.
Toil Free Line 0800-720036
@Nakuru Water

infor@nakuruwater.co
custcare@nakuruwat
www.nakuruwater.co

Copy

OUR REF: NAWASSCO/KPLC/vol1/039

DATE: 11th November, 2021

The Managing Director,
Kenya Power & Lighting Co. Ltd,
Central Office P.O. Box 30099
Nairobi Kenya,

Dear Sir/Madam,

RE: PROPOSED REROUTING OF 132KV UEB LINE AT LAKE NAKURU-NAKURU

We are in receipt of your letter dated 9th July 2021 referenced KP1/7/2/3/GKK/GW on the above referenced matter. We have reviewed the request and have no objection subject to the following conditions.

1. That the applicant (KPLC) obtains a signed wayleave agreement with NAWASSCO before commencement of the works.
2. All the works within NAWASSCO premises to be done under joint supervision with NAWASSCO team to ensure safety and safeguard integrity of company infrastructure.
3. The proposed power line shall not hinder access to sewer ponds/sewer treatment infrastructure from either direction.
4. That any costs arising from the proposed works shall be borne by the applicant.
5. That KPLC will be responsible for any damages caused by the proposed works to NAWASSCO infrastructure including reinstatement of grounds.
6. That NAWASSCO shall give a 6 months' notice to KPLC in case of a need to utilize/relocate the wayleave and as such an agreement of an appropriate relocation shall be made at the applicants cost.

If the above condition are acceptable to you kindly notify NAWASSCO for forward engagement.

Yours Sincerely,


J.N. GACHATHI
MANAGING DIRECTOR



12.5 Annex 5: Sample Questionnaires filled during the EIA Project report study



Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT

Public Consultation Questionnaire for the proposed 132kV line rerouting within Nakuru National Park.

Kenya Power and Lighting Company Limited intend to reroute 132kV line submerged in water within Nakuru National Park in Nakuru County. The objective of the project is to reduce the risk the line poses to the lake and public and to enhance reliability and security of power supply within Nakuru County and its environs.

1. What benefits (faida) do you expect from the proposed rerouting, construction and operation of the Proposed 132kv line project.

- ① Continual provision of power supply to homes, and institutions and industries
- ② Reduction of risk to the lake.
- ③ Increase in work opportunity for the residents

2. What Negative (madhara) Environmental Impacts do you expect from the proposed rerouting construction, operation and decommissioning of the proposed 132kV line project

- None

3. What actions should be taken to minimize /reduce the above negative impacts (jinzi ya kuzuia au kupunguza madhara)

- None

4. Do you support the proposed project? Yes/No..... (unakumbali mradi au la) (Tick as appropriate)

- Yes

Name of Respondent: E.K. BETT Signature: Bett

ID. Number/ Telephone No: 13561613 P.O. Box 972-20106 Tel. No. 0713 034 644

Location: NAKURU - LANET Date: 7.12.2021



Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT

Public Consultation Questionnaire for the proposed 132kV line rerouting within Nakuru National Park.

Kenya Power and Lighting Company Limited intend to reroute 132kV line submerged in water within Nakuru National Park in Nakuru County. The objective of the project is to reduce the risk the line poses to the lake and public and to enhance reliability and security of power supply within Nakuru County and its environs.

1. What benefits (faida) do you expect from the proposed rerouting, construction and operation of the Proposed 132kv line project.

- Reduced risk which the line poses to the lake and public
- Enhance reliability and security of power supply.

2. What Negative (madhara) Environmental Impacts do you expect from the proposed rerouting construction, operation and decommissioning of the proposed 132kV line project

- Reducing forest cover
- may interfere with the soil of the wayleave which may cause soil erosion.

3. What actions should be taken to minimize /reduce the above negative impacts (jinzi ya kuzuia au kupunguza madhara)

The operation to be done during the right season (weather)
- plant more site friendly tree species.

4. Do you support the proposed project? Yes No (unakumbali mradi au la) (Tick as appropriate)

provided the right procedure are followed

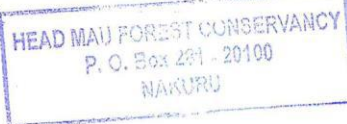
Name of Respondent: HUMPHREY MOKTAI

Signature

ID. Number/ Telephone No: 0722966713

Location: MAU HEAD OF FOREST CONSERVANCY OFFICE

Date: 09/12/2017





Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT

Public Consultation Questionnaire for the proposed 132kV line rerouting within Nakuru National Park.

Kenya Power and Lighting Company Limited intend to reroute 132kV line submerged in water within Nakuru National Park in Nakuru County. The objective of the project is to reduce the risk the line poses to the lake and public and to enhance reliability and security of power supply within Nakuru County and its environs.

1. What benefits (faida) do you expect from the proposed rerouting, construction and operation of the Proposed 132kv line project.

Assured Certainty of uninterrupted power in our businesses and homes - Reduced (zero) risk of electrocution in case the power line fell on the ground in water.

2. What Negative (madhara) Environmental Impacts do you expect from the proposed rerouting construction, operation and decommissioning of the proposed 132kV line project

None

3. What actions should be taken to minimize /reduce the above negative impacts (jinzi ya kuzuia au kupunguza madhara)

NA

4. Do you support the proposed project? Yes /No..... (unakumbali mradi au la) (Tick as appropriate)

Name of Respondent Samuel Wangoo

Signature [Signature]

ID. Number/ Telephone No: 0789477777

Location: Lake view

Date 2/12/2021



Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT

Public Consultation Questionnaire for the proposed 132kV line rerouting within Nakuru National Park.

Kenya Power and Lighting Company Limited intend to reroute 132kV line submerged in water within Nakuru National Park in Nakuru County. The objective of the project is to reduce the risk the line poses to the lake and public and to enhance reliability and security of power supply within Nakuru County and its environs.

1. What benefits (faida) do you expect from the proposed rerouting, construction and operation of the Proposed 132kv line project.

It create Employment to the residents

2. What Negative (madhara) Environmental Impacts do you expect from the proposed rerouting construction, operation and decommissioning of the proposed 132kV line project

Destruction of Eco-system

3. What actions should be taken to minimize /reduce the above negative impacts (jinzi ya kuzuia au kupunguza madhara)

To cut the necessary trees only

4. Do you support the proposed project? Yes/No..... (unakumbali mradi au la) (Tick as appropriate)

YES

Name of Respondent: Moses KABUCHO

Signature:

ID. Number/ Telephone No: 0724807848

Location: LAKEVIEW

Date: 8/12/2021



Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT

Public Consultation Questionnaire for the proposed 132kV line rerouting within Nakuru National Park.

Kenya Power and Lighting Company Limited intend to reroute 132kV line submerged in water within Nakuru National Park in Nakuru County. The objective of the project is to reduce the risk the line poses to the lake and public and to enhance reliability and security of power supply within Nakuru County and its environs.

1. What benefits (faida) do you expect from the proposed rerouting, construction and operation of the Proposed 132kv line project.

VIJANA..... KATAKATA..... KAZI.....

2. What Negative (madhara) Environmental Impacts do you expect from the proposed rerouting construction, operation and decommissioning of the proposed 132kV line project

UJAKATI..... WA MITI.....

3. What actions should be taken to minimize /reduce the above negative impacts (jinzi ya kuzuia au kupunguza madhara)

KUPANDA..... MITI..... KUINGINE.....

4. Do you support the proposed project? Yes/No..... (unakumbali mradi au la) (Tick as appropriate)

YES

Name of Respondent.....FRANCIS NJUGUNA..... Signature.....

ID. Number/ Telephone No:.....0727046122.....

Location: LAKE VIEW..... Date 8-12-2021.....



Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT

Public Consultation Questionnaire for the proposed 132kV line rerouting within Nakuru National Park.

Kenya Power and Lighting Company Limited intend to reroute 132kV line submerged in water within Nakuru National Park in Nakuru County. The objective of the project is to reduce the risk the line poses to the lake and public and to enhance reliability and security of power supply within Nakuru County and its environs.

1. What benefits (faida) do you expect from the proposed rerouting, construction and operation of the Proposed 132kv line project.
- High level voltage line nearby the institution for future operation within the institution.
- Reducing/Expanding/Enhancement of human world contact.
2. What Negative (madhara) Environmental Impacts do you expect from the proposed rerouting construction, operation and decommissioning of the proposed 132kV line project
- Electrical shock
- Short circuiting
3. What actions should be taken to minimize /reduce the above negative impacts (jinzi ya kuzuia au kupunguza madhara)
- Regular project Monitoring
4. Do you support the proposed project? Yes/No..... (unakumbali mradi au la) (Tick as appropriate)
YES

Name of Respondent: Catherine M. Karne Signature: [Signature]

ID. Number/ Telephone No: 8812676 10720227194

Location: Afraho Date: 8/12/2021

KALOLENI PRI. SCHOOL
P. O. Box 124-20100
NAKURU
Date: 8/12/2021



Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT

Public Consultation Questionnaire for the proposed 132kV line rerouting within Nakuru National Park.

Kenya Power and Lighting Company Limited intend to reroute 132kV line submerged in water within Nakuru National Park in Nakuru County. The objective of the project is to reduce the risk the line poses to the lake and public and to enhance reliability and security of power supply within Nakuru County and its environs.

1. What benefits (faida) do you expect from the proposed rerouting, construction and operation of the Proposed 132kv line project.

To enhance security of the animals

2. What Negative (madhara) Environmental Impacts do you expect from the proposed rerouting construction, operation and decommissioning of the proposed 132kV line project

No negative impact expected from this.

3. What actions should be taken to minimize /reduce the above negative impacts (jinzi ya kuzuia au kupunguza madhara)

None

4. Do you support the proposed project? Yes /No..... (unakumbali mradi au la) (Tick as appropriate)

Name of Respondent..... Klinnie Klaya

Signature [Signature]

ID. Number/ Telephone No: 28880570

0728 470 688

Location: Flamingo Road - Nakuru

Date 08/12/2021



Kenya Power

ENVIRONMENTAL IMPACT ASSESSMENT

Public Consultation Questionnaire for the proposed 132kV line rerouting within Nakuru National Park.

Kenya Power and Lighting Company Limited intend to reroute 132kV line submerged in water within Nakuru National Park in Nakuru County. The objective of the project is to reduce the risk the line poses to the lake and public and to enhance reliability and security of power supply within Nakuru County and its environs.

1. What benefits (faida) do you expect from the proposed rerouting, construction and operation of the Proposed 132kv line project.
Benefit with prevent accidents and outages in industries and in homes.
2. What Negative (madhara) Environmental Impacts do you expect from the proposed rerouting construction, operation and decommissioning of the proposed 132kV line project
In case of an emergence caused by snap breaking of the wires it can cause deaths to wildlife in lake Nakuru national park.
3. What actions should be taken to minimize /reduce the above negative impacts (jinzi ya kuzuia au kupunguza madhara)
Regular Repair & Maintenance of the line
4. Do you support the proposed project? Yes /No..... (unakumbali mradi au la) (Tick as appropriate)
Yes

Name of Respondent.....  Signature *[Handwritten Signature]*

ID. Number/ Telephone No:.....

Location:..... Date



INTERGRATED ENVIRONMENTAL IMPACT ASSESSMENT STUDY:

PROPOSED PROJECT: REROUTING OF 132KV DUAL TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

STAKEHOLDER ENGAGEMENT QUESTIONNAIRE:

Kenya Power intends to reroute a section of its existing 132KV dual transmission power line that is within Lake Nakuru National park. Lake Nakuru water levels have been gradually rising since 2009 which has affected infrastructure in the park including the power line whose section of about 3km is currently submerged. KPLC proposes to re-route said section in order to alleviate any adverse impacts which might emerge if the towers stay for longer periods in water. The project will involve installation of about 12 towers. The construction activities include excavation of the tower foundations, reinforcing through concreting, tower erections and stringing. The area where the line will pass through is at the periphery of the park which has grass land, shrubs and few scattered acacia trees.

Please respond to the following questions in relation to the proposed project.

1. What are your views about the proposed project?
Continuous Engagement should be involving key and relevant institutions of stakeholder be carried out extensively to allay any fears
2. What benefits do you expect from the construction and operation of the proposed project?
*Adjacent Communities be given consideration for any casual labour, especially the youth
 2. Uninterrupted power supply to K.P.S.C. Participate more in Conservation*
3. What Negative impacts do you expect from the construction, operation of the proposed project?
Reduced grazing land, hibernation area for wild animals during construction period, damaged environment due to increased traffic
4. What actions should be taken to minimize/reduce the above negative impacts you have mentioned?
*Designate different entrance close to the construction site
 - Sensitize the staff on the need to respect & care for environment
 - K.P.S.C. to compensate kw*
5. Do you support the proposed project? Yes No.....(Tick as appropriate)
6. If no, give reasons for not supporting the project.

Name of Respondent/Organization *Anna Echani (WCK)* Signature *[Signature]*
 Telephone No. *0720209625* ID. No. *10987849*
 Physical address/Location *Lake Nakuru National Park* Date *07/12/2022*





INTERGRATED ENVIRONMENTAL IMPACT ASSESSMENT STUDY:

PROPOSED PROJECT: REROUTING OF 132KV DUAL TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

STAKEHOLDER ENGAGEMENT QUESTIONNAIRE:

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Please respond to the following questions in relation to the proposed project.

1. What are your views about the proposed project?

POSITIVE

2. What benefits do you expect from the construction and operation of the proposed project

ISOLATION FROM THE PROTECTED AREA
SAFE FOR THE ANIMALS

3. What Negative impacts do you expect from the construction, operation of the proposed project?

N/A

4. What actions should be taken to minimize /reduce the above negative impacts you have mentioned?

N/A

5. Do you support the proposed project? Yes /No.....(Tick as appropriate)

6. If no, give reasons for not supporting the project.

N/A

Name of Respondent/Organization

Park Action Committee (Chairman)

Telephone No

0722701757

Physical address/Location

WITHIN THE PARK LAKE NAKURU NATIONAL PARK





INTERGRATED ENVIRONMENTAL IMPACT ASSESSMENT STUDY:

PROPOSED PROJECT: REROUTING OF 132KV DUAL TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

STAKEHOLDER ENGAGEMENT QUESTIONNAIRE:

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Please respond to the following questions in relation to the proposed project.

1. What are your views about the proposed project?

The project is okay as it serves many sockets and besides, they support the re-route for sustainable effective & efficient power supply

2. What benefits do you expect from the construction and operation of the proposed project

Continued power supply - for development

3. What Negative impacts do you expect from the construction, operation of the proposed project?

Accidents which can be controlled through loss of properties / which can be controlled through proper safety measures throughout

4. What actions should be taken to minimize /reduce the above negative impacts you have mentioned?

timely information sharing to the affected population, organization etc ensure all activities are done in strict accordance with the right information on the appropriate time to

5. Do you support the proposed project? Yes No (Tick as appropriate)

6. If no, give reasons for not supporting the project.

Name of Respondent/Organization .. Grace .. CAPAKU # Signature .. GR 19
 Telephone No .. 0734 44 5100 .. ID. No. 20392621
 Physical address/Location .. 28700 .. 20100 .. Date: 21/11/2022

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INTERGRATED ENVIRONMENTAL IMPACT ASSESSMENT STUDY:

PROPOSED PROJECT: REROUTING OF 132KV DUAL TRANSMISSION POWER LINE AT LAKE NAKURU NATIONAL PARK.

STAKEHOLDER ENGAGEMENT QUESTIONNAIRE:

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Please respond to the following questions in relation to the proposed project.

1. What are your views about the proposed project?
The proposed project will be helpful in safeguarding property and life with in the park and marine life in the lake.
2. What benefits do you expect from the construction and operation of the proposed project?
A reduction of dangerous exposure to electrocution and shocks to life and within the park
3. What Negative impacts do you expect from the construction, operation of the proposed project?
*A clearance of existing vegetation along the new line
 A waste pollution during the construction phase*
4. What actions should be taken to minimize /reduce the above negative impacts you have mentioned?
*A careful construction / design of the proposed routing to avoid/minimize minimal clearing of existing vegetation and waste pollution
 A community / stakeholder sensitization*
5. Do you support the proposed project? Yes No (Tick as appropriate)
6. If no, give reasons for not supporting the project.

Name of Respondent/Organization *Water Resources Authority* Signature *David Mungu Mutua*
 Telephone No. *020 275425013* ID. No. *4695344*
 Physical address/Location *Nakuru* Date *8/12/2022*
P.O. Box 1600, 1000-20100
Water Resources Authority
REGIONAL MANAGER
WATER RESOURCES AUTHORITY
NAKURU
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