ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT STUDY REPORT FOR THE PROPOSED KILGORIS - KEHANCHA HIGH VOLTAGE TRANSMISSION LINE PROJECT

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This Environmental and Social Impact Assessment study report is being submitted in accordance with the terms and conditions of the contract signed and TORs (submitted to NEMA) in respect to provision of consultancy services for conducting ESIA for the proposed Kilgoris – Kehancha132kV Transmission Line. The document has been prepared in accordance with Environmental (Impact Assessment and Audit) Regulations, 2003 of the Kenya Gazette supplement No. 56 of 13th June 2003, Legal Notice No. 101.

Executive Summary

The GoK is seeking financial support of US$370 million from the World Bank for Kenya Electricity System Improvement Project (KESIP), to be implemented by Kenya Power and KETRACO. The project's main objective is to increase the capacity of the transmission system and increase electricity access in Kenya. Part of this fund will be used for the Kilgoris–Kehancha 132kV Transmission Line Project.

The Kilgoris–Kehancha 34km 132kV Transmission Line Project is aimed at; (1) electrifying new areas and meet currently unserved demand, and (2) meet the Kilgoris and Kehancha Sub-County electricity requirements for their planned development programs (Feasibility Study on Priority Transmission Infrastructure Assignment II; 2018).

This report is an Environmental Impact Assessment Study Report for the Transmission Line. The objective of the assessment was to identify significant potential impacts of the project on environmental and social aspects, and to 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 of its phases (construction, implementation, and decommissioning phases).

The key activities undertaken during the assessment included:

- Understanding the project.
- Site assessment to collect baseline information.
- Consultations with key stakeholders.
- Identification and assessment of all potential environmental and social impacts.
- Recommendation of cost-effective mitigation measures, proportionate to the nature and scale of risks and impacts identified, to avoid, minimize, or remedy anticipated negative impacts.
- Analyzing alternatives and
- Report writing.

From the baseline survey, the line will mainly pass through agricultural lands (mostly sugar plantation). Sensitive ecosystems that may be affected include; a one (1) kilometer long Eucalyptus plantation forest, riverine vegetation in about 10 locations, and vulnerable indigenous tree species like *Dioyspyros abyssinca* (Olenatuyian), and *Olea Africana* (Oloiren). Also to be affected is a number structures and trees and Shrubs of various age, height, width, and species.

The ESIA identified that, the project will affect over two hundred (200) parcels of land which are privately owned. Within these land parcels, a number of structures and trees and Shrubs of various age, height, width, and species will be affected. World Bank Safeguard Policy OP 4.12, and KETRACO's Resettlement Policy Framework developed under this project observes that, should a project affect more than 200 PAPs then a full Resettlement Action Plan (RAP) must be conducted. This therefore, calls for the client to conduct an elaborate Resettlement Action Plan (RAP) to ensure that affected individuals and households and displaced communities are meaningfully engaged and consulted and are timely, adequately, and fairly compensated.

The ESIA study also found that, the project area is inhabited by the Maasai ethnic community. The community is included among people who meet the World Bank's OP 4.10 criteria, and to whom this policy would apply, and classified as VMGs under the Kenyan law. For all projects that are proposed for World Bank financing and affect Vulnerable and Marginalized Groups (VMGs), as defined by the Constitution of Kenya (2010), the World Bank requires the borrower to engage in a process of free, prior and informed consultation (FPIC). The objectives of the policy are to avoid adverse impacts on Indigenous Peoples (IPs)/VMGs, secure broad community support for the project and provide the IPs/VMGs with culturally appropriate benefits. Therefore, since the Maasai, who are also VMGs, are the overwhelming majority in the project area (95.4% of the population), elements of the VMGP or appropriate mitigation measures have been integrated into the ESMP to ensure their full participation and access to culturally appropriate social and economic benefits. Further, the proponent will implement project structured interventions to ensure vulnerable individuals and among VMGs and non-VMGs effectively participate and benefit from the project.

Baseline water quality for all the water resources and noise levels for specific locations were identified and will help KETRACO monitor if project implementation has effects on water quality and noise levels.

The identified potential negative impacts include;

- Way-leave acquisition (resettlement and loss of use).
- Project induced labour Influx.
- Impacts on culture, heritage, and norms.
- Community health and safety.
- Impacts on pastoralism.
- Destruction of existing vegetation and habitat.
- Disturbance to wildlife.

- Avi-fauna disturbance and mortality.
- Impacts on surface and underground water reserves.
- Workers health and safety.
- Waste handling, storage, and disposal.
- Noise and vibrations.
- Air pollution.
- Soil erosion.
- Impacts on archeological and historical sites.
- Air craft navigation safety.
- Traffic disruption on road crossings during stringing.
- Visual and aesthetic impacts.
- Fire outbreaks and
- COVID-19.

Some mitigation measures proposed included; development and implementation of management plans including resettlement, social assessment, gender mainstreaming, livelihood restoration, labor management, local recruitment, labor influx management, community development, stakeholder engagement, fire management, and GBV management; ensuring the health and safety of community is safeguarded; selective clearance of vegetation; avoiding locating towers within the riparian zones; implementing all necessary measures to ensure health and safety of the project workers; sound management of solid and liquid waste; ensuring noise and vibrations from machinery, vehicles and construction activities are kept at a minimum; water sprinkling to suppress dust emission; speed limits; chance find procedures; seeking all necessary approvals; and provision of all necessary PPEs.

An Environmental and Social Management Plan (ESMP) outline has been developed to ensure sustainability of the site activities from construction through operation to decommissioning. The plan provides a general outlay of the activities, associated impacts, and mitigation action plans. Implementation timeframes and responsibilities are defined. Where practicable, the cost estimates for recommended measures are also provided. The estimated cost for implementation of the ESMP during the pre-construction and construction phases is Kenya Shillings fifteen million, five hundred and fifty thousand (15,550,000). A monitoring plan has also been developed and highlights the environmental and social performance indicators that should be monitored.

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List of Abbreviations

ACC	Assistant County Commissioner
AfDB	African Development Bank
AP	Angle Point
CBO	Community Based Organization
CRC	Community Resettlement Committee
dB	Decibels
dB(A)	A-weighted sound pressure level
dBC	Decibels relative to the Carrier
EA	Environmental Audit
EMCA	Environmental Management and Coordination Act
EMF	Electro-Magnetic Field
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
EPRA	Energy and Petroleum Regulatory Authority
FGD	Focus Group Discussions
FPIC	Free Prior and Informed Consent
GBV	Gender Based Violence
GDC	Geothermal Development Company
GoK	Government of Kenya
GPS	Global Position System
GRC	Gross Replacement Cost
GRM	Grievance Redress Mechanism
ID	Identity Card
IDP	Internally Displaced Persons
IP	Indigenous Peoples
IUCN	International Union for Conservation of Nature
KCAA	Kenya Civil Aviation Authority
KDRIP	Kenya Development Response Displacement Impacts Project
KENHA	Kenya National Highways Authority
KenGen	Kenya Electricity Generating Company
KETRACO	Kenya Electricity Transmission Company
KESIP	Kenya Electricity System Improvement Project
KFS	Kenya Forest Service

KM	Kilometer
KPLC	Kenya Power
KSEIP	Kenya Social Economic Inclusion Project
KSh.	Kenya Shilling
kV	Kilo Volt
KWH	Kilo Watt Hour
KWS	Kenya Wildlife Service
LCPDP	Least Cost Power Development Plan
LILO	Line In Line Out
LMCP	Last Mile Connectivity Plan
L.R	Land Registration
M&E	Monitoring and Evaluation
MoE	Ministry of Energy
MW	Mega Watts
NEMA	National Environment Management Authority
NGO	Non-Governmental Organization
NMK	National Museums of Kenya
OHL	Over-Head Line
OP	Operational Policy
OSHA	Occupation Safety and Health Act
OVI	Objectively Verifiable Indicators
PAP	Project Affected Person
PIN	Personal Identification Number
PIU	Project Implementation Unit
PCR	Physical Cultural Resources
RAP	Resettlement Action Plan
REREC	Rural Electrification and Renewable Energy Corporation
RPF	Resettlement Policy Framework
SHE	Safety Health and Environment
STD	Sexually Transmitted Diseases
UNCBD	United National Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework for Convention on Climate Change
UTM	Universal Transverse Mercator
VMGP	Vulnerable and Marginalized Groups Plan
VMGF	Vulnerable and Marginalized Groups Framework

WIBA	Work Injury Benefit Act
WB	World Bank
WRA	Water Resources Authority

CHAPTER 1: INTRODUCTION

1.1: Background

Vision 2030 is Kenya's development blueprint covering the period 2008 to 2030. The objective of Vision 2030 is to help transform Kenya into a, "middle-income country providing a high quality of life to all of its citizens by the year 2030". The Vision outlines the Government of Kenya's economic growth objectives.

Vision 2030 recognizes the energy sector as one of the infrastructure enablers of the economic, social and political pillars underlying the Vision. The Sessional Paper No. 4 of 2004 on Energy recognizes that affordable, quality and cost-effective energy services is an important prerequisite for attainment of accelerated social and economic growth and development. In view of these considerations, energy sector development is a key policy concern for Kenya's development.

To guide the energy sector development, the Ministry of Energy in 2011 developed the Least Cost Power Development Plan (LCPDP), in pursuit of the provisions of section 5 (g) of the Energy Act, which mandates the EPRA to prepare indicative energy plans. The LCPDP was updated in 2017 to cover the period 2017 -2037.

According to LCPDP, the demand for electric power continued to rise significantly over the five years preceding 2017, driven by a combination of normal growth, increased connections in urban and rural areas as well as the country's envisaged transformation into a newly industrialized country as articulated in Vision 2030 and in the Big 4 Agenda. However, the power market remained unbalanced with this demand not fully met by supply. This was mostly due to system constraints and weather challenges.

From the Kenya Power annual report for 2017/18, the electricity peak demand grew by 8% from 1,656MW to 1,802MW. The number of customers connected to the national grid in the financial year 2017/2018 increased by 9.4% from 6,182,282 to 6,761,090. The customer base had increased by 1.2 million new customers in 2016/17.

This increase in number of customers was as a result of the "Last Mile Connectivity Plan (LMCP)" which was launched in 2015 to scale up connectivity in rural and peri-urban areas by

providing subsidy for grid extension to enable customers get electricity supply at affordable cost. Implementation of LMCP is organized in four distinct phases.

- Phase I and II are funded by African Development Bank (AfDB) and targets to connect 549,152 customers.
- Phase III is funded by the World Bank and aims to connect 200,000 customers (this project falls under this phase).
- Phase IV is funded by the French Development Agency (AFD), and aims to connect 296,649 customers.

As at 30th June 2018, Kenya had an installed electricity generation capacity of 2,351MW comprising of hydro (826.5MW), thermal (808MW), geothermal (662MW), wind (26MW), biomass/cogeneration (28MW), and solar (0.8MW).

The total transmission network (220kV and 132kV) stood at 4,766kms by June 2017 of which 839.11kms (132 kV), 374.59km (220 kV) and 585km (400kV) were under KETRACO while the rest were managed by KPLC.

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

To address these constraints, the Kenya Electricity Transmission Company (KETRACO) has identified the need for a number of new transmission projects. Among these projects is Kilgoris - Kehancha 132kV Transmission Line.

The GoK is seeking financial support of US$370 million from the World Bank for Kenya Electricity System Improvement Project (KESIP), to be implemented by Kenya Power and KETRACO. The project's main objective is to increase the capacity of the transmission system and increase electricity access in Kenya. Part of this fund will be used for the Kilgoris – Kehancha 132kV Transmission Line Project.

The Kilgoris–Kehancha 132kV Transmission Line Project is aimed at enhancing the adequacy, reliability, and security of electricity power supply in Narok and Migori Counties. The project will also help meet the increasing demand for power supply, help meet the objectives of The Big Four Agenda (industrialization), and minimize the frequency of power outages in the two counties.

Currently, Kilgoris is supplied from Kegati 132/33kV substation in Kisii County via Kilgoris feeder ex Kegati 132/33kV substation. Kehancha, on the other hand, is supplied by Migori 33kV feeder ex Kegati 132/33kV substation and an 11kV feeder from Migori 33/11kV substation. With commissioning of Awendo 132/33kV substation, it is expected that Kegati will be offloaded substantially. The Kisii-Kilgoris and Kisii-Migori-Isebania-Kehancha lines are long, with long spurs, and substantial power losses, hence the proposal to construct the Kilgoris-Kehancha Transmission Line.

Kilgoris 400/132/33kV substation (part of the 400kV Rongai-Kilgoris TL project) is planned to be in place by 2023. Sotik–Kilgoris 132kV will have been in place earlier by 2022. These two developments will have placed Kilgoris as a major reinforced bulk power supply point.

While the initial proposal was Kilgoris-Lolgorien-Kehancha TL, the feasibility study found that, it would not be justified to propose a new 132/33kV substation at Lolgorien due to the low load in this particular area. Furthermore, the proposed 132/33kV substation at Kilgoris which is scoped to be in place by 2022, is close to Lolgorien thus 33kV feeders from Kilgoris substation will re-enforce the 33kV feeder network in Lolgorien.

A new 132/33kV substation is proposed at Kehancha from where 33kV feeders can supply and reinforce Lolgorien area. Kehancha 132/33kV is centrally located such that, significant loads around Transmara and Kehancha, can easily be supplied from it. In the case year of 2025, the loads at Lolgorien and Kehancha will have grown to 2MW and 5.7MW respectively. If projected to 2065, the loads will have grown to 10MW and 35MW for Lolgorien and Kehancha respectively. It is therefore clear that a new substation will be required at Kehancha. Possible consideration is to make provision for double circuit line design but implement single circuit for start in 2025, the second circuit can be strung as load grows over time.

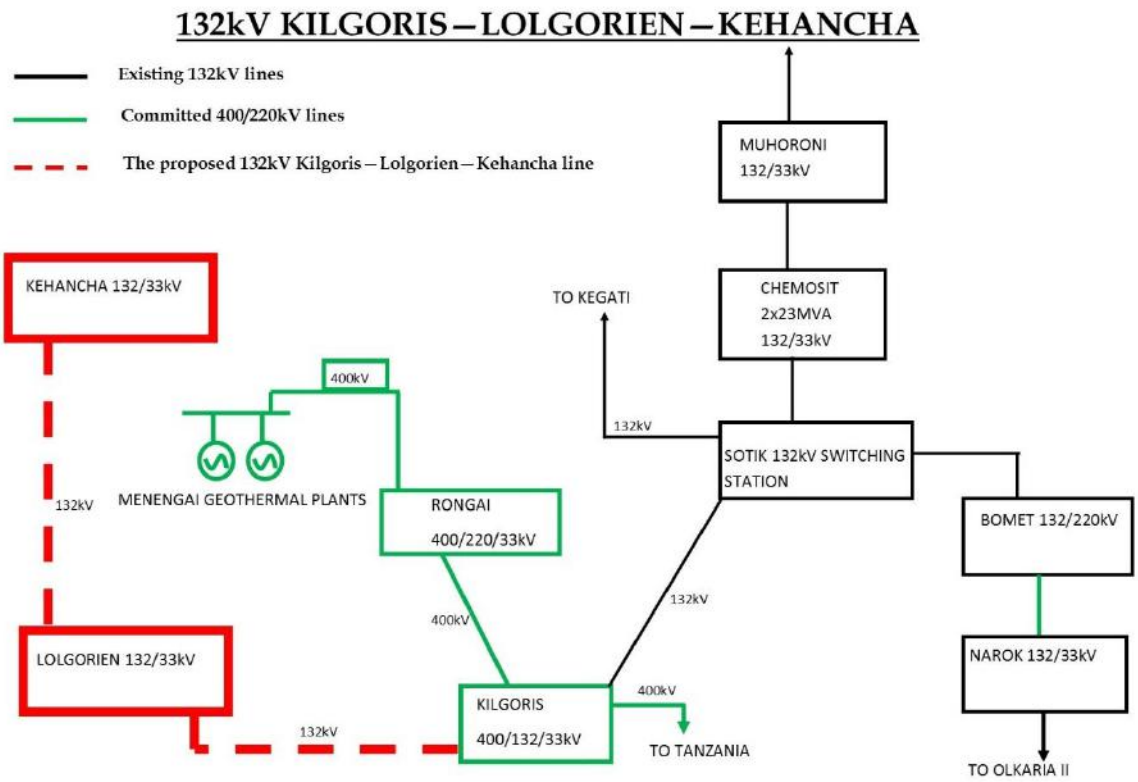


Figure 1.1: the previously proposed 132kV Kilgoris–Lolgorien–Kehancha TL

The transmission line under this project is proposed to be constructed with ACSR Lynx conductor rated 97MVA per circuit 132kV which generates about 5MVAR per 100km per circuit. Again, the Kilgoris – Kehancha stretch will only be about 34km, the reactive power generated by the line will not be significant enough to alter the bus voltages above the steady state limits. This line can be charged without any line reactors or capacitors from either end.

The feasibility study found out that, Kilgoris–Kehancha line can be charged from Kilgoris end without line compensation (reactor/capacitor) needed. The voltage rise along the line is negligible. When the system is projected to 40 years after 2025, it was observed that neither thermal limit or voltage limit are violated. Technically the proposed 132kV Kilgoris–Kehancha offers solution that do not violate thermal loading limits nor bus voltage limits and can be considered for implementation to serve the load demands at Kehancha and Lolgorien.

Analysis of the Load Flow Results showed that, in the base year, which is assumed to be 2025, the flow on this line will be 2X2.8MW from Kilgoris towards Kehancha with a 3% loading on each line. The power will be coming from Kilgoris which is assumed to be commissioned and supplied from Geothermal Power plants. In the target year 2035, the flow towards Kehancha was projected to increase to 2X4.5MW and 5% line loading with an anticipated load growth at Kehancha. With one line out, the flow on the remaining line would be 5.6MW and

9MW in 2025 and 2035 respectively. The loading on the line does not therefore approach the rating of the line in the planning horizon.

Transmission losses for the base year 2025 were calculated for the cases - with and without the proposed 132kV Kilgoris-Kehancha line versus 33KV line. Loss reduction by the construction of the Kilgoris-Kehancha transmission line was calculated by considering the initial length of 33kV feeders supplying the loads without the line viz a viz the estimated length of the 33kV feeders with the introduction of the line.

Assumption: 33kV conductor was used.

Losses without 132kV Kilgoris-Kehancha line=0.629MW

Losses with 132kV Kilgoris-Kehancha line=0.247MW

Loss reduction = 0.382MW

With all conditions factored, the following recommendations were made by the feasibility study team:

Transmission line:

Kilgoris–Kehancha 132kV double circuit with ACSR Lynx Conductor (34km).

Air Insulated Substation (AIS):

Substation Extension at Kilgoris:

- 2nos 132kV line bay for Kilgoris – Kehancha 132kV double circuit line.
- All related switchgear, modifications/ extension of the Control room building, protection, control and telecommunication systems to accommodate these extensions.

New 2x23MVA 132/33kV substation at Kehancha with double bus single breaker configuration including;

- 2nos 132kV line bays for Kilgoris – Kehancha 132kV double circuit line.
- 2nos 132kV transformer bays for 2x23MVA, 132/33kV ICTs.
- Six (6) 33kV line bays for six feeders.
- All related switchgear, a functional control room building to accommodate all the required control and protection panels, telecommunication facilities and manpower.

The length of the proposed 132kV overhead transmission line is approximately 34 km and the tentative line of traverse is indicated in the diagram below.

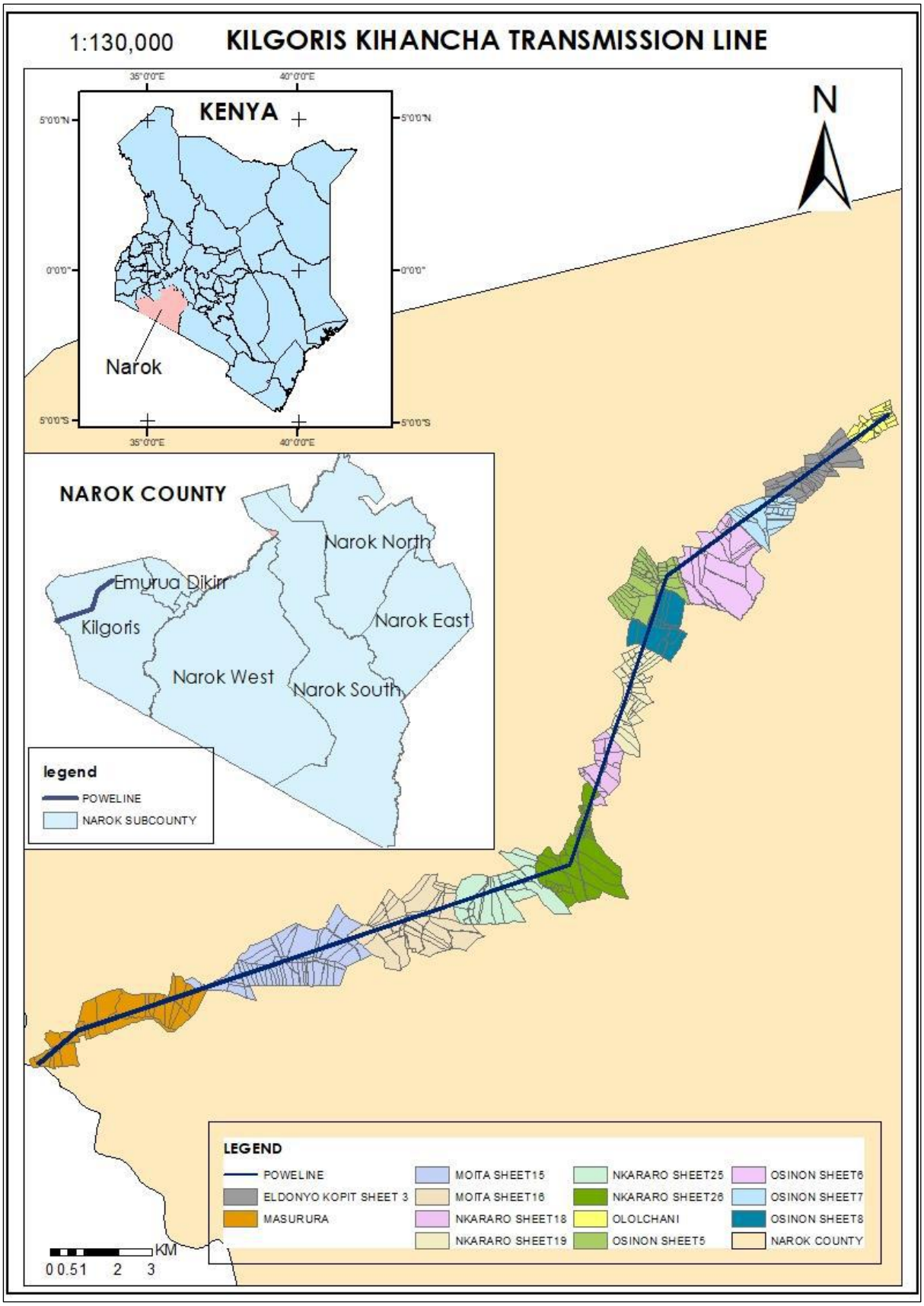


Figure. 1.2: Proposed 132kV Kilgoris–Kehancha transmission line route

KETRACO in line with its principle of environmental conservation and social inclusivity ensures that negative impacts associated with the transmission line project are avoided, minimized or compensated, while their positive impacts are enhanced.

The Joint Venture of Tingori Consultancy Ltd and Savannah Consulting Ltd has been contracted to undertake preparation of Environmental and Social Impact Assessment (ESIA), Resettlement Action Plan (RAP), Social Assessment, and Vulnerable and Marginalized Groups Plan (VMGP) for Kilgoris – Kehancha Transmission Line. This report will focus on environmental and social considerations while the other reports will be undertaken in the subsequent proposed RAP studies.

The Kenya Government policy on all new projects requires that an Environmental and Social Impact Assessment (ESIA) study be carried out at the project planning phase in order to ensure that significant impacts on the environment are taken into consideration at the construction, operation and decommissioning stages.

This Environmental and Social Impact Assessment has identified both positive and negative impacts of the proposed project to the environment and proposes mitigation measures in the Environmental Management Plan developed to address potential negative impacts, during the construction, operation and decommissioning phases of the project, for overall environmental sustainability.

1.2: Study Objectives

The principal objective of this assessment was to identify significant potential impacts of the project on environmental and social aspects, and to 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 of its phases (construction, implementation, and decommissioning phases).

The specific objectives of this ESIA were to:

- Identify and assess all potential environmental and social impacts of the proposed project;
- Review policy, legal, and administrative frameworks;
- Develop an Environmental Management System for the project;
- Generate baseline data that will be used to monitor and evaluate the mitigation measures implemented during the project cycle;

- Recommend cost effective measures to be used to mitigate against the anticipated negative impacts;
- Prepare an Environmental and Social Impact Assessment Report compliant to the EMCA, Cap 387 and the Environmental (Impact Assessment and Audit) Regulations (2003), detailing findings and recommendations.

1.3: Terms of Reference (Tor) for the ESIA Process

Detailed TORs as approved by NEMA are given in appendix I. The TORs included; -

- Description of the baseline environment (physical, biological, social, and cultural)
- Detailed description of the proposed project
- Review of legislative and regulatory framework that relate to the project
- Identification of potential environmental impacts that could result from the project
- Carrying out public consultation on positive and negative impacts of the project
- Proposing mitigation measures against identified environmental and social impacts of the project
- Development of an Environmental Management Plan to mitigate negative impacts
- Development of an Environmental Monitoring Plan
- Preparation of an Environmental and Social Impact Assessment Report

1.4: Scope of the Study

The study has been conducted to evaluate the potential and foreseeable impacts of the proposed transmission line on the environment and social set-up within the locations it will pass in Narok County. The physical scope is limited to the proposed site and the immediate environment as may be affected or may affect the proposed project. Any potential impacts (localized or delocalized) are also evaluated as guided by EMCA, Cap 387 and the Environmental (impact assessment and Audit) Regulations, 2003. This report includes an assessment of impacts of the construction, operations, and decommissioning of the proposed project, site, and its environs.

1.5: ESIA Approach and Methodology

The approach to this exercise was structured such as to cover the requirements under the EMCA Cap 387, the Environmental (Impact Assessment and Audit) (Amendment) Regulations, 2019, the World Bank Safeguard Policies triggered under this project including; Environmental and Social Impact Assessment, Involuntary Resettlement, Indigenous Peoples (known in Kenya as Vulnerable and Marginalized Groups – VMGs), Forests, Natural Habitats, and Physical Cultural Resources, and frameworks developed under this project (RPF, VGMF and ESMF) and World Bank Group/IFC EHS Guidelines on electrical transmission and

distribution. It involved largely an understanding of the project background, the preliminary designs and the implementation plan, as well as commissioning. In addition, baseline information was obtained through physical investigation of the site and the surrounding areas, desktop studies, survey, photography, public consultations with members of the community in the project areas, and discussions with key informants (local administration and heads of departments).

The key activities undertaken during the assessment included the following:

- Mapping of the project area which involved literature review and a transect walk through the proposed transmission line route;
- Assessment of the baseline conditions of the project area which involved a study on the surface water resources (including water quality analysis), ecological study (flora, fauna, and avifauna), social impact assessment, noise level measurements, and an anthropological and archaeological study;
- Stakeholders mapping and analysis;
- Consultations with the key project stakeholder including the project proponent, community members, National and County administration, opinion leaders, church elders, Community Based Organizations (CBOs), NGOs, and National and County Government departmental heads. The consultations were based on the proposed project, site planning, project benefits, anticipated impacts, and the project implementation plan;
- Physical inspections of the proposed project area (site assessment) which included observation of available land marks, photography and interviews with the local residents;
- Evaluation of the activities around the project site and the environmental setting of the wider area through physical observations and literature review;
- Review of available project documents;
- Identification and assessment of all potential environmental and social impacts of the proposed project e.g., land take and resettlement, disruption of livelihoods, disruption of habitats, noise and vibration, dust emission, creation of employment opportunities, labour influx, social conflicts, Gender Based Violence, among others;
- Proposition of alternatives
- Recommendation of cost-effective measures, proportionate to the nature and scale of risks and impacts identified, to be used to mitigate against the anticipated negative impacts;
- Report writing, review and submissions.

The steps that were followed during this assessment included; -

1. Screening
2. Scoping Exercise and Development of TORs
3. Literature Review
4. Review of Laws, Regulation and Policies
5. Site Assessment
6. Social Impact Assessment
7. Public Consultation
8. Impact prediction/ identification and analysis
9. Formulation of mitigation measures
10. Environmental and Social Management Plan (ESMP)
11. Environmental and Social Monitoring Plan
12. Analysis of Alternatives
13. Reporting

Table 1.1; Table of activities

DATE	VENUE	ACTIVITY
09/05/2019	KETRACO Offices, Nairobi	Meeting with the KETRACO team
13/05/2019	World Bank Offices, Nairobi	Meeting with the World Bank Team
27/05/2019	Consultant Offices, Nairobi	Recruitment of Enumerators
30/05/2019 - 31/05/2019	Field	Reconnaissance Survey
01/06/2019	Castle Gardens Hotel, Nairobi	Training of enumerators and testing data collection tools
01/06/2019	Castle Gardens Hotel, Nairobi	Training of enumerators and testing data collection tools
09/07/2019	World Bank Offices, Nairobi	Presentation of the Inception Report
11/07/2019	KETRACO Offices, Nairobi	Project planning meeting with the KETRACO team
21/07/2019 - 16/09/2019	Field	Data Collection

A detailed technical approach and methodology for ESIA as outlined in the inception reports is given in appendix II.

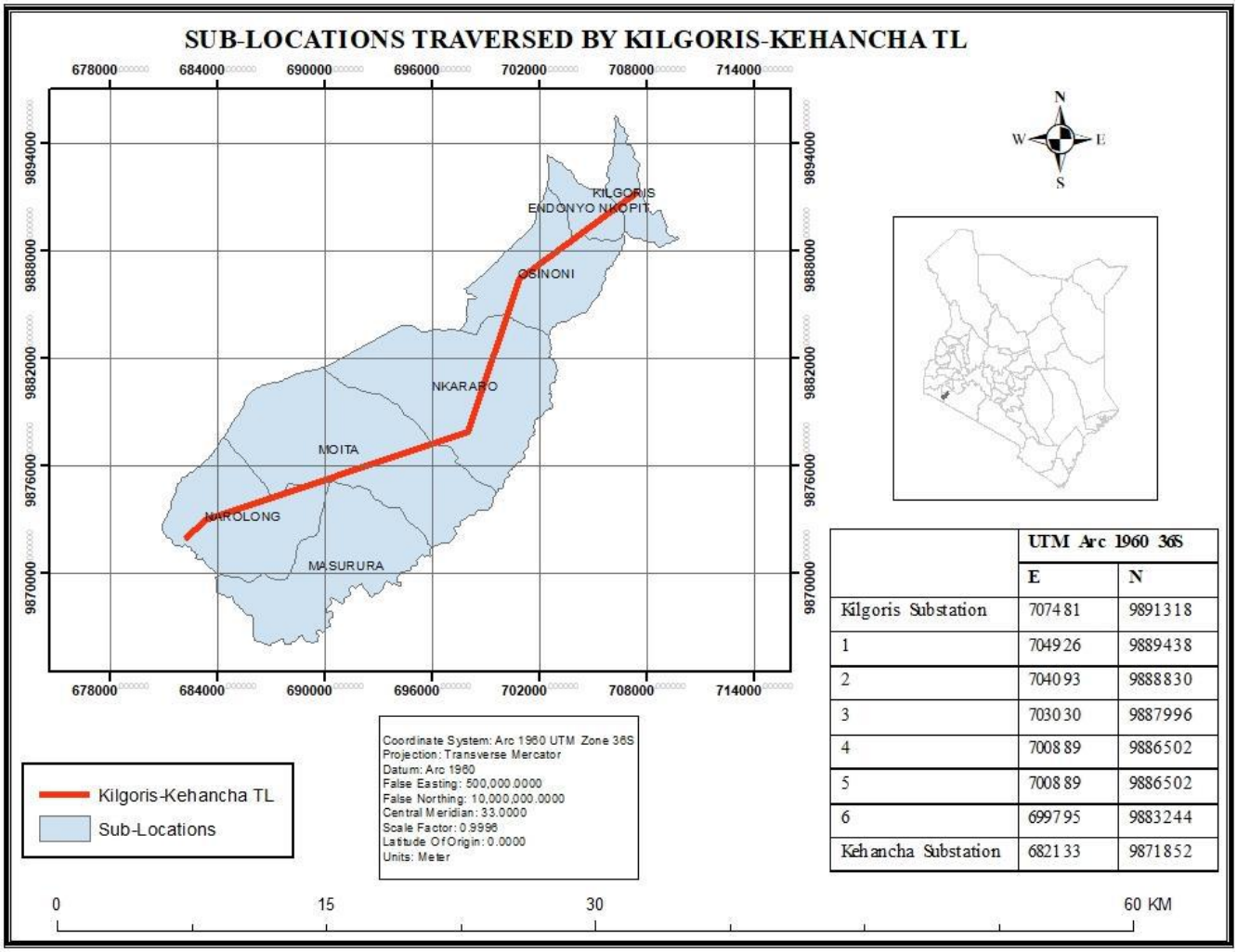
CHAPTER 2: PROJECT DESCRIPTION

2.1: Introduction

The project will essentially involve the construction of a 34km, 132kV, Overhead Transmission Line from Kilgoris Town and terminate in Game Township (about 3km from Kehancha Township in Migori County). Both towns are located in Narok County.

2.2: Description of Transmission Line Route

The route of traverse of the transmission line is shown on the map below;-



	UTM Arc 1960 36S	
	E	N
Kilgoris Substation	707481	9891318
1	704926	9889438
2	704093	9888830
3	703030	9887996
4	700889	9886502
5	700889	9886502
6	699795	9883244
Kehancha Substation	682133	9871852

Figure 2.1: GPS coordinates of the TL

Plate 2.1: Proposed site for Kilgoris Substation

The proposed TL will start at the proposed Kilgoris Substation which will be located at Lepolosi Village (0^0 59' 07" S and 34^0 59' 54" E), in Kilgoris, Narok County.

The proposed TL will leave the proposed substation site in a south westerly direction and will overpass a murram access road in Lepolosi area. The TL will maintain the south western direction for about 1 km before passing over River Enkare Ngetwa which is a permanent river used by locals for domestic and livestock purposes.

The TL will then pass through Ol Gobit Village an area characterized by large sugarcane plantations at 0^0 59' 55"S and 34^0 50' 51"E. After Ol Gobit the line will pass through Murram Village and will overpass a murram access road at 1^0 01' 08"S and 34^0 50' 32"E. The terrain in Murram area is gentle slopping and the vegetation mainly includes eucalyptus trees, bushes and shrubs.

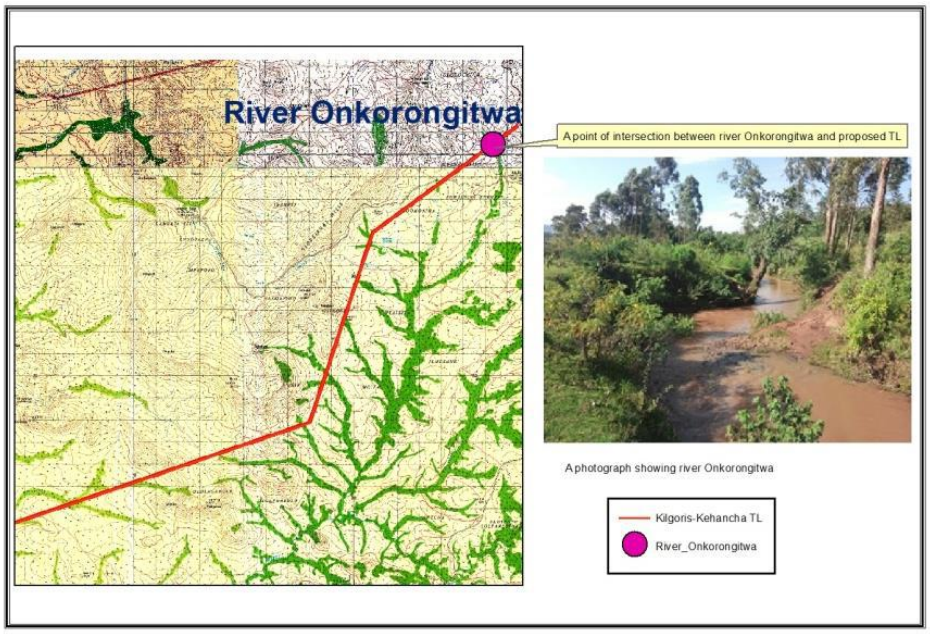


Plate 2.2: River Enkare Ngetwa

The TL then overflies the main Kilgoris- Awendo murram road at Naboda Village diagonally at 1^0 00' 28"S and 34^0 50' 06"E. Naboda village is rich in vegetation which includes trees and thick bushes. Agriculture is the main economic activity like most parts in the region.

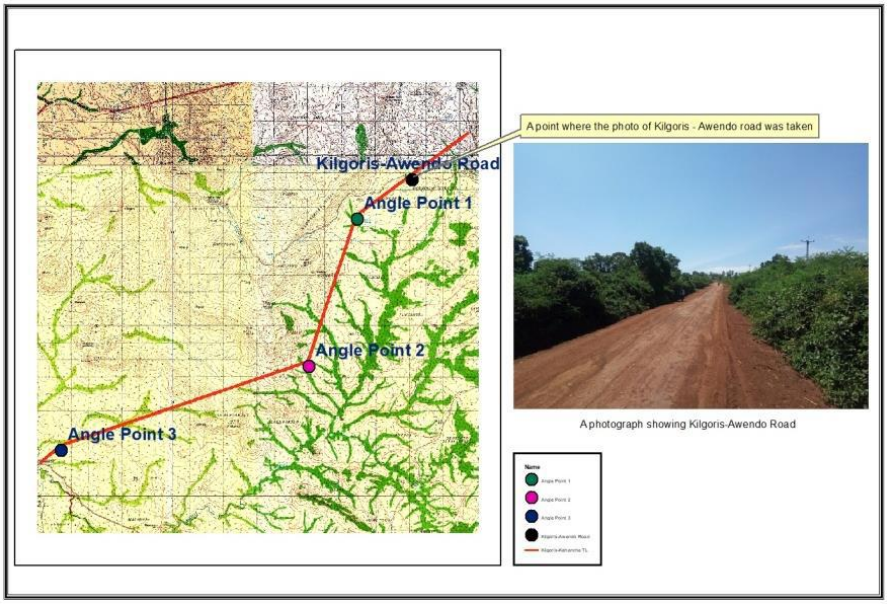


Plate 2.3: Kilgoris- Awendo Road

About 300metres after crossing Kilgoris - Awendo murram road, the TL will cut across a modified gallery forest located on a private land and comprising a mixture of indigenous and exotic tree species. River Naboda flows within the wooded area and originates from the nearby highlands. The contractor should observe mitigation measures recommended in the ESMP to avoid unnecessary vegetation clearing and contamination of River Naboda.

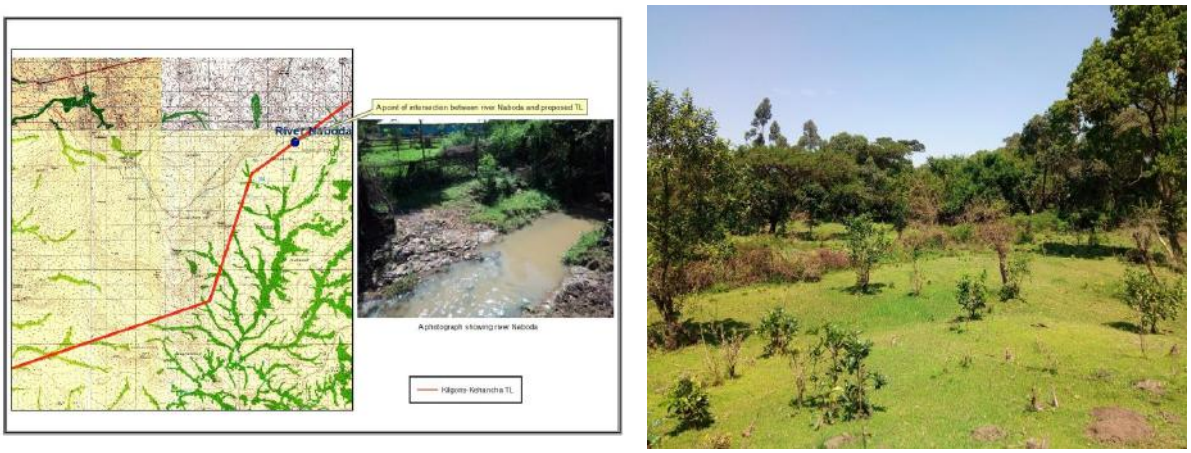


Plate 2.4: (left) River Naboda and (right) Gallery Forest

After crossing the forest area, the TL will pass through Naboda/Olomoneira Village at 1^0 00' 55" S and 34^0 49' 30" E. This area is characterized by large sugarcane plantations and small-scale farming (beans, maize, bananas and livestock rearing).

The TL will make the first angular turn in Osinoni Village at 1^0 01' 44" S and 34^0 48' 21" E about 9km from the start point (Kilgoris Substation). At this angle point, the TL creates an obtuse angle taking a south west (SW) direction but maintaining the general southwest course from the take-off point. Osinoni area is also characterized by large sugarcane plantations and small-scale farming. After Osinoni Village, the TL will cross a small stream called Nkare Ibi and a private eucalyptus plantation forest that stretches about a kilometer. The plantation is on leased land and belongs to Nyamache tea factory. Moving further south the TL will cross River Enesoit at 1^0 01' 49" S and 34^0 48' 15"E.

Plate 2.5.: (left) Plate 6: River Enesoit; (Center)Eucalyptus plantation forest and far end access to the forest

Plate 2.6: Riverine vegetation at River Kapnor

After crossing the eucalyptus plantation, the TL will pass through Olenkii Village (beacon KET 28) at (1^0 02' 38"S and 34^0 48' 03"E). Olenkii area is generally flat and has scattered semi-permanent houses. The TL will cross River Kapnor in Olenkii

Still maintaining the general south-western direction, the TL will pass through Nentekeny Village. Beacon 30 KET 30) at (1^0 03' 28"S and 34^0 47' 47"E) and a pegged point at (1^0 03' 30"S and 34^0 47' 46"E) were observed by the team of consultants in Nentekeny area. The terrain in this area is gentle slopping with few hills.

Shrubs and trees form the vegetation of the area. The TL will continue moving south and will cross River Enkir kor in Nentekeny area.

Plate 2.7: KETRACO beacon 30 and on the right sugarcane transportation at Nentekeny

The TL will then pass through Endonyo Narok Village which is about 6km from Nentekeny Village. The area between Nentekeny and Endonyo Narok is generally sparsely populated and has large sugarcane plantations. The terrain around AP2 is generally flat with some areas of rock outcrops with vegetation being mainly thick bushes and grasslands. At AP2 (1^0 06' 25"S and 34^0 46' 48"E), the TL makes an angular turn more towards the west but maintains the general south-western direction towards Kehancha. After the second angle point the TL will overfly River Ole Katuna/Endonyo Narok at 1^0 06' 28"S and 34^0 46' 38".

From Endonyo Narok, the TL passes through Ormogo Village at 1^0 07' 10"S and 34^0 44' 35"E, about 5 kilometers from Endonyo Narok. The TL will cross the murram road diagonally, forming a transversal before crossing Endruny Stream.

Plate 2.8: (left) Access road traversed by the TL and (right) Endruny Stream

The TL will then pass through Moita location after crossing Moita River at Ol Donyo Dapasha (1^0 07’ 29”S and 34^0 43’ 39”E) located on a hill.

Plate 2.9: (left) Ol Donyo Dapasha area and (right) Moita River

The TL will descend from the hills heading further south traversing several sugarcane plantations before getting overflying River Ndiiru, which acts as a borderline between Moita and Masurura. The line will then follow the river course until AP3 but at a safe distance (over 200m) from the riparian zone. Masurura is a relatively gentle sloping area with land parcels approximating 100m long each, uninhabited, bushy, and used mainly for grazing fields. The more inhabited area of Masurura is Narolong Village. In this section the line avoids the town center and a school. A KETRACO bacon was observed at 1^0 08’ 11”S and 34^0 41’ 34”E. The TL then overfly River Narolong, which is a tributary of Ndiiru River.

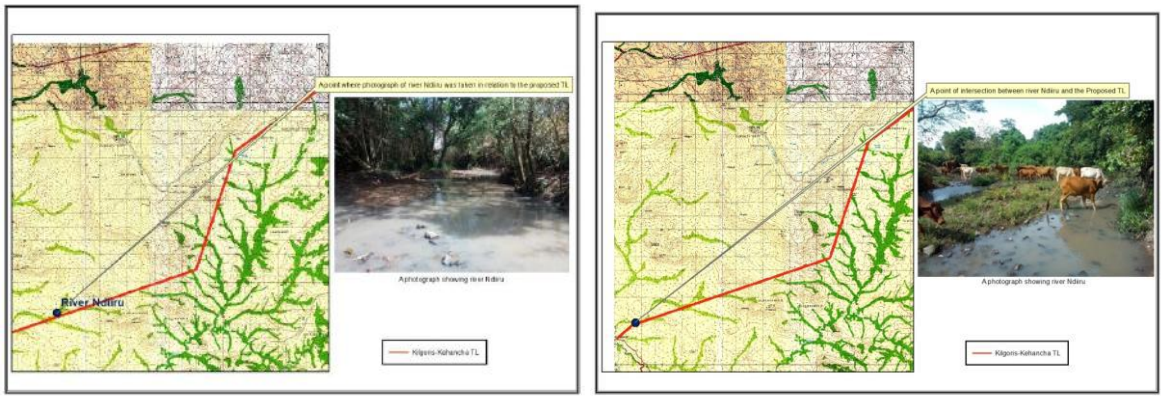


Plate 2.10: Different sections of River Ndiiru

The TL makes the third and final angular turn (AP3) in Osagam Village at 1^0 09’ 06”S and 34^0 38’ 53”E. AP3 is located in a demarcated undeveloped property, fenced using natural shrubs, 5 acres in size, and quite close to Ndiiru River but not on the riparian.

From AP03, the TL makes an angular turn towards the south but maintaining the general southwest direction, heading towards Kehancha. Along the route, the TL will overfly the Narolong-Game Road as it passes through about 20 homes before it terminates at the proposed Kehancha substation site (1^0 09' 40"s and 34^0 38' 14"E) located about 1.5 km from AP3 and about 100metres from Game Centre and 3km from Kehancha town. The proposed site is an undeveloped land with no boundaries, dominated by thick bushes and borders Kehancha- Lolgorien Road.

Plate 2.11: The proposed site for Kehancha Substation

2.3: Construction Procedures

2.3.1; Wayleave Acquisition

The very first procedure in the implementation of the transmission line project shall be the acquisition of the wayleave corridor. The way-leave corridor is recognized as the safety corridor outside of which negative impacts from transmission lines are assumed to be negligible. For this project, the wayleave corridor will be 30m. Within this corridor, structures or trees with a capability of growing taller than 6 feet (1.8m) will have to be cleared. Other activities like farming and grazing are allowed. Land ownership titles for the land under right of way will not be transferred but instead will remain the land owner's property. KETRACO will only register grant of easement on the titles.

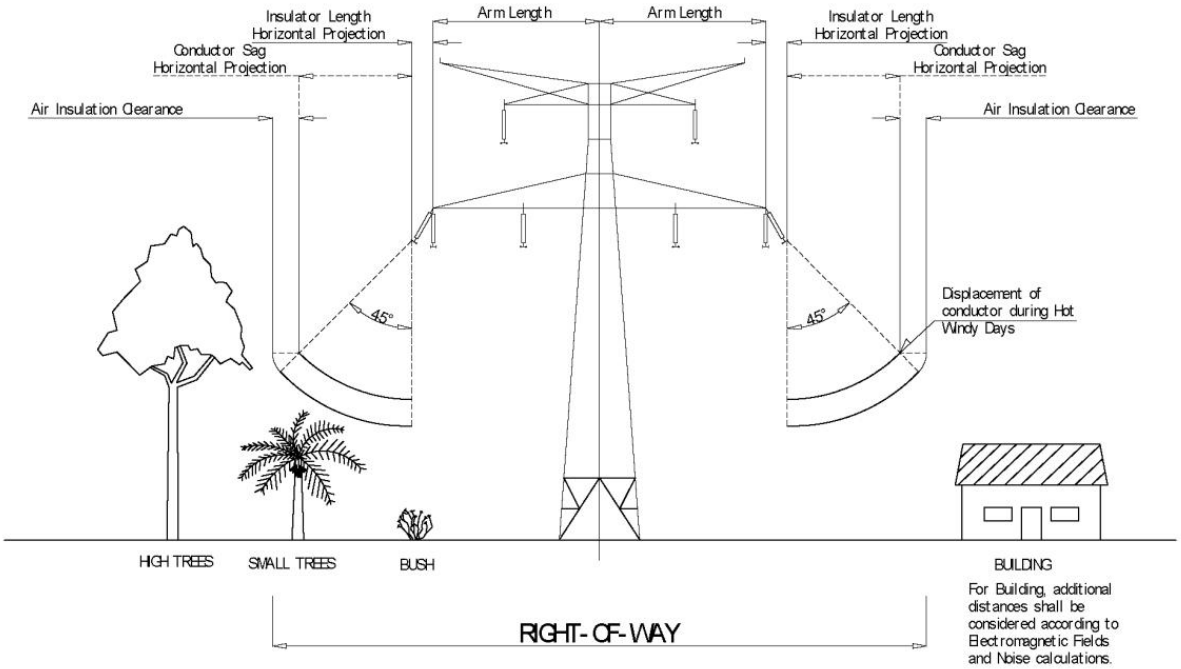


Figure 2.2: An illustration of a Way-leave Corridor; courtesy of KETRACO

The process of acquiring the wayleave starts by route survey, environmental impact assessment, and conducting a resettlement action plan (RAP), specifying the procedures to be followed and the actions to be taken to properly resettle and compensate affected people and communities. The RAP must identify the full range of people affected by the project and justify their displacement after consideration of alternatives that would minimize or avoid displacement. It outlines eligibility criteria for affected parties, establishes rates of compensation for lost assets, and describes levels of assistance for relocation and reconstruction of affected households.

According to the KETRACO RPF developed under this project, PAPs will be compensated at full replacement cost. Full Replacement Cost for agricultural land, is the pre-displacement market value of land of equal productive potential or use located in the vicinity of the affected land, plus the cost of preparing the land to levels similar to those of the affected land, plus the cost of any registration and transfer taxes. For land in urban areas, it is the pre-displacement market value of land of equal size and use, with similar or improved public infrastructure facilities and services and located in the vicinity of the affected land, plus the cost of any registration and transfer taxes. For houses and other structures, it is the market cost of the materials to build a replacement structure with an area and quality similar to or better than those of the affected structure, or to repair a partially affected structure, plus the cost of transporting building materials to the construction site, plus the cost of labour and contractors'

fees, plus the cost of any registration and transfer taxes. For crops, this means, when arrangements cannot be made to allow for harvest, the market value for lost cash crops is paid. For trees, “where markets exist, the value of a tree of a specified age and use can be used to determine compensation rates. Where markets do not exist, surrogate values must be determined. For timber trees, the value of a tree equals that of the lumber. For fruit or fodder trees, the value is equal to the cumulative value of the fruit crop for its productive life (and any timber value). If replacement trees are provided, good practice indicates that compensation be based on the value of the harvests lost until the replacement trees come into full production (typically, 7–10 years). In the case of immature trees, a less costly alternative may be to directly supply seedlings as a replacement and provide compensation for the resulting delay in reaching fruit-bearing capacity”. In determining the replacement cost, depreciation of the asset and the value of salvage materials are not taken into account, nor is the value of benefits to be derived from the project deducted from the valuation of an affected asset. Where domestic law does not meet the standard of compensation at full replacement cost, compensation under domestic law is supplemented by additional measures so as to meet the replacement cost standard. Such additional assistance is distinct from resettlement measures to be provided under other clauses in OP 4.12, para. 6.

Implementation of RAP shall be done by KETRACO’s Project Implementation Team (PIT). The PIT should ideally comprise of staff members from all relevant departments including Engineering, Survey, Socio-Economist, Land-Economist, Environment, Communication, Accounts, Legal, and Finance. Wayleave Officers, and a Social Safeguards Officer should be engaged to ensure day-to-day running of RAP implementation and assisting the PIU in stakeholder engagement among other tasks. To ensure smooth running of the project, the proponent should build the capacity of the Wayleave Officers and the Social Safeguards Officer. Any dispute/grievance that may arise will be received and resolved by the Grievance Redress Mechanism established at the on-set of the project.

2.3.2; Bush Clearing

Specific sites for structures such as towers, staging areas, and areas for tower assembly must be cleared of any interfering vegetation. Bush clearing involves cutting down of trees with a capability of growing taller than 6 feet (1.8m) and shrubs and bushland that may hinder construction activities. This is important so as to make the wayleave accessible (to allow large equipment including drill rigs, concrete trucks and crane to be delivered to the site) during construction process.

Plate 2.12: Section of an old TL way-leave corridor cleared of bushes; Courtesy of KETRACO

For this project, it is highly recommended that, the proponent conducts selective clearing of vegetation on the way-leave corridor and avoid unnecessary vegetation clearing. Most trees/bushes found in the project area don't have the capability of growing taller than 6 ft (1.8m) and need not be cleared.

2.3.3; Access Routes and Other Ancillary Facilities

The transmission line generally passes near motorable access roads but in some sections, these roads may be at a significant distance from the transmission line. In such sections, the contractor, may be required to create their own temporary access routes.

Ancillary facilities for this project may include project camp site, materials holding and storage facilities, quarries, etc.

Land for access routes and ancillary facilities will be acquired by the contractor on a willing seller willing buyer basis, while ensuring that the full replacement cost principles of OP 4.12 are adhered to, or the current market value, whichever is higher.

The Contractor shall be responsible for maintaining agreed access routes in a usable condition without undue widening for the duration of the construction period. The land occupier and members of the neighbouring communities shall not be put to any inconvenience in gaining

access to their land or buildings. No unauthorized access routes shall be taken by the Contractor.

2.3.4; Tower Foundation

Plate 2.13: Tower foundation; Courtesy KETRACO

The type of the foundation to be casted at any location depends upon the type of soil, sub–soil water level and the presence of surface water. These include; -

1. Normal Dry Foundation: used at locations where normal dry cohesive soils are met and where sub-soil water is met below the foundation base level.
2. Wet Foundation: used where sub-soil water is met at 1.5 metres or more below the ground level or in cases where there is surface water for long periods with water penetration not exceeding one metre below the ground level, e.g., paddy fields or sugar cane fields.
3. Partially Submerged Foundation: used at locations where sub-soil water table is met between 0.75 and 1.50 metres below the ground level.
4. Fully Submerged Foundation: used at locations where sub-soil water table is met within 0.75 metre below the ground level.
5. Black Cotton Soil Foundation: used at locations where soil is clayey/expansive type, not necessarily black in colour, extending to the required depth of excavation of the pit, which shrinks when dry & swells when wet resulting in differential movement of the soil.
6. Soft Rock or Fissured Rock Foundation: used at locations where decomposed or fissured rock gravel, kankar, limestone, laterite or any other soil of similar nature is met.
7. Hard Rock Foundation: used at locations where chiseling, drilling and blasting is required for excavation of hard rock type foundations.
8. Sandy Soil Foundation: used where soil with negligible cohesion is met.

While excavating, the earth is cut vertically/tapered/in steps as per the soil conditions at site to avoid any kind of mishap caused by collapsing of the pit sides during the course of

excavation and foundation work. The excavated earth is kept at a sufficient distance so that it does not create any burden on the sides of excavated earth pits.

During excavation in sandy soil or water bearing strata, and particularly in black cotton soil where there is every likelihood of collapsing of the sides of the pits, shoring and shuttering made of wooden planks of sufficient thickness or steel frames of adequate strength is necessary. Where water is encountered during excavation, dewatering shall be carried out manually or by mechanical means. Excavation in soft rock is done with the help of chisels. For excavation in hard rock, blasting can be resorted to.

After the excavation is completed, the sides of the stub setting template are assembled and placed on the four sides of the location. The sides are then connected together, taking into consideration the type of tower (normal or with extension) to be erected, to form the shape of the template with the four corners located in the excavated pits. The stubs are then fixed on the legs of the template.

Former boxes of the shape, size and dimensions for the individual type and make of tower are then fabricated. The chimney and pyramid portions are adequately braced to retain proper shape while concreting. To avoid honeycombs in the concrete, the former boxes are sufficiently tightened to prevent cement slurry from coming out. A window is provided on the upper part of one face of large size frustums so that concrete may be placed easily in the lower part. This window is fitted back after placing concrete in the lower part.

When casting the foundation, all wet locations must be kept completely dewatered both during the placing of the concrete and for 24 hours after completion. The base pad of required depth is then placed using specified concrete mix and allowed to set.

After the frustum part is poured, the earthing connection is fitted on the designated stubs. Earthing is provided on Leg 1. Additional earthing, if required, is provided on Leg 3. Counterpoise earthing is provided on all legs.

The concrete is then poured into the chimney portion. After pouring of every 450mm of concrete, poking rod or vibrator is used so that no empty spaces are left inside.

Former boxes are normally removed 24 hours after concreting. After removal of the former boxes, the pits are back filled with earth, which is free from grass, dung, wooden waste,

postures & fodder, woods, shrubs, thorns, etc. This is done in layers not exceeding 150mm, sprinkled with water, and well compacted.

2.3.5; Tower Erection

Plate 2.14: Tower erection; Courtesy of KETRACO

Tower erection works shall mainly be carried out by derrick pole. Derrick pole is a tubular steel pipe structure of around 6m in length attached with hooks at one end and fitted with a single sheave block at the other end. It is basically a load carrying tool used to lift the tower members for erection. The four main legs of the tower are individually attached to stubs using cleats, plates, and bolts. Since the legs are not self-supported, they are anchored individually using polypropylene ropes. Unsupported legs are supported by guy ropes which are anchored on ground by crow bars or existing trees. The cross braces of the first section which are already assembled on the ground are raised one by one as a unit and bolted to the already erected leg angles. This process leads to the basic tower structure with leg extensions installed.

At this point one corner of the diagonal frame at which derrick can be installed and supported is chosen. The hook of the derrick is attached to the leg of the tower by means of ropes. Polypropylene ropes of adequate length are drawn through the block of the derrick and passed through one more block at the bottom of tower attached to the stub leg with the free end being available for pulling either manually or by use of a tractor. The other end of the rope through the derrick will be taken down and secured with the tower member to be lifted. Prior to the lifting process, the top of the derrick is anchored to the ground using ropes in the direction opposite to that of the lift to obtain balance during the lifting process.

For assembling the second section of the tower, two derrick poles are placed on each other on top of the diagonally opposite legs and are supported by guy ropes. These two poles are used for raising parts of the second section. The leg members and braces of the section are

then hoisted and assembled. The derrick poles are then shifted to the top of the members to raise the parts of the third section of the tower. Derrick poles are thus moved up as the tower grows. This process is continued till the complete tower is erected. Cross arm members are assembled on the ground lifted up and fixed to the main body of the tower using the same procedures from top towards the bottom.

2.3.6; Stringing

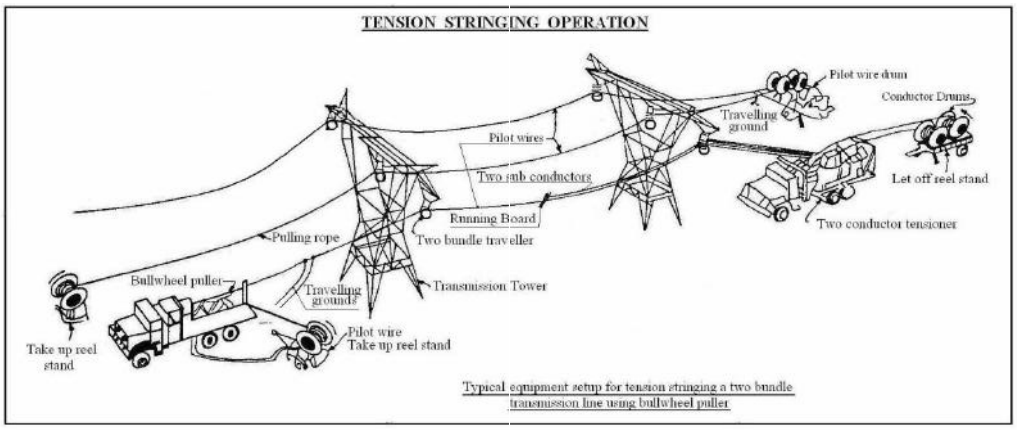


Figure 2.3: Stringing Operation; Courtesy of construction manual for TL by Rajasthan Transco

The process of attaching conductor cables to the insulators suspended from the towers is called conductor stringing. It generally involves pulling the conductor off of a truck-mounted spool. Specifically, conductors are pulled from one tower to the next through a pulley system which is temporarily placed on the tower. Trucks, heavy equipment and sometimes helicopters are used in this process.

Before hoisting, all insulators are cleaned in a manner that will not spoil, injure or scratch the surface of the insulator. Disc insulators shall be examined for any cracks, chipping, or any other damage. Disc insulators having any hair cracks or chipping or defective glazing or any other defect shall not be used.

One person should be posted on each tower with red and green flags and whistle so that he can give a signal, which is relayed to the pulling end by other similarly placed persons, to stop the paying out operation if any roller gets stuck or any mid span joint gets stuck in any roller or any other emergency occurs. Walkie – Talkie sets may also be used for this purpose. Walkie - Talkie sets stationed at the tensioner, puller and intermediate spans, as required, should be used specially for tension stringing.

Apart from the conductors and insulators, other accessories to be installed in the transmission line include; aviation warning markers, bird diverters, spacers and galloping devices.

2.3.7; Energizing and Hand-Over

This is the last stage in the construction phase of the transmission line project. It is conducted after final checking of towers, conductors, and all other associated equipment and there are no defects/shortcomings in the work of the transmission line.

The concerning Executive Engineer shall be present at the time of charging the transmission line who shall ensure that all testing and checking has been done and approval of the relevant authorities has been obtained.

2.4: Transmission Line Design

2.4.1; Air Space Protection

Where it is likely that the power line is hazardous to aviation and avi-fauna safety because of its height and location, spherical markers will be used to identify overhead wires. The Kenya Civil Aviation Authority (KCAA) regulations, establish standards for determining obstructions in navigable airspace. Issues such as size and height of towers, right-of-way needs, maintenance access, and impacts to the approach zone, clear zone, or safety zone has to be evaluated and approved by KCAA to utilize property near airports and airstrips.

2.4.2; Conductor Clearances

Conductor Vertical Clearances

The following are the minimum vertical clearances to be ensured from the line conductors at maximum sag (inclusive of 0.3m included in sag calculations to accommodate conductor creep) to ground level or objects and crossings as described (Ref; Feasibility Studies for Transmission Lines Assignment III by Lahmeyer International for KETRACO TLs 2014).

Condition	**Clearance in M**
Above terrain in general, including minor roads/tracks	7.0
Above main (paved) roads	8.0
Above secondary (unpaved) roads	8.0
Above railways	8.5
Above steep or swampy ground, inaccessible to vehicles < 3.0m, and above water at max. flood level, except navigable rivers	6.5

Design Factors of Safety

The following design factors are for steel lattice towers and are true for 132 kV lines

Conductors, earth wire and optical fibre earth wire at final maximum working tension based on ultimate nominal breaking load.	3.00
Conductors, earth wire and optical fibre earth wire at still air everyday temperature final tension based on ultimate nominal breaking load	5.00
Tension clamps and mid-span joints based on conductors, earth wire and optical fibre earth wire ultimate nominal breaking load.	0.95
Insulators and Fittings (based on failing load)	
▪ under normal working conditions	3.00
▪ under broken string conditions	3.00
Steel Lattice Towers	
▪ Steel towers under normal working conditions	2.00
▪ Steel towers under broken wire conditions	1.50
▪ Steel towers under maintenance conditions	2.00
▪ Cascade Collapse for suspension towers	1.00
Foundations	
▪ Foundations under normal working conditions	2.50
▪ Foundations under broken wire conditions	1.75
▪ Foundations under maintenance conditions	2.00
▪ Factor against overturning/uprooting	1.20

2.4.3; Tower Layout

Plate 2.15:TL Tower; Courtesy KETRACO

Possible Tower Configurations

With regard to line design, there are four (4) different variants, which are technical feasible:

Conventional overhead line (Steel lattice towers with individual foundations)

- Advantages: cost effective design (regarding investment cost); ease of construction (no heavy equipment required).
- Disadvantages: space requirements (easement / permanent land take), visual impact (in urban areas).

Compact overhead line (Self-supported steel lattice towers with monoblock foundations for suspension towers.)

- Advantages: economic design, ease of construction,
- Disadvantages: slightly higher cost for (heavier) suspension towers, access to crane is required.

Tubular steel pylons / Pre-stressed concrete poles.

- Advantages: reduced easement / land take (because of smaller base), visual impact.
- Disadvantages: considerably higher cost than for steel lattice towers, requirements concerning access (temporary land take / destruction) and construction (heavy equipment/ noise).

The towers recommended for this project being the most common ones used by KETRACO are the steel lattice towers with individual foundations.

2.4.4; Tower Type Family Recommendation

Taking into account the cost and space available the best option is to use tower structures of the self-supporting lattice-type galvanized steel frame with square bases, individual concrete foundations per leg, body and leg extensions, cross arms for phase and earth conductors. Corrosion protection shall be of hot dip galvanization (minimum 610 g/m^2).

The towers shall be fitted with anti-climbing devices at 3m from the ground, step-bolts on two diagonally opposite legs starting above the anti-climbing to the top, name plate and phase plates following the specifications of the Client.

Taking into account the possible theft of tower members, the towers shall be fitted with anti-theft bolts from ground level to the anti-climbing device level.

Tower dimensions

Regardless of dimensions such as footprint, member slope, cross-arms attachment to body width, which is the results of the static calculation and experience of the designer, a tower is defined by other typical dimensions listed below:

- phase to phase distance
- phase to earth wire distance in regards of the location of the earth wire to ensure an optimum against lightning strikes
- attachment height to ground of the suspension and tension string
- phase to structure clearance (which has to be followed by the strings as well as the jumpers of the tension towers)

The footprint square cross section dimension will depend on the type of the tower (angle, tension, or suspension tower) but on average is about 5m square.

Tower Height

The minimum tower height H is calculated and equals the sum of the following:

- h1 - Minimum permissible ground clearance
- h2 - Maximum sag (at highest conductor temperature)
- h3 - Vertical spacing between conductors
- h4 - Vertical clearance between ground wire and top conductor

$H = h1 + h2 + h3 + h4$

KETRACO towers range between 30 and 80m from the ground level.

2.4.5; Definition of Spans

Each type of tower is characterized by a set of spans called "Typical spans" whose values are involved not only in the calculation of distances between phases, distance to ground, height above ground, but also in the calculation of forces acting on the structures (weight, wind load, etc.).

Those typical spans are:

The basic span is the most economical horizontal distance between two consecutive towers. It is the basis for determining the height of attachment above the ground conductor of the lowest points. It therefore affects mostly the normal height of the tower.

The maximum span is the maximum horizontal distance that can separate two towers. It is the basis for determining the characteristic dimensions of the tower cross-arms and mainly distances between conductor and earth wire

The wind span is mainly used to determine the horizontal force acting on the tower structure. For anchoring supports, wind range is the distance over which the wind is expected to act perpendicularly to the cable. It is equal to the arithmetic mean of adjacent spans of a support.

The weight span is the horizontal distance between the points where the tangent to the parabola is the horizontal distance between the points where the tangents to the curve of the two adjacent spans are horizontal.

For this project, a standard span of 300m is recommended.

2.4.6; Selection of Conductors

The phase conductors used by KETRACO are all of ACSR type, namely with Code Names LYNX, CONDOR and HAWK. The project will try to us, as far as possible, the same conductor types:

Voltage Level	Phase Conductor Type ACSR
132 kV	1 x LYNX

2.4.7; Selection of Shield Wires

Conventional Earth Wire – Type ACS

The earth wire fulfils two functions:

- Shielding the phase conductors from direct lightning strikes
- Reliable high capacity communication channel by using OPGW (Optical Ground Wire).

Because earth wires are usually required to have less sag than the phase conductors, they are normally either ACS or steel construction.

Standard earth conductors used in most of the lines are aluminium-clad steel conductors. They are standardised according to IEC 61089, EN 50182, Table F21 or ASTM B416. The standard earth wire is type ACS at KETRACO.

2.4.8; OPGW Shield Wire

Fibre optic cable links are today the foundation of communications systems, since they have the advantage of large capacity, high speed, and long distance transmission. At the same time, they are not influenced by electromagnetic fields and do not show any cross-talk, which is very important for installations on high voltage (HV) lines.

The most common method for this is to install an **Op**tical Ground **W**ire (**OPGW**), which contains optical fibres, as a substitution of an existing ground wire.

The main characteristics of an OPGW are:

- the mechanical strength, which is mainly determined by the amount of steel;
- the short time current capacity, which is mainly determined by the amount of aluminium (alloy); and
- the number of optical fibres.

The fibres OPGW shall follow the following specifications and recommendations:

Optical fibre:	CCITT (recently ITU-T) recommendation, IEEE 1138, Annexure A for short circuit tests
IEC 60794	Optical Fibre Cables
IEC 61395	Creep test for stranded conductors
EN 187 000	Optical Fibre Cables (Generic specification)
EN 187 100	Optical Telecommunication Cables (Sectional specification)
EN 187 200	Sectional Specification: Optical Cables to be used along Electrical Power Lines (OCEPL)
EN 187 201	Family specification OPGW
EN 187 204	Family specification OPPC
EN 188 000	Optical Fibres (Generic specification)
IEC 60104	Aluminium-magnesium-silicon Alloy Wire for Overhead Line Conductors
IEC 60304	Fibres and binders colours
IEC 60865-1	Short-circuit Currents - Calculation of Effects.
IEC 60889	Hard Drawn Aluminium Wire for Overhead Line Conductors
IEC 60949	Calculation of Thermally Permissible Short-circuit Currents, taking into Account Non-adiabatic Heating Effects.
IEC 61089	Round Wire Concentric Lay Overhead Electrical Stranded Conductors.

IEC 61232	Aluminium-clad Steel Wires for Electrical Purposes
IEC 61597	Overhead Electrical Conductors – Calculation Methods for Stranded Bare Conductors
ITU G.652	Characteristics of a Single-mode Optical fibre

2.4.9; Foundation Design

The foundations shall be of pad and chimney concrete reinforced type. Piles may be employed in bad and buoyant terrain (lake and river crossing). The foundations capacity shall be determined in regards of a soil investigation.

The safety factors shall be as per “Design Factors of Safety”:

- 2.50 in regards of the yield strength of the steel for normal load cases
- 1.25 in regards of the yield strength for exceptional load cases

For the purposes of classification, foundation type selection, the basically soils to be found in the project area have been divided into the groups as per following table.

Soil Type	Soil Conditions
S1	Rock such as granite (with different levels of different minerals included), lightly weathered
S2	Very good soil such as hard clay, dense sand, very weathered rock
S3	Good/Normal soil such as medium-dense or loose soils, such as firm clay and medium sands
S4	Poor soft soil / backfill material
S5	Very poor soil such as waterlogged soils, swamps, soils below water table for a significant period of the year

2.4.10; Tower Footing Resistance

Lightning strikes to towers lead to an increase of the tower’s potential, which is essentially determined by the tower footing resistance. If this potential exceeds the electric strength of the insulators, back-ward flashovers occur across the insulators, which, especially when they occur in the direct vicinity of the switchgear, can cause high over-voltage and over-voltage with high rates of change. Here, linking the last towers to the switch gearearthing system as a remedial measure is a suitable method if significantly reducing the tower footing resistance and of preventing backward flashovers across the insulators of these towers. For economic

reasons however, this measure is generally restricted to portal and first tower seen from the substation.

Earthing of tower structure shall be made as required by soil conditions and the value of earth resistance at each tower location. One or more ground rods per tower shall be installed depending on the requirements. The design is dependent of the soil resistivity to be performed during the survey by the Contractor.

KETRACO's values for the nominal footing resistance of steel lattice towers are:

Voltage (kV)	Footing Resistance Ω
132	10
225	10
275	10
400	10

The use of ground rods of a 35 x 35 x 4 mm diameter cruciform and 3.0 metre long steel rods is proposed. Ground rods shall be hot-dip galvanized. The ground rods shall be buried or driven at the base of the tower leg foundation. In order to avoid vandalism of the earthing material it is propose to connect the foundation steel and tower leg to the earth conductors beneath the soil surface; this is a proven practice at ESKOM South Africa.

Where the measured tower footing resistance is greater than the required value, earth improvements shall be made by additional ground rods or earthing counterpoise cable connected to each tower leg. Earthing cables (counterpoise) shall be of galvanized steel wire with 11.5mm diameter.

The terminal towers shall be connected to the substation earthing grid.

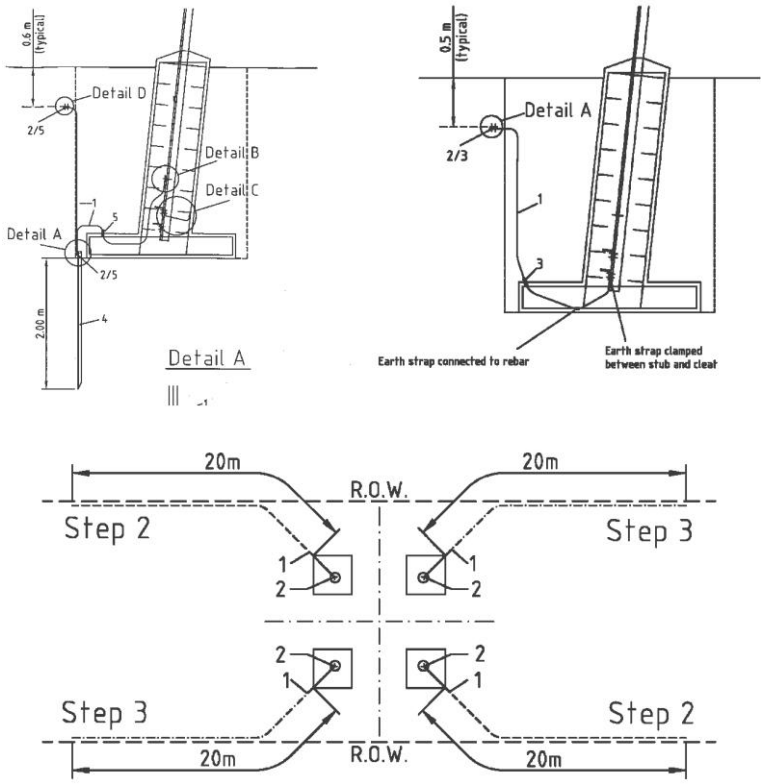


Figure 2.4: Tower Footing; Courtesy of KETRACO

2.4.11; Other Accessories

The following equipment must be included:

- Tower number plates, phase plates, warning plates;
- Anti-climbing devices;
- Spacers for bundled conductors;
- Anti-theft protection bolts.

2.5: Project Justification

Currently electricity is accessible to less than 20% of the total population and approximately 5% of rural population. The government's goal is to accelerate access rate to 40% of rural population by 2040. This will be achieved by among others, improvement and expansions of the system networks. This project will contribute in the expansion of the transmission network.

2.6: Project Budget

Being part of the KESIP project, the cost for implementation of the project will be sought from development partners. The 132kV Kilgoris-Kehancha Electricity Transmission Line project is expected to cost approximately US Dollars seventeen million, six hundred thousand (US$ 17,600,000). However, cost for wayleave acquisition and compensation thereof, to be

determined after the RAP process, shall be a counterpart funding from the Government of Kenya.

2.7: Target Group for the ESIA Report

The ESIA Report has been prepared for use by different stakeholders to be involved in the construction, operation, and decommissioning of the proposed 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 project.

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

- World Bank as the Project financier.
- Relevant government ministries and agencies for policy implementation.
- Project Affected Persons and Interested Parties.
- Planners and Engineers to be involved in preparation of designs and plans for the project.
- Proponent.
- Contractors to be engaged in the project.
- People to be involved in the management and operation of the project.

CHAPTER 3: ENVIRONMENTAL AND SOCIAL SET-UP OF THE PROPOSED AREA

3.1: Background

Narok county lies between latitudes 0^0 50' and 1^0 50' South and longitude 35^0 28' and 36^0 25' East. It borders the Republic of Tanzania to the South, Kisii, Migori, Nyamira and Bomet counties to the West, Nakuru County to the North and Kajiado County to the East. The county covers an area of 17,933.1 Km^2 representing 3.1 per cent of the total area in Kenya and hence the eleventh largest county in the country.

3.2: Climatic Conditions

The climatic condition of Narok County is strongly influenced by the altitude and physical features. The county has four agro-climatic zones namely: humid, sub-humid, semi-humid to arid and semi-arid. Two-thirds of the county is classified as semi-arid. Temperatures range from 20^0 C (January- March) to 10^0C (June- September) with an average of 18^0C. Rainfall amounts are influenced by the passage of inter-tropical convergence zones giving rise to bi-modal rainfall pattern. Long rains are experienced between the months of February and June while the short rains are experienced between August and November. Rainfall ranges from 2,500 mm in wet season to 500 mm during the dry season.

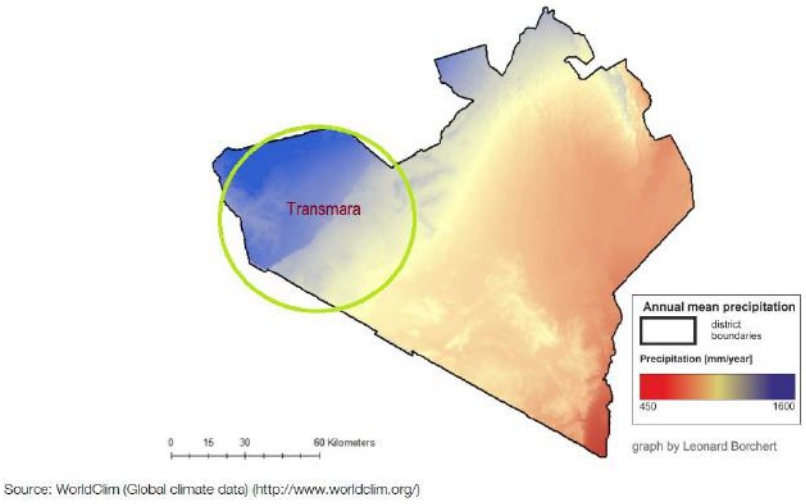


Figure 3.1; Mean annual precipitation in Narok County

The March to June season receives high intensity rainfalls that support growth of vegetation which is food for wild animals. The seasons are also important to farmers in planning for planting and harvesting.

3.3: Ecology

Trans Mara is highly biodiverse and contains the Nyekweri forest, an important patch of indigenous forest that is used by elephants and other wildlife for food and shelter. Natural pathways link the Trans Mara and the National Reserve through a steep escarpment, which

the elephants use during their seasonal migration between the two areas. However the areas along and adjacent to the proposed Kilgoris-kehancha TL is mainly covered by human settlements with scattered trees, shrubs and gladed grasslands. Woodlands occur in a few places and natural forests only along river valleys (gallery forests). A number of woodlots are also found on some sites along the proposed TL.

This section describes details of the 34km Kilgoris-Kehancha TL routing and the ecological (fauna, flora and hydrology) characteristics arising from the field study (full report is in appendix III). The study focused on the proposed Transmission line route with special emphasis on ecologically sensitive sites along the proposed route.

Agro-ecological zones

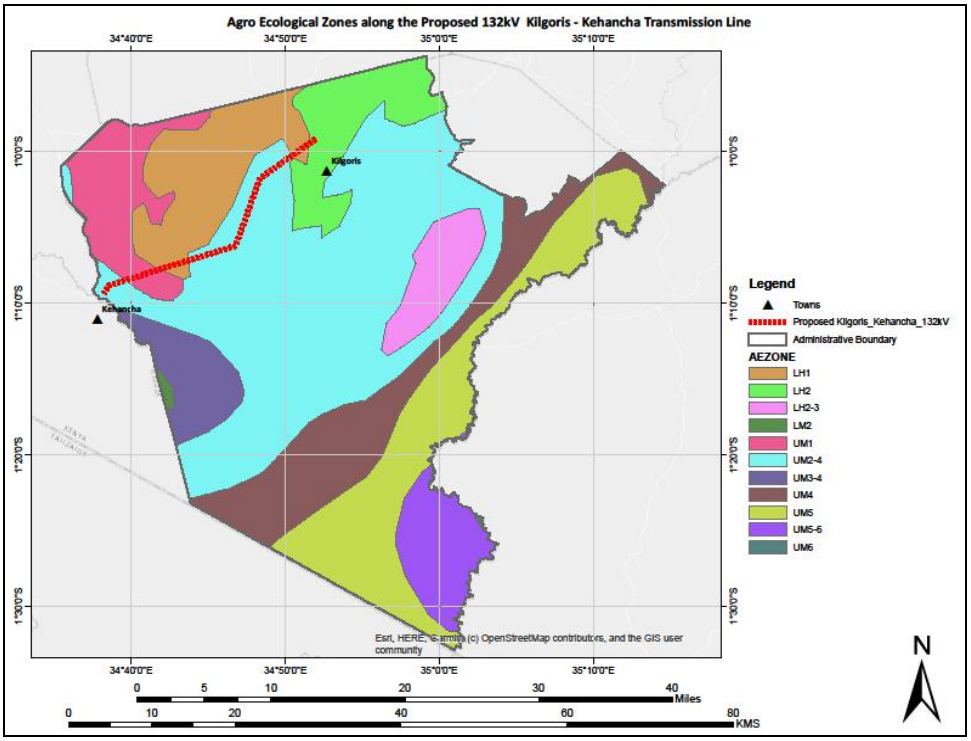


Fig 3.2: Agro-ecological Zones in Transmara

The proposed TL line traverses four (4) agro-ecological zones in diverse sites. The line commences at Kilgoris substation that is located in zone Lower Highland Zone (LH2) which is mainly described as a Wheat-Pyrethrum Zone. This shortly (<2km) gives way to LH1 which is a Tea-Dairy Zone with good yield potential. A larger portion of the TL traverses UM2-4which is basically described as Maize-Coffee Zone. This is largely a transition zone of UM 2, 3, and 4. The line then re-enters zone LH1 nearer Angle point 3 and terminates at the proposed Kehancha SS in zone UM2-4.

Wildlife

The area within which the TL traverses is mostly a human settlement region in the northern part of Trans-Mara area with few wildlife present. Located about 40 km from the Mara Triangle, there are reported occasional movements of small game from the park areas into the settlement zones (figure 3.2b). The most reported wildlife species are Hyena, Hare, and Mongoose. Human- wildlife conflict occurs mostly in areas adjacent to the Mara Reserve, mainly south most parts of Transmara (Wasilwa, 2003).

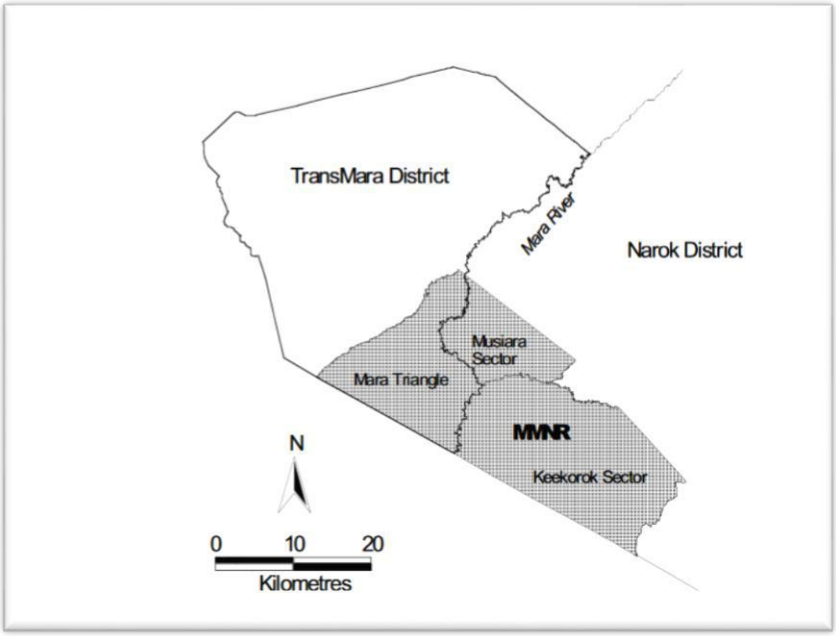


Fig 3.2b: The Mara Triangle

Birds

There is a considerable overlap of birdlife occurrence between Trans-mara and the adjacent Mara and Gwasi regions. The following bird species are common: Mountain Greenbul *Andropadus nigriceps*, Cinnamon Bracken Warbler *Bradypterus cinnamomeus*, Brown Woodland Warbler *Phylloscopus umbrovirens*, White-browed Crombec *Sylvietta leucophrys*, Northern Double-collared Sunbird *Cinnyris reichenowi* and Black-billed Weaver *Ploceus melanogaster*.

Rare birds include Crested Guinea fowl (*Guttera pucherani*) – found mainly along riverine forests, Scaly Francolin (*Francolinus squamatus*) a forest generalist. Local resident throughout the region and common only in moist thicket and dense forest understory.

In Sugarcane farms, there is an abundant occurrence of the common bulbul (*Pycnonotus barbatus*), the Common stone chat (*Saxicola torquatus*), Eurasian bee eater (*Merops apiaster*), and Common waxbill (*Estrilda astrild*)

In the scattered forests and woodlands, the Common bulbul (*Pycnonotus barbatus*), Grey throated barbet (*Gymnobucco bonabartei*), Speckled mouse bird (*Colius striatus*), and Double toothed barbet (*Lybius bidentatus*) are abundant.

Detailed Description of Ecological Conditions of the Proposed Kilgoris-Kehancha Transmission Line

The proposed TL line traverses farm lands, rivers and streams and some gallery forest on rivers/streams. The first section from Kilgoris substation to Angle point 2 is mainly rolling hills. Followed by hills and higher altitude areas towards angle point no. 2 and finally a section around Masurura area (Angle point no 3) with riverine/riparian vegetation. The most fragile sites in the entire route are either riverine systems, with gallery forests, and few planted woodlots and a larger plantation. Due to environmental conditions in such areas, any riparian or riverine forest also tends to attract small game and avifauna species. During the field study of the proposed TL route, various ecologically sensitive sites were identified. A detailed analysis for the different sections of the route is provided in the following sub-sections of this section.

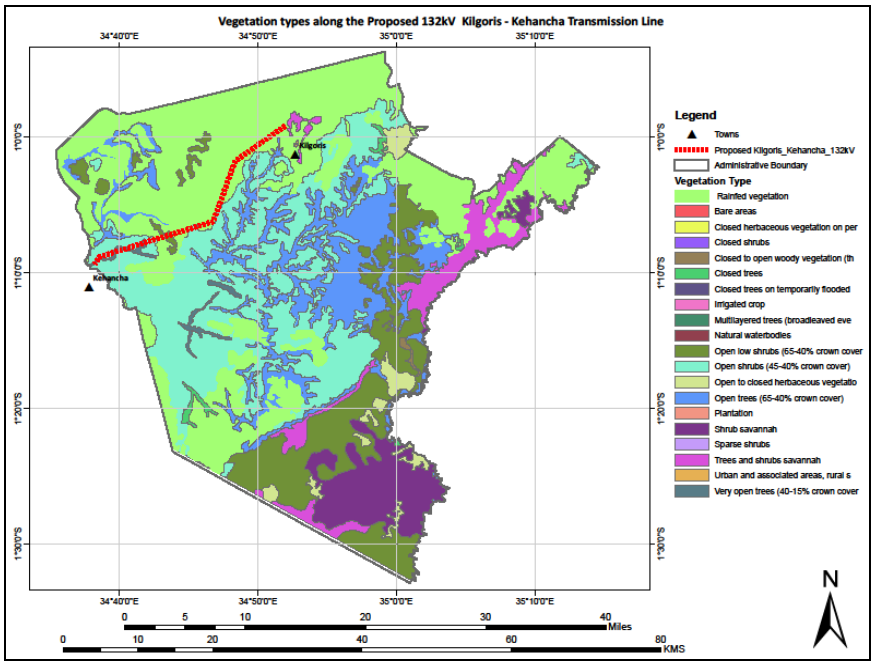


Figure 3.3: Vegetation types in Trans Mara

Kilgoris Sub-station to Angle Point No.1

This section starts at the proposed Kilgoris Sub-station (0° 59.195'S; 34° 51.896'E) to Angle Point No. 1 (1º 1.760' S; 34º 48.360' E). This section is mainly composed of farmland with scattered shrubs and crops mainly maize, grass and scattered homes. This area is a completely modified landscape due to human activities, mainly farming and grazing, except on the few natural vegetation areas around rivers and streams. There are scattered planted woodlots and boundary planting using *Eucalyptus spp* and *Grevillea robusta*. Other species found in the section are *Croton macrostachyus*, *Todalliaasiatica*, *Trichiliaemetica*, *Kigelia Africana*, and *Croton megalocapus*. Shrub species include *Caesalpinadecapelata*,

Solanumincum, *Pennisetumpurpereum*, *Cyperusimmensus*, *Solanummauritania*. Common grasses are *Sproboluspyramidalis* and *Centella*asiatica. A comprehensive checklist is provided in Appendix III.

Plate 3.1; Sensitive site at Enkare Ngetwa river, 1.5 km from Kilgoris SS

Plate 3.2; Grevillea robusta followed by Eucalypts grandis, then Caesalpinadecapelata and Brideliamicrantha

The proposed TL will cross Enkare Ngetwa River, a sensitive environment composing of riverine vegetation with *Bridelia micrantha*, *Senna didymobotrya*, *Ficus spp*, Acocanthera *schimperi*, *Elaodendron buchananii* and *Markhamia lutea* interspersed with *Cyperusspp* reeds. Within the same section, the TL will also cross the Naboda River, which is composed of sparse riverine forest.

The main issues at these two sensitive sites are likely to be loss of natural vegetation, erosion especially on the southern banks of Enkare Ngetwa River which has more slope. About 200 m of natural vegetation and 100m long at Enkare Ngetwa and Naboda rivers respectively is likely to be affected, with mainly loss of large trees. River Naboda is a channel like river with large indigenous tree along the bank.

The rest of the section up to Angle Point no. 1 is mainly composed of farmlands with sugarcane plantations and other agricultural crops and grazing land. This section ends at Angle Point No. 1, about 8 km from the proposed Kilgoris sub-station as shown in the figure and plates below:-

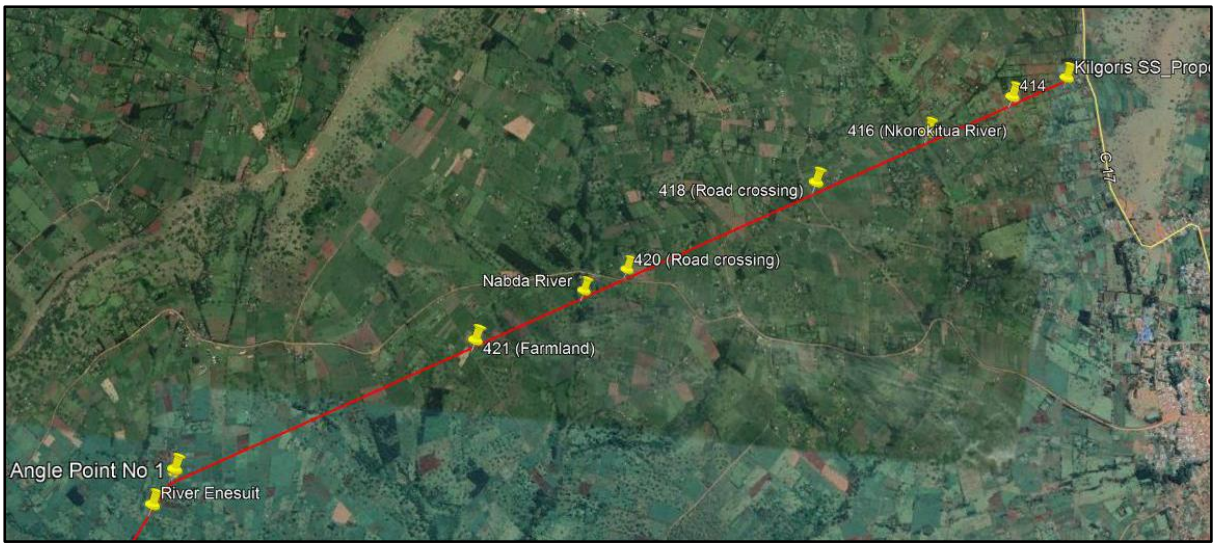


Figure 3.4; Section between Kilgoris Sub-station to AP1

Plate 3.3; Furrow irrigated land with black cotton soil and (right) Acocantheraschimperi

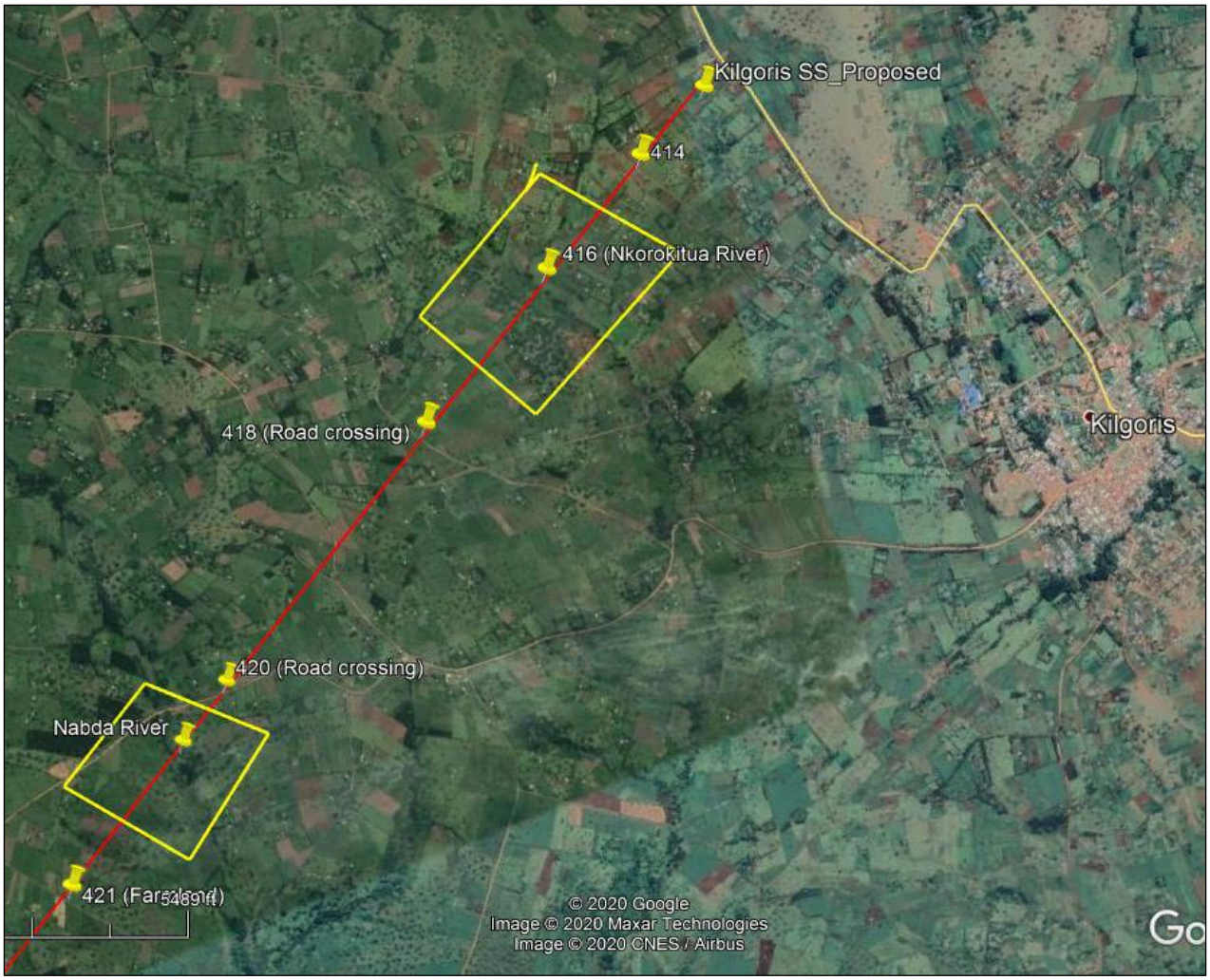


Figure 3.5; Environmentally sensitive sites in Kilgoris SS to Angle point No. 1section

Plate 3.4; River Naboda, with Penisetumclandestinum and (right) the river withSetariaverticillata

Plate 3.5; Grazing land with Penisetumclandestinum grass; (middle) Acacia lahai; (far end) Caesalpiniadecapetala

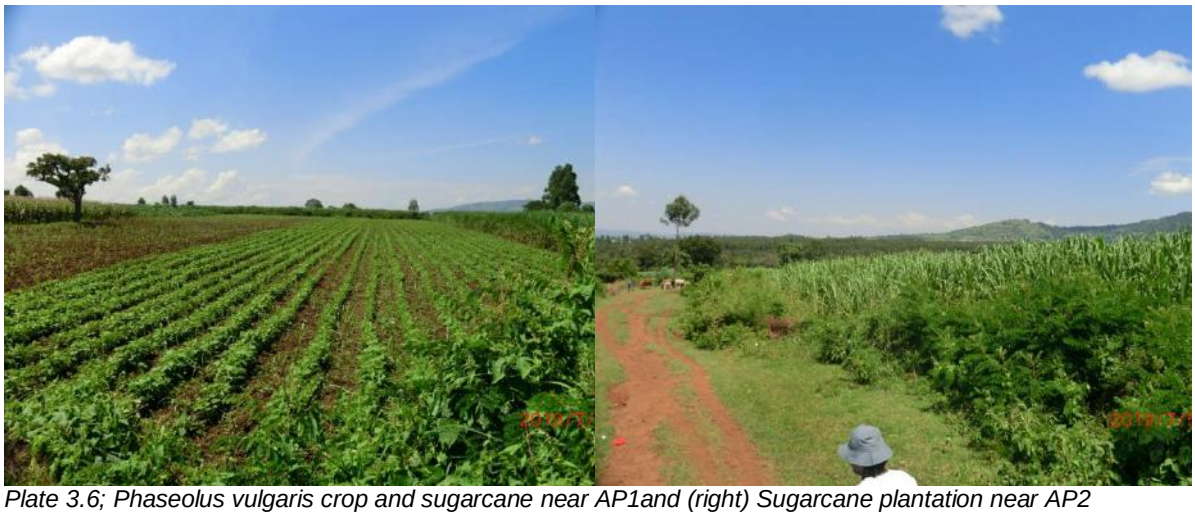


Plate 3.6; Phaseolus vulgaris crop and sugarcane near AP1and (right) Sugarcane plantation near AP2

Angle point 1 to Angle Point 2 (Endonyo Narok Village)

This section of the proposed TL starts at AP 1 (1^0 1.760' S; $34^0$48.360' E) and takes a south Westerly direction through a number of rivers, a Eucalyptus plantation, woodlots up to Nentekeny Primary School, then through farmlands up to AP2 (1^0 06.420'; 34^0 46.804' E). This sections ranges from 1700 to about 1770 m above sea level and, as in the first section is composed of farmlands but this time with large sugarcane plantations, Maize, beans and pasture land.

This section also contains a number of ecologically sensitive sites especially at the beginning. River Enkare Enesoit is located 300 metres south west of AP1at 01^0 1.749' S; 34^0 48.363' E. The river has sparse vegetation of few trees, up to 5 m in height, shrubs and undergrowth of grasses. The river has several livestock watering points which has caused erosion at some points. At location 1° 3.715'S, 34° 47.719'E, about 3.7 km from AP2 the proposed line passes directly in a one-hectare woodlot of Eucalyptus spp. The main issue at the river site will be erosion and clearance of vegetation before construction commences.

Figure 3.6; Angle point 1 to Angle point 2 (Endonyo Narok village)

Figure 3.7; A google map of the 1km long Eucalyptus plantation with an image of the trees on the right


Plate 3.7; River Enesoit and on the right the adjacent farmland

At about 500m after AP2, there is a Eucalyptus plantation measuring approximately 80 Hectares, and consisting of various sizes of original crop and coppice crop measuring an average of 15 metres in height and 20 cm in diameter at breast height (DBH). The spacing is 2.5 x 2.5 metres. Most of the area is under coppice crop which has been thinned in some sections to 2 coppices per stump. The plantation also has patches of grass undergrowth and is also used for grazing. The area has been leased by Nyamache Tea Factory for production of fuelwood for tea processing.

The transmission line will pass though the plantation for a distance of one (1) kilometer, and with a ROW of about 30 metres, about 3 hectares of the plantation will be felled. The density of the plantation is 1,600 stems per hectare. With an average of 2 coppices, the average loss will be about 3,000 stems, translating to about 5,650 m^3 of wood. However, this can still be used by the factory if the trees are near rotation age for fuelwood. It is noted that the coppice and other planting are at different sizes/ages for sustainable harvesting. On the exit side of the Eucalyptus plantation is a small river (River Kapnor) which has only shrubs and few trees on the bank.

Plate 3.8; Rhusnatalensis at River Kapnor bank and on the right Thunbergiaalatta

Plate 3.9; Eucalyptus Plantation between Angle point 1 and 2

Plate 3.10; Young coppice crop section at the plantation and right exit side of Nyamache Eucalyptus plantation

Plate 3.11; Landscape towards AP2 after the Eucalyptus plantation and on the right Ficusspp

Plate 3.12; Sporoboluspyramidalis grassland; then Sugarcane transportation and Cyperus articulates at AP2

AP2 to the proposed Kehancha sub-station

This section of the proposed TL starts at AP2 (1° 6.420'S, 34° 46.804'E) at Endonyo Narok village and takes a less south westerly direction through series of rivers, gallery forests and riparian areas up to AP3, located at 01^0 09.110' S, $034^0$38.895' E at 1450 metres above sea

level. This is the most ecologically sensitive section of the line and starts from Enkir Kor River through Moita area up to a riparian zone around AP3.

The most common tree species found along the proposed TL in this section are *Maytenu ssp, Caesalpinia decapetala, Senna didymobotrya, Stephania abyssinica, Bridelia sp*, *Centella asiatica, Markhamialutea*, *Erythrina* abyssinica, *Vangueria madagascariensis, Vernonia mauritianum, Acacia seyal, Acacia xanthophloea, and Centella asiatica, Vernonia sp*. Main shubs are *Plectranthus barbatus, lerodendrum johnstonii, Solanum mauritianum, Vernonia sp, Gutenbergia cordifolia, Caesalpini adecapetala, and Enteropogon microstachyus. Olea Africana,* an endangered species is found in around this section. There is reported presence of small game in this area, mainly hyena, Mongoose, Hare, and Monkey.

Towards Angle Point 3 at Masurura area are open grasslands and farmlands on sections traversed by the TL. From Angle point 3 to Kenhancha SS are mainly farmlands interspersed with *Ficusspp*, *Rhusnatalensis*, and *Senna didymobotrya*. At Kehancha SS are scattered trees such as *Polyciaskikuyuensis*, *Bauhinia spp*, *Erythrinaabysinica* and shrubs on black cotton soils.

Plate 3.13; Ficusspp; (middle) Sporoboluspyramidalis; and on the far end Warbugiaugandensis

Plate 3.14; Pennisetumclandestinum; (middle) Grassland/riverine vegetation and on far end AP3 area

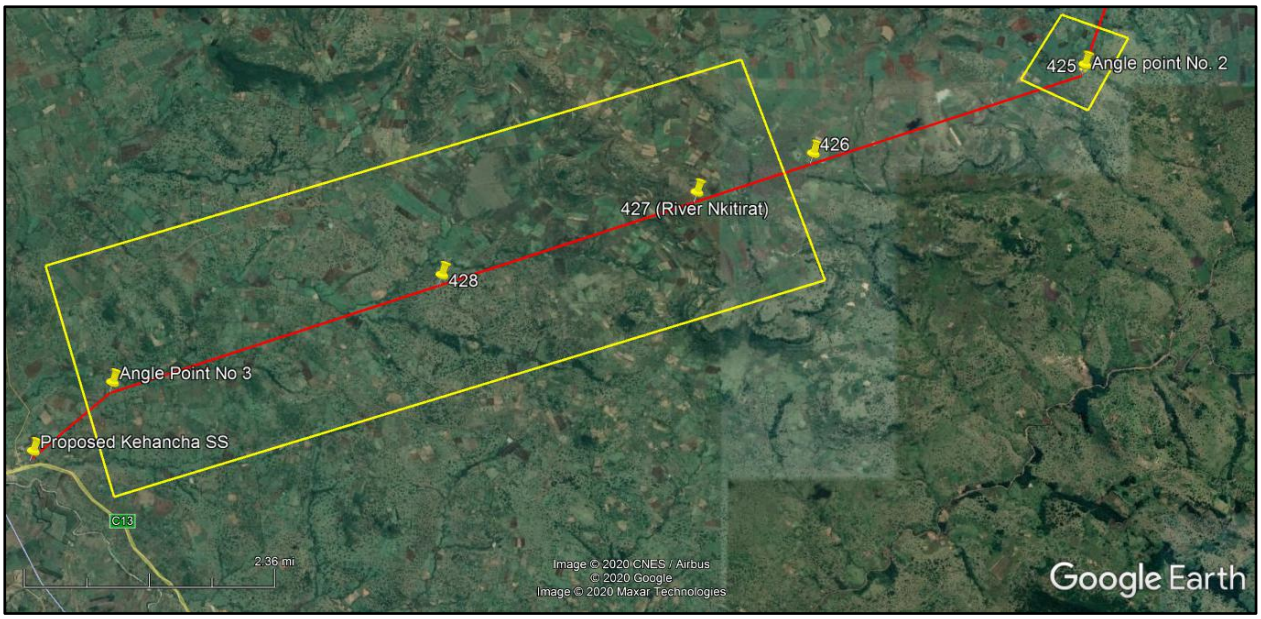


Figure 3.8: Angle point 2 to Kehancha SS showing sensitive riverine and gallery forest sites

Plate 3.15; Centellaasiatica and on the right Markhamialutea

Plate 3.16; Angle Point 3 and Eucalyptus woodlot

Plate 3.17; Site of proposed Kehancha SS and on the right Site of proposed Kehancha SS

According to The Peregrine Fund, the Victoria Basin as well as the Maasai Mara region are well known and documented migratory corridors for avifauna. This area along with the Nyakweri Forest, which lies immediately to the east of the proposed line are critically important areas for a number of threatened bird species.

Boasting over 550 resident and migratory species, the Mara shelters an incredible array of both regionally and globally threatened birds. Easily spotted on the plains are the common ostrich, secretary bird, ground hornbill and bustard (Kori, black-bellied and white-bellied). Also plentiful are crowned plover, red-necked spur fowl and helmeted guinea fowl, while along the rivers African fish eagle, Egyptian geese, yellow-billed stork, sacred ibis and blacksmith plover abound. The Reserve also boasts 53 species of raptors, to include augur buzzard, black-shouldered kite, bateleur eagle and 6 species of vulture. The Reserve is the only place in Kenya where you can see the rare Schalow's turaco. Vultures and raptors can travel up to 200km when looking for food.

3.4: Water Resources

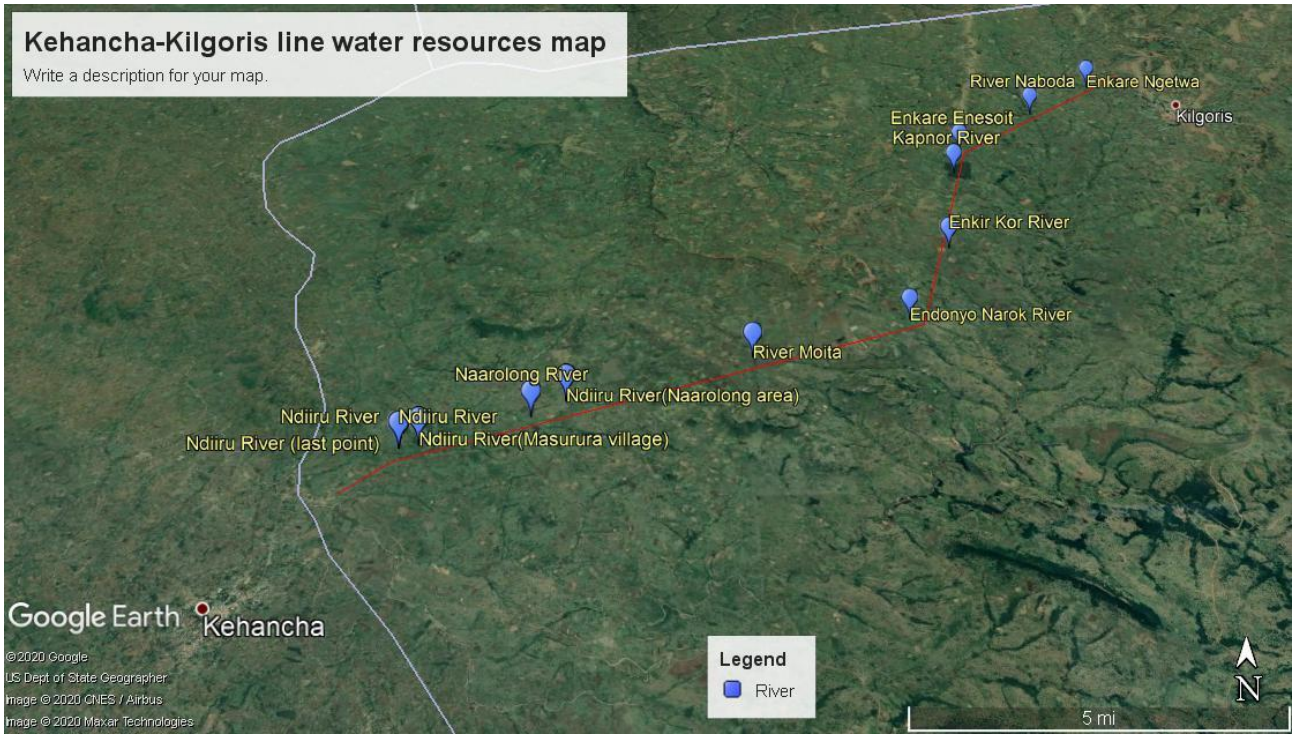


Figure 3.9: Water resources along the proposed Kehancha-Kilgoris High Voltage Line

Rivers traversed by the proposed transmission line include Enkare Ngetwa, Naboda, Enkare Enesoit, Kapnor, Enkir Kor, Ole Katuna, Moita, Ndiiru, and Narolong.

Table 3.1 below gives a summary of the water bodies, locality, GPS coordinates and observations made during water resources assessment exercise. The water samples were collected at locations where the transmission line crosses the rivers. Water samples were collected during the wet season and the results provide a baseline for this particular season.

Table 3.1: Water resources baseline data

Water Resource	Location	GPS Coordinates Region 36m		Observations	Recommendations (as per the Water Resources Management Rules 2007)
		X	Y		
Enkare Ngetwa	Leporosi Village, Kilgoris locality	706356	989046	✓ River 6m wide estimated from the top edge of the river bank ✓ Turbid water flowing in the water course ✓ Sand harvesting done in the river bed ✓ Riparian reserve well conserved with 50m flood plain on the left bank (LB) ✓ River water used for livestock, wild animals and recreation	Works done at this point should be outside the floodplain and NOT within 50 metres from the top edge of the river bank

Water Resource	Location	GPS Coordinates Region 36m		Observations	Recommendations (as per the Water Resources Management Rules 2007)
		X	Y		
River Naboda	Naboda village	703803	9888592	✓River channel approximately 15m wide measured from the top edge of the river bank & joins Enkare Ngetwa ✓Low flows of approximately 1m in the channel ✓Slightly turbid water ✓Evidence of the river channel being susceptible to erosion ✓Riparian reserve well conserved with some vegetation in the river channel	Works should NOT be done within a distance of 30 metres from the top edge of the river bank
Enkare Enesoit	Osinoni village	700794	988622	✓Joins Enkare Ngetwa ✓The river is covered with vegetation, characteristic of spring waters and is 1m wide ✓Has a 5m flood plain on both the left bank (LB) and right bank (RB) which is vegetated ✓Formed by 2 upstream streams that drain the area ✓Community uses a spring that has been protected for domestic water requirements ✓Area has a flow path that recharges Enkare Enesoit River ✓Area has a number of springs and therefore requires protection	The area exhibits characteristics for a groundwater conservation area, which is a sensitive area. Any excavations should be done outside the extent of the recharge area, at a distance of about 15 metres from any springs.
Kapnor River	Olenkii area, Narok County	700368	9884993	✓ River channel approximately 6m wide measured from the top edge of the river bank ✓Flows in the river channel ranging from 1.5m to 3.0m ✓River channel covered with vegetation ✓Riparian reserve well conserved ✓River water used for domestic purposes	Works should NOT be done within a distance of 30 metres from the top edge of the river bank
Enkir Kor River	Nentekeny area, Narok County	699447	988102	✓River channel approximately 3m wide ✓Slightly turbid ✓Water used for domestic purposes and livestock.	Works should NOT be done within a distance of 30 metres from the top edge of the river bank
River Ole Katuna (Endonyo Narok River)	Endonyo Narok area, Ole Katuna village	697679	9877778	✓River channel approximately 4m wide measured from the top edge of the river bank ✓Vegetation growing along the river channel ✓Riparian reserve conserved ✓Eucalyptus trees planted within the riparian reserve ✓River flow channel approximately 1m wide ✓Flood plain on the left bank (LB)	Works should NOT be done within a distance of 20 metres from edge of the flood plain which is 30 metres from the top edge of the river bank

Water Resource	Location	GPS Coordinates Region 36m		Observations	Recommendations (as per the Water Resources Management Rules 2007)
		X	Y		
River Moita	Ormogo Village, Moita Location	693009	9876192	✓River section has flooding characteristics ✓ Aquatic vegetation present in the river channel ✓There is a public road serving the area 20m upstream of the point ✓Water used for livestock ✓Riparian reserve is vegetated	Works should NOT be done within a distance of 30 metres from the top edge of the river bank
Ndiiru River -Naarolong	Naarolong area, Narok County	687849	9874735	✓Slightly turbid water ✓River channel flowing with water approximately 4.5m wide ✓Riparian reserved vegetated ✓Water used for both domestic and livestock	Works should NOT be done within a distance of 30 metres from the top edge of the river bank
Naarolong River	Naarolong Village, Narok County	686934	9874162	✓Pools of water along the river ✓Riparian reserve on both sides vegetated and conserved ✓Water used for domestic, livestock and wildlife	Works should NOT be done within a distance of 30 metres from the top edge of the river bank
Ndiiru River-Masurura	Masurura Village	684050	9873222	✓River channel approximately 15m wide measured from the top edge of the river bank ✓Rocky river channel ✓Point of ox-bow lake ✓Riparian reserve well conserved ✓vegetation growing up to the river channel`	Works should NOT be done within a distance of 30 metres from the top edge of the river bank
Ndiiru River (last point)	Masurura Village	683545	9873083	✓River channel approximately 20m wide measured from the top edge of the river bank ✓Rocky river channel ✓Eroded river banks ✓Pools of water in the river channel ✓Vegetated river banks though vegetation being eroded ✓Livestock drinking point ✓Last angle point as the line exits the river system to Kehancha Sub Station	Works should NOT be done within a distance of 30 metres from the top edge of the river bank

Summary of Laboratory Analysis Results

Water samples were collected from all the water resource points and taken to the laboratory for water quality analysis. The following table gives a summary of the lab results.

Table 3.2; Results of the water quality analysis

Parameter	Guide value (max allowable)	Enkare Ngetwa	River Naboda	Enkare Enesoit	Kapnor River	Enkir Kor River	Endonyo Narok River	River Moita	Ndiiru River (Naarolong	Naarolong River	Ndiiru River (Masurura	Ndiiru River (last point)
pH	6.5 -8.5	6.7	7.0	6.8	7.0	5.9	7.1	6.8	7.3	7.4	7.1	7.1
Suspended solids	30 (mg/L)	40	33	50	133	10	200	467	80	13	20	30
Total Dissolved Solids	1200 (mg/L)	87	88	146	75	86	245	208	399	354	226	239
Nitrate-NO_3	10 (mg/L)	5.0	4.0	4.0	5	19	2.0	ND	5.0	6.0	6	6.0
Nitrite –NO_2	3 (mg/L)	ND	ND	ND	ND	ND	ND	0.3	0.02	ND	ND	ND
Ammonia–NH_3	0.5 (mg/L)	ND	0.4	ND	ND	ND	0.3	2.8	1.5	0.8	0.6	0.5
E.coli	Nil/100 ml	310	10	5	310	7	17	4	100	NIL	NIL	10
Fluoride	1.5 (mg/L)	0.5	0.5	0.6	0.5	0.5	1.0	3.8	1.5	1.3	0.5	0.9
Phenols	Nil (mg/L)											
Arsenic	0.01 (mg/L)	6	6	3	8	4	5	7	10	17	11	6
Cadmium	0.01 (mg/L)	0.011	0.025	0.019	0.110	0.014	0.009	0.008	0.005	0.005	0.006	0.009
Lead	0.05 (mg/L)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Selenium	0.01 (mg/L)											
Copper	0.05 (mg/L)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Zinc	1.5 (mg/L)	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Alkyl Benzyl Sulphonates	0.5 (mg/L)											
Permanganate value	1.0 (mg/L)	4.0	4.7	6.3	3.2	1.6	7.1	5.5	5.5	2.4	6	5.5

Interpretation of the Results

The results discussed in the following section are for water samples collected from water resources in their natural state and present the physical-chemical and micro-biological status of the water resources at the time the water samples were collected.

Interpretation of Physical-Chemical Parameters

- PH levels were within the NEMA guideline values of 6.5-8.5 for all the samples except Enkir Kor River which tested at 5.9. The value is however within KS EAS 12:2018 standard of 5.5-9.5
- River Naboda (33mg/L), Enkare Ngetwa (40mg/L), Enkare Enesoit (50mg/L), Ndiiru River-Naarolong area (80mg/L), Kapnor River (133mg/L), Endonyo Narok River(200mg/L) and River Moita (467mg/L), had high levels of suspended solids compared to NEMA standard of 30 (mg/L). Generally suspended solids in a body of water are as a result of organic materials such as decayed plants and leaves, and

inorganic materials such as silt due to erosion or surface runoff. The high levels of suspended solids in Kapnor River, Endonyo Narok River and River Moita can be attributed to loading of the rivers with high quantities of silt and decayed organic plants materials as a result of soil erosion during the heavy rains from the upper catchment areas of the rivers.

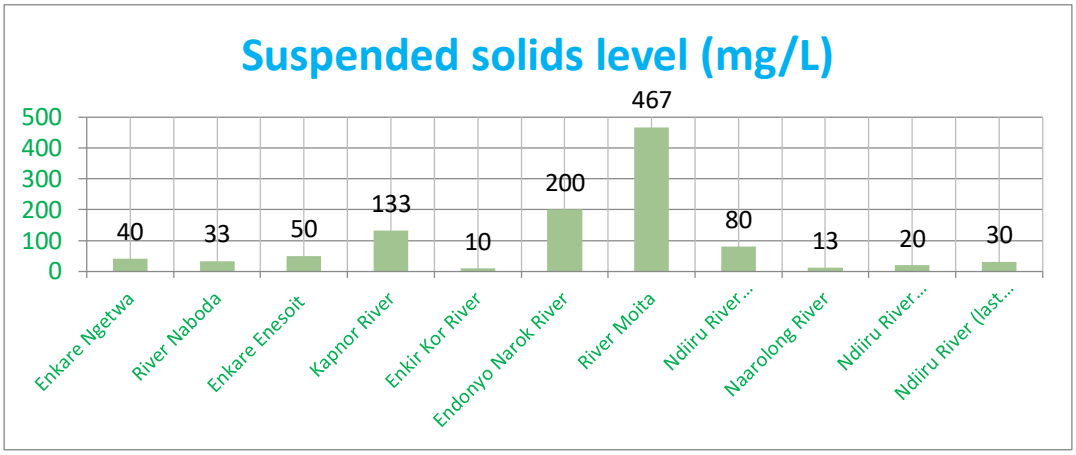


Figure 3.10: Suspended solids (mg/L)

- All the samples had Total Dissolved Solids levels within the NEMA standard of 1200mg/L.
- All the samples had Nitrate –NO_3 levels within NEMA standard of 10mg/L except Enkir Kor River which recorded a value of 19mg/L.
- All the samples had Nitrite –NO_2 levels within NEMA standard of 3mg/L.
- Ndiiru River-Naarolong area (1.5mg/L) and River Moita (2.8mg/L) had high levels of Ammonia-NH_3, while Ndiiru River-Masurura village (0.6mg/L) and Naarolong River (0.8mg/L) had Ammonia-NH3 levels slightly above the NEMA standard of 0.5mg/L.

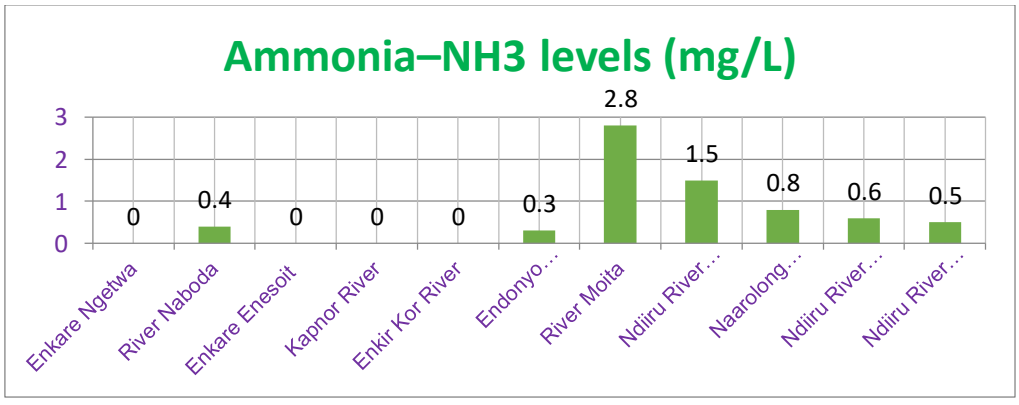


Figure 1: graph of Ammonia -NH_3 (mg/L)

- Except for River Moita, all the samples had Fluoride levels within NEMA standard of 1.5mg/L. High fluoride levels in River Moita can be attributed to dissolution of silt deposited into the river due to erosion of high fluoride content rocks in the upper catchment of river.

- Arsenic is highly toxic in its inorganic form and contaminated water used for drinking, food preparation and irrigation of food crops poses the greatest threat to public health from arsenic. Long-term exposure to arsenic from drinking-water can cause cancer and skin lesions. Arsenic has also been associated with cardiovascular disease and diabetes, and in utero and early childhood exposure has been linked to negative impacts on cognitive development and increased deaths in young adults. All the collected samples tested for high levels of Arsenic, ranging from 3mg/L to 17mg/L against NEMA standard of 0.01mg/L. The high levels of Arsenic in all the water samples collected indicate that the rocks and soils in the area where the proposed transmission line traverses have high Arsenic content. Arsenic as an element occurs naturally in rocks and soil.

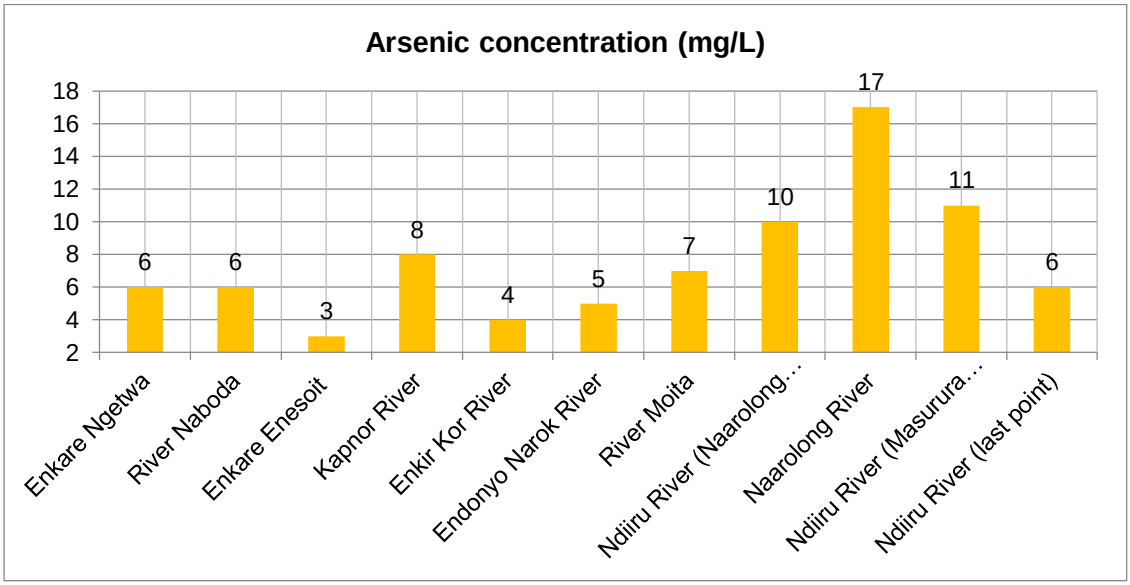


Figure 3.12: Arsenic levels (mg/L)

- All the samples had 20-min Permanganate values within the NEMA standard of 1.0mg/L indicating enough oxygen levels to oxidize both organic and inorganic matter in the water resources.
- All samples collected except Naarolong River and Ndiiru River (Masurura village) tested positive to E.Coli, indicating contamination of the water resources with human waste. High levels were recorded at Ndiiru River -Naarolong area (100/100ml), Kapnor River (310/100ml) and Enkare Ngetwa (310/100ml).

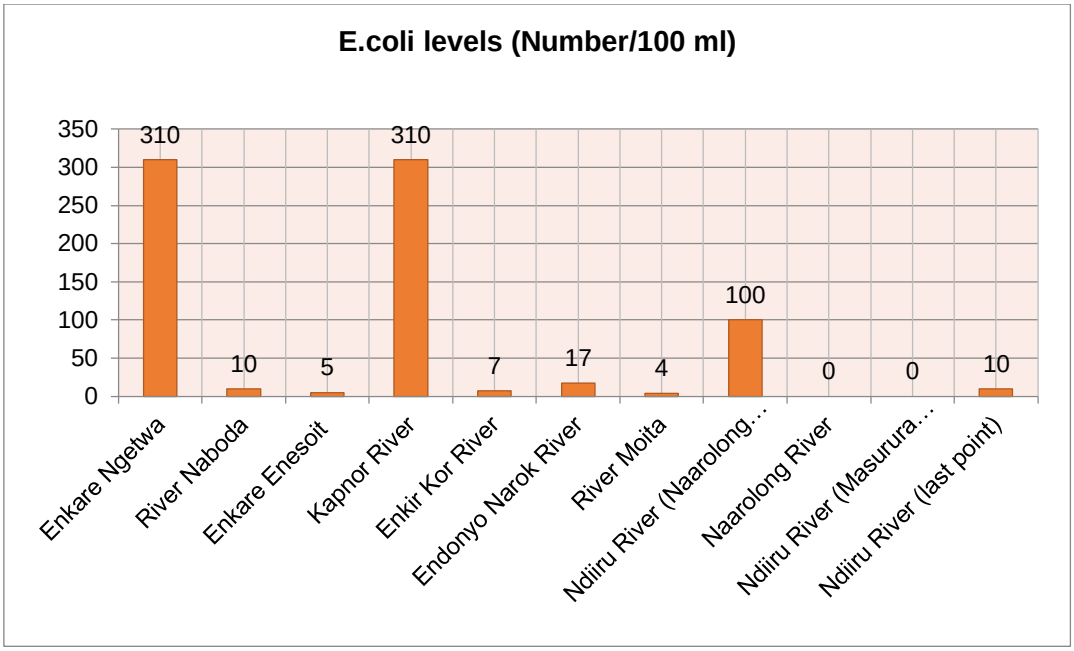


Figure3.13: E.coli (Number/100ml of water sample)

Interpretation of Heavy Metal Analysis Results

- The water samples tested Nil for Lead (Pb), Copper (Cu) and Zinc
- Enkir Kor River (0.014), Enkare Enesoit (0.019), River Naboda (0.025mg/L) and Kapnor River (0.110mg/L) had Cadmium levels above NEMA standard of 0.01mg/L. Cadmium (Cd) has the chronic potential to cause kidney, liver, bone and blood damage from long- term exposure at levels above the maximum contaminant level (MCL). The high level of Cadmium in River Naboda can be attributed to leaching of certain fertilizers since the area is agricultural.

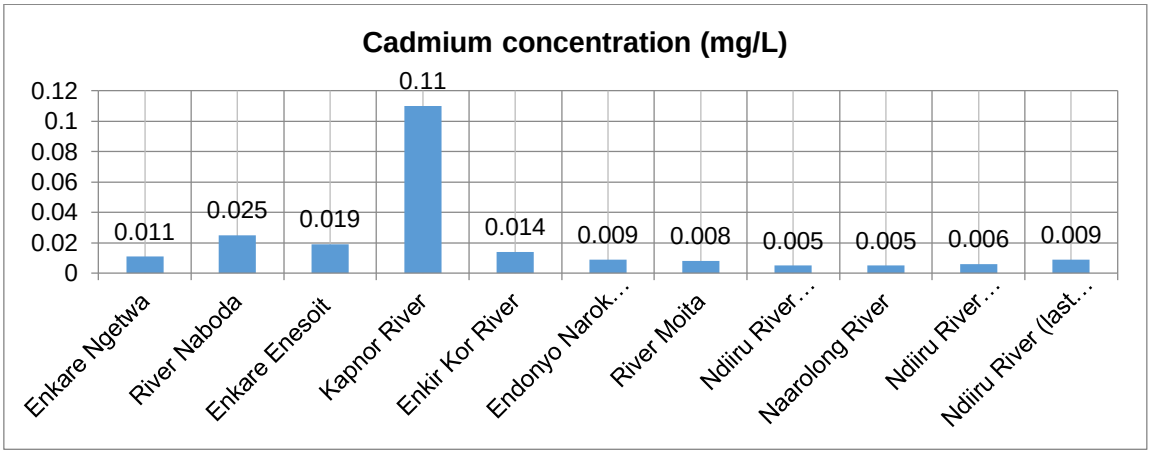


Figure 2: cadmium concentration (mg/L)

Recommendations

Riparian conservation and protection of the river resources from pollution to be done by ensuring that NO works are carried out within the distances mentioned in Table 2 for every water resource. However, if the contractor finds it unavoidable, then an approval to carry out

such activities or works shall be sought from Water Resources Authority as required by Water Act 2016 and Water Resources Management Rules 2007.

It is recommended that, KETRACO, conduct bi-annual water quality analysis for these water bodies to monitor environmental performance of the proposed project and based on the above baseline, observation of significantly higher values would indicate pollution which could be as a result of the project implementation. Corrective actions, if established pollution is highly likely to be by project implementation, must be taken.

Appendix IV gives the full Surface Water Resources Survey Report

3.5: Social Economic Status

Sources of income

Kilgoris is an agricultural zone mainly because of the fertile lands and the reliability of the rainfall in the area. These coupled with good climatic condition for farming has made most of the residents in Kilgoris eke a living through farming. Most of the residents are self-employed agriculturalists where they rely on their produce to earn income. Land in the area is available and most residents farm either on their own pieces or on rented pieces.

The crops grown in the area are mainly sugarcane, maize and beans. The residents were in the past selling maize but with the establishment of the Mara sugar factory, the area has seen an increase in sugarcane farming as the factory provides a ready market. There are those who continue to engage in cultivation of food crops such as maize and beans, which they sell to the National Cereals and Produce Board (NCPB) stores in Transmara, as well as other local purchasers. According to the Kenya Housing and Population Census, 106,110Ha of the land was under agricultural use, 79.3% of which was under subsistence farming. 37,369 households in the sub-county engage in farming, with 14.4% of them engaging in commercial farming.

The project area being a Maasai inhabited area, would inevitably see livestock keeping as a source of livelihood. The local community being pastoralist, keeps large herds and flocks of cattle, sheep and goats. They earn from the livestock through the sale of the animals or their produce. Most women earn from the sale of cow milk, which is distributed in Kilgoris to hotels and restaurants, and men from the sale of the livestock which mostly happens on Tuesdays when there are market days in Kilgoris. According to the 2019 Census, the most kept livestock was indigenous cattle, with a total of 25,636 household recording holding such stock. Sheep

and goats were also common with the number of households holding the two standing at 14,863 and 10,608 households respectively.

The road network in the area has also offered an opportunity for locals to earn a living through offering transport services. The most common form of transport in Kilgoris is the *boda boda*, motorcycles used to ferry people in the area. The roads being earthen makes the *boda bodas* popular and the most convenient form of transport thus creating opportunities for the locals to earn from offering the services.

The number of people formally employed in Kilgoris is small when compared to the larger population. Figure 3.1 is a pie chart depicting the sources of income in the project area.

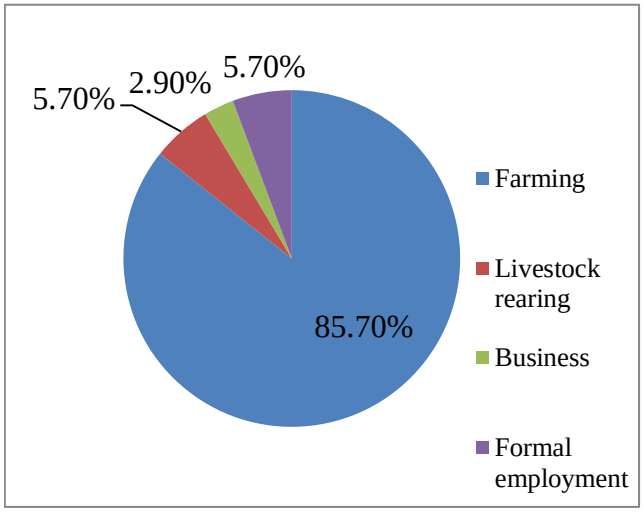


Figure 3.15: Sources of income in the project area

The distribution of income in the area denotes slight inequality which can be attributed to the differences in land sizes owned as well as economic activity. The inequality is more pronounced when it comes to men and women as women are not engage in gainful employment and are faced with obstacles when they seek financial independence.

The proposed project will impact on the sources of income and distribution both positively and negatively. The line will create new opportunities and sources of income for the locals through employment as well as in business through supply of goods and services. On completion it will enable the locals to use the stable power supply to establish more businesses thus increasing the sources of income. The establishment of new businesses and employment of workers in the construction site will definitely play a big role in reducing the inequality in distribution of income.

Economic Impacts

The proposed project will definitely have an impact on the economy of the project area. The proposed line, being a development project, was aimed at improving the economy of Narok and Migori Counties. The implications of the proposed line can be assessed from the following two angles

1. **During Construction and decommissioning phases** - the proposed line will have an impact of the economic lives of the locals during this phase through employment in the project. This will see an improvement in the economy of the area as a result of households and individuals being able to meet their needs. The small-scale businesses in the project area will also benefit from this phase as an influx of people earning from the working on the project will increase demand for goods and services. Grocers, retailers and service shops will be the biggest beneficiaries of this. The disposable income of the construction workers will definitely have an effect on the economy. Conversely, the project during construction, will disrupt farming activities which is a major source of income for the locals. The locals, largely reliant on cane for income, will not have much to supply to the factory thereby depriving them of income. In addition, the farmers are contractually bound to deliver the cane which could hurt their standing if they fail to deliver. Mara Sugar Factory is also expected to suffer from reduced cane deliveries which may lower its sugar production.
2. **Implementation Phase** - as the project objective indicates, Kilgoris will benefit from improved power supply which will be a key incentive and resource in establishment of new businesses and the expansion of existing ones. Businesses reliant on electricity such as retail and wholesale shops, welding, barbershops and hair salons will be the biggest beneficiaries. This will definitely lead to an improvement in the economy of the area from the individual level, household level culminating to economic growth in the area generally. In addition, improved power supply will lead to improved connection at households' level by the power distribution company thus improving on the quality of life for the families in the area. Industries in the area are set to benefit from the improved supply. The industries include the Transmara Sugar Company and Gold mining in Lolgorien and Kehancha. The supply will also be an incentive for more industries to set up.

Socio-cultural Environment.

Being predominantly Maasai, Kilgoris residents would obviously be subscribers to the culture of the Maasai and as stated before, their culture and social way of life is distinct and uniquely different from major Kenyan communities. The community's culture may be affected by the proposed line and would therefore be prudent to also examine what aspects could be impacted by the project. In that regard, there is need to analyse the rituals, social organisations, religion and laws that may be affected.

1. **Rituals** - the ritual that is most likely to be affected by the line is initiation, though to, at most, a minimal extent. The local community performs a rite of passage on boys when they are in their teen age to initiate them into the early stages of adulthood. The

rite involves circumcision of the boys and seclusion during the healing period where they are taught on the community's culture and expectation of men. The seclusion is done in forest areas and thickets where they pitch a camp for the initiation candidates. During this period the initiates do not interact with women, and children. The rite of passage only poses a small risk in case of interference, that would lead to violence. Burial sites may also be affected. The community don't mind the line overflying their graves but may not allow their buried ones to be exhumed. A number of graves were identified but none was on the way-leave.

2. **Social Organisation** - the community is organised from the family level where the man is the head of the family. The community's organisation is well organised from the *morans* level, after initiation, where the group of initiates is organised and led by two age-set leaders. On graduation from being *morans*, the men are led by a council of elders who are involved in governing the community's cultural and ethical life. These leaders work hand in hand with the national government's leadership in the governance of the area. The elders in conjunction with the local administration handle most of the matters that arise in the area. Therefore, any issues arising from the project would be solved by the team.
3. **Religion** - most of the locals are Christians. There are however a few who subscribe to the traditional Maasai Religion.
4. **Laws** - the community has the norms that it adheres to. These are the rules that govern coexistence in the community to ensure that all the members treat each other with respect and uphold the highest standards of morals. The project could pose a challenge when it comes to adherence during the construction phase as the workers will be from different cultures and the interaction of these cultures could on occasions lead to a norms and mores related clash.

Cultural impacts

The local community is renowned world over for its unique culture. The project could interfere with certain aspects of their culture and in so doing potentially sow resistance from the local community. It therefore is necessary to analyse the aspects that are likely to be affected, in order to create a mitigation plan for the impacts.

1. **Material Culture**- This refers to the things that for a major part of the life of the local community hold significant value in usage, norms, and rituals. The objects are often valued sentimentally or monetary form. The Maasai, being pastoralists, have the most elaborate form of material culture in Kenya. Their attachment to livestock, that is cattle, sheep and goats, is unparalleled. Livestock is their source of livelihood, has been ancestral heritage, and is a form of prestige. The animals are also very significant to

their rituals as they form a key part of the rituals. It thus could be very detrimental for the project to interfere with this very important aspect of their culture. The project could run into headwinds with the local community during the construction phase in the event their animals grazing grounds are interfered. In addition, if the security and safety of their animals, especially from construction activities, is not guaranteed, it would precipitate conflict. Certain trees especially the huge ones and *mugiet* (a tree on which the sticks that were used in roasting meat during circumcision and other traditional ceremonies) are also held with esteem.

2. **Collectivism**- The local community's culture, values communal living much more than living as an individual. Most of their organisation is communal, right from living as an extended family, the participation in social affairs, and participation in rituals. This thus creates a sense of belonging in the area from the locals, which they would not want interfered with. The proposed project could potentially affect this aspect when it necessitates displaced persons to move to other places, thus breaking that bond. The client should therefore ensure that such attachment is not disregarded when compensating the individuals affected.
3. **Conformity**- The rules, norms and beliefs of the community are uniform, seeing as they belong to the same ethnic community. These aspects of culture are normatively passed on from one generation to the other and thus conformity to the acceptable norms and behaviour is uniform across the board. The visiting construction workers need to take cognisance of the local culture and ethos to avoid instances of culture shock. Both the community and the visitors will require training on how to relate well within their different cultures.
4. **Civilisation**- The area has made significant strides towards joining the world in development and adapting to its dynamism. Several facets of civilisation denote advancement, which include education, health, and inclusion. The area has seen improvement in all the named aspects. The area records high levels of literacy among children, a departure from the past where children would skip school to herd. The residents have embraced modern medicine as is evident through the hospital admissions for both outpatients and in patients. On inclusion however, the area is still grappling with cultural beliefs on the place of the woman in the society as well as those of persons with disability (PWDs). The project will definitely advance the gains made in the health and education sectors as its completion would ensure that household, schools, and hospitals are supplied with power.

Family and Community Impacts.

The family is the smallest unit of social organisation. In Kilgoris, this unit lives predominantly as the extended family, with cases of nuclear families being slightly less. This unit is held in high regard and is treated as the society's source of life and its premises for existence. It thus is expected of every member of the community to belong in one, either as the founder or as the product. The father is the head of the home in Kilgoris and the mother is charged with the responsibility of homemaking.

The proposed line could impact the existence of this unit mostly when it comes to decision making during compensation. The entire process could potentially split families especially when there are no consultations within the household on how to utilise the proceeds of compensation.

The families then form a community that coexist and cooperate in several of its daily activities. Rituals and leadership are community based and this creates a very strong bond among the residents of Kilgoris.

The line is likely to impact the community in the following two ways:

1. There will be an influx of construction workers into the community during the construction phase. This will affect the coexistence and cooperation that exists and render interactions shallow and meaningless.
2. On displacement of families, the community will lose its members as a result of the lines traversing through the community, members who probably were key contributors to the functioning of the community.

Gender Relations Impact

Gender is defined by the role the society demands the different sexes play. Therefore, being a social construct, it is more often dependent on the community one has been brought up in. In Kilgoris engendering of these roles is done from the onset during child hood. Young boys are taught how to herd and tender for livestock while young girls are taught how to care for the home by helping in activities such as fetching firewood and water. As the children grow into puberty, they are taught of the different roles and responsibilities each gender has in the society and on how to relate with the other members of the society. The young men are taught on how to keep interaction with women at the bare minimum levels and so are the young girls taught. On marriage the man becomes the head of the household, the provider and protector. The woman is the home maker and is charged with looking after the family and building their

home. In leadership, women are not involved and in fact, it is a man who represents them in the council of elders.

The proposed line poses the following challenge to the gender relations in Kilgoris:

1. Women are their husband's or their father's 'property' and as such any intruder who would make advances to them would meet dire consequences. Visiting workers should therefore be advised on how to keep relationships respectful.
2. The proposed project could be a source of conflict for many families and the society at large. When compensating for the house, if the woman is compensated against the wishes of the household head, it could create rifts in families and create chaos.

Potential Project Affected Persons (PAPs)

The transmission line will affect personal property as it traverses the farmlands and homesteads. This will in turn affect people's livelihoods, environment as well as abode. The level of impact is predicted to be considerable thereby necessitating carrying out a full Resettlement Action Plan (RAP) study, since the number of affected persons will be above 200 persons. Therefore, there is need to analyse the level to which individuals are affected so as to determine compensation.

For the proposed Kilgoris-Kehancha transmission line, the affected persons are largely farmers and settled pastoralists. The level of impact varies from one PAP to another and thus would have to be evaluated on a case by case basis. On observation, the team was able to identify that all the categories of assets that could possibly be affected, that is, land, trees and crops, and structures, will be affected. The transmission line also traverses a 1 km long plantation (eucalyptus) forest in Osinoni. The number of PAPs living on the project area necessitates a full RAP as they exceed the required 200. The RAP will be the basis on which PAPs and PDPs will be identified.

The proposed transmission lines have distinct set of communities who live along the lines. The projects will affect the people in the areas traversed as well as the culture of the locals. Therefore, it is important to determine the adversity of the effects so as to create a plan for mitigation and compensation.

People, Community and Structures

In Kilgoris, the proposed line traverses areas that are inhabited by the Maasai community. This community is semi-nomadic and is also known for livestock rearing. However, the inhabitants of the project area mostly engage in farming due to the areas favorable climatic

condition as well as influence from the neighboring Kisii community. The presence of a sugar processing plant, Mara Sugar factory, in the area has also greatly contributed to their choice of livelihood as the factory provides a ready market for their produce. This however has not made them abandon livestock rearing in its entirety as they still own large herds of cattle which they graze.

The culture of the Maasai community is unique and very distinct. It is renowned world over for its authenticity since it is one of the least externally influenced cultures in Kenya. The locals subscribe to the norms and morals of this culture.

Since the culture of the community is such that very little infiltration by elements of modern society and especially western cultures, oftentimes, the members of this community have been underserved by successive governments. This thus led to the community's identification as one of the vulnerable and marginalized groups in Kenya. The community structures of the locals start from the most basic of society's institutions, the family. Most of the families are polygamous with the man as the head of the household. Many family units live on the same piece of land as an extended family. This, therefore, makes the size of the household big. The community is under the leadership of elders who guide the community on political and cultural matters. The kinship and communal ties among the residents of this area are close and strong.

Population Density and Distribution

In getting to understand and scope the possible implications of the project in terms of compensation, looking at the population density and composition is essential so as to predict the social cost of the project. By so doing, the client will understand the settlement patterns and the population trends in the area for purposes of conducting a RAP as well as to understand the population that will benefit directly from the project on completion.

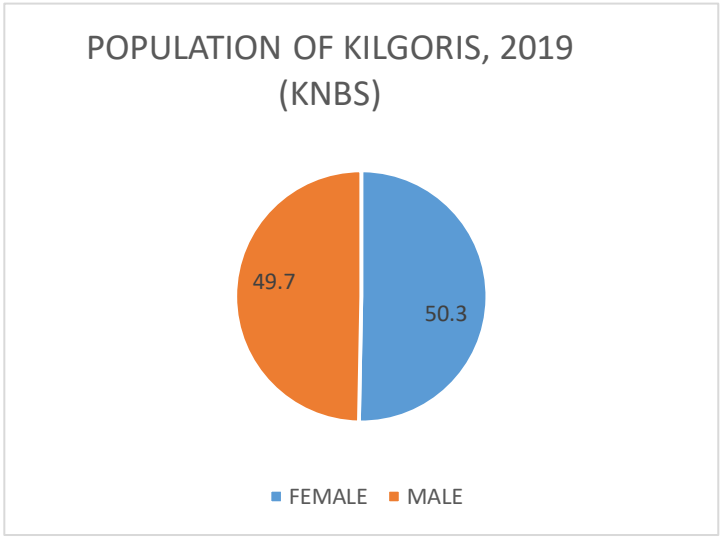


Figure 3.16; Population of Kilgoris. 2019 Housing and Population Census by KNBS

The line traverses areas whose population density and distribution is not as high as urban centres. The Kilgoris-Kehancha line takes off and terminates in Kilgoris sub-county. The Kenya Housing and population Census of 2019 reported that Trans Mara West sub-county had a population of 245,714 with males accounting for 49.74% of the population and females accounting for 50.26%. Children accounted for 55.83% of the sub-county's population, according to the Kenya Housing and Population Census of 2019. The labour force age (15-64 years) made up 49.29% of the population. The dependency ratio of the area stood at 102.88. The youth constituted 27.61% of the population while the elderly (65+) constituted 2.25% of the population. The population of Kilgoris town was 10,845 with 51.3% of the population being male and 48.7% being female. The population density of Trans Mara West in 2019 stood at 97 persons per square kilometer.

Trans Mara West has a total of 50,132 households according to the 2019 Kenya Housing and Population Census. The average household size in the sub-county was found to be 4.9 persons. The population of Kilgoris is dense with most residents living in large tracts of land.

The anticipated impacts of the line on population are influx of people during the construction phase who might decide to remain post construction thus increasing the population in the area. Cases of rural-urban migration after the line is commissioned will rise as Kilgoris will have stable supply necessary to support businesses and living.

Health Profile

Provision of health services is a devolved function, according to the Constitution of Kenya, 2010 and thus services are provided by County Governments. In Kilgoris, health services are provided either in dispensaries or at the Trans Mara district hospital. The population is not very far from the dispensaries albeit there is a challenge in accessing health services due to the condition of the roads. The dispensaries that serve the population living along the line are Naarlong, Nkararo and Osinoni dispensaries.

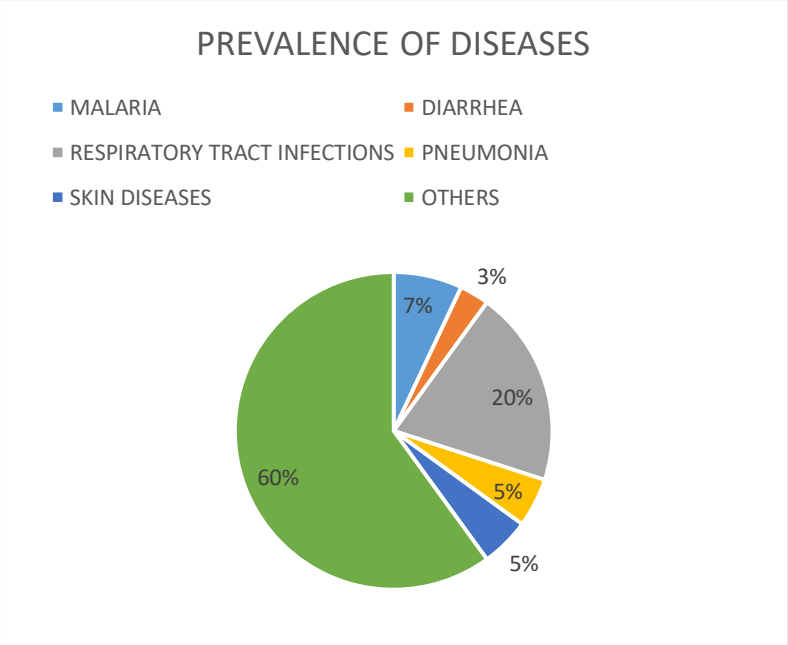


Figure 3.17; Disease prevalence in the project area. Transmara District Hospital Statistics office

The prevalent diseases are malaria with a prevalence rate of 7%, diarrhea at 3%, Respiratory Tract Infection (RTIs) at 20%, pneumonia at 5% and skin diseases with a prevalence of 5%. The malaria prevalence rate could be attributed to the low percentage of people who sleep under mosquito nets in the Narok County which was pegged at 31.5% according to the Kenya Demography 2014 survey by KNBS. Non- communicable diseases in the area are not prevalent with incidences being few. Common non communicable diseases include Diabetes and high blood pressure. On HIV/AIDS, the sub-county had a relatively low positively rate in 2008 of 1 % as compared to the national positivity rate of 4%. The implications of the proposed line include a rise in the positivity rate due to an increase in social vices such as prostitution.

Employment and Labour market

The line being a development project with benefits to the locals will obviously have impacts on employment and the labour market. Not only will it create employment opportunities on completion, but also during the construction phase. This will essentially boost self-employment and to some extent formal and informal employment. The current dynamics of employment and the labour market is as follows.

In Kilgoris, the residents are farmers and herders who mainly engage in sugarcane farming which they sell to the local Mara Sugar Company. The farms do not only employ the farmers, but also farmhands. Other than farming, livestock keeping and casual labour is common. Self-employment especially in the *boda boda* sectors is common too, as it is the main mode of transport in the area.

Overall, Narok County has 12.7% of its population formally employed, 16.3% working in family business, 45.5% working in the agricultural sector and 10.7% home makers and retirees. The rest are full time students and volunteers**.** The level of unemployment in the county stands at

2.8%, while the number of the economically inactive youth accounts for 11.9% of the population.

Land Tenure

Kilgoris is a rural agricultural area whose land is owned mostly on a freehold basis. The land was originally community land and was subdivided to the locals who now own it privately. The parcels of land traversed are owned by individuals who have title deed and allotment letters. There is only one section in Nkararo, where the line traverses a portion of Ntekeny Primary School's land, which is public land. The area is zoned out as agricultural land according to the land use regulations.

Education Profile

The population is served by 199 primary schools and 34 secondary schools. According to information obtained from the Sub-County education office in Kilgoris, out of the total number of 54,172 students who enrolled in the primary schools, 51.04% are boys with the remainder being girls. In secondary schools, males account for 52.59% of the total number of students which is 6,111. This makes the gender parity ratio of both levels of education to stand at 4.10% and 16.23% for the primary school and secondary school level respectively. The completion rates in the sub-county are relatively good, for the primary school level 74% of the students who enroll complete their studies. Of these, the girls that enroll, only 70% of them finalize their studies as compared to boys at 79%. This could be attributed to cultural impediments such as early marriages and poverty. It is, surprisingly, quite a different case for secondary education as the girls' completion rate is higher than that of boys. Of the total number that enrolls in form 1, 71% complete their secondary school education as compared to boys' 68%. The percentage of the total that complete is 69.6%. The transition rates are, however, low. Out of the boys that enroll into primary school is 46.3%, transition into secondary school while 36% of girls are the ones who transition. The rate for the total stand at 41.4%. This number could be attributed to several factors including poverty, cultural practices and attitude towards formal education. The transition rates from secondary school

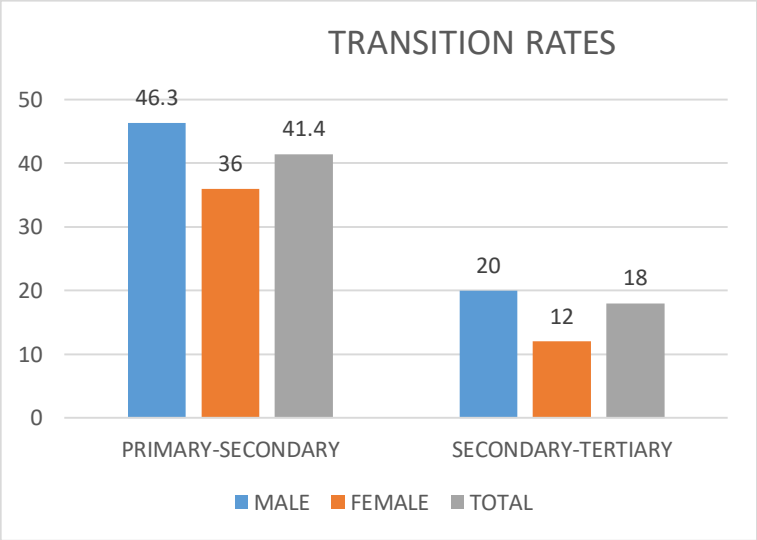


Figure 3.18; School enrollment. Transmara West Sub-County Education office

to institutions of higher learning is much lower with only 18% transiting to institutions of higher learning. The percentage of the boys that transit is 20% and 12.0% for girls. This could be attributed to poverty and fewer tertiary institutions. The teacher/pupil ratio in primary schools in the sub-county is 1:46 and 1:28 in secondary school.

The impact that the project could have on the project areas' education trends include, but is not limited to, truancy in the area as the students opt to work in construction sites and an increase in dropout rate. It is also expected that, on completion, more schools and villages will be energized and students will have more study time which may translate to better school performance.

To develop skills among its youth, Narok County in 2018 had 9 Youth Polytechnics with trainee enrolment of 600. Five of the youth polytechnics are in Transmara Sub-county. The County also has 111 Adult and Continuing Education Centres, a Youth Sports Center, and is currently developing a talents center.

These institutions have created various skill sets including, electrical, mechanical, masonry, carpentry, driving, welding, social work, information technology among others.

Energy Access and Infrastructure

In 2018, connectivity to electricity stood at 20% in Narok County (KPLC Annual Report, 2018). Firewood and charcoal still remain the main energy sources and account for 80% of the total energy used in the County. About 51% of Narok residents use lanterns for lighting despite the high cost of paraffin. Hotels, lodges, and a few households in rural areas including the Mara use diesel powered generators to meet their energy needs.

A solar energy project has been established in Talek Centre to supplement the electricity supply in the county and currently serves over 2,000 people. Geothermal Development Company is currently in the process of establishing a geothermal plant in Suswa following successful explorations.

KETRACO has various electricity infrastructure projects in the County including the Loyangalani-Suswa 400kV, Olkaria 1AU-Suswa 220kV, Olkaria IV-Suswa 220kV, Suswa-Isinya 400kV (complete) and Ethiopia Kenya Interconnector, and Olkaria-Narok 132kV (on-going).

3.6: Archaeological Baseline Survey

Introduction.

The Archaeological Baseline Survey identified locations to target, in the identification of archaeological resources. The specific survey stop points were identified from the map based on appearance of less vegetation, hence open soils surfaces in which to observe archaeological material. However, many of the points turned out to be open swampy areas mostly inaccessible during the ongoing local rains. Survey points therefore shifted to areas along or near roads where the transmission line intersected with local roads, or where specific accessible land features such as forest, river channels etc., were present. These were labeled stop points along the transmission line.

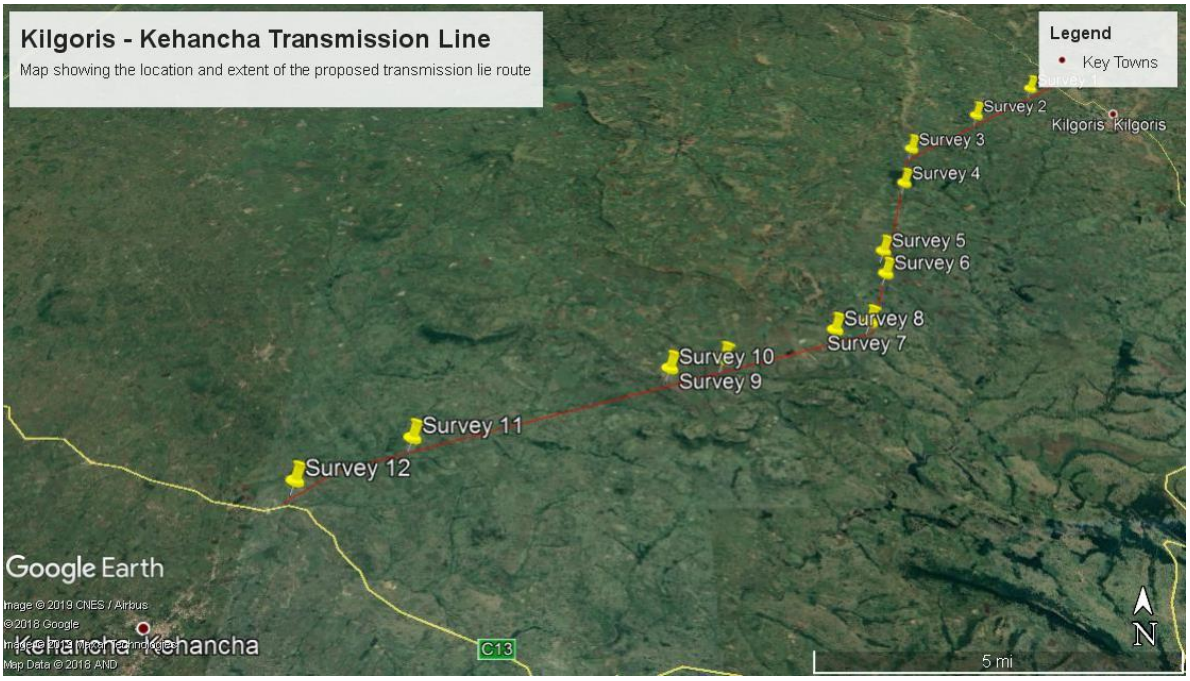


Figure. 3.19; Survey points along the TL

Plate 3.18; Archaeological finds from Stop 1

Stop point 1(GPS Coordinates 0.988918 S, 34.861092 E) was located about 100m South West of the proposed Kilgoris substation and on the road leading to river Enkare Nketwa. Two obsidian flake fragments were observed in a shallow road cutting and two quartzite flakes, two cores and one obsidian fragment were identified in the road cutting. The lithic tools here either come from road fill or are deriving from adjacent thin sediments. However, the road is not graded yet (according to a local informant), so these finds were probably derived from local sediments rather than transported in with the road fill. Isolated occurrences of quartzite, chert and obsidian flakes are observed. Sediment gets thicker towards the river and rocks and stone artefacts fewer in number. Areas across both banks of the river have rock boulders, with a swampy area east of the river channel.

Stop point 3 (GPS Coordinates 1.002467S, 34.842381 E) was at an intersection of the TL with two roads. Here quartzite flakes and cores were seen in road cutting. Road seemingly cuts through a site with concentration of stone artefacts or archaeological deposits.

Plate 3.19; Archaeological finds from Stop 3

Stop 4(GPS Coordinates 1.007893S, 34.835106 E) was along an intersection with a road. In situ quartzite flakes were observed on the road cutting with a profile of laterite overlain by approximately 1 foot of loamy soils. Stop 5 (GPS Coordinates 1.007987 S, 34.832935 E) was in a thickly vegetated area with a stream, swampy, anthills, and short grass cover. The ground surface was not visible except along the road area where erosion on cattle tracks had exposed some clay sediments with few quartzite tools. This sighting of flakes in cattle track disapproved the initial notion that the lithics may have been derived from road fill sediments brought in from elsewhere.

Plate 3.20; Archaeological finds from Stop 4 & 5

Plate 3.21; Archaeological finds from Stop 8

Stop point 8 (GPS Coordinates 1.058466 S, 34.796297 E) was located between two roads in a grass covered area behind Nkararo School. One of the roads had newly been graded and had not been refilled with sediments from elsewhere. Flakes and cores in red quartzite like those already seen elsewhere were observed, some of which were in situ.

Stop point 10 (GPS Coordinates 1.119447 S, 34.743324 E) was in an area recently cultivated and in a newly cut road intersection with TL near survey 9. A concentration of obsidian, chert flakes, and chips in road cutting about 6m from TL centerline. Obsidian concentration east of the TL and on the west about 20m away is a large concentration of quartzite flakes and cores tending towards the nearby river. This concentration runs for about 100meters west of the TL with scatters seemingly washed downslope towards the river.

Plate 3.22; Archaeological finds from Stop 10

Stop point 11(GPS Coordinates 1.124889 S, 34.727531 E) was along TL near survey 10 and between cane plantations. Along the foot path was thick red volcanic soil without archaeological material. The adjacent long thick grasses cover the ground surface from observation of archaeology and the recently ploughed land had no traces of archaeology.
Stop point 14 was the proposed site for the Kehancha substation. It was an open area with some bushes and sparse to medium sized grass cover with very thin sediment over and no archaeology observed.

Localities near Stop Points 2 (GPS Coordinates 0.993047 S, 34.855234 E), 6 (GPS Coordinates 1.029098 S, 34.806019 E), 7 (GPS Coordinates 1.044062 S, 34.800911 E), 9 (GPS Coordinates 1.105507 S, 34.782186 E 19 E), 11 (GPS Coordinates 1.029098 S, 34.806019 E), 12 (GPS Coordinates 1.136647 S, 34.692959 E), AND 13 (GPS Coordinates 1.151154 S, 34.650143 E)were along grassy local road, edge of forests, swamps, farms, grass covered areas, where there were no surface soil to observe, or where observable, had no archaeological material to be reported.

Plate 3.23; some of the areas visited without visible surface archaeological material.

Table 3.3; List of surveyed stop points and recorded Artefacts

NAME	X	Y	Elev.	Description/ Comment/Find
Stop point 1	34.861092	-0.988918	1705	Obsidian, flakes quartzite flakes & cores in Road cutting
Beacon 3	34.858231	-0.990952	1745	Farmland
River Ngoro-keitua	34.855142	-0.993066	1720	Adjacent to large swamp/flood plain
Stop point 2	34.855234	-0.993047	1719	Track in cane plantation
Stop point 3	34.842381	-1.002467	1797	quartzite flakes & cores at T-Junction
Stop point 4	34.835106	-1.007893	1737	in situ quartzite flakes & cores at intersection with road
Stop point 5	34.832935	-1.007987	1721	Artefacts near indigenous forest area
Stop point 6	34.806019	-1.029098	1728	NW edge of plantation forest
Stop point 7	34.800911	-1.044062	1719	SW edge of plantation forest
Stop point 8	34.796297	-1.058466	1771	Artefacts between two roads behind Nkoraro school
Angle Point (AP) 2	34.780056	-1.107030	1681	In thick tall grass area
Stop point 9	34.782186	-1.105507	1671	Track in cane plantation
Stop point 10	34.743324	-1.119447	1736	concentration of obsidian, chert flakes and chips
Artefacts	34.743028	-1.119929	1734	Down same road in stop point 10
Stop point 11	34.727531	-1.124889	1819	Track in cane plantation
Stop point 12	34.692959	-1.136647	1517	Open area near swamp
Stop point 13	34.650143	-1.151154	1451	Swamp

Angle Point (AP) 3	34.648252	-1.151859	1451	Open area/farmland
Substation 2, Game	34.637537	-1.161339	1434	Bushland with open spaces

Discussion

Overall, based on the presence of number of archaeological assemblages of lithic artifacts, the surveys carried out along the project footprint area demonstrated that the area holds significant archaeological heritage resources. These archaeological artefacts occur along the project specific route and appear to have significant archaeological materials and sites, as they record important archaeological traces indicative of archaeological period hitherto unrecorded in the region. These include Early Stone Age (ESA) Middle Stone Age (MSA) and Later Stone Age (LSA) stone artefacts sites that are rare and/or not recorded among the archaeological occurrence of the areas along the Transmission Line route in the NMK database. The following recommendations, are therefore, offered to safeguard these and undocumented sites along the transmission line during the construction phase.

- The absence of a recorded or a well stratified archaeological site with dense concentration of artifacts is not an indication of the absence of sub-surface materials underground. A Chance Finds Procedure (CFP) should therefore be developed and provided to field crews during the crew induction. The CFP is a project specific document that aims to minimize damage to objects accidentally uncovered during the construction phase.
- Construction crew including machine operators, HSE personnel, site engineers, and surveyors must undergo an induction and regular training on the significance of archaeological heritage resources, how to identify such sites and features and how to report the occurrence of suspected archaeological material. It is recommended that the training be provided on a continuous basis.
- In the event of exposing human remains during construction, the matter will fall into the domain of National Museums of Kenya and will require a professional bio-archaeologist to undertake mitigation and rescue. Such work will also be at the cost of the developer.

Appendix V gives the full Archaeological Survey Report.

3.7: Baseline Noise Levels

Noise level assessment was carried out to determine ambient noise levels within the project area to be used as a baseline in assessing noise exposure levels during project implementation. The locations sampled coincided with water sampling points (to make it easy for KETRACO monitoring team) and areas close to relatively higher settlements.

A summary of the ambient noise level measurements (using Mastech Digital Sound Level Meter-MS6700 Series) at the selected sites is presented in the table below.

Table 3.4; Noise levels at selected locations of the TL

Area	GPS Coordinates UTM 37N (ARC 1960)		Minimum readings (dBA)	Maximum readings (dBA)
	X	Y		
Leporosi	706356	989046	32.4	47.5
Naboda	703803	988859	34.1	45.4
Osinoni	7007794	988622	36.2	48.3
Olenkii	700368	9884993	41.4	54.1
Nentekeny	699447	988102	33.0	39.5
Endonyo Narok	697679	987778	30.8	38.5
Moita	693009	9876192	31.2	40.7
Narolong	687849	9874735	35.6	43.9
Masurura	684050	9873222	37.3	50.1

Conclusion

The recommended noise limits to reduce hearing loss (occupational deafness) by International Labour Organization (ILO) and World Health Organization and The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009 are:

- 90dB (A) for 8 hours daily as the occupational exposure level (OEL), which most workers can continually be exposed to noise without developing occupational hearing loss in industries.
- For workshops and plant areas where occasional communication is required, the recommended limit is 65 - 85 dB (A).

Based on the results presented in the table above, the measured noise levels are within the permissible limits for construction sites as well as residential areas as provided for in EMCA (Noise and Excessive Vibration Pollution Control) Regulations, 2009.

It is recommended that, KETRACO, conduct bi-annual Noise level assessment to monitor noise levels generated by the proposed project and based on the above baseline, identify areas that need corrective action.

3.8: Land cover and land use

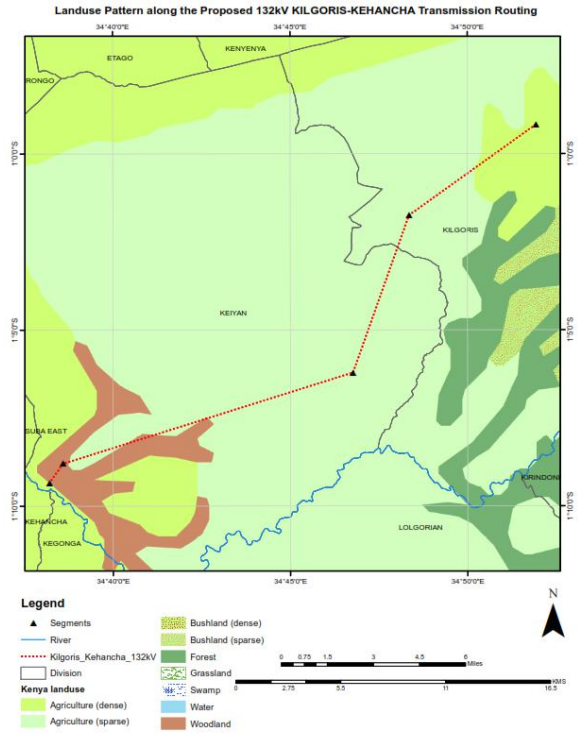


Figure .3.20: Land use patterns along the TL

Trans Mara, a sub-county of Narok County, covers 2,901Km^2. Rainfall is bi-modal with a maximum of 2300mm in the highlands and 700mm in the lowlands. The five wards of Trans-Mara comprise of Kiridon, Lolgorien, Kilgoris, Keyan and Pirrar and are all situated in the Trans Mara forest ecosystem, which comprise forest excisions to agricultural cropland. The major livelihoods are crop production in the highland divisions and livestock production in the lowlands, with 70% of the population engaged in agricultural related activities. Intensive agriculture, pastoralism and settlements are the major land uses in Trans Mara.

Land users include farmers, pastoralists, woodlot growers, and settlement.

CHAPTER 4: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

4.1: Introduction

Environmental impact assessment is a tool for environmental conservation and has been identified as a key component in new project implementation. According to section 58 of the Environmental Management and Coordination Act (EMCA) Cap 387, second schedule 9 (I), and Environmental (Impact Assessment and Audit) Regulation, 2003, both new and old projects must undergo Environmental Impact assessment and Audits. The report of the same must be submitted to National Environmental Management Authority (NEMA) for approval and issuance of the relevant certificates.

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

4.2: Environmental and Social policy

This ESIA has been prepared to fully comply with environmental and social safeguard policies and procedures as outlined in World Bank Operational Policy 4.01 and as per various regulations by National Environment Management Authority, in Kenya.

4.3: Relevant Kenya Policies, Plans and Strategies

The policies that are relevant to the proposed development project include the following:

4.3.1; Vision 2030

The Kenya Vision 2030 aims to transform Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. The blue print is based on three “pillars”; the economic, the social and the political. The adoption of Vision 2030 came after the successful implementation of the Economic Recovery Strategy for Wealth and Employment Creation (ERS) which has seen the country’s economy back on the path to rapid growth since 2002 when Gross Domestic Product (GDP) grew from a low of 0.6% and rising gradually to 6.1% in 2006, one of the foundations for Vision 2030 is infrastructure. The Vision aspires for a country firmly interconnected through a network of roads, power lines, railways, ports, airports, water and sanitation facilities, and

telecommunications. In this Vision to ensure that the main projects under the economic pillar are implemented, investment in the nation's energy sector is given the highest priority. The proposed development project will promote the economic growth of the locality and transport sector during construction and operation phases and help propel Kenya to a middle-income country as envisioned in the Vision 2030 development plan by developing the energy sector, one of the key target sectors in the plan.

4.3.2; The Big 4 Agenda

The Big 4 Agenda is a presidential directive on areas of key development to focus on for the period 2018 to 2022. The areas of focus and the agendas are as follows:

- Enhance manufacturing in the country from 9.2% to 20% of GDP by 2022
- Food security and nutrition through 100% food and nutrition security commitment
- Universal health coverage by scaling up NHIF uptake to 100%
- Affordable housing by implementing 500,000 new affordable homes

Access to affordable and reliable energy is a major contributor towards achieving the Big Four Agenda.

4.3.3; Policy Paper on Environmental and Development (Sessional Paper No. 6 of 1999)

This policy was formulated on the basis of the National Environment Action Plan (NEAP) process of 1994. The policy's major objective is to harmonize environmental and developmental concerns to ensure sustainability. Furthermore, this policy ensures that environmental issues are taken into consideration before the commencement of development policies, programmes, plans and projects. The proposed project is therefore consistent with the Sessional Paper No. 6 of 1999.

4.3.4; The National Energy Policy, 2018

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.

The policy address issues relating to;

- Petroleum and Coal,
- Renewable Energy,
- Electricity,
- Energy Efficiency and Conservation,
- Land, Environment, Health and Safety,
- Devolution and Provision of Energy Services, and

- Energy Financing, Pricing and Socio-Economic Issues;

The policy observes that, the Government will Support the development by KETRACO of new transmission lines, comprising of about 5,000km in the short term and 16,000 km by 2031 to enhance security, reliability and affordability of electricity supply. The proponent will therefore, be guided by this policy.

4.3.5; The Kenya National Climate Change Response Strategy

The purpose of this strategy is to put in place robust measures needed to address most of the challenges posed by climate variability and change through impact assessments and monitoring of various projects. According to Climate Change Projections, in this country we are likely to experience hotter drier sunny seasons, warmer wetter rainy seasons, rise in sea levels and an increase in extreme weather events. These climactic changes will impact on our daily lives and the buildings that we work and live in must be adapted to cope with such changes. With time both existing buildings and the construction of new buildings will have to adapt to cope with the conditions climate change may produce. A range of new ways to design, construct, upgrade and occupy buildings so that they are more energy efficient as well as resilient to threats such as flooding and drought is proposed.

In the construction sector, priority inclusion areas should include energy efficient innovations and technologies, and utilization of low-carbon appliances and tools; the utilization of eco-friendly energy resources such as wind, solar, biogas, small hydros, etc.; as well as possible utilization of biofuels.

4.3.6; The National Poverty Eradication Plan (NPEP) of 1999

The National Poverty Eradication Plan (NPEP) was formulated with an objective of reducing the high levels of poverty in Kenya by 50 percent by the year 2015, as well as to strengthen the capabilities of the poor and vulnerable groups to earn income. The plan also aimed at reducing gender and geographical disparities in order to create a healthy, better-educated and more productive population. The formulation of the plan was guided by the goals and commitments agreed during the World Summit for Sustainable Development (WSSD) of 1995. The plan therefore focuses on the delivery of four WSSD themes of poverty eradication; reduction of unemployment; social integration of the disadvantaged people and creation of an enabling economic, political, and cultural environment through development of transport and communication sector. The plan is implemented by the Poverty Eradication Commission (PEC) that was established in collaboration with various Government Ministries, bilateral and multilateral donors, the private sector, Community Based Organizations (CBOs) and Non-

Governmental Organizations (NGOs). The NPEP is relevant since the proposed project will create an enabling environment that will contribute immensely in the enhancement of economic growth in Kenya. The proposed project would also impact businesses, agricultural and tourism related activities that have great relevancy to poverty eradication in the country.

4.3.7; Environment and Development (Sessional Paper No. 6 of 1999)

The Kenya's policy paper on the Environment and Development was formulated in 1999. The policy defined approaches that will be pursued by the Government in mainstreaming environment into development. The policy harmonized environmental and developmental objectives with the broad goal of achieving sustainable development. The policy paper also provided guidelines and strategies for government action regarding environment and development. With regard to wildlife, the policy reemphasized government's commitment towards involving local communities and other stakeholders in wildlife conservation and management, as well as developing mechanisms that allow them to benefit from the natural resources occurring in their areas. The policy also advocated for the establishment of zones that allow for the multiple use and management of wildlife. This policy is relevant to the proposed development project in view of the potential impacts on the environment and involvement of the public in project planning.

4.3.8; The National Biodiversity Strategy of 2000

The National Biodiversity Strategy and Action Plan (NBSAP) was formulated in order to enable Kenya address national and international commitments defined in Article 6 of the Convention on Biological Diversity (CBD). The strategy is a national framework of action for ensuring that the present rate of biodiversity loss is reversed and present levels of biological resources are maintained at sustainable levels for posterity. The general objectives of the strategy are to conserve Kenya's biodiversity; to sustainably use its components; to fairly and equitably share the benefits arising from the utilization of biological resources among the stakeholders; and to enhance technical and scientific cooperation nationally and internationally, including the exchange of information in support of biological conservation. The proposed project will need to comply with the requirements of this strategy since the project may lead to loss of biodiversity in some sections along the proposed route.

4.3.9; The Land Policy (2007)

The Land Policy in Kenya is guided by the environmental management principles which are aimed at restoring the environmental integrity through introduction of incentives and encouragement of use of technology and scientific methods for soil conservation, among others. The policy further requires fragile ecosystems to be managed and protected by

developing a comprehensive land use policy bearing in mind the needs of the surrounding communities. The policy also requires zoning of catchment areas to protect them from degradation and establishment of participatory mechanisms for sustainable management of fragile ecosystems. The policy also called for development of procedures for co-management and rehabilitation of forest resources while recognizing traditional management systems and sharing of benefits with contiguous communities and individuals. Lastly, all national parks, game reserves, islands, front row beaches and all areas hosting fragile biodiversity are declared as fragile ecosystems under the policy.

The policy recognizes that sustainable management of land based natural resources depends largely on the governance system that defines the relationships between people, and between people and resources. To achieve an integrated approach to management of land-based natural resources, all policies, regulations and laws dealing with these resources need to be harmonized with the framework established by the Environmental Management and Coordination Act (EMCA) 1999.

The policy also addresses land management particularly in Section 3.4.3.2 on ecosystem protection (including wetlands). Measures for protection are required for fragile ecosystems. The policy also calls for the protection of watersheds, lakes, drainage basins and wetlands. The policy prohibits settlement and agricultural activities in water catchment areas and calls for identification, delineation and gazettement of all water courses and wetlands.

4.3.10; Wildlife Policy of 2011

The wildlife policy is aimed at promoting protection and conservation of wildlife in Kenya, both in protected and non-protected areas. The policy is implemented by the Kenya Wildlife Service (KWS). The proposed project will need to be consistent with this policy. Where wild animals will be disturbed during the construction and operation of the transmission line, appropriate mitigation measures must be implemented to minimize disturbance to wildlife.

4.3.11; Wetlands Policy of 2013

The wetlands policy is intended to promote protection of wetlands in Kenya. The policy sets out strategic measures for the protection of existing wetlands in Kenya. The proposed project has crossed some critical water bodies such as the Kandutura, Ayiam, Terienkwe, Nontoto, Nkengu Emuny, and Engare Narok Rivers, and Dams Nyeusi, Kaijeria, and Parariro . It would be important to undertake appropriate mitigation measures in order to minimize or avoid degradation of wetlands.

4.3.12; Physical Planning Policy

The current policy governs the development and approval of all building plans as provided for in the Physical Planning Act (Cap 286). The proposed project will be subjected to the provisions of this policy and legislation.

4.3.13; Public Health Policy of 2014

The public health policy calls upon the project proponents to ensure that buildings are adequately provided with utilities so that they are fit for human habitation. The workers camps must be provided with all amenities/utilities that are essential for safeguarding public health for all people using the facilities.

4.3.14; HIV/ AIDS Strategic Plan 2014/15-2018/19

The Kenya AIDS Strategic Framework 2014/15-2018/19, is the Strategic guide for the country's response to HIV at both national and county levels. The framework addresses the drivers of the HIV epidemic and builds on achievements of the previous country strategic plans to achieve its goal of contributing to the country's Vision 2030 through universal access to comprehensive HIV prevention, treatment and care. The vision of this strategic plan is to have A Kenya free of HIV infections, stigma and AIDS related deaths. The goal of the plan is to Contribute to achieving Vision 2030 through universal access to comprehensive HIV prevention, treatment and care. The objectives of the plan are: 1. Reduce new HIV infections by 75% 2. Reduce AIDS related mortality by 25% 3. Reduce HIV related stigma and discrimination by 50% 4. Increase domestic financing of the HIV response to 50%. The proponent must ensure that the project aligns itself towards the objectives of this plan.

4.3.15 Gender Policy of 2011

The purpose of the Gender Policy is to institutionalize The Kenya National Policy on Gender and Development (NPGD), within Gender, Children and Social Development. It articulates the policy approach of gender mainstreaming and empowerment of women at the ministry level. The policy seeks to have a society where women, men, children and persons with disabilities enjoy equal rights, opportunities and a high quality of life. This report has in depth addressed matters to do with gender and development.

4.4: KETRACO's Internal Policies and Guidelines

4.4.1; KETRACO Policy Frameworks

KETRACO with the assistance of the World Bank has developed a number of policy frameworks to guide the implementation of the Kenya Electricity System Improvement Project (KESIP). These policy frameworks have briefly been highlighted in the following chapters.

Environmental and Social Management Framework (ESMF)

The Environmental and Social Management Framework (ESMF) addresses the environmental and social impacts of the portion of the KESIP, that KETRACO will implement.

The ESMF sets out the principles, rules, guidelines, and procedures to assess the environmental and social impacts of KESIP subprojects. The main purpose of the ESMF is to:

- Establish clear procedures and methodologies for the environmental and social assessment, review, approval and implementation of investments to be financed under the project;
- Specify appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns related to project investments;
- Determine the training, capacity building and technical assistance needed to successfully implement the provisions of the ESMF; and
- Provide practical information resources for implementing the ESMF

Resettlement Policy Framework (RPF)

The development of the Resettlement Policy Framework (RPF) followed the World Bank's safeguard policy on Involuntary Resettlement (OP 4.12). OP 4.12 become applicable if projects involve physical displacement through acquisition of land for project activities, economic displacement, or restricted access to natural resources and assets that lead to loss of income sources or means of livelihood.

The RPF provides project stakeholders with the procedures to address the risks that may arise if successful implementation of a subproject requires economic or physical displacement of populations. It provides guidelines on how the projects will avoid, manage or mitigate all project related displacement risks.

The objective of the RPF is to establish the principles, procedures, entitlements and eligibility criteria, organizational arrangements, and provisions for monitoring and evaluation (M&E), the framework for stakeholder and PAPs participation, as well as the mechanisms for addressing grievances which will be applied to all KETRACO KESIP transmission subprojects.

Vulnerable and Marginalized Groups Framework (VMGF)

The VMGF describes the policy requirements and planning procedures that KESIP will follow during the preparation and implementation of its subprojects, especially those identified as occurring in areas where IPs/VMGs are present. It outlines the specific means of ensuring that the IPs/VMGs are given fair, prior and informed consultation before, during and after the project implementation.

The objective of the VMGF is to ensure that the management of issues related to IPs/VMGs is integrated into the KESIP transmission subprojects to ensure effective mitigation of potential adverse impacts while enhancing accrual of benefits for IPs/VMGs. The Framework provides information on:

- The types of investments likely to be proposed for financing under the project;
- The potential positive and adverse effects of such investments on IPs/VMGs;
- A plan for carrying out the SA for such investments;
- The process for preparing VMGPs;
- A framework for ensuring the Free Prior Informed Consent with the affected IPs/VMGs is obtained at each stage of project preparation and implementation;
- Institutional arrangements, including capacity building where necessary, for screening project-supported investments, evaluating their effects on IPs/VMGs, preparing VMGPs, and addressing any grievances;
- Monitoring and reporting arrangements, including mechanisms and benchmarks appropriate for the project; and
- Disclosure arrangements for VMGPs.

4.4.2; KETRACO Safety, Health and Environment (SHE) Policy

KETRACO has prepared a SHE Management System with the specific aim of complying with Occupational Safety and Health Act (OSHA), 2007; Environmental Management & Coordination Act, 1999; Energy Regulatory Board's Environment, Health and Safety Policy Framework for the Electric Power sub-sector, 2005; its internal SHE Policy and donor requirements.

4.4.3; KETRACO Route Selection Criteria

A. Criteria for Route Selection:

The route of a transmission line is decided from the following main considerations:

- Shortest length, hence least capital cost.
- Ease during construction and ease in maintenance of the line (route near roads for easy approach &accessibility).

- Requirement of future loads (substations) near the proposed route so that the line can be easily connected.
- Required separation distance from parallel communication lines (Communication, Railways, etc.) for meeting the conditions of induced voltage.
- Avoiding of forest areas as well as wild life sanctuaries.
- Cost of securing and clearing right of way (ROW).
- Maintaining statutory distances from Airports, Airstrips and Helipads.

The following areas are to be avoided as far as possible while selecting the route of the line:

- Tough inaccessible areas where approach is difficult.
- Towns and villages, leaving sufficient margin for their growth.
- Areas subject to floods, gushing streams during rainy seasons, tanks, ponds, lakes, etc. and natural hazards.
- Wooded areas with high trees or fruit bearing trees involving payment of heavy compensations for cutting of the trees.
- Swamps and shallow lands subject to flood, marshy areas, low lying lands, river beds, and earth slip zones, etc. involving risk to stability to foundations.
- High hillocks/hilly areas/sand dunes and areas involving abrupt changes in levels and requiring too many long spans.
- Series of irrigation wells.
- Rifle shooting areas and other protected areas such as army/defense installations and ammunition depots.
- Areas which involve risk to human life, damage to public & private properties, religious places, cremation grounds, quarry sites and underground mines, gardens, orchards and plantations.
- Areas which will create problems of right of way and wayleaves.
- Buildings/Storage areas for explosives or inflammable materials, bulk oil storage tanks, oil or gas pipelines.

Other points to consider include:

- The route of the transmission line shall, as far as possible, be the shortest length between the pre-determined substations.
- The route of the transmission line is to be so located that, as far as possible, it is protected from high winds and falling trees & branches. In hilly tracks, the line is to be routed, as far as possible, along the side of the hills or through valleys rather than over high points. However, a route of the line very close to steep slopes of hills be avoided as far as possible as there may be difficulty in obtaining lateral (side) clearance to

ground for conductors. Also, there may be overhanging/loose boulders which may roll down and damage the line.

- It is desirable to take the line as near the paths and roads as practicable without unduly increasing the length of the line so as to facilitate transportation of material during construction and the patrolling/maintenance of the line. Where the line cannot be routed near paths/roads economically, care shall be taken to see that easy access is possible at every 5 to 8 km. It shall be ensured that all angle/tension points are approachable to facilitate easy transportation of stringing equipment during construction and for maintenance/breakdowns.
- In hilly/mountainous type of terrain or in thickly populated areas, it is generally not advisable to attempt a direct route or try to locate towers in long spans. Small angles of a few degrees cost a little more and add little to the length of the line. Suspension towers (A - type) can be provided for line angles of up to 2 degrees and small angle towers (B - type) can be provided for angles up to 10 degrees.
- In general, large angles in the line are to be avoided wherever possible. The magnitude of the angle should be small as far as possible and should never be more than 60degrees.
- The line shall be aligned suitably so that it can be diverted/Looped In Looped Out (LILO) to cater for possible future loads/sub stations along the route.

B. Telecommunication, Electricity Distribution Lines, and Electric Fences:

The line route shall be so selected that the voltage induced in parallel running telephone/ communication/power lines/electric fences/signaling lines/circuits of the Communication does not exceed the prescribed permissible values under fault conditions. The Stakeholders approval should be obtained before energizing the line.

C. Approval of The Aviation Authorities:

The line route shall be at a sufficient distance from aerodromes/airports so that clearance from the KCAA is not required or, otherwise, can be obtained easily.

D. Crossing of Rivers/Roads:

- Crossing of rivers is preferably done at points where the bed is of the smallest width and the banks on both sides of the rivers are high. The crossing is done at points of the river path where it is unlikely to cut the banks when it is flowing. Towers must be spanned as far back from the riparian as is possible.
- The route is selected such that multiple crossings of the same road are avoided.
- Crossing of roads at very small angles is to be avoided.

- Approval of the Roads' Authority must be sought.

E. Crossing of Power Lines:

- When crossing existing higher voltage power lines, the new line shall normally be below such existing lines except in extremely limiting circumstances.
- When crossing existing lower voltage power lines, the new line shall normally be above such existing lines except in circumstances where it is not possible.
- When crossing existing power lines of the same voltage, the new line may be above or below such existing lines as per site conditions.

F. Approval of Forest Services:

- Forest area is to be avoided as far as possible.
- If forest area cannot be avoided, or if the line route is uneconomical in case forest area is avoided, then the approval of the Forest Department is required.

4.5: The National Legal Framework

4.5.1; The Constitution of Kenya

The Constitution of Kenya has taken on board various issues that are related to environmental management. Article 42 of the Bill of Rights contained in the Constitution provides that 'every Kenyan has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures. Chapter 5 of the Constitution is dedicated to land and the environment. The constitution requires that land be used and managed in a manner that is equitable, efficient, productive and sustainable. Part 2 of Chapter 5 of the constitution is dedicated to Environment and Natural Resources. Article 69 in Part 2 provides that the state shall encourage efforts towards sustainability of natural resources, increasing of the national forest cover, public participation in the management, protection and conservation of the environment, protection of genetic resources and biodiversity, Environmental Impact Assessment, Environmental Audit and Monitoring of the environment, etc.

4.5.2; Other Relevant National Environmental Legislations

Table 4.1; Kenyan environmental laws and regulations relevant to the Project.

No.	Legislation	Relevance	Trigger	Compliance
1.	The Environment Management and Co-ordination (EMCA), Cap 387 and the amendment to the Second Schedule (2019)	✓ The legislation advocates for environmental protection during project implementation and restoration of impacted environment. ✓ Section 58, subsection 1 – Requires that before a project is executed, an ESIA Report must be prepared and submitted to the Authority (NEMA) in a prescribed form. ▪ Subsection (7); ESIA shall be conducted in accordance with the ESIA regulations, guidelines and procedures issued under the EMCA. ▪ EMCA Part V Section 50 - The Authority shall, in consultation with the relevant lead agencies (including Ministry of Wildlife & Tourism KWS) prescribe measures necessary to ensure the conservation of biological diversity in Kenya. ✓ EMCA, Section 72, 74,75, and 76 deals with water pollution, and prohibition and license to discharge effluent ✓ EMCA, Section 91 and 94 deals with the classification of wastes, handling and their management ✓ EMCA, Section 107 provides standards for the control of noxious smell ✓ EMCA, Part XIII, Section 142 (1) says that any Person who– ▪ Discharges any dangerous materials, substances, oil, oil mixtures into land, water, air or aquatic environment; ▪ Pollutes the environment; ▪ Discharges any pollutant into the environment Commits an offence and shall on conviction, be liable to a fine not less than two million shillings.	✓ Project has the potential to affect the physical and biological environment including soil, water, air, flora and fauna during construction.	✓ The execution of an ESIA Study in compliance with regulations has been commissioned. ✓ The ESIA Report has provided an Environmental and Social Management Plan (ESMP) that will be followed by the contractor to mitigate identified project impacts and implement monitoring activities.
2.	The Environment (Impact Assessment and Audit) Regulations, 2003 (Rev. 2019)	✓ The Regulation provides the guidelines that have been established to govern the conduct of environmental assessments and environmental audits in Kenya. ✓ The legislation provides guidance on project impact categorization into low, medium and high risks and implementation of appropriate environmental and social impact assessments. ✓ Section 4 (1) says no proponent shall implement a project that (a) is likely to have a negative environmental impact; or (b) for which an environmental impact assessment is required under the Act or these Regulations unless an environmental impact assessment has been concluded and approved in accordance with these Regulations, ✓ Part III describes the ESIA Study Process, Part IV describes the contents of an ESIA Study Report and Part V elaborates on environmental audit and monitoring. ✓ The regulations provide guidelines on preparation of ESIA Project Report ✓ The EMCA, Cap 387 requires that during the ESIA process a proponent shall in consultation with the Authority seek views of persons who may be affected by the project or activity through posters, newspaper, radio and public meetings with the affected parties and communities.	✓ Being a high voltage transmission line, the proposed project is anticipated to have significant environmental, social, economic and cultural impacts. The proposed project must therefore be subjected to a full ESIA study.	✓ This Study is aimed at ensuring compliance of these regulations. The study has collected information on project design, the relevant baseline data, conducted an elaborate public consultation process and created an Environmental and Social Management Plan (ESMP) and a monitoring plan (ESMoP) that if implemented will ensure conservation and protection of environment and improved livelihoods. ✓ The proponent will be required not to start the

No.	Legislation	Relevance	Trigger	Compliance
				project until an ESIA License has been issued. ✓ The study envisage annual environmental audits by the proponent.
3.	Environmental Management and Co-ordination (Water Quality) Regulations, 2006	✓ The Regulations observe that, every person shall refrain from any act which directly or indirectly causes, or may cause immediate or subsequent water pollution, and it shall be immaterial whether or not the water resource was polluted before the enactment of the Act. It further observes that, no person shall throw or cause to flow into or near a water resource any liquid, solid or gaseous substance or deposit any such substance in or near it, as to cause pollution. It goes on to state that, no person shall: 1. Discharge, any effluent from sewage treatment works, industry or other point sources into the aquatic environment without a valid effluent discharge license issued in accordance with the provisions of the Act. 2. Abstract ground water or carry out any activity near any lakes, rivers, streams, springs and wells that is likely to have any adverse impact on the quantity and quality of the water, without an Environmental Impact Assessment license issued in accordance with the provisions of the Act; or 3. Cultivate or undertake any development activity within a minimum of six meters and a maximum of thirty meters from the highest ever recorded flood level, on either side of a river or stream, and as may be determined by the Authority from time to time.	✓ The proposed project will have potential to contaminate water resources that it will traverse. Water resources along the TL corridor include; Rivers Enkare Ngetwa, Naboda, Enkare Enesoit, Kapnor, Enkir Kor, Ole Katuna/Endonyo Narok, Moita, Ndiiru, Narolong, and Enkare Ibi stream	✓ KETRACO shall ensure tower foundations are not located near or next to the afore-mentioned water resources and definitely not on their riparian zones. ✓ The contractor will not be allowed to abstract water from water resources in the project area without approval of the community and relevant authorities. ✓ The contractor shall avoid motor vehicles crossing rivers and streams from undesignated points to only use existing bridges or designated crossing points. ✓ The contractor shall put measures to prevent siltation of water resources ✓ The contractor shall provide mobile toilets to avoid Leachates from open defecation by project workers contaminating the water resources ✓ The contractor shall enact solid waste management to reduce or completely stop

No.	Legislation	Relevance	Trigger	Compliance
				contamination of water systems by solid waste ✓ Baseline water quality of these water resources have been identified and KETRACO should, during construction phase, periodically monitor it to ensure they are not contaminated.
4.	Environmental Management and Co-ordination (Waste management) Regulations, 2006	✓ This Regulation define rules for the management of waste in general and for the management of solid waste, industrial waste, hazardous waste, pesticides and toxic substances, biomedical waste and radioactive substances in particular. ✓ The regulation observes that; 1. No person shall dispose of any waste on a public highway, street, road, recreational area or in any public place except in a designated waste receptacle. 2. Any person whose activities generate waste shall collect, segregate and dispose or cause to be disposed of such waste in the manner provided for under these Regulations. 3. Without prejudice to the foregoing, any person whose activities generates waste has an obligation to ensure that such waste is transferred to a person who is licensed to transport and dispose off such waste in a designated waste disposal facility. 4. Any person whose activities generate waste, shall segregate such waste by separating hazardous waste from non-hazardous waste and shall dispose of such wastes in such facility as is provided for by the relevant Local Authority. 5. Any person who owns or controls a facility or premises which generates waste shall minimize the waste generated by adopting the cleaner production principles.	✓ Implementation of the proposed transmission line project will result in generation of various forms of waste including wood, cement bags, paper, metals, plastic, dredged materials, coarse and fine aggregates, etc.	✓ The contractor shall; ✓ Provide waste receptacles for collecting waste and shall ensure waste is segregated. ✓ Contract a NEMA registered waste handler to collect and dispose of waste at designated sites ✓ Ensure updated waste tracking sheets are maintained for collected waste. ✓ Implement sustainable waste management principles of reduction, reuse and recycling. ✓ Provide mobile toilets for construction workers to manage human waste. ✓ Sensitize construction workers on best waste management practices
5.	Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution Control) Regulations, 2009	✓ The regulations observe that, except as otherwise provided in the Regulations, 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. ✓ In determining whether noise is loud, unreasonable, unnecessary or unusual, the following factors may be considered: ▪ Time of the day; ▪ Proximity to residential area; ▪ Whether the noise is recurrent, intermittent or constant; ▪ The level and intensity of the noise;	✓ Construction equipment, vehicles and other construction activities have potential to cause noise pollution and excessive vibrations.	KETRACO will ensure the contractor; ✓ Provides ear protection (earmuffs and ear plug) to employees working in areas with high noise levels. ✓ Ensure machines and equipment are dully serviced and inspected to reduce noise emission

No.	Legislation	Relevance	Trigger	Compliance
		▪ Whether the noise has been enhanced in level or range by any type of electronic or mechanical means; and, ▪ Whether the noise is subject to be controlled without unreasonable effort or expense to the person making the noise. ✓ These regulations also relate noise to its vibration effects and seek to ensure that the level of noise causes no harmful vibrations. Any person(s) intending to undertake activities in which noise is suspected to be injurious or endangers the comfort, repose, health or safety of others and the environment, must make an application to NEMA and acquire a license		✓ Restrict construction work to day time hours only ✓ Sensitizes drivers against unnecessary hooting and vehicle idling. ✓ Baseline noise levels of various points within the transmission line have been given and KETRACO should, during construction phase, periodically monitor it to ensure they are not exceeded.
6.	Environmental Management and Co-ordination (Air Quality) Regulations, 2014	✓ The objective of these Regulations is to provide for the prevention, control and abatement of air pollution to ensure clean and healthy ambient air. The regulations observe that; 1. No person shall- a. Act in a way that directly or indirectly causes, or is likely to cause immediate or subsequent air pollution; or b. Emit any liquid, solid or gaseous substance or deposit any such substance in levels exceeding those set out in the First Schedule. c. No person shall cause emission of the priority air pollutants prescribed in the Second Schedule to exceed the ambient air quality limits prescribed in the First Schedule. 2. No person shall cause emission of the priority air pollutants prescribed in the Second Schedule to exceed the ambient air quality limits prescribed in the First Schedule. 3. No person shall cause the Ambient Air Quality levels specified in the First Schedule of these Regulations to be exceeded. 4. No person shall cause or allow particulate emissions into the atmosphere from any facility listed under the Fourth Schedule to these Regulations in excess of those limits stipulated under the Third Schedule. 5. Any person, being an owner of premises, who causes or allows the generation, from any source, of any odour which unreasonably interferes, or is likely to unreasonably interfere, with any other person's lawful use or enjoyment of his property shall use recognized good practices and procedures to reduce such odours to a level determined by the odour panel, including any guidelines published by the Authority for reducing odours.	✓ Operation of construction equipment, movement of vehicles, excavation, and use of cement may result in dust and exhaust emissions during construction phase of the project	KETRACO will ensure the contractor; ✓ Restricts burning of waste on site ✓ Regularly services vehicles and machines to reduce gaseous emissions ✓ Regularly sprinkle water in dusty sections to suppress dust emission ✓ Provides dust masks for workers working in dust prone sections
7.	Environmental Management and Coordination (Conservation of	✓ The regulations observe that; 1. A person shall not engage in any activity that may- a. have an adverse impact on any ecosystem; b. lead to the introduction of any exotic species; c. lead to unsustainable use of natural resources,	✓ The project travels areas of ecological importance such as, woodlands, and riparian zones	✓ KETRACO has commissioned an ESIA study for the proposed project that has identified the baseline conditions of the ecosystems

No.	Legislation	Relevance	Trigger	Compliance
	Biological Diversity and Resources, Access to Genetic Resources, and Benefit Sharing) Regulations, 2006.	✓ Without an Environmental Impact Assessment License issued by NEMA.		and formulated a plan for their protection and conservation.
8.	The Occupational Safety and Health Act, No. 15 of 2007	✓ This is an Act of Parliament to provide for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for the establishment of the National Council for Occupational Safety and Health and for connected purposes. Of importance to the proposed project are: ➢ Registration of workplaces ➢ Health General Provisions (including cleanliness, overcrowding, ventilation, lighting, drainage of floors, and sanitary conveniences) ➢ Safety General Provisions (including ladders, ergonomics at the workplace, Fire prevention, safety provisions in case of fire, evacuation procedures) ➢ Welfare General Provisions (including supply of drinking water, washing facilities, accommodation for clothing, facilities for sitting, and first-aid) ➢ Prevents employment of children in workplaces where their safety and health is at risk. ➢ Encourages entrepreneurs to set achievable safety targets for their enterprises. ➢ Promotes reporting of work-place accidents, dangerous occurrences and ill health with a view to finding out their causes and preventing of similar occurrences in future. ➢ Promotes creation of a safety culture at workplaces through education and training in occupational safety and health. ➢ Provision of safety gear (PPE) where hazards are anticipated.	✓ The construction sites for the proposed project will be places of work with construction workers. The workplaces will have occupational hazards and risks that could result to injuries to workers.	KETRACO will ensure that; ✓ The site (s) are dully registered as workplaces ✓ Health and safety committees are constituted and dully trained ✓ Statutory inspection of all equipment is done ✓ Statutory trainings are conducted ✓ All workers/visitors are provided with appropriate PPE ✓ Workers are covered by an insurance in case of work-related injuries/illness ✓ Fully equipped first aid kit and trained first aider are available on site always ✓ Firefighting equipment have been provided ✓ Material Safety Data Sheets are maintained on site ✓ Accidents, incidents and near misses are documented ✓ Accident investigations are conducted
9.	The Work Injury Benefits Act, 2007	✓ This Act provides for compensation to employees for work related injuries and disease contracted in the course of their employment and for connected purposes. Key sections of the Act include the obligations of employers; right to compensation; reporting of accidents; compensation; occupational diseases; medical aid etc.	✓ Construction activities will have potential to cause injuries/ health hazards to	KETRACO and the Contractor will ensure that; ✓ Workers are covered by an insurance policy for work related injuries

No.	Legislation	Relevance	Trigger	Compliance
			construction workers.	✓ Accidents, incidents and near misses are documented ✓ Accident investigations are conducted ✓ Workers undergo induction before employment and medical examination
10	Energy Act 2019	✓ This is an Act of Parliament to consolidate the laws relating to energy, to provide for National and County Government functions in relation to energy, to provide for the establishment, powers and functions of the energy sector entities; promotion of renewable energy; exploration, recovery and commercial utilization of geothermal energy; regulation of midstream and downstream petroleum and coal activities; regulation, production, supply and use of electricity and other energy forms; and for connected purposes. ✓ Section 7-8 of this Act states that it the obligation of the government to provide energy in all areas of the country and promote energy investments. ✓ Section 117 states "any person who wishes to carry out generation, exportation, importation, transmission, distribution and retail supply of electricity, must apply for a license from the Authority" ✓ The Act, also established the Energy and Petroleum Regulatory Authority (EPRC) whose mandate is to regulate all functions and players in the Energy sector. One of the duties of the EPRC is to ensure compliance with Environmental, Health and Safety Standards in the Energy Sector, as empowered by Section 98 of the Energy Act, 2006. In this respect, the following environmental issues will be considered before approval is granted: ▪ The need to protect and manage the environment, and conserve natural resources; ▪ The ability to operate in a manner designated to protect the health and safety of the project employees; the local and other potentially affected communities. ✓ Section 27 and 28 under this Act requires that an application be made before the transmission and supply of bulk energy. Licensing and authorization to generate and transmit electrical power must be supported by an Environmental and Social Impact Assessment (ESIA) Report approved by NEMA. ✓ Article 177 gives obligation to the transmission licensee to make compensation to the owner or occupier of any land or the agents, workmen or servants of the owner or occupier of any land which is the subject of the provisions of the Act, for damage or loss caused by the exercise or use of any power or authority conferred by this Act or by any irregularity, trespass or other wrongful proceeding in the execution of this Act or by the loss or damage or breaking of any energy infrastructure or by reason of any defect in such infrastructure. ✓ Article 179, gives the Cabinet Secretary for Energy Authority for compulsory acquisition of land for purposes of constructing, modifying or operating any energy infrastructure or for incidental purposes where reasonable attempts to acquire the land had failed	✓ The proposed project is an energy investment project that aims to make electricity accessible to people in the proposed project area and its environs. ✓ KETRACO is a player in the energy sector and regulated by EPRA	✓ KETRACO has applied for and obtained a high voltage power transmission license from EPRA. ✓ The proponent has commissioned an ESIA study for the proposed project ✓ The proponent will be required to implement the ESMP and ESMoP developed and any other conditions that may be issued by NEMA.

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11	The Wildlife Conservation and Management Act No. 47 of 2013 (Revised 2014)	✓ This is an Act of Parliament to provide for the protection, conservation, sustainable use and management of wildlife in Kenya. Section 19 elaborates on the functions of the County Wildlife Conservation and Compensation Committees that includes undertaking education, extension services and public awareness. Section 26(1) stipulates that the provisions of this Act with respect to conservation, protection and management of the environment shall be in conformity with the provisions of the Environmental Management and Coordination Act, CAP 387. Section 28 says that Water Act shall apply without exception. Section 29 emphasizes requirement for Sustainable use of land. Section 30 prohibits any activity which is likely to have adverse effects on the environment, including the seepage of toxic waste into streams, rivers, lakes and wetlands. Section 31 provides for declaration of protected areas by the Cabinet Secretary. Section 46 provides for Protection of endangered and threatened ecosystems. Section 47provides for listing of endangered and threatened species and amendment of the list from time to time. Section 89 provides offences relating to pollution of designated wildlife areas and section 92 provides offences relating to endangered and threatened species. ✓ Subject to section 45 (1) No person shall mine or quarry in a national park without the approval and consent of Kenya Wildlife Service (KWS). Where this is approved an ESIA license shall be mandatory. Section 89 (1) provides that any person who: - ➢ discharges any hazardous substances or waste or oil into a designated wildlife area contrary to the provisions of this Act and any other written law; ➢ pollutes wildlife habitats and ecosystems; ➢ discharges any pollutant detrimental to wildlife into a designated wildlife conservation area contrary to the provisions of this Act or any other written law, commits an offence and shall be liable upon conviction to a fine of not less than two million shillings or to imprisonment of not less than five years or to both such fine and imprisonment. ✓ Section 93 stipulates that any person who: - ➢ knowingly introduces an invasive species into a wildlife conservation area; or ➢ Fails to comply with the measures prescribed by the Cabinet Secretary set out under this Act, commits an offence and shall be liable upon conviction to a fine of not less than three hundred thousand shillings or to imprisonment of not less than one year or to both such fine and imprisonment.	✓ Though the proposed project will not traverse designated wildlife habitats, it will pass through wooded and bushy areas and plantation forest that may have small wildlife.	The contractor shall; ✓ Prohibit his workers from poaching/hunting of wildlife and shall charge violators in a court of law. ✓ Ensure no invasive species is introduced into the wildlife habitats ✓ Avoid discharging any waste, oil, or any other pollutant into the wildlife habitats ✓ Schedule construction activities to avoid breeding and nesting seasons for any critically endangered or endangered wildlife species. ✓ Apply selective vegetation clearing to minimize loss of fodder for wildlife and natural habitats. ✓ Impose speed limits in the wild areas and on highways where wildlife concentration is high ✓ Liaise with KWS while working in wildlife habitats.
12	National Museums and Heritage Act No. 6 of 2006, Revised 2012	✓ This law provides for the establishment, control, management and development of national museums and the identification, protection and conservation of cultural and natural heritage of Kenya. ✓ Section 30 states "Where a person discovers a monument or object of archaeological or paleontological 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. ✓ According to section 43 (1) A monument which is for the time being owned by the National Museums, or under the guardianship of the National Museums, shall be	✓ Though no archaeology was identified, the proposed transmission line may traverse areas of cultural or national l heritage with objects of archaeological or	✓ KETRACO shall liaise with National Museums of Kenya to determine presence of archeological or paleontological sites along the line route. ✓ In case of a chance find, the contractor/KETRACO stop the works in that location and notify the National

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		properly maintained by the National Museums, except so far as its maintenance is, by such guardianship or agreement the responsibility of the owner of the monument or of any other person.(3) When any such monument or any part thereof is used periodically for religious observances, the National Museums shall make due provision for the protection of the monument from pollution or desecration (a) by prohibiting entry therein, except in accordance with by-laws made with the concurrence of the persons in religious charge of the monument or part thereof, of any person not entitled so to enter by the religious usage of the sect or community by which the monument or part thereof is used; or (b) by taking such other action the National Museums deems necessary. ✓ As per section 57 (1), the Minister may by notice in the *Gazette* appoint persons recommended by the National Museums to be heritage wardens for the purpose of enforcing this Act. A heritage warden appointed under subsection (1) may, with leave of the Attorney-General be appointed prosecutor for purposes of prosecuting offences committed under this Act	paleontological interest.	Museums of Kenya for further directions
13	Forest Conservation and Management Act No. 34 of 2016	✓ An Act of Parliament to give effect to Article 69 of the Constitution with regard to forest resources; to provide for the development and sustainable management, including conservation and rational utilization of all forest resources for the socioeconomic development of the country and for connected purposes. The Act applies to all forests on public, community and private lands. ✓ According to section 3, the Act shall apply to all forests on public, community and private lands. ✓ Section 4 give the principles of this Act as: ➢ good governance in accordance with Article 10 of the Constitution; ➢ public participation and community involvement in the management of forests; ➢ consultation and co-operation between the national and county governments; ✓ Section 21 outlines the forestry functions of County Governments. Each County Government: ➢ shall manage all forests on public land defined under Article 62(2) of the Constitution; ➢ shall promote afforestation activities in the county; ➢ shall advice and assist communities and individuals in the management of community forests or private forests; ➢ may enter into joint management agreements with communities or individuals for the management of community forests or private forests. ✓ As per section 42all indigenous forests and woodlands shall be managed on a sustainable basis for purposes of: ➢ conservation of water, soil and biodiversity; ➢ riparian and shoreline protection; ➢ cultural use and heritage; ✓ Section 44 avers that	✓ The transmission line will pass through wooded and bushy areas	✓ ESIA Study has already been Commissioned ✓ KETRACO will liaise with KFS while working in forest and bushy areas ✓ Cutting of trees will only be done where necessary and compensation of cut trees will be done according to KFS rates. ✓ KETRACO will ensure measures are taken to rehabilitate disturbed sites by replacing trees and natural vegetation where appropriate. ✓ KETRACO in consultation with KFS will assist the communities engage in tree planting drives especially in schools ✓ KETRACO to comply with ESIA recommendations on protection of Sacred and Cultural sites and protected/threatened flora species.

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		➢ Where the Service is satisfied that utilization of a public forest can be done through the granting of a concession, the Service shall grant the concession subject to the provisions of the Constitution, this Act and any other relevant written law. ➢ The Service shall not recommend any such proposal unless: the proposal has been subjected to an independent environmental impact assessment; and public consultation in accordance with the Second Schedule has been undertaken and completed. ✓ According to section 64 (1), except under a license or permit or a management agreement issued or entered into under this Act, no person shall, in a public or provisional forest fell, cut, take, burn, injure or remove any forest produce. ✓ Section 75. No. 9 of 1999 to apply (1) where a provision of this Act requires a person to conserve or protect the environment, the relevant provisions of the Environmental Management and Co-ordination Act, 1999, shall also apply with respect to the manner in which the conservation or protection shallproceed.(3)AuserorotherrelatedrightshallnotbegrantedunderthisActwherethe requirement for a strategic environmental, cultural, economic and social impact assessment license under the Environmental Management and Co-ordination Act, Cap 387, has not been complied with.		
14	National Land Commission Act, 2012	✓ An Act of Parliament to make further provision as to the functions and powers of the National Land Commission, qualifications and procedures for appointments to the Commission; to give effect to the objects and principles of devolved government in land management and administration, and for connected purposes. Sections 5 outlines the functions of the Commission while section 6 gives the powers of the commission. ✓ The Commission can initiate investigations into present or historical land injustices, recommend appropriate redress, monitor and have oversight responsibilities over land use planning throughout the country.	✓ The Commission will be key in wayleave acquisition for the project.	✓ KETRACO will ensure land acquisition and way leave acquisition is done according to the provisions of this act. ✓ KETARCO will liaise with National Land Commission to determine land owners whose land is affected by the project and for compensation procedures.
15	Land Registration Act No. 3 of 2012	✓ This is an Act of Parliament to revise, consolidate and rationalize the registration of titles to land, to give effect to the principles and objects of devolved government in land registration, and for connected purposes. ✓ Section 34 states that “A person who requires an official search in respect of any parcel, shall be entitled to receive particulars of the subsisting entries in the register, certified copies of any document, the cadastral map, or plan filed in the registry upon payment of the prescribed fee” ✓ Section 98 gives conditions for creation of an easement, while sections 99 and 100 talk about cancellation, extinguishment, and enjoyment of easements and analogous rights ✓ The act requires that proper marking and maintenance of boundaries. With regard to the maintenance of boundaries, the Act requires every proprietor of land to maintain in good order the fences, hedges, stones, pillars, beacons, walls and other features that demarcate the boundaries, pursuant to the requirements of any written law.	✓ The proposed TL will traverse private land. People whose land is traversed by the project will need to be verified, compensated, and an easement registered in their title deeds.	✓ A RAP study has been commissioned. ✓ KETRACO will conduct land searches with County Land Registrar for all affected land parcels to determine the land owners before compensating them. ✓ KETRACO will register easement on title deeds of all PAPs.

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16	Land Act 2012	✓ An Act of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources, and for connected purposes ✓ 19. (1) The Commission shall make rules and regulations for the sustainable conservation of land based natural resources. ✓ Section 107 (7) Says for the purposes of sections 110 to 143, interested, persons shall include any person whose interests appear in the land registry and the spouse or spouses of any such person, as well as any person actually occupying the land and the spouse or spouses of such person. ✓ Section 110. (1) Says that land may be acquired compulsorily under this part if the Commission certifies, in writing, that the land is required for public purposes or in the public interest as related to and necessary for fulfillment of the stated public purpose. ✓ Section 126. Says if the Commission is satisfied that any land of which the occupation or use has been secured under this Part is needed solely as a means of access to other land, then— (b) the compensation to be paid under section 120 shall be limited to the damage done to trees, plants, growing crops and permanent improvements on the land, together with a periodical sum for diminution in the profits of the land and of adjoining land by reason of that use. ✓ Section 146, Says the Commission (National Land Commission) may, create a right of way which shall be known as public right of way. ✓ Section 148 (1) Subject to the provisions of this section, compensation shall be payable to any person for the use of land, of which the person is in lawful or actual occupation, as a communal right of way and, with respect to a wayleave, in addition to any compensation for the use of land for any damage suffered in respect of trees crops and buildings as shall, in cases of private land, be based on the value of the land as determined by a qualified valuer.	✓ Restriction of use of land taken up by the transmission line (30m wide for a distance of 100km). The project will reduce the use of the land occupied by the TL.	✓ KETRACO has commissioned a RAP to determine affected land, crops and structures and their value. ✓ KETRACO will ensure all project affected persons are compensated for wayleave acquired as well as crops and structures affected by the project. ✓ KETRACO will ensure way leave acquisition is done according to the provisions of this act.
17	Land Value Index Act (Amendment) Act, 2018	This Act states that valuation of land for purposes of compensation shall be based on the Land Value Index which is an analytical representation showing the spatial distribution of land values in a given geographical area at a specific time. This is to be developed jointly by the National Government and County Government. The Act also clearly stipulates that compensation relating to compulsory acquisition shall not be paid to a public body unless there is a demonstrable inference that the land was purchased and developed by that public body. Apart from monetary compensation, the following new forms of compensation have been introduced under the Act: ✓ Allocation of an alternative parcel of land of equivalent value and comparable geographical location and land use to the land compulsorily acquired; ✓ Issuance of government bond; ✓ Grant or transfer of development rights as may be prescribed; ✓ Equity shares in a government-owned entity; and ✓ Any other lawful compensation. The owner whose land has been compulsorily acquired shall elect the form of compensation.	✓ The proposed project involves valuation of land for purposes of compensation.	✓ KETRACO will ensure the land valuation is done according to the provisions of this Act. ✓ KETRACO will also ensure that the compensation process align with the Land Value Index Act, 2018

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		The Act establishes the Land Acquisition Tribunal which shall hear disputes related to the compulsory land acquisition process and in determining such disputes, confirm, vary or quash the decision of the NLC. Previously, disputes were referred to the Environment and Land Court (ELC). However, following the passing of this Act, the Tribunal has first instance jurisdiction to hear such disputes with the ELC exercising appellate jurisdiction. Provision is made for Compensation for occupants in good faith of acquired land who may not hold titles having met certain criteria such as they must have occupied the land twelve years prior to publication of notice. An occupant in good Faith does not include a person unlawfully occupying land.		
18	Kenya Roads Act 2007	✓ An Act of Parliament to provide for the establishment of the Kenya National Highways Authority, the Kenya Urban Roads Authority and the Kenya Rural Roads Authority, to provide for the powers and functions of the authorities and for connected purposes. ✓ Section 49 (1) prohibits erection, construction of any structure on or over or below the surface of a road reserve without approval from the relevant Road Authority.	✓ The proposed transmission line will pass over roads including; Kilgoris-Awendo, Kilgoris-Nentekeny, Moita-Narolong, and Narolong-Kehancha	✓ KETRACO will consult the relevant Road Authorities (KeNHA, KeRRA and KURA) to seek approval before passing the transmission line over roads and road reserves.
19	Public Roads and Roads of Access Act Cap. 399 (Revised Edition 2010)	✓ The legislation provides for appropriate governance on development and use of public roads and roads of access. ✓ The Act advocates for notification and seeking permission for construction of Roads of Access from land owners; ✓ Section 10requires that notice is served on land owners affected by the road project. ✓ Section 11 elaborates on granting of leave to construct road of accesssubjecttosuchconditionsandtopaymentofsuchcompensationinrespectofanygrowing crops or permanent improvements damaged or destroyed by the construction of such road of access	✓ The Construction and Operation activities of the Transmission project will require access roads within the project area. The access roads will pass through private property	✓ KETRACO to ensure contractor acquire land for access roads as per these regulations and apply proposed mitigation measures provided in this ESIA Study Report to minimize impact and inconvenience to project area community
20	Water Act No. 43 of 2016	✓ An Act of Parliament to provide for the regulation, management and development of water resources, water and sewerage service; and for other connected purposes. This Act provides for the regulation, management and development of water resources and water and sewerage services in line with the Constitution. Authorities shall, in administering or applying this Act, be guided by the principles and values set out in Articles 10, 43, 60, and 232 of the Constitution. It establishes the Water Resources Authority ("Authority"), the National Water Harvesting and Storage Authority, the Water Services Regulatory Board, the Water Sector Trust Fund and the Water Tribunal. Section 36 provides that a permit is required for any of the following purposes; ➢ Any use of water from a water resource, except as provided by section 37; ➢ The drainage of any swamp or other land; ➢ The discharge of a pollutant into any water resource; and	✓ Construction phase of the project will have potential to affect underground and surface water resources.	✓ The contractor shall be prohibited to abstract water from water resources without a permit. ✓ Contractor shall be restricted to discharge any form of pollutant into water resources. ✓ Contractor shall create awareness among workers on water resource conservation.

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		➢ Any other purpose, to be carried out in or in relation to a water resource, which is prescribed by Regulations made under this Act. ✓ Section 143. A person shall not, without authority conferred under this Act (a) willfully obstruct, interfere with, divert or obstruct water from any watercourse or any water resource, or negligently allow any such obstruction, interference, diversion or abstraction; or (b) throw, convey, cause or permit to be thrown or conveyed, any rubbish, dirt, refuse, effluent, trade waste or other offensive matter or thing into or near to any water resource in such manner as to cause, or be likely to cause, pollution of the water resource. ✓ Section 144. (1) Without prejudice to any other remedy or course of action, if a person contravenes any provision under this Act, then, the Authority, the Regulatory Board, the county government executive concerned or the licensee concerned may, by order served on the person concerned, require that person within a reasonable time specified in the order to remedy the contravention and in particular (a) to clean up any pollution or make good any other harm identified in the order which was caused to any water resource by reason of the contravention		
21	The Physical Planning Act No.6 of 1996 Revised 2012	✓ An Act of Parliament to provide for the preparation and implementation of physical development plans and for connected purposes. The Act provides for implementation of regulated development through preparation of physical development plans while taking into account potential environmental impacts. Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. Section 31 states,"(1) Any person requiring a development permission shall make an application in the form prescribed in the Fourth Schedule, to the clerk of the local authority responsible for the area in which the land concerned is situated". Section 36 states "If in connection with a development application a local authority is of the opinion that proposals for industrial location, dumping sites, sewerage treatment, quarries or any other development activity will have injurious impact on the environment, the applicant shall be required to submit together with the application an environmental impact assessment report".	✓ The proposed project has potential to interfere with Physical planning designs of the areas it traverses.	✓ KETRACO shall apply for development permission and share project designs and line routes with relevant physical planning departments to ensure it does not affect physical planning designs in the proposed project areas. ✓ KETRACO has commissioned this Environmental Social Impact Assessment Study to determine potential environmental impacts of the project and provide mitigation measures.
22	Employment Act No 11 of 2007 Revised 2017	✓ An Act of Parliament to repeal the Employment Act, declare and define the fundamental rights of employees, to provide basic conditions of employment of employees, to regulate employment of children, and to provide for matters connected with the foregoing. ✓ ✓ 4(1) No person shall use or assist any other person in recruiting, trafficking or using forced labour. ✓	✓ There will be employment opportunities for skilled, unskilled and semiskilled people during construction and operation phases of the proposed project.	✓ The contractor will be prohibited from using forced labour during project implementation. ✓ The contractor shall ensure there is no form of discrimination against any worker during construction phase of the project.

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		✓ 5(3) No employer shall discriminate directly or indirectly, against an employee or prospective employee or harass an employee or prospective employee— (a) on grounds of race, colour, sex, language, religion, political or other opinion, nationality, ethnic or social origin, disability, pregnancy, mental status or HIV status; (b) in respect of recruitment, training, promotion, terms and conditions of employment, termination of employment or other matters arising out of the employment. ✓ ✓ Section 6 of the act prohibits any form of sexual harassment at the workplace. ✓ ✓ 53 (1) Notwithstanding any provision of any written law, no person shall employ a child in any activity which constitutes worst form of child labour.		✓ Sexual harassment will be strongly prohibited and will be chargeable in a court of law. ✓ The contractor shall not use child labour (workers below 18 years).
23	✓ HIV and AIDS Prevention and Control Act No. 14 of 2006 Revised in 2012	✓ The Act provides for measures for the prevention, management and control of HIV and AIDS, to provide for the protection and promotion of public health and for the appropriate treatment, counseling, support and care of persons infected or at risk of HIV and AIDS infection. ✓ 7 (1) The Government shall ensure the provision of basic information and instruction on HIV and AIDS prevention and control to— (a) employees of all Government Ministries, Departments, authorities and other agencies; and (b) employees of private and informal sectors. ✓ 31 (1) Subject to subsection (2), no person shall be— (a) denied access to any employment for which he is qualified; or (b) transferred, denied promotion or have his employment terminated, on the grounds only of his actual, perceived or suspected HIV status.	✓ Risk of spread of HIV/AIDS and other STIs will be high during construction of the proposed project as a result of an influx of people from different areas.	✓ KETRACO is advised to ensure that the contractor conducts HIV/AIDS awareness campaigns and provides condoms for workers. ✓ The contractor shall be directed not to discriminate any worker at the workplace based on their HIV status.
24	Public Health Act, Cap 242	✓ This Act aims to protect public health in Kenya and outlines guidelines in regards to food hygiene and protection of foodstuffs, animal keeping, public water supply, prevention and destruction of mosquitos, and the abatement of nuisances including nuisances arising from sewerage ✓ ✓ Section 115 states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health	✓ The proposed project has potential to cause health nuisances especially during construction phases through generation of waste, human waste, garbage etc.	✓ The contractor shall provide waste receptacles for collecting waste ✓ The contractor shall contract a NEMA licensed waste handler to collect and dispose of waste. ✓ The contractor shall ensure construction activities are conducted between 6 am-6 pm. ✓ The contractor shall provide mobile toilets for workers. ✓ The contractor shall not discharge any form of pollutant into water resources.
25	Climate Change Act, 2016	✓ This is an Act to provide for a regulatory framework for enhanced response to climate change; to provide for mechanism and measures to achieve low carbon climate	✓ Operation of equipment, vehicles	✓ The contractor shall;

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		development. Section 3 stipulates in part, that the national and county governments shall promote low carbon technologies, improve efficiency and reduce emissions intensity by facilitating approaches and uptake of technologies that support low carbon, and climate resilient development. According to section 15 of the Act, each state department and national government public entity shall among others; integrate the climate change action plan into sectoral strategies, action plans and other implementation projections for the assigned legislative and policy functions and report on sectoral greenhouse gas emissions for the national inventory.	and use of certain materials during construction and operation phases of the project has potential to emit greenhouse gases that contribute towards climate change. ✓ Burning of waste on site may contribute towards greenhouse gas emission. ✓ logging or cutting down of trees will reducing the existing carbon sink	✓ Service machines and equipment to reduce emission of gases ✓ Create awareness on reducing idling of vehicles and equipment. ✓ Avoid burning of materials on site. ✓ Ensure selective vegetation clearing
26	✓ Civil Aviation Act, 2013	✓ This is an Act of Parliament to provide for the control, regulation and orderly development of civil aviation in Kenya; and for connected purposes and Safety of aircraft and persons on board. Under this Act, the Kenya Civil Aviation Authority (KCAA) has to authorize and approve the height of the mast for the purpose of ensuring the safety of flying aircraft over the proposed project area. Section 56 of Civil Aviation Act (Restriction of building in declared areas) observes that, the Cabinet Secretary may, where he considers it to be necessary in the interests of the safety of air navigation, by order published in the Gazette, prohibit the erection within a declared area of any building or structure above a height specified in the order. A “declared area” in this case means any area adjacent to or in the vicinity of an aerodrome which the Cabinet Secretary may by notice in the Gazette declare to be a declared area. Section 57 (Control of structures, etc., on or near aerodromes), observes that, the KCAA Director General may consider provisions for civil aviation safety and security or efficiency of air navigation ought to be made; ▪ whether by lighting or otherwise for giving aircraft warning of the presence of any building, structure, tree or natural growth or formation on or in the vicinity of an aerodrome; or ▪ by the removal or reduction in height of any such obstruction or surface,	✓ The height of transmission line and towers has a potential to interfere with flight paths and aviation safety in general. There are also airstrips including; Kilgoris airstrip, Intona airstrip, and Kehancha airstrip	✓ KETRACO will be required to acquire a KCAA license for this transmission line. ✓ Where it is likely that the power line is hazardous to aviation safety because of its height or location, spherical markers will be used to identify overhead power lines or KETRACO will consider reducing the size of its towers in such sections.
27	Work Injury Benefits Act, 2007;	✓ The Work Injury Compensation Benefit Act 2007 provides guidelines for compensating employees on work-related injuries and diseases contacted in the course of employment; and provision of compulsory insurance for all employees;	✓ The project will be high risk to workers due to its inherent nature of implementation	✓ The proponent will have to ensure that both its internal staff and contractors’ staff and workers are catered for as provided in this Act.

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				✓ Contractor and subcontractors must take insurance for all workers
28	National Gender and Equality Commission Act, 2011	✓ An Act of Parliament to establish the National Gender and Equality Commission as a successor to the Kenya National Human Rights and Equality Commission pursuant to Article 59(4) of the Constitution; to provide for the membership, powers and functions of the Commission, and for connected purposes. Key to this act is the affirmative action, popularly known as the Two-thirds gender rule, which requires not more than two-thirds of people who hold public office be from the same gender.	✓ The contractor will need to employ people of different gender.	✓ KETRACO will implore the contractor to give more opportunities to women and to strive to achieve the Two-thirds gender rule.
29	The Valuers Act cap 532	✓ The Act Cap makes provisions for the relevant charges and conducts of valuers in relation to valuation of assets. ✓ The Act also provides the relevant regulations and guidelines in the undertaking of the valuation works.	✓ The project requires land valuation for due compensation to project effected persons	✓ Valuation will be carried out to meet the actual compensation measures and the market rates and reduce any acts of malice in the exercise.
30	Building Code, 2000;	✓ This law recognizes the county governments as the leading planning agencies mandating the potential developers to submit development applications for approval. ✓ The county governments are hence empowered to approve or disapprove plans if they do or don't comply with the law, respectively.	Construction of the transmission line triggers the codes	✓ The proponent has to submit the designs and building plans for approval
31	County Government Act No. 17 of 2012 Revised 2017	✓ The County Government Act is intended to provide powers, functions and responsibilities to deliver services to the Counties under the devolved government. ✓ As per section 3 the object and purpose of this Act is to (h) prescribe mechanisms to protect minorities within counties pursuant to Article 197 of the Constitution; ✓ Section 34 says that, the county executive committee shall exercise the executive authority (e) while ensuring the protection and promotion of the interests and rights of minorities and marginalized communities; ✓ Section 94 observes that, a County government shall use the media to (c) undertake advocacy on core development issues such as agriculture, education, health, security, economics, sustainable environment among others; ✓ Section 104 (2) avers that, the county planning framework shall integrate economic, physical, social, environmental and spatial planning. ✓ As per section 110. (2), the spatial plan, which shall be spatial development framework for the county, shall (c) contain strategies and policies regarding the manner in which the strategies and policies shall (vi) contain a strategic assessment of the environmental impact of the spatial development framework; ✓ Section 115. (1) observes that, Public participation in the county planning processes shall be mandatory and be facilitated through (b) provision to the public of clear and unambiguous information on any matter under consideration in the planning process, including— ➢ clear strategic environmental assessments; ➢ clear environmental impact assessment reports;	✓ The project will traverse Narok County.	✓ Project plans will be taken to county governments for approval. ✓ Project design will conform to local zonal physical planning requirements ✓ ESIA Study which is in progress will carry out an all-inclusive Public Participation process through consultations, sensitization meetings and Public Consultation Meetings. ✓ Since the Maasai, who are also VMGs, are the overwhelming majority in the project area (95.4% of the population), elements of the VMGP or appropriate mitigation measures have been integrated into the ESMP to ensure their full participation and access to

No.	Legislation	Relevance	Trigger	Compliance
				culturally appropriate social and economic benefits. Further, the proponent will implement project structured interventions to ensure vulnerable individuals and households found among VMGs and non-VMGs effectively participate and benefit from the project.
32	Agriculture and Food Authority Act, No. 13 of 2013 Revised2015	✓ The Act provides for governance on land classification, land use and preservation. ✓ Section 21. Land Development Guidelines (1) The Cabinet Secretary shall, on the advice of the Authority, and in consultation with the National Land Commission, provide general guidelines, in this Act referred to as land development guidelines, applicable in respect of any category of agricultural land to the owners or the occupiers thereof. ✓ Section 23. Land preservation guidelines ✓ (1) The Cabinet Secretary, on the advice of the Authority, and in consultation with the National Land Commission, for the purposes of the conservation of the soil, or the prevention of the adverse effects of soil erosion on, any land, may, prescribe national guidelines for any or all of the following matters: (a) prohibiting, regulating or controlling the undertaking of any agricultural activity including the firing, clearing or destruction of vegetation when such prohibiting, regulating or controlling is deemed by the Cabinet Secretary to be necessary for the protection of land against degradation, the protection of water catchment areas or otherwise, for the preservation of the soil and its fertility; (b) requiring, regulating or controlling: ➢ the afforestation or re-afforestation of land; ➢ the drainage of land, including the construction, maintenance or repair of drains, gullies, contour banks, terraces and diversion ditches; ➢ salination, acidification and saltification of soil; (c) requiring the uprooting or destruction, without payment of any compensation therefore, of any vegetation which has been planted in contravention of a land preservation order; ✓ Section 32. Land preservation orders A county government may make a land preservation order against the owner or occupier of land, or against both the owner and occupier either at the same time or at different times.	✓ The proposed transmission line crosses over agricultural land where farmers grow crops such maize, beans, potatoes, kales, cabbages, mangos, avocados, and bananas.	✓ Project proponent undertakes to abide by the requirements of the developed guidelines touching on type of development, prevention of adverse effects and following preservation orders issued by County Government.
33	The Sexual Offences Act, 2006 and its amendment 2012	✓ The Act of Parliament makes provision about sexual offences, their definition, prevention and the protection of all persons from harm from unlawful sexual acts, and for connected purposes. ✓ The Act gives prominence on observing a standard work ethic to ensure all genders are not subjected to sexual offences. ✓ The Act lists a number of sexual offences for compliance	✓ The Contractor and subcontractors will have a workforce that need to observe this Act	✓ The contractor to have in place a sexual harassment policy ✓ All workers to comply to this Act.

No.	Legislation	Relevance	Trigger	Compliance
34	Protection of Traditional Knowledge and Cultural Expressions Act, 2016;	✓ The Act of parliament provides a guideline for the protection and promotion of traditional knowledge and cultural expressions	✓ The project is to be implemented within an area regarded to have cultural importance and attachment to their indigenous knowledge	✓ The client will be required to conduct a Vulnerable and Marginalised Group Plan which will address this issue.

4.6: World Bank Safeguard policies

4.6.1; World Bank policy OP 4.01 Environmental Assessment

The objective of this policy is to ensure that Bank financed projects are environmentally sound and sustainable, and that decision making is improved through appropriate analysis of actions and of their likely environmental impacts. This policy is applicable if a project is likely to have potential (adverse) environmental risks and impacts on its area of influence. OP 4.01 covers impacts on the natural environment (air, water and land); human health and safety; physical cultural resources; and transboundary and global environment concerns. Projects are screened and assigned categories (A, B, C or FI) depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

The operational principles of the policy require the environmental assessment process to;

- Evaluate a project potential environmental risks and impacts in its area of influence
- Examines project alternatives
- Identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts
- Include the process of mitigating and managing adverse environmental impacts throughout project implementation
- Evaluate adequacy of existing legal and institution framework including applicable international environmental agreements. This policy aims to ensure that projects contravening the agreements are not financed.
- Undertake meaningful stakeholder consultation before and during project implementation
- Engage service of independent experts to undertake the environmental assessment
- Provide measures to link the environmental process and findings with studies of economics, financial, institutional, social and technical analysis of the proposed project.

This Project falls under clause 3 subsection 10 (e) of the second schedule of the Environment (Impact Assessment and Audit) (Amendment) Regulations, 2019 and is designated as a high risk project. The project also aligns to category A under OP 4.01. It therefore, require a full Environmental Assessment (EA) since the project is associated with significant impacts.

The Proponent has commissioned an Environmental and Social Impact Assessment study in compliance with the policy. The ESIA study was conducted by independent ESIA experts and underwent an elaborate public participation process and encourages more public consultation

and participation during construction, implementation, and decommissioning phases of the project; examined project alternatives; identified potential negative impacts of the project and formulated mitigation measures for all the identified impacts; and is written in a format suggested by the policy.

4.6.2; World Bank policy OP 4.04 Natural Habitats

This policy recognizes that the conservation of natural habitats is essential to safeguard their unique biodiversity and to maintain environmental services and products for human society and for long-term sustainable development. The World Bank therefore supports the protection, management, and restoration of natural habitats in its project financing, as well as policy dialogue and economic and sector work. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development.

To meet the requirements of this policy, the ESIA team with the guidance of a qualified and experienced Ecologist collected baseline information on natural habitats and used the information to predict potential project impacts on the ecosystems and formulated measures to eliminate or minimize the impacts. The consulting team also engaged several stakeholders during project impact evaluation and those consulted included NEMA, WRA, KWS, KFS, WWF, The Peregrine Fund, Nature Kenya, and County Government Officials among others.

4.6.3; World Bank policy OP 4.10 Indigenous Peoples

The objective of this policy is to ensure that;

- The development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples;
- Adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated; and
- Indigenous peoples receive culturally appropriate and gender and intergenerationally inclusive social and economic benefits.

This policy is applicable since Maasais, a community included among people who meet the OP 4.10 requirements, and to whom this policy would apply are present in the project area.

4.6.4; World Bank policy OP 4.11 Physical Cultural Resources

This policy addresses physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural

significance. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water. Their cultural interest may be at the local, provincial or national level, or within the international community

Though no Physical Cultural Resources were identified in the project area during the ESIA process, the Contractor/KETRACO shall be required to comply with chance find procedures which should include stopping the works in that location and notifying the National Museums of Kenya (NMK) for further directions.

4.6.5; World Bank Operational Policy 4:12 Involuntary Resettlement

The World Bank safeguard policy on involuntary resettlement, Operational Policy (OP 4.12) establishes guidelines for land acquisition and compensation of people affected by a World Bank sponsored project. Key principles and policy objectives of OP 4:12 can be summarized as to:

- Avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs;
- Assist displaced persons in improving their former living standards, income earning capacity, and production levels, or at least in restoring them;
- Encourage community participation in planning and implementing resettlement; and
- Provide assistance to affected people regardless of the legality of land tenure.

The proponent already has a Resettlement Policy Framework. For this project, the ESIA study recommends a detailed RAP and the proponent to ensure that, the RAP is implemented in accordance with the RPF.

4.6.6; World Bank Operational Policy 4:36 Forests

The objective of this policy is to assist borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests. The policy aims to ensure that Forests are managed in a sustainable manner, significant areas of forest are not encroached upon and the rights of communities to use their traditional forest areas in a sustainable manner are not compromised.

While no gazetted/protected forest were observed during the ESIA process, the project will pass through bushland, wooded areas, and privately owned forest areas. Project activities have the potential to affect the health and quality of these resources and the rights and welfare

of local resident's dependent on the resources. The ESMP has formulated mitigation measures to ensure conservation of these forested areas.

Table 4.2: Applicable World Bank Safeguard Policies

Policy	Applicable	Explanation
Environmental Assessment OP 4.01	Yes	This Project falls under clause 3 subsection 10 (e) of the second schedule of the Environment (Impact Assessment and Audit) (Amendment) Regulations, 2019 and is designated as a high risk project. The project also aligns to category A under OP 4.01. Therefore, this policy is applicable. To address the requirements of this policy, the client has commissioned full Environmental Assessment (EA). The ESIA study was conducted by independent ESIA experts and underwent an elaborate public participation process and encourages more public consultation and participation during construction, implementation, and decommissioning phases of the project; examined project alternatives; identified potential negative impacts of the project and formulated mitigation measures and a monitoring plan for all the identified impacts; and is written in a format suggested by the policy. This policy is applicable under this project.
Natural Habitats OP 4.04	Yes	The project will pass through natural habitats with unique biodiversity. To meet the requirements of this policy, the ESIA team with the guidance of a qualified and experienced Ecologist collected baseline information on natural habitats and used the information to predict potential project impacts on the ecosystems and formulated measures to eliminate or minimize the impacts. The consulting team also engaged several stakeholders during project impact evaluation and those consulted included NEMA, WRA, KWS, KFS, and County Government Officials among others.
Forests OP 4.36	Yes	While no gazetted/protected forest were observed during the ESIA process, the project will pass through bushland, wooded areas, and privately owned forest areas. Project activities have the potential to affect the health and quality of these resources and the rights and welfare of local resident's dependent on the resources. Therefore the policy is applicable. The ESMP has formulated mitigation measures to ensure protection and conservation of these forested areas.
Pest Management OP 4.09	No	The project will not involve the use of pesticides for pest management. This policy is not applicable under this project.
Physical Cultural	Yes	Though no Physical Cultural Resources were identified in the project area during the ESIA process, the project will involve excavation activities which may lead to excavation and impacts on PCRs. In case of a Chance Find, the

Policy	Applicable	Explanation
Resources OP 4.11		client will be required to comply with chance find procedures which include stopping the works in that location and notifying the National Museums of Kenya (NMK) for further directions. This policy is applicable under this project.
Indigenous Peoples OP 4.10	Yes	This policy is applicable under this project since, Maasai, included among people who meet the OP 4.10 requirements, and to whom this policy would apply, and classified as VMGs under the Kenyan law, are present in the project area. Therefore, since the Maasai, who are also VMGs, are the overwhelming majority in the project area (95.4% of the population), elements of the VMGP or appropriate mitigation measures have been integrated into the ESMP to ensure their full participation and access to culturally appropriate social and economic benefits. Further, the proponent will implement project structured interventions to ensure vulnerable individuals and households found among VMGs and non-VMGs effectively participate and benefit from the project.
Involuntary Resettlement OP 4.12	Yes	The project will affect more than 200 PAPs. The client will be required to undertake a full RAP. The RAP should seek ways to avoid or minimize resettlement and should ensure that affected individuals and households and displaced communities are meaningfully engaged and consulted and are timely, adequately, and fairly compensated. This policy is applicable under this project.
Safety of Dams OP 4.37	No	Other than water pans for pastoralist communities, the project will not construct any dams. This policy is not applicable to this project.
Projects on International Waterways OP 7.50	No	The project will not have any activity in catchment areas of international waterways. This policy is not applicable under this project.
Projects in Disputed Areas OP 7.60	No	The project will not implement activities in disputed areas. This policy is not applicable under this project.

4.7 Comparison between World Bank Operation Policies and Kenya Legal Framework

A comparison between the Laws of Kenya and The World Bank Operation Policies are contained in Table 4.3. Table 4.4 gives the Severity of impact of land taking and recommended compensation options as per OP .4.12.

Table 4.3: A Comparative Analysis between World Bank Operation Policies and Kenyan Laws

World Bank Operation Policies	Applicable Kenyan Legal Framework	Comparison/Comment	The law to be applied
OP 4.12 recognizes a) Those who have formal legal rights to land (including customary and traditional rights recognized under the laws of the country); b) Those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets provided that such claims are recognized under the laws of the country or become recognized through a process identified in the resettlement plan c) Those who have no recognizable legal right or claim to the land they are occupying.	The Land Act 2012, the Community Land Act, 2016, and the Environment and Land Court Act, 2011 recognize those with formal rights to land including customary. The Land Value (Amendment) Act, 2019 observes that, compensation may be made to occupants in good faith of land compulsorily acquired who may not hold title to the land they occupy. The Act therefore, recognizes occupants in good faith of land who include squatters.	No gap	Implement both Kenyan legislation and World Bank Policy.
Compensation levels should be sufficient to replace the lost land and other assets at full replacement cost in local markets.	The Land Value (Amendment) Act, 2019 defines the criteria for valuation of land for purposes of determining the just compensation to be awarded. The Act also observes that, compensation to be awarded should be just, prompt and in full. The Valuers Act (Cap 532), establishes the Valuers Registration Board, which regulates the activities and practice of registered valuers. Registered valuers must be trained on valuation methods one of which is the Gross Replacement Value Method which OP 4.12 recognizes as the Full Replacement Cost.	No gap	Implement both Kenyan legislation and World Bank Policy.
Taking of land and related assets may take place only after compensation has been paid and, where applicable, resettlement sites and moving allowances have been provided to the displaced persons.	The Land Value (Amendment) Act, 2019 observes that, compensation for compulsorily acquired land should be prompt i.e., within a reasonable time of, and in any case not more than one year after, the taking of possession of the land by the Commission and in full including payment of reasonable	No gap	Implement both Kenyan legislation and World Bank Policy.

World Bank Operation Policies	Applicable Kenyan Legal Framework	Comparison/Comment	The law to be applied
	expenses to be determined by the Commission.		
Information related to quantification and costing of land, structures and other assets, entitlements, and amounts of compensation and financial assistance are to be disclosed in full to the affected persons. Displaced persons and their communities are provided timely and relevant information, consulted on resettlement options, and offered opportunities to participate in planning, implementation and monitoring of resettlement.	Access to Information Act, 2016 observes that, every citizen has the right of access to information held by the State. The proponent is therefore, obligated to disclose all relevant project information to the PAPs in culturally appropriate languages and formats, using feasible techniques such as FGDs, public barazas in easily accessible locations, and a timeframe that enables meaningful consultations.	No gap	Implement both Kenyan legislation and World Bank Policy.
A draft resettlement plan that conforms to OP 4.12 is a condition of appraisal, however, where impacts on the entire population are minor (impacts are considered "minor" if the affected people are not physically displaced and less than 10% of their productive assets are lost), or fewer than 200 people are displaced, an abbreviated resettlement plan may be agreed with the borrower.	Though the Land Act, 2012 is silent on this, most sectoral policies address this issue. KESIP RPF avers that, an Abbreviated Resettlement Action Plan (ARAP) will be prepared for subproject that are likely to affect fewer than 200 people or more than 200 people but with minor land acquisition of land (10% or less) and no physical relocation. Where PAPs include IPs/VMGs or the context is otherwise unusually complex, a RAP will be prepared.	No gap	World Bank OP 4.12 policy
Where there are adverse indirect social or economic impacts, it is good practice for the borrower to undertake a social assessment and implement measures to minimize and mitigate adverse economic and social impacts, particularly upon poor and vulnerable groups.	Environmental Management and Coordination Act (EMCA), Cap 387 and the Environmental (Impact Assessment and Audit) Regulations (2003) guides on preparation of environmental and social impact assessment	No gap	Implement both Kenyan legislation and World Bank Policy.
OP 4.12 requires, the resettlement plan (RP) provides prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project. For households with land-based livelihoods that lose a significant portion of their holdings, Bank policy gives preference to land-	The Land Value (Amendment) Act, 2019 observes that, compensation for compulsorily acquired land may take any one or more of the following forms; a) allocation of alternative parcel of land of equivalent value and comparable geographical location and land use to the land compulsorily acquired; b) monetary payment	No gap	Implement both Kenyan legislation and World Bank Policy.

World Bank Operation Policies	Applicable Kenyan Legal Framework	Comparison/Comment	The law to be applied
based strategies. Payment of cash compensation may be appropriate where (a) livelihoods are land based but the land taken for the project is a small fraction of the affected asset and the residual is economically viable; (b) active markets for land, housing, and labor exist, displaced persons use such markets, and there is sufficient supply of land and housing; or (c) livelihoods are not land-based. Cash compensation levels should be sufficient to replace the lost land and other assets at full replacement cost in local markets.	either in lump sum or in instalments spread over a period of not more than one year; c) issuance of government bond; d) grant or transfer of development rights as may be prescribed; e) equity shares in a government owned entity; or f) any other lawful compensation.		
To restore people's income-earning opportunities after land acquisition and resettlement, OP 4.12 specifies that "displaced persons are provided with development assistance in addition to compensation measures such as land preparation, credit facilities, training, or job opportunities".	Kenyan laws are silent on development assistance on top of compensation measures.	KESIP RPF advocates for provision of Rehabilitation Assistance needed to enable PAPs and Displaced Persons to improve their living standards, income earning capacity and production levels or at least maintain them at pre- project levels.	WB's OP 4.12
Resettlement programs to be sustainable, with meaningful consultation with affected parties.	The Land Act, 2012 Act provides steps for sensitizing the affected population. Gives provisions and guidance on consultation on implications and grievance procedures.	Same as the World Bank	WB's OP 4.12
Involuntary resettlement should be avoided where feasible, or minimized, exploring all alternatives. Particular attention should be given to vulnerable groups. Affected persons should be assisted to improve their livelihoods and standards of living or at least to restore them to pre- project levels.	As per the Prevention, Protection and Assistance to Internally Displaced Persons and Affected Communities Act, 2012, the government shall prevent displacement of persons who have been forced to leave their homes or places of habitual residence as a result of large-scale development projects except in situations justified by overriding public interests. Environmental Management and Coordination Act (EMCA), Cap 387 guides on identification of	Same as the World Bank	WB's OP 4.12

World Bank Operation Policies	Applicable Kenyan Legal Framework	Comparison/Comment	The law to be applied
	project impacts including resettlement and preparation of mitigation measures.		
Displaced persons should be assisted in improving livelihoods etc. or at least restoring them to pre-project levels.	The Land Act 2012 guarantees the right to fair and just compensation in case of relocation.	Just and fair compensation as outlined in the Land Act 2012 is not clear and can only be determined by NLC. It gives provisions about improving livelihood or restoring them to pre-project status.	World Bank OP 4.12 policy
PAP Consultation: Displaced persons should be meaningfully consulted and should be given equal opportunities to participate in planning and implementing resettlement programs	The Land Act outlines procedures for consultation with affected population by the NLC and grievance management procedures.	Similar to the World Bank's	Implement both Kenyan legislation and World Bank Procedures.
Grievance Redress Mechanism: A culturally appropriate and accessible grievances redress mechanism will be established and applied to the entire RAP implementation process, including physical and economic resettlement.	The National Land Commission Act, 2012 encourages the application of traditional dispute resolution mechanisms in land conflicts. The Land Act, 2012 establishes the Land Arbitration Tribunal where any dispute arising under the Act are referred to, while the Environment and Land Court Act, 2011 has created a court with powers to deal with disputes relating to land administration and management.	Similar to the World Bank's	Implement both Kenyan legislation and World Bank Policy.

Table 4.4 Severity of impact of land taking and recommended compensation options as per OP .4.12

#	Severity of impact (OP 4.12)	Recommended compensation options
1	If more than 20% of holdings are acquired.	*Option 1:* Replacement land for that taken. *Option 2:* Prorated cash compensation and rehabilitation package.
2	Displaced Persons losing more than 20 percent of their total agricultural land.	Those affected are entitled to a land-replacement option.
3	If less than 20% of holdings are acquired.	Prorated cash compensation is vailed to those affected.
3	If more than 80% of holdings are acquired.	*Option1:* Replacement land for that taken is availed to those affected.

		Option 2: Prorated cash compensation, rehabilitation package, and option to sell residual land.
4	Residual holdings no longer economically viable.	*Option 1*: Replacement land for that taken. *Option 2*: Prorated cash compensation, rehabilitation package, and option to sell residual land.

Source; Involuntary Resettlement Sourcebook; Planning and Implementation in Development Projects by World Bank

4.8: International Conventions

4.8.1; The Rio Declaration and Agenda 2

The action plan for the 21st century are two non-legally binding instruments adopted by the 1992 United Nations Conference on the Environment and Development (UNCED). While the Rio Declaration contains general principles and objectives, Agenda 21 contains detailed guidance on their practical implementation. Principle 4 of the Rio Declaration provides that in order to achieve sustainable development environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it. Principle 25 accentuates this by stating that peace, development and environmental protection are interdependent and indivisible.

4.8.2; The United Nations Convention on Biological Diversity (UNCBD), 2000

The Convention on Biological Diversity (CBD) is an agreement between countries based on natural and biological resources. The CBD has three main goals: to protect biodiversity; to use biodiversity without destroying it; and, to share any benefits from genetic diversity equally.

Article 6 of the convention provides that parties shall develop national strategies, plans or programs for the conservation and sustainable use of biological diversity and endeavour to integrate the conservation and sustainable use of biological diversity into relevant sectorial or cross sectorial plans, programs and policies.

Article 7 of the Convention requires parties to identify components of biodiversity important for conservation and sustainable use and to monitor the components so identified, paying particular attention to those requiring urgent conservation measures and those with potential for sustainable use. Parties are required to identify and monitor processes and activities which may have significant adverse impacts on conservation and sustainable use of biodiversity.

Article 8 requires parties to put in place in situ conservation measures including: -

a. The establishment of a system of protected areas;

b. The promotion of the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings;
c. Promotion of environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering the protection of these areas;
d. The rehabilitation and restoration of degraded ecosystems and the recovery of threatened species and
e. Prevention, control and eradication of alien invasive species.

The proponent will put in place measures to ensure that biodiversity is conserved. Where possible clearing of vegetation should be minimized as much as possible.

4.8.3; The United Nations Framework Convention on Climate Change (UNFCCC),1992

The United Nations Framework Convention on Climate Change provides the basis for concerted international action to mitigate climate change and to adapt to its impacts. Its provisions are far-sighted, innovative and firmly embedded in the concept of sustainable development. With 189 Parties, the Convention has nearly a universal membership.

According to Article 2, the Convention's ultimate objective is "to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic [originating in human activity] interference with the climate system". This objective is qualified in that it "should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner". In stating this objective, the Convention reflects concerns that the earth's climate system is threatened by a rise in atmospheric greenhouse gas (GHG) concentrations, which is caused by increased anthropogenic GHG emissions. The Convention does not state a limit for total anthropogenic GHG emissions which would have to be respected to reach the objective. Nor does it indicate the level of total GHG concentrations beyond which "dangerous anthropogenic interference with the climate system" would occur. Estimates of where these levels lie evolve continually with scientific advances and are complicated by the political need to take into account the changing ability of societies to adapt to climate change. Another important factor is that stabilizing atmospheric concentrations of GHGs to near current levels would actually require a steep reduction of current emissions. This is because, once emitted, GHGs remain in the atmosphere for a considerable length of time: carbon dioxide, for instance, stays in the climate system, on average, for a century or more.

According to Article 4(1), the convention provides that all parties make general commitments regarding;

a. The establishment of national inventories of greenhouse emissions and sinks;
b. The promotion of scientific and technical cooperation;
c. The sustainable management of forests, oceans and ecosystems and
d. The integration of climate change considerations in national social, economic and environmental policies.

Bush clearing on the way-leave trace, extra efficiency (30% of energy is lost while transmitting power on 33 and 66kV lines as opposed to high voltage lines), and communities adopting use of electricity as opposed to fossil and wood fuels will invoke this treaty. The Proponent will ensure that the contractor adopts measures to reduce greenhouse gas emission during the construction and operation phase of the project as outlined in the ESMP.

4.8.4; United Nations Convention to Combat Desertification (UNCCD)

The UNCCD was adopted on 17th June 1994 in Paris and came into force on 26th December 1996. Kenya ratified the Convention in 24th June 1997. The purpose of the Convention is to address the problem of the degradation of land by desertification and the impact of drought particularly in arid and dry semi-humid areas. The strategic objectives of the convention are to;

1. Improve the condition of affected ecosystems, combat desertification/land degradation, promote sustainable land management and contribute to land degradation neutrality
2. Improve the living conditions of affected populations
3. Mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems
4. Generate global environmental benefits through effective implementation of the UNCCD
5. Mobilize substantial and additional financial and non-financial resources to support the implementation of the Convention by building effective partnerships at global and national level

KETRACO shall put into place mitigation measures advised in the ESMP that reverse land degradation including selective clearance of vegetation, tree planting, and preventing soil erosion among other measures.

4.8.5; African Convention on the Conservation of Nature and Natural Resources

It was held on 15 September, 1968 in Algiers. The convention sought to awaken the continent on the need to preserve natural ecosystems and employ sustainable use of natural resources of economic importance, particularly the soil, water, flora and fauna.

KETRACO shall encourage the planting of indigenous trees to try to restore a balance within the ecosystem in areas that will be disturbed.

4.8.6; Paris Agreement

The Paris Agreement is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC), dealing with greenhouse gas emissions mitigations, adaptation and finance. The long term goal of this agreement is to keep the increase in global average temperature to well below 2^0 C above pre-industrial levels; and to limit the increase to 1.5^0 C, since this would substantially reduce the risks and effects of climate change.

To promote the goals of the Paris Agreement, KETRACO and the contractor will ensure that greenhouse gas emission reduction measures recommended in the ESMP and Monitoring Plan are adhered to.

4.9: Institutional Framework

4.9.1; Environmental Institutional Framework

This section presents the institutions important to the environmental implementation of the project.

National Environmental Management Authority (NEMA)

The objective and purpose for which NEMA is established is to exercise general supervision and co-ordinate over all matters relating to the environment and to be the principal instrument of the government in the implementation of all policies relating to the environment. A Director-General appointed by the president heads NEMA. The Authority shall:

- Co-ordinate the various environmental management activities being undertaken by the lead agencies and promote the integration of environmental considerations into development policies, plan, programmes and projects with a view to ensuring the proper management and rational utilization of the environmental resources on a sustainable yield basis for the improvement of the quality of human life in Kenya.
- Take stock of the natural resources in Kenya and their utilization and conservation, with the relevant lead agencies.

- Examine land use patterns to determine their impact on the quality and quantity of the natural resources.
- Carry out surveys, which will assist in the proper management and conservation of the environment.
- Advise the government on legislative and other measures for the management of the environment or the implementation of relevant international conservation treaties and agreements in the field of environment as the case may be.
- Advise the government on regional and international environmental convention treaties and agreements to which Kenya should be a party and follow up the implementation of such agreements where Kenya is a party.
- Undertake and co-ordinate research, investigation and surveys in the field of environment and collect and disseminate information about the findings of such research, investigation or survey.
- Mobilize and monitor the use of financial and human resources for environmental management.
- Identify projects and programmes or types of projects and programmes, plans and policies for which environmental audit or environmental monitoring must be conducted under EMCA.
- Initiate and evolve procedures and safeguards for the prevention of accidents, which may cause environmental degradation and evolve remedial measures where accidents occur.
- Monitor and assess activities, including activities being carried out by relevant lead agencies in order to ensure that the environment is not degraded by such activities, environmental management objectives are adhered to and adequate early warning on impeding environmental emergencies is given.
- Undertake, in co-operation with relevant lead agencies programmes intended to enhance environmental education and public awareness about the need for sound environmental management as well as for enlisting public support and encouraging the effort made by other entities in that regard.
- Publish and disseminate manuals, codes or guidelines relating to environmental management and prevention or abatement of environmental degradation.
- Render advice and technical support, where possible to entities engaged in natural resources management and environmental protection so as to enable them to carry out their responsibilities satisfactorily.
- Prepare and issue an annual report on the state of the environment in Kenya and in this regard may direct any lead agency to prepare and submit to it a report on the state of the sector of the environment under the administration of that lead agency and,

- Perform such other functions as government may assign to the Authority or as are incidental or conducive to the exercise by the authority of any or all of the functions provided under EMCA.

National Environmental Complaints Committee (NECC)

The Committee performs the following functions:

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

National Environmental Tribunal (NET)

This tribunal guides the handling of cases related to environmental offences in the Republic of Kenya. If disputes to this project arise, they are supposed to be presented here for hearing and legal direction.

4.9.2; Ministerial Institutional Framework

There are several institutions that have been set up to operate under the Ministry of Energy and Petroleum (MOE&P) to provide services in the energy sector particularly generation, transmission and distribution of electricity. They include Energy and Petroleum Regulatory Authority (EPRA), Kenya Electricity Generating Company (KenGen), The Kenya Power and Lighting Company (KPLC), The Rural Electrification Authority (REA), Kenya Electricity Transmission Company (KETRACO), Geothermal Development Company (GDC), Energy Tribunal, Kenya Nuclear Electricity Board (KNEB), and Independent Power Producers (IPPs).

The roles and functions of these institutions have been categorized into generation, transmission, distribution, oversight, policy and regulation. The functions are elaborated in Table 4.2 below

Table 4.5: Roles of Organizations involved in Electricity Generation & Distribution

No.	Category	Institution	Role/Function
1	Policy	Ministry of Energy and Petroleum (MOE&P)	MOE&P is in charge of making and articulating energy policies to create an enabling environment for efficient operation and growth of the sector.
3	Arbitration	Energy Tribunal	Energy Tribunal is an independent legal entity which was set up to arbitrate disputes in the sector.
4	Regulation	Energy Regulatory Commission (ERC)	Energy Regulatory Commission (ERC) is responsible for regulation of the energy sector. Functions include tariff setting and oversight, coordination of the development of Indicative Energy Plans, and monitoring and enforcement of sector regulations.
5	Generation	Kenya Electricity Generating Company (KenGen)	KenGen carries out generation of electricity from hydropower, thermal, geothermal and wind.
		Geothermal Development Company (GDC)	GDC undertakes surface exploration of geothermal fields, exploratory appraisal and production drilling, and management of steam fields as well as entering into steam sales agreements with investors.
		Independent Power Producers (IPPs)	IPPs are private investors that are involved in generation either on a large scale or for the development of renewable energy under the Feed-in-tariff Policy. Some of the IPPs include IberAfrica Power, Rabai Power, Tsavo Power, or Power, Mumias Sugar Company etc.
6	Transmission	Kenya Electricity Transmission Company (KETRACO)	KETRACO Plans, designs, constructs, owns, operates and maintains new high voltage (132kV and above) electricity transmission infrastructure.
7	Distribution	Kenya Power and Lighting Company commonly known as Kenya Power	KPLC is the off-taker in the power market buying power from all power generators on the basis of negotiated Power Purchase Agreements (PPAs) for onward transmission, distribution and supply to consumers.
		Rural Electrification and Renewable Energy Corporation (REREC).	Rural Electrification and Renewable Energy Corporation (REREC) has a mandate of implementing rural electrification projects with an additional mandate of spearheading Kenya's green energy drive.

4.9.3 The World Bank

The World Bank plays a critical role in implementation of the ESIA since it has laid globally accepted operational policies to which all actors are to comply with. The WB will provide supervisory roles in the implementation of the ESIA and the project through monitoring of use

of funds and the Environmental Social Performance of the project against the laid procedures in the Operational Policies, the ESMF and the ESMP.

4.10 Grievance Redress Mechanism for Workers and Community Members.

KETRACO at the beginning of RAP implementation process will set up a Community Resettlement Committee (CRC) whose role, among others, will be resolution of disputes as soon as they arise, through an agreed socio-cultural approach. The CRC shall comprise of diverse stakeholder groups including at the lowest tier, at which most grievances and disputes should be resolved, PAPs, community elders, local administration, intergenerationally inclusive community members who are conversant with socio-cultural GRM process, and community level organization representatives. In its composition, KETRACO should consider all groups including women, youth, and Persons with Disability.

Grievances may be received by village elders, local leaders (including religious leaders), politicians, members of CRC, local administrators (chiefs and ward reps), or KETRACO staff and can be through any mean including oral, letter, email, or telephone.

The procedure for addressing grievances at the community level will start with registration of the grievances with KETRACO's Community Liaison Officer (CLO) on site or with the CRC. The CLO will, within a week, convene a meeting with CRC, invite the aggrieved party to the meeting and present the grievance to the committee for hearing. The committee will resolve the complaint if possible, if not, the CLO will escalate the unresolved complaints to the PIU.

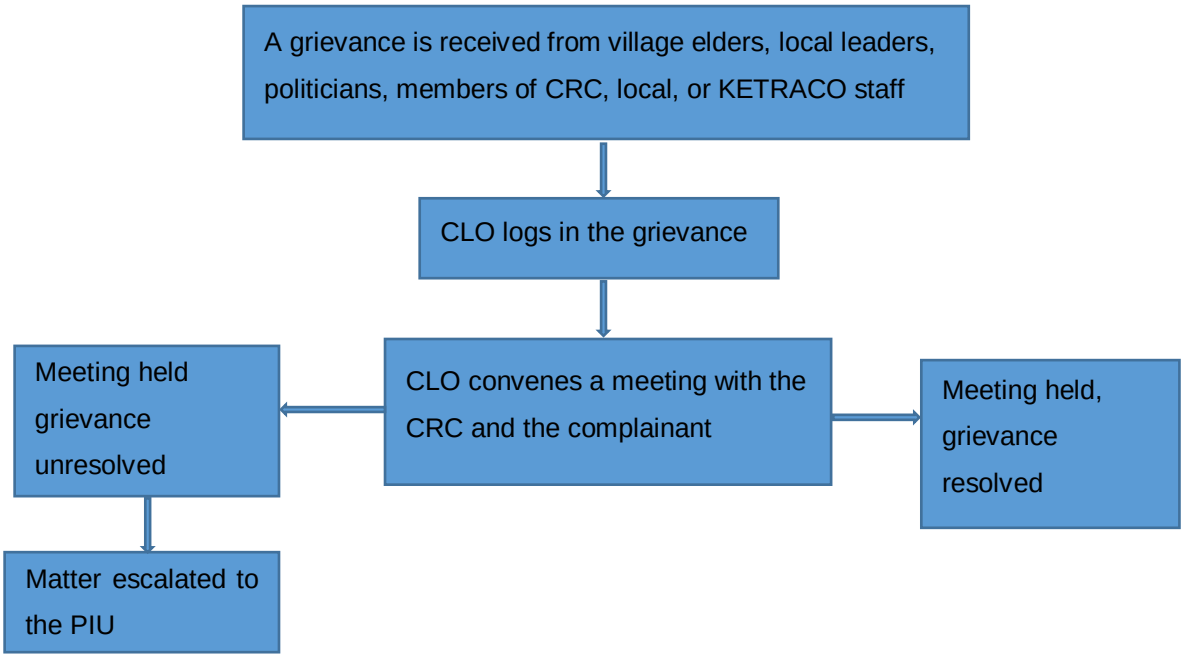

Figure 4.1: Community Level Grievance redress procedure

The second level grievance redress will be at the Company level, whereby, grievances will be received by KETRACO through email, letters, verbal, suggestion box or from the CLO. Once grievances are received, they will be logged into the grievance log in the office. Some grievances may be resolved immediately, if not, they will be escalated to KETRACO's PIU. KETRACO will acknowledge receipt of complaints within two weeks and will strive to resolve each complaint within two months. In the two levels, and where necessarily, the GRM process should ensure anonymity in reporting complaints.

The PIU will convene a meeting with the aggrieved party and seek to resolve the grievance. However, if the PIU is unable to resolve it, depending on the nature of the grievance, the PIU, through the General Manager Technical Services (GMTS) or the Company Secretary (CS), will escalate the grievance to the Ministry of Energy and Petroleum, the National Land Commission (NLC), or the National Environmental Complaints Committee (NECC) for arbitration. MoEP, NLC, or NECC will resolve it but if unable to, the aggrieved party will have an option to go to court in which case the court judgement will be final as well as access the World Bank GRS. It is worth noting here that, while aggrieved parties shall be free to pursue legal redress according to the laws of the land, cases that are referred to the legal redress system shall no longer be within the control of the project.

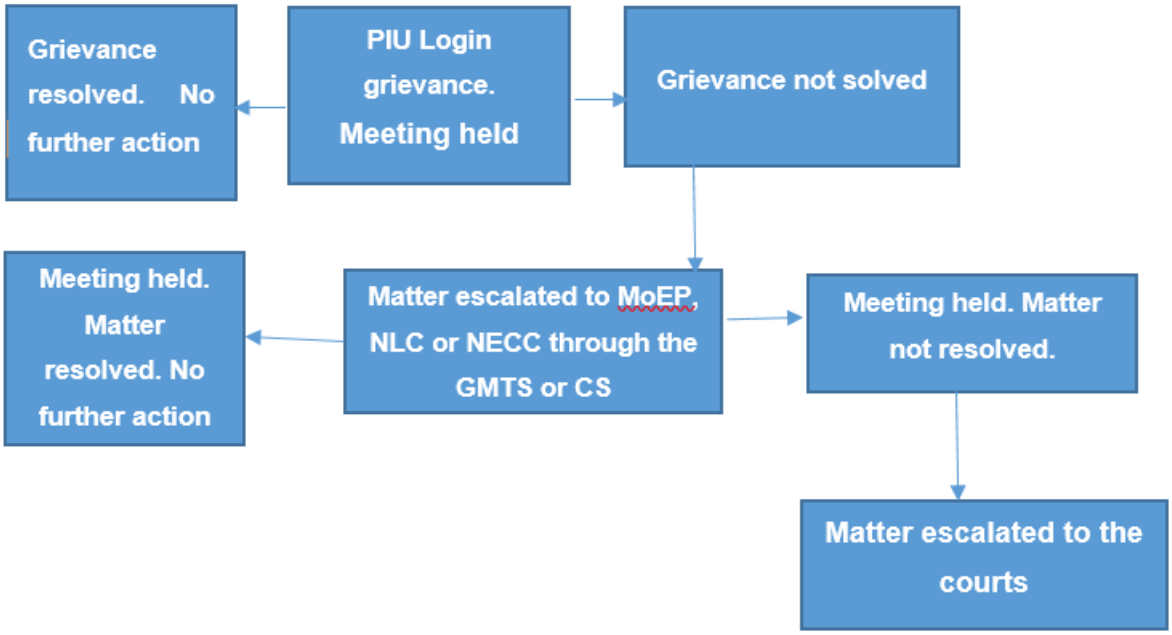

Figure 4.2: PIU level Grievance Redress Procedures

The World Bank Grievance Redress Service

The World Bank's Grievance Redress Service (GRS) provides an additional, accessible way for individuals and communities to complain directly to the World Bank if they believe that a World Bank financed project had or is likely to have adverse effects on them or their community. The GRS enhances the World Bank's responsiveness and accountability by ensuring that grievances are promptly reviewed and responded to, and problems and solutions are identified by working together.

The GRS accepts complaints in English or the official language of the country of the person submitting the complaint. Submissions to the GRS may be sent by:

Email: grievances@worldbank.org
Fax: +1-202-614-7313
Letter: The World Bank
Grievance Redress Service (GRS)
MSN MC 10-1018
1818 H St NW
Washington, DC 20433, USA
http://pubdocs.worldbank.org/en/440501429013195875/GRS-2015-BrochureDec.pdf

World Bank Inspection Panel

The Inspection Panel is an independent complaints mechanism for people and communities who believe that they have been, or are likely to be, adversely affected by a World Bank-

funded project. The Board of Executive Directors created the Inspection Panel in 1993 to ensure that people have access to an independent body to express their concerns and seek recourse. The Panel assesses allegations of harm to people or the environment and reviews whether the Bank followed its operational policies and procedures

The Panel has authority to receive Requests for Inspection, which raise issues of harm as a result of a violation of the Bank's policies and procedures from any group of two or more people in the country where the Bank financed project is located who believe that, as a result of the Bank's violation of its policies and procedures, their rights or interests have been, or are likely to be adversely affected in a direct and material way. They may be:

- an organization, association, society, or other group of individuals;
- A duly appointed local representative acting on explicit instructions as the agent of
- adversely affected people;
- In exceptional cases, a foreign representative acting as the agent of adversely affected
- people;
- An Executive Director of the Bank in special cases of serious alleged violations of the
- Bank's policies and procedures.

The Panel may be contacted by:

Email; ipanel@worldbank.org

Phone +1-202-458-5200

Fax +1 202-522-0916 (Washington, D.C.)

mail at: Inspection Panel, Mail Stop MC 10-1007, 1818 H Street, N.W., Washington, D.C. 20433, U.S.A.

http://ewebapps.worldbank.org/apps/ip/Documents/Guidelines_How%20to%20File_for_web.pdf

CHAPTER 5: STAKEHOLDER CONSULTATION

5.1: Introduction

Stakeholder consultation was undertaken among people living in the environs of the proposed transmission line project as an integral part of the ESIA study. The aim was to ensure that all stakeholder interests were identified and incorporated in project development at planning, implementation and operation phases.

The specific objectives for consultation process were to:

- Create public awareness about the proposed project
- Seek public opinion and concerns relating to the project and more specifically problems they anticipate and ways of overcoming them.
- Obtain professional advice from sector heads including departmental heads and local administration
- Consultatively and in a participatory way identify potential positive and negative impacts of the project and seek remedial measures
- Sell the project to the public for their acceptance and ownership

These meetings enabled interested and affected parties to contribute their concerns (views and opinions on the proposed project) which might have been overlooked during the scoping exercise. Findings of stakeholder analysis were very important in predicting impacts and development of ESMP. Stakeholder consultations for the proposed project followed several steps as described below:

5.2: Stakeholders Mapping and Analysis;

Two major categories of stakeholders were identified;

1. Those who were affected by the project and
2. Interested Parties

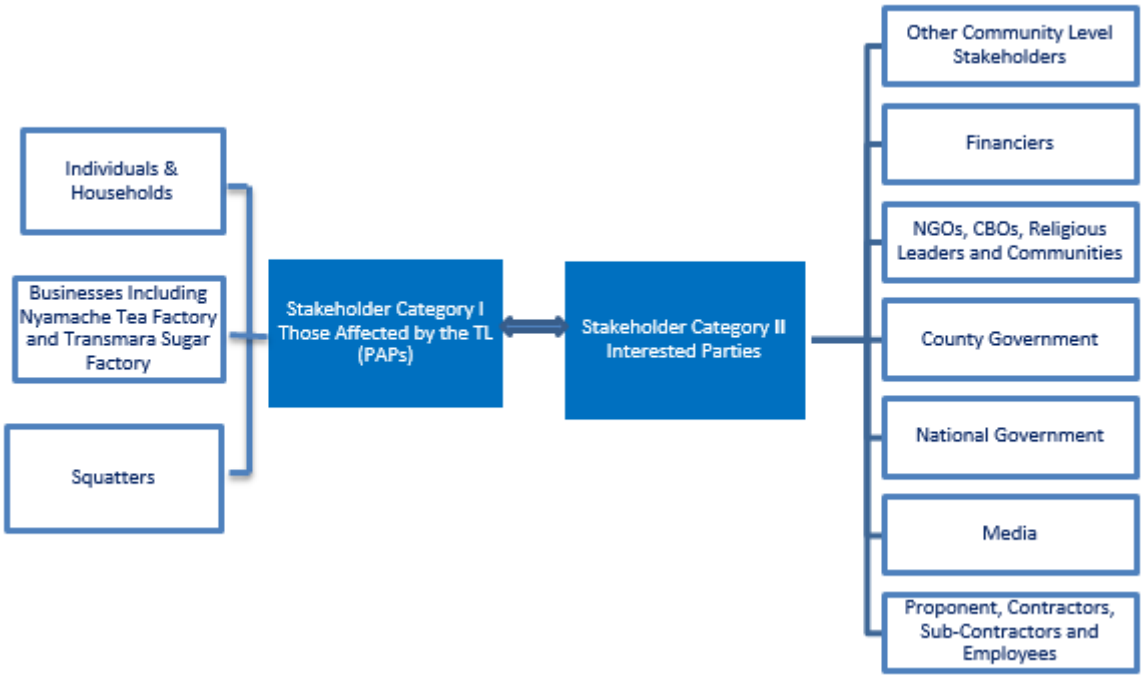

Figure *5.1: Identified key stakeholders*

The proposed project will typically involve construction of a transmission line from Kilgoris to Kehancha. Of necessity, land for the location of the transmission line must be acquired. Individuals, households, businesses, and institutions whose land, structures, or trees and crops will be affected by the project are known as Project Affected Persons (PAPs) and were categorized as Stakeholder Category I.

The second category (Interested Parties) comprised of National and County Government officers in charge of diverse sectors which are likely to be impacted by the project. This category was consulted as key informants on sectoral policy and to advise the ESIA study on mitigation measures to be put in place so as to minimize adverse impacts in their respective sectors. This category also included local policy makers and opinion leaders, local administration, NGOs, Religious leaders, media, and other community level stakeholders (persons who lived close to the TL route but whose property was not affected). The proponent, contractors, sub-contractors, and employees were also identified as key stakeholders.

5.3: Approach to Stakeholder Consultations

A detailed stakeholder's consultation for this study was undertaken from 29th July to 31st October, 2019. These consultations were conducted in the form of; key informant oral interviews, key informant questionnaires, community questionnaires, and public *barazas.*

5.3.1: Key Informant oral Interviews:

The following people were consulted:

Narok County

1) County Director of Environment, National Environment Management Authority
2) Warden, Kenya Wildlife Service – Transmara West
3) Ass. Ecosystem Conservator, Kenya Forest Service-Narok (Mau)
4) Forester, Kenya Forest Service, Transmara Sub-County
5) Sub-regional Manager- Water Resources Authority
6) Principal Occupational Safety and Health Officer- Directorate of Occupational Safety and Health Services
7) Assistant Labour Officer, Narok
8) Veterinary Department-Narok County
9) Chief Zoologist, Kenya Tsetse and Trypanosomiasis Eradication Council (KENTTEC)
10) County Director of Fisheries, Fisheries Department, Narok County Government
11) Branch Manager, Kenya Dairy Board-Narok
12) County Director of Health, County Department of Health and Sanitation, Narok
13) County Drought Response Officer, National Drought Management Authority Narok
14) Asst. Labour Officer, Labour Office Narok
15) Accountant, Department of Economic Planning, Narok County
16) Chief Officer, Public Works, Narok County Government
17) Director, Renewable Energy, Ministry of Environment, Energy and Natural Resources-Narok County Government
18) Sub-County Agriculture Officer, Department of Agriculture, Trans Mara West Sub county, Narok County Government
19) Department of Livestock Development, Narok County Government
20) Resident Engineer, Kenya Rural Roads Authority-Kilgoris
21) Public Health Officer, Department of Public Health, Narok County Government
22) Sub-County Land Surveyor, Department of Lands, Narok County Government
23) Clerical Officer, Ministry of Water, Irrigation and Sanitation, Narok County Government
24) Programme Officer, WildWide Fund for nature (WWF)
25) Legal Officer, Transmara Sugar Company
26) Production Manager, Nyamache Tea Factory
27) Chiefs from Lepolosi, Murram, Osinoni, Nentekeny, Moita, Endonyo Narok, and Narolong,

Nairobi County

1. Senior Aerodrome Inspector, Kenya Civil Aviation Authority
2. Collection Manager and Cultural Heritage Researcher, National Museums of Kenya
3. Assistant Director of Africa Programs, The Peregrine Fund.
4. Membership Manager, Nature Kenya

5.3.2: Key Informant Questionnaires:

Open-ended questionnaires were administered to stakeholders comprised of GoK officers and civil society groups in charge of diverse sectors which are likely to be impacted by the proposed project. Concerns, views and opinions from a total of 28 respondents were received (Appendix VIII).

5.3.3: Community Questionnaires:

Open-ended questionnaires were administered to households, and small business enterprises neighbouring the site. Concerns, views and opinions from a total of 102 respondents (91 males 11 females) were received (Appendix IX).

5.3.4: Public *Baraza*

Public *barazas* were held in Lepolosi, Murram, Osinoni, Nentekeny, Moita, Endonyo Narok, and Game villages/towns with the assistance of the local administration and leaders. A public announcement notices in both English and Kiswahili (appendix VI) was given to the chiefs two (2) weeks prior to the meeting (appendix VII)to ensure more community members were aware of the meeting and attended. The chiefs were requested to also include in their invitations women, youth, PWDs, and the elite in the society like teachers.

In the *barazas*, the consultant team would introduce themselves, their consultancy, the proponent, and the World Bank; explain to the communities the proposed project; highlight the advantages of the project; inform the participants that, they had been contracted among others to help develop an environmental management plan that would ensure any negative impacts of the project are mitigated and that the participants had been identified as an important stakeholder who would assist in developing the management plan and therefore the reason for the visit.

Representatives from the proponent (KETRACO) consisting of an Environmentalist, Socio-Economist, and a Land-Economist were also present in the public *barazas*.

The environmentalist generally explained that KETRACO was a 100% Government entity under the Ministry of Energy mandated to transmit high voltage power from the generating

companies like KENGEN and GDC. The transmitted power would be stepped down at a step-down substation for distribution by Kenya Power. He would explain that, the proposed Kilgoris-Kehancha transmission line would be part of a circuit that was in the works to include the Sotik-Kilgoris, the Rongai-Kilgoris, and Awendo-Migori-Isebania transmission lines which were either under construction or had been proposed. The rationale behind the construction was to aid in powering Kenya in accordance with the Big 4 Agenda to facilitate industrialization. The benefits that the communities would accrue from the project include: creation of employment during the construction phase and in the industries that would be set up; supply of clean, reliable, and secure power that had no black-outs; creation of business opportunities such as supply of materials, catering for workers, refrigeration, and welding; and improvement of security through street lighting. However, the project would have some anticipated negative impacts like felling of trees on the wayleave (which would be compensated for and more planted), dust emission which the contractor would mitigate by sprinkling water on the roads, and noise pollution which would be mitigated by constructing during the day. The contractor would be required to source unskilled labour from the locality. Socially, the project would bring about social vices and conflict arising from cultural differences. The community and the contractor would be educated on co-existence. On waste management, the contractor would be required to handle waste in a rational manner. On matters sanitation the contractor would be required to ensure use of mobile toilets for all staff. The contractor would be required to regularly repair the machinery on concrete ground to avoid oil from seeping into the ground. He would also add that the pylons would be secured with barbed wire and spikes to prevent people from climbing and that workers erecting them would be equipped with safety gear (PPEs) at all times.

The Land-Economist generally explained that there will be compensation for the affected assets. Three types of compensation including Structures, Land, and Trees/Crops were given. For structures, the company would compensate based on valuation and the World Bank's requirement of 'Full Replacement Cost'. The agreed amount would be paid through the owner's bank account. He explained that compensation would be done in two phases, 70% to aid in relocation and 30% on proof of relocation. There would be an additional 15% disturbance allowance. For crops/trees, way leave officers would conduct a census of the affected crop/trees and record the number against which the owner would sign if satisfied including the chief to affirm that indeed the crops belong to the affected person. The rates for these would be dictated by the Kenya Forest Service and the Ministry of Agriculture. Compensation of land would be based on proof of ownership, level and extent of impact. He explained that the company doesn't buy land but instead seeks the right of way hence a maximum of 98% compensation. This implies that the land owner would retain ownership but has limited use on

the land (prohibited from planting trees capable of growing beyond 6 feet (1.8m) and erecting structures on the way leave of the transmission line). According to KETRACO, whole land is compensated if the remaining unaffected land is less than 2,000m^2.

In the meetings, the Socio-Economist emphasized on the need to ensure the societies in the project area are not negatively affected but also do not take undue advantage which would increase the project cost and create a big burden to the Government. He gave an example of one of the lines where some people learned of where it would pass through and built structures along the wayleave. KETRACO in this instant rerouted the line and speculators lost a lot of money. He explained to the participants that, the project was aimed at promoting social economic benefits in the area and that since it was a World Bank funded project, its implementation, would be very keen on environment and social welfare. He informed the participants that, apart from developing the local transmission lines KETRACO also builds interconnectors (between countries) in bid to increase Kenya's power supply and to create a highway for power trade. Such interconnectors included, the Ethiopia-Kenya TL, the Kenya-Uganda TL, and Kenya-Tanzania TL. The lines would boost power pools like Southern Africa and Northern Africa Power Pools. He assured participants that, all affected property would be compensated for and reiterated the benefits of the project to the society including, increasing the supply of power, improving connectivity, supporting industrialization, street lighting and generally improving the quality of life thus transforming the lives of the people within and around the project area.

Table 5.1: Summary of Consultative Meetings

Area	Date	Venue	Time	Attendance		
				Male	Female	Total
Game	22/07/2019	Game Centre	12:00-1:20pm.	24	2	26
Moita	23/07/2019	Moita Shopping Centre	2:30pm-4:30pm	80	4	84
Osinoni	23/072019	Osinoni Dispensary	11:00 am-1:00pm.	54	2	56
Kilgoris	24/07/2019	Kilgoris Academy	12:00 noon -1:45pm	29	4	33
Murram	24/07/2019	Murram	3:00 pm -4:30 pm	33	5	38
Nentekeny	25/07/2019	Nentekeny Primary School	11:30am -1:26pm	22	2	24
Endonyo Narok	25 /07/ 2019	Endonyo Gobit	2:00pm-4: 06 pm	30	3	33

Women participation in the meetings was low. The area is predominantly inhabited by the Maasai community. The Maasai culture is extremely patriarchal in nature. Men are the decision makers and hardly allow women to attend to meeting. Another reason would be the nature of their work in the society. Women are the family care givers. They tend to the children,

are required to prepare family meals, collect water and firewood among other chores. These chores are quite demanding and hardly leave any time for the women to attend meetings. This report (ESMP) recommends creation of a Gender Mainstreaming Plan to reduce the risk of gender inequality and biases and ensure women participation in decision making processes and access project benefits.

Appendices X and XI give the minutes of the meetings and attendance list respectively.

Questions and comments by the participants and responses from KETRACO and the Consultant team are highlighted below;

Table 5.1; Lepolosi *Baraza* (24th July, 2019- 12:00 am) Venue: Kilgoris Academy

Questions and Comments	Answers
If the substation is to be built, will the land still be used by the owner?	No; substation land is fully bought by KETRACO and the title deed will bear the name of KETRACO.
Can alternative land be sought if it is not possible to set up the substation in the initial proposed site?	Yes, indeed. Substation land is acquired on willing buyer-willing seller basis. It is not through compulsory acquisition. A number of factors also need to be considered before siting of a substation land. In addition, KETRACO will advertise requesting for land when it is sure of setting up a substation. At the moment, it still does not know where exactly the intended land will be.
After a substation land has been bought, where will the owner go?	Substation land is acquired on willing buyer-willing seller basis. It is not through compulsory acquisition. Once an agreement has been struck and the land bought, the owner will paid full amount and will have to look for an alternative area to relocate.
Where will the power come from?	KETRACO intends to create a network of transmission lines in the region. This power line will form a circuit and may come from the proposed Sotik-Bomet-Kilgoris TL on the Kilgoris side and the Awendo-Migori-Isebania TL from the Kehancha side
Must substation land be very big? I have seen smaller ones.	The ones you may have seen might be Kenya Power substations. KETRACO substation are for high voltage power and require bigger land acreage. The visible part of the station might seem small but in real sense the land acquired could be much bigger to cater for expansion in future.

What if the required land size for setting up a substation land cannot be acquired, what happens?	Based on the studies and other factors, a suitable land will be acquired. If land holding is small, different parcels are amalgamated to attain the desired size.
Will land acquisition for substation be compulsory?	Substation land is acquired on willing buyer-willing seller basis. It is not through compulsory acquisition.

Plate 5.1; (left) Some members present in the baraza. (right) One of the consultants explaining the TL

Plate 5.2; (left) A resident asking a question and (right) A KETRACO staff responding to questions asked

Table 5.2; Murram *Baraza* (24th July, 2019- 3:00 pm) Venue: Murram Centre

Questions and Comments	Answers
In this region, there are sugar factories that supply farmers with fertilizers and other inputs, being that they are shareholders in such plantations; in such a case, who will be compensated, the owner of the plantation or the respective factory?	Since the sugarcane/ plantation belong to the owner, it is the owner that will be compensated. The sugar companies would be notified of the destruction of cane and that the farmer would be fairly compensated for the cane to be destroyed thus enabling the farmer to pay for the inputs.

If two people farm in the same plantation, who will be compensated?	The parties concerned will be asked to agree on compensation mode and once they agree, compensation would be done according to their agreement.
Can cattle graze below the transmission line? Can one build a cow shed on the wayleave	Yes; cattle can graze below the transmission line. However, cattle shed cannot be constructed under the transmission line or on the wayleave.
If the wayleave affects two adjacent neighbours, will both of them be compensated?	Yes; both of them will be compensated since they are on the way leave of the transmission line.
Will the power be connected to people?	No; this is high voltage power which needs to be stepped down first before it is connected to final consumers of power. KETRACO is only mandated to transmit power. Kenya Power is the entity with the mandate to connect customers to the power.
How will we benefit if the transmission line just passes through Murram Centre?	The benefit comes from the fact that there will be adequate and reliable power within the project area. In addition, with adequate power, the cost of electricity will be affordable which can be easily connected to those who need it. In addition, there will be local benefits such as employment and more industries in the area.
Does the land belong to KETRACO after compensation?	No; the land will still remain property of the owner but the owner has limited use. The owner is not allowed to put up a structure and he/she cannot plant a tree with the ability to grow more than 6ft (1.8m) high.
Is compensation lifetime or once in full?	The compensation is done once after agreement between the property owners and KETRACO.
For resources such as trees that should not be interfered with, what will KETRACO do?	KETRACO avoids culturally sensitive areas, like shrines, burial sites among others.
Will compensation be before removal of property or after?	For structures, the compensation will be done before. This is to enable one to relocate elsewhere. For trees and crops, compensation will be done after they have been cleared.
Will the compensated house be still the same or better?	The compensated house should be the same or better than the one the owner initially had. In addition to the agreed valued amount, a 15% disturbance allowance is also offered to the affected house owner.

Plate 5.3; (left) A KETRACO staff introducing the project and (right) A KETRACO officer giving the benefits of TL

Plate 5.4; Some of the women in attendance

Table 5.3: Osinoni *Baraza* (23rd July, 2019- 11:00 am) Venue: Osinoni Centre

Questions and Comments	Answers
Will people be compensated for their property?	Compensation will be done in terms of: Crops and trees- a report on the quantity affected will be developed and based on the report, the PAPs will be adequately compensated. This will take a minimum of 60 days. Land- this is paid according to extent of impact. Compensation has an additional; 15% disturbance allowance to help a PAP relocate. This will take 90 days. However, land for substations will be acquired entirely and the land will belong to KETRACO. Structure- the owner of the structure will be paid and in addition, a 15% disturbance allowance will be given. This will take 90 days. 70% of the total agreed amount will be paid then after the structure has been demolished and the owner has moved out of the wayleave, the remaining 30% will be paid. Wayleave will be acquired under limited use (one is not allowed to plant a tree capable of growing more than 6 feet (1.8m) in height

	and one is not allowed to construct a structure on the wayleave of the TL).
How will the proposed transmission line boost power?	At the present, the region is served by a 33 kV line. The project will serve the region with a 132kV line which will be enough to meet the increasing power demand in the region.
Will people be connected to the KETRACO power?	The law does not allow KETRACO to distribute power to final consumers of power. It is only mandated to transmit high voltage power over long distances before it is stepped down at the substation and then given to Kenya Power for distribution to the final consumers.
What are the direct benefits that the locals will get?	With adequate power supply, there will be improved livelihoods. For example, more people can now be connected to power; there will be adequate power to schools which will make learning to go on until late evenings; the health sector will improve since it will be able to equip its facilities with machines that need reliable power; and heavy industries will probably be set up within and around the project area creating employment for the youth. In addition, there will be jobs available when the project kicks off- skilled labour will be available for individuals within the country to apply. However, unskilled labour will be sourced from the locals.
If there are different property owners within a given property, how will the compensation be done?	For disputed property, KETRACO with the help of the local administration will meet all the claimants and try to sought out the issue. In such cases, compensation is withheld until the disputed is resolved.
Will compensation really be done?	Yes, it is the policy of KETRACO to compensate all PAPs fairly and satisfactorily.
How do you compensate for ancillary facilities E.g., a road to access the wayleave? Who will do the compensation?	Compensation for such cases will be discussed with the land owner during project implementation and will most likely be by the contractor. KETRACO will however ensure fair compensation is given.
In this area, people burn their land to prepare for the new crop. Is burning under the transmission line allowed?	Burning land under the transmission line is not allowed. Metal loses its quality slowly as it burns and over a long time can make tower collapse.

If a servant owns a structure in a land that is not his and is affected, who would be compensated?	The owner of the structure (in this case the servant) will be compensated for the structure
It is greatly unfair to compensate based on impact. If two people have the same size of land affected but one has a bigger land, he gets paid less – that is unfair. Everyone should be paid the same. ***(Comment for onward passing to KETRACO)***	
All parties to be involved during compensation. ***(Comment for onward passing to KETRACO)***	

Plate 5.5; (left) Some of the women in attendance and (right) Community members during the baraza

Plate 5.6; (left) Village elders of Osinoni Location and (right) A resident of Osinoni giving a vote of thanks

Table 5.4: Nentekeny *Baraza* (25th July, 2019- 11:30 Am) Venue: Nentekeny Primary School

Questions and Comments	Answers
Why can't the electric power not get stored in Kilgoris and distributed by Kenya Power for their consumption as opposed to KETRACO transmitting it.	Electricity power generated cannot be stored. It has to be used. The substation at Kilgoris would serve the Transmara region. The power would be transmitted from other existing transmission line networks within the region. KETRACO aims to build a transmission network in all regions of the country.
What is ESIA and what is RAP?	ESIA is Environmental Impact Assessment. The rationale behind ESIA studies is to ensure adherence to the country's environmental standards. An ESIA identifies both negative and positive impacts associated to a project and formulates mitigation measures to eliminate or reduce to the lowest possible minimum the negative impacts. Resettlement Action Plan (RAP) in simple terms is a census of the affected persons and their affected assets for compensation purposes. It is a plan that specifies the amount each PAP would receive as compensation, the procedures to be followed and the actions to be taken to properly resettle and compensate affected people and communities.
Is compensation for a hut and a permanent house the same?	Compensation for a permanent house and a hut shall not be the same as their values cannot be the same. Each structure shall be valued and the affected person paid enough compensation to replace the affected structure.
Some areas do not have title deeds, how will compensation be done?	For such cases, allotment letters will be used to compensate the rightful owners of the land. KETREACO will however, liaise with the land registry to confirm ownership before issuing out funds.
Will the area occupied by a pylon be compensated?	Yes, it will but compensation does not depend on a pylon falling on one's farm but on the full length of the wayleave whether there was a pylon or not. No extra money is paid if a pylon falls on one's land
For those who will not be affected by the transmission line, how will they benefit?	The benefit comes from the fact that there will be adequate and reliable power within the project area. In addition, with adequate power, more people can be connected to the national grid, and the cost of electricity will be more affordable. In addition, there will be

	local benefits such as employment, industrialization, and enhanced security due to streets lighting.
Nentekeny Primary School wants to set up a boarding section. It has applied for power connection severally without success. How will the school get power?	The chief rose to explain that, KETRACO as it had earlier explained, was in no position to do this, but he would assist the school get connected to the grid.

Plate 5.7; A consultant introducing the proposed project and (right) A KETRACO officer responding to issues raised

Plate 5.8; (left) A consultant addressing the meeting and (right) The chief putting the meeting to a close

Table 5.5: Endonyo Narok *Baraza* (25th July, 2019- 2:00 pm) Venue: Endonyo Narok Primary School

Questions and Comments	Answers
What is the extent of the wayleave and how will you measure it?	The wayleave for this proposed transmission line will be 30metres. This will be measured by the surveyors using high precision equipment
Will compensation be in full or in instalments each month/year?	The compensation for land, crops, and trees would be a one-off after an agreement has been reached between the property owner and KETRACO, however, compensation for structures will be done in two installments, an initial 70%, then 30% after proof of relocation.

Can I be connected to the high voltage power?	This is not possible. The power transmitted is of very high voltage and would burn the house if directly connected. KETRACO's mandate, is transmission of high voltage power from point of generation over long distances up to the substation where it is stepped down for onward distribution by Kenya Power to final consumers of power.
I gave my aunt a space to build her house; in this case who will be compensated?	The owner of the house (in this case the aunt) will be compensated.
If sugarcane/ crops and land belong to different people, will the land owner also be paid?	All the owners of the affected assets will be compensated accordingly.
If I want the transmission line to pass elsewhere and not through my land, is it possible to negotiate?	Deviation of the transmission line means more angle points. The more the angle points the more expensive the project becomes. Angle towers are more expensive than tension towers. The transmission line will pass through the intended areas but will always avoid environmentally sensitive areas and public utilities like schools, health centres, churches, and towns. Re-routing to help one or a few persons shall therefore, not possible unless there is a very good reason.
If the transmission line falls, who should we contact?	These lines do not fall. However, if such a case happens, then they can report to the local administration, wayleave officers or to KETRACO office in Nairobi.
Will youth get jobs?	Yes; there will be jobs available. Skilled jobs will be sourced from all over the country. Unskilled labour will be sourced from the community members.
Can KETRACO get land elsewhere for a person whose land has entirely been taken by the wayleave?	This person is identified as a Project Displaced Person (PDP). KETRACO compensates up to 98% of the affected land (to avoid taking his title deed – the land shall still belong to him) but requires him to seek for an alternative land elsewhere. The company believes that, the PDP is more qualified than KETRACO to look for a land that suits him/her. Negotiations on this are however possible. According to KETRACO, whole land is compensated if the remaining unaffected land is less than 2,000m^2.

If the transmission line affects a large portion of small land and a small portion of a large land, is the compensation the same?	KETRACO operates on the policy of equity versus equality. Compensation will be based on the extent affected and impact created.
In this area, there are lands with no title deeds since it is under adjudication. There are also many cases in court. Will affected lands which are undergoing court cases stop the project?	In such cases, compensation is set aside and withheld pending the ruling. For cases which are not in court, the local administration will be consulted to resolve the dispute. However, the work involving the project will still continue.
When will the project start?	Studies are still ongoing. Based on these studies, the World Bank will determine whether or not it is viable to proceed with the proposed project.

Plate 5.9; (left) The chief calling the meeting to order and (right) Community members following the proceedings

Plate 5.10; (left) A KETRACO staff responding to questions and (right)The chief putting the meeting to a close

Table 5.6: Moita *Baraza* (23rd July, 2019- 2:30 pm) Venue: Moita Centre

Questions and Comments	Answers
Where are the headquarters of KETRACO?	The company's headquarters are located at Kawi House in Nairobi's South C but there are KETRACO Wayleave Officers in locations where KETRACO has projects under construction.

How many of the 47 counties have transmission lines?	Almost all the counties in Kenya have been traversed by KETRACO TLs.
For PDPs will KETRACO pay for the land to be bought or the one to be forfeited/affected?	PDPs are paid 98% of the land value, which is similar to the value of the whole land, and the land still remains to be the property of the PDP. This compensation is for the affected land which will be enough to buy land of similar quality.
Will the KETRACO line have its own route or will pass along the roadside?	The TL will not follow the road reserves like Kenya Power distribution lines but will follow a designated wayleave on people's farms and the wilderness.
Is the compensation monthly or in full?	The compensation is made in full – one off - after agreement with the property owner.
Will a structure be demolished before compensation?	After an agreement with the owner of the structure, 70% of the agreed amount will be paid before demolition and another 30% on proof of relocation. The owner would be given ample time to relocate.
We are pastoralists; can we graze livestock under the transmission lines?	Grazing under the transmission lines is allowed but cow sheds are structures and are not allowed on the way-leave.
Can one connect KETRACO power to their house?	No; this is high voltage power which needs to be stepped down first before it is connected to final consumers of power. KETRACO is only mandated to transmit power.
How will be bare/unused land be compensated as compared to productive land?	Bare/unused land would most likely have no crops or trees and so compensation would be land alone, but developed or productive land would have crops and trees and so compensation would be for land, crops and trees. Land value however would most probably be the same if they are in the same area.
Does KETRACO power have blackouts?	One aim of the project is to eliminate blackouts in the region.
Those who will not be around or near the transmission line, will they get power? What benefit will they get	The benefit comes from the fact that there will be adequate and reliable power within the project area. This will increase connectivity, allow more industries to be set up which will provide employment to the youth, enable putting up of street lights which would enhance security, provide employment opportunities among others.

Plate 5.11; (left) The chief calling the meeting to order and (right) KETRACO officer explaining the proposed project

Plate 5.12; (left) A village elder raising an issue of concern and (right) KETRACO staff responding

Table 5.7: Game *Baraza* (22nd July, 2019- 12:00 am) Venue: Game Centre

Questions and Comments	Answers
There are two types of beacons (painted pegs and concrete); which one is important to us?	The consultant was not aware of the conflicting beaconing but world seek clarification from KETRACO (members of whom were to join the team later in the day) and revert back to the chief who would relay the information to the rest of the community members.
How will power be connected to people if the transmission line just passes over properties?	Connecting people directly to the line wouldn't be possible as the power was of very high voltage and needed to first go to a substation to be stepped down and be given to Kenya Power for distribution to customers.
How many substations will be there?	There will be none along the line but two at the take-off and terminus in Kilgoris and Kehancha.
The wayleave for this line will be 30m. When will the affected people be consulted? Individually or during barazas?	This is the first of the consultation meeting. KETRACO will conduct many more during construction period. A team of professionals will in a few weeks' time visit the area to consult

	individual PAPs and enumerate all their property that will be affected for purposes of compensation.
If an affected person does not have a title deed, what will happen?	For land proof of ownership would be essential be it a title deed, allotment letter or any other government recognized land ownership document. However, one does not need to have a title deed for compensation of structures, trees and crops.
How will the affected people be compensated; monthly, yearly or will it be full compensation?	The compensation is made in full – one-of payment - after agreement with the property owner.

Plate 5.13; (left) Aconsultant explaining the project and (right) A community member asking a question

Plate 5.14; (left) Some members present during the baraza and (right) A side meeting with some PAPs

5.3.5 Focused Group Discussions for Vulnerable and Marginalized Groups

To ensure that all IPs/VMGs participate in and receive culturally appropriate benefits from the project, a Focused Group Discussion (FGD) was held at South West Hotel, Kilgoris town on 13th January 2020. From each location (Leporosi, Osinoni, Nentekeny, Endonyo Narok, Moita, Narolong, and Game), at least five persons were nominated to represent the VMGs. The five included village elders and representatives for women, youth, and PWD. To ensure that consultations and participation processes were free, prior and informed, notices (appendix XIII) were sent to the chiefs two weeks prior to the consultations (appendix XIV) with emphasis

that Indigenous Peoples'/Vulnerable groups' traditional decision-making institutions or processes are included in the consultations. In addition, the notices for consultation clearly indicated that broad representation of the project-affected communities was fundamental. Thus, involvement of various groups including women, youth, the elderly, and people with disabilities was of utmost importance. Therefore, the consultation framework was gender and intergenerationally inclusive. The minutes of the meeting are given in appendix XII while appendices XIII and XV give attendance list and the transcripts of the meeting respectively.

Plate 5.15; Focused Group Discussion held in Kilgoris

5.4: Outcome of the Stakeholder Consultations:

5.4.1: Information Provided by Key Informant

In summary, the following issues of concern were raised by the key informants:

- The only Game reserves close to the transmission line is Mara Game Reserve
- Community wildlife areas within or around the proposed project area were identified to be; Mara North, Oloisukut, Kirindoni,
- Common wildlife species in the project area include; Elephants, Lions, Leopards, Hyenas,
- Threatened/rare/endangered species include; Rhinos, Lions, Leopards, indigenous tree species like *DioyspyrosAbyssinca* (Olenatuyian), and *Olea Africana* (Oloiren),
- Sensitive/unique habitats, include; Riverine and scrub bushes, and hillsides,
- There are no gazetted forests in the project area.
- There is a 300-acre private plantation forest with Eucalyptus species that belong to Nyamache Tea Factory.
- Identified project Impacts include;
    - ✓ Subsistence hunting of small wildlife.
    - ✓ Birds colliding with the TL cables.
    - ✓ Soil erosion.
    - ✓ Vegetation clearing. Destruction of both exotic and indigenous tree species.
    - ✓ Water pollution from oil spillage.
    - ✓ Siltation of the water resources.
    - ✓ Destruction of riparian vegetation.
    - ✓ The project may affect underground water distribution.
    - ✓ Air pollution.
    - ✓ Noise pollution.
    - ✓ Displacement of residents.
    - ✓ Animals may fall into tower excavations which may cause injury or death.
    - ✓ Social ills due to labour influx
    - ✓ Limitation of land use
    - ✓ Child labour
    - ✓ Sexual exploitation and abuse of young girls and boys.
    - ✓ Reduced sugar production by Transmara Sugar Factory due to a reduction in sugar cane production.
- Suggested Mitigation Measures.
    - ✓ The project should safeguard small wildlife from poachers.
    - ✓ Minimize vegetation clearing.
    - ✓ Reduce soil exposure which leads to soil erosion.

- ✓ Farmers to be provided with tree seedlings to compensate for the loses.
- ✓ Preserve medicinal trees.
- ✓ KETRACO to consult water authorities to ensure their systems are not disturbed.
- ✓ Workers to be paid more than the minimum wage rate as per the law.
- ✓ Educate and sensitize the public.
- ✓ Avoid excavating near water bodies.
- ✓ Avoid destruction of riparian/riverine vegetation.
- ✓ Restore/rehabilitate degraded areas.
- ✓ Fence the tower foundation excavations to protect animals and children from falling into them.
- ✓ Resettle affected persons in accordance to the RPF developed under this project.
- ✓ Employ locals. Consider youth, women, PWDs during employment
- ✓ Avoid putting towers on road reserves.
- ✓ Timely and fair compensation to affected persons.
- ✓ Transmara Sugar Company to be involved during the RAP process

5.4.2: Information Provided by Community Informant

In summary, the following information was provided by the members of the community:

- ➢ Impacts as identified by community members:
  - ✓ Health hazards.
  - ✓ Loss of agricultural and grazing land
  - ✓ Can cause skin cancer.
  - ✓ Resettle/displace/disturb population.
  - ✓ Compensation may not be adequate.
  - ✓ Children may be exposed to danger while playing with the TL.
  - ✓ It will affect trees and crops.
  - ✓ The conductors may snap and cause damage to life and/or property.
  - ✓ It may affect livestock production.
  - ✓ Compensation money may create conflicts between family members.
  - ✓ Increase insecurity/theft in the project area.
  - ✓ Noise pollution.
  - ✓ Some people have small ‘shambas’ and may become Project Displaced Persons.
  - ✓ Influx of workers may have negative cultural effects.
  - ✓ Soil erosion.

- ✓ It may cause fire outbreak

- Mitigation measures as suggested by the community members;
  - ✓ The line to pass through areas that are less populated.
  - ✓ Educate and sensitize the public on the importance of the project and the negative impacts of the project.
  - ✓ On a regular and a continuous basis meet the PAPs.
  - ✓ Compensation must be timely, fair, and adequate.
  - ✓ Create a mechanism for negotiation (to reach a common understanding) on compensation issues.
  - ✓ Proper consultation on property valuation and compensation
  - ✓ Compensation of wayleave should be done early before project commencement to avoid future project delays.
  - ✓ Use chiefs and village elders to resolve family conflicts arising from compensation money.
  - ✓ Create proper/effective mitigation measures to protect the environment.
  - ✓ Use available local construction materials.
- Issues of concern as raised by community members;
  - ✓ The project should start as soon as possible.
  - ✓ KETRACO to ensure the contractor employs the local youth.

5.5: Overall Picture from the Stakeholder Consultations.

The overall picture emergent from the stakeholder consultations is that their attitude towards the project is positive and desirous. In addition, the project is seen as being strategic to stabilizing power supply which is crucial to sustained economic growth. In order to sustain this overwhelming public support, the project development should proceed simultaneously with resolution of stakeholder concerns.

5.6 Stakeholder Engagement and Grievance Redress during Construction, Operations, and Decommissioning Phases

Prior to the start of the project, the proponent will develop a stakeholder engagement plan to be used in each of the project phases (pre-construction, construction, operations, and decommissioning). Stakeholders will be provided with information in a timely manner and the information will relate to planned and unplanned activities in every phase of project implementation. This could include information on safety measures in the vicinity of the construction site, traffic management, employment opportunities, opportunities for service provision (for example, banking, eateries, tailoring and cleaning services, etc.) and any other

emerging issue or identified during the development of the ESIA. Stakeholder engagement will be done through a range of methods, including:

i. Face to face meetings (unless otherwise not possible due to unforeseen events such as disease outbreak like a spike in COVID-19). Most of the time these engagements will be facilitated by the Community Liaison Officers.
ii. Written updates that will be posted in public spaces including markets and shopping centres, worship centres, chief's camp and in public institutions such as learning institutions.
iii. Public barazas, seminars, workshops, and Focus Group Discussion
iv. Quarterly monitoring reports and annual project progress reports, including compliance on environmental and social impacts requirements, health and safety performance, and implementation of the grievance redress mechanism, among others.

The grievance redress mechanism developed at the start of the project shall continue to exist during the construction, operations, and decommissioning phases of the project (it may be necessary to change the name of the RAP committee). The GRM committee will convene meetings on a regular, predefined basis to solve any reported grievance. The proponent, depending on the seriousness of a reported grievance may request the committee to convene an impromptu meeting. Anyone, including community members, project employees, social organizations, and governmental units will be eligible to submit a grievance to the project if any activity of the project is deemed to cause adverse impact on the community, the environment, or on their quality of life.

5.7 Public Disclosure

It is a World Bank procedural requirement that, an ESIA for a World Bank funded project, be publicly disclosed. This allows the public and other stakeholders to comment on the possible environmental and social impacts of the project. Towards this end, summaries of ESIAs and all project frameworks/plans will be disclosed to PAPs in culturally appropriate languages and formats, using feasible techniques such as FGDs, public *barazas* in easily accessible locations, and a timeframe that enables meaningful consultations. Among others, the following are suggested disclosure method;

1. Hard copies and summaries (in culturally appropriate languages) will be made available at the following offices;
    a. KETRACO Offices in Nairobi.
    b. NEMA Offices in Nairobi, Narok, and Kilgoris.
    c. County Commissioner's Office at Narok.

d. Chiefs' Offices at Kilgoris, Osinoni, Nkararo, Moita, and Narolong.

2. Soft Copies will be made available at the following sites
    a. KETRACO's webpage at www.ketraco.co.ke
    b. NEMA's website at www.nema.co.ke
    c. World Bank's external website.

3. Through subsequent consultation fora by KETRACO,

CHAPTER 6: POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS OF THE PROPOSED PROJECT

6.1: Introduction

A summary of the main potential impacts and mitigation measures of the proposed project based on stakeholders' views, assessment of the project area, evaluation of project processes, literature materials, and consultants' previous experience in undertaking ESIAs is discussed below.

6.2: Positive Impacts

Broadly, the identified positive impacts associated with the proposed transmission line project include;

6.2.1; Reliable and Secure Electricity Power Supply

The project will enhance the adequacy, reliability, and security of electricity power supply in Kilgoris and Kehancha Sub-Counties. This will help meet the increasing demand for power supply, increase connectivity, minimize if not eliminate power outages (blackouts), and stabilize power supply by eradicating over and under voltages.

6.2.2; Achievement of the Big Four Agenda

The Big Four Agenda has focused a lot on manufacturing. For this to be achieved, adequate, reliable and secure power supply is of necessity. The project therefore, will create an enabling environment for the investors to set up big industries in areas like tanning of skins and hides, milk cooling and processing, abattoirs, sugar processing, ICT, and gold mining. The other objectives of the Big 4 Agenda including Housing, Food Supply, and Health Care require power supply and this project will come in handy. Currently within the project area there are a number of processing establishments which include Transmara Sugar Company, Gold mining at Kilimapesa Hill in Lolgorien by Kilimapesa Gold Ltd. and in Kehancha by the locals.

6.2.3; Contribute towards reduction in Greenhouse Gas emission and global warming

Current electricity power transmission mode in Narok and Migori Counties is mainly through 33kV distribution lines. Studies show that, the 33kV distribution lines lose up to 30 per cent of the power they transmit. High voltage transmission lines on the other hand are efficient and hardly lose any power they are transmitting. The project therefore, will contribute towards saving power loses which translates to reduced generation of excess power (lost during transmission). A significant amount of power produced in Kenya (33.4%), is from thermal

sources (fossil fuels). With less need of power generation, the diesel power generators can be rested. This will ultimately result in a reduction in the generation of greenhouse gasses. The project will further reduce the need for diesel operated (factory and business) equipment and household dependence on kerosene and fire wood. This will again help reduce emission of greenhouse gasses and global warming.

6.2.4; Contribute towards lowering the cost of electricity

The project as stated above will help reduce transmission losses by almost 30 percent. This will translate into reduced power production costs and as a consequence the final power tariffs per kilowatt hour charged to Kenya Power customers.

6.2.5; Employment Opportunities

The construction, implementation, and decommissioning phases of the proposed project will create employment opportunities for both skilled and unskilled personnel. These opportunities will include;

- Way-Leave Officers (at least 2 who shall be KETRACO staff),
- Bush clearing personnel (by contractor/proponent)
- Tower foundation, erection, and stringing technicians (by contractor)
- Drivers (by contractor/proponent)
- Security personnel (by contractor/proponent)
- Casual Workers (by contractor)
- Operation and maintenance technicians (by proponent)
- Cleaners (by proponent)
- Decommissioning staff (by contractor)

The project can employ an approximated 50 permanent staff and 150 casual workers. The proponent has committed to ensure that priority is given to the local communities.

6.2.6; Contribution towards reduction of environmental pollution

Studies show that, the dominant energy source in the two counties is fuel-wood (charcoal and fire wood). The project will provide alternative energy source and thus reduce reliance on fuel-wood thereby contributing towards among others, the national goal of meeting the minimum forest cover (charcoal burning is a key contributor to reduced forest cover) and emissions from burning of fuel-wood (reducing household air pollution).

6.2.7; Gains in the Local and National Economy

Expected gains in the local and national economy from the construction and operation of the proposed project will be in the form of consumption of locally available materials. Local economy will benefit from the sale of;-

1. Fuel and lubricants from the main petrol stations at Kilgoris, Lolgorien, and Kehancha for project vehicles and machinery and from the small retail shops at Osinoni, Nentekeny, Moita, and Game for motorbikes that may be used to ferry workers.
2. Cement, glass, metal, paint, and timber from hardware stores at Kilgoris and Kehancha for construction of project materials camps, workers' camps, and to some extent tower foundation.
3. Loose aggregates from local traders in Kilgoris, Osinoni, Nentekeny, Moita, Game, Lolgorien, and Kehancha for construction of project materials camps, workers' camps, and to some extent tower foundation.
4. Building stones and coarse aggregates from quarries and traders in Kilgoris, Osinoni, Nentekeny, Moita, Game, Lolgorien, and Kehancha for construction of project materials camps, workers' camps, and to some extent tower foundation.
5. Electrical equipment and services in Kilgoris, Lolgorien, and Kehancha for new electrical installations in buildings.

The national economy will benefit from taxes levied from the contractors and their employees and income from business associated with the project.

6.2.8; Informal Sector Benefits

The project will require supply of large quantities of building materials most of which will be transported by local traders. Project workers will need to go to their designated places of work which will boost the local transport industry especially *matatus* and *boda bodas.* Project vehicles and machinery will require regular maintenance which can be sourced from local garages and spare part shops in Kilgoris, Lolgorien, and Kehancha. The Project will also spur the growth of small business enterprises including those that provide accommodation, food items, health services, entertainment, clothing, and enhancement of beauty among others in urban centers like Kilgoris, Murram, Osinoni, Nentekeny, Moita, Game, Lolgorien, and Kehancha.

6.2.9; Development of Other Sectors

Increase in reliability and security of power supply in the region will enhance efficiency and productivity of other sectors including;-

1. Improved grades for school going children due to added study time,

2. Better performance of health facilities in Kilgoris, Lolgorien, and Kehancha as they can now have reliable power to run power operated treatment equipment and refrigeration
3. Increased livestock production due to an increase in availability of market as a result of more abattoirs with refrigeration facilities and milk processing industries in the main urban centers. The livestock industry will also benefit from refrigeration of drugs and increase in Artificial Insemination (AI).
4. Increased efficiency in water supply due to power operated water pumping equipment.
5. Improved agricultural production in areas with surface water resources like Lepolosi, Murram, Osinoni, Ol Donyo Narok, Moita, and Narolong due to an increase in power driven irrigation equipment.
6. With more reliable power supply, Mara Sugar Company will be able to increase its daily cane processing. This will create a need for more sugar cane by the company which in effect will increase the sugar cane market and agricultural production in the area.

6.2.10; Security

Increased availability of power will trigger more street lighting in Kilgoris, Lolgorien, Osinoni, Nentekeny, Moita, Narolong, Game, and Kehancha. Increased power connectivity in the villages within the project area will lead to more security lights in households. This will contribute towards enhancement of security in the project area and may contribute towards a reduction in arson activities that normally happen at night due to land conflict in the area.

6.3: Negative Impacts

Social Impacts

6.3.1; Acquisition of Wayleaves and Land for Sub-stations, Contractor Facilities and Workers Camps

The proposed project will require a wayleave corridor of 30m width. Within the 30m corridor, no structures or trees or crops with a capability of growing taller than 6ft (1.8m) shall be allowed. Sugar cane which is the main crop to be affected has no capability of growing taller than 6 ft (1.8m) and can be allowed except on tower foundation areas.

In Ol Donyo Koipit and Ololchani land registration blocks which host Lepolosi, Murram, and Naboda villages more than 20 parcels may be affected. Here, average land acreage is 10 acres. Before the Naboda River, land use is agricultural and mainly comprise of food crops like maize, beans, and vegetables. After the river, the land is mainly under sugar production. Way-leave acquisition in this section, apart from land, will affect a few structures, a number of trees and crops. Affected structures can be relocated in the same land. Osinoni land

registration block hosts a Transmara Sugar Company sugar collection point which indicates the extensive sugar production in the region. The region also host a 1 km long Eucalyptus plantation forest owned by the Nyamache Tea Factory. Way-leave acquisition here apart from land will affect a number of structures, sugar cane farming, the plantation forest, food crops like maize, fruits, beans, and vegetables and a number of trees. In Endonyo Narok village, way-leave acquisition will affect a number of structures, trees, sugar cane farms and food crops. The village also host a primary school that is on the way-leave trace. Moita land registration block has large blocks of land that are mostly over 30 acres. Over 20 parcels of land will be affected. The land is under sugar production and food crops. Moita has a number of hills and hosts a number of rivers and therefore, a number of trees will be affected. Also, to be affected will be a number of structures. Masurura registration block comprise of Narolong and Game villages. As compared to the other sections of the TL, this is the least densely populated section. Land use here is mainly under bushes and serves as grazing fields. Land, structures, crops, and trees will be affected in the acquisition of way-leave. The section hosts the proposed substation land.

Land will also be required for ancillary facilities, which may include, project campsite, materials holding and storage facilities, temporal worker camps, quarries, etc.

Way-leave acquisition will also have effects on family set-up due to unexpected large income from compensation including domestic violence/wife battering, drunkenness, marrying more wives, running to far urban Centers to seek worldly pleasures, getting conned, misuse of money, and gambling.

Proposed Mitigation measure

To properly resettle and fairly compensate affected people and communities, the proponent should;

- Conduct an elaborate Resettlement Action Plan (RAP)
- Compensate PAPs fairly (at full replacement cost) and promptly
- Give PAPs adequate time to relocate
- Form Resettlement Action Plan Committees to resolve potential conflicts
- Salvaged materials from structures, crops, and trees to belong to PAPs
- Formulate and implement a Livelihood Restoration Plan to cushion economic displacement and loss of livelihoods. This should include sugarcane farming, woodlot for Nyamache Tea Factory, and for any other businesses and livelihoods affected by the project.

- Develop and implement a Gender Mainstreaming Plan to reduce the risk of gender inequality and biases and ensure participation of women in decision making and sharing of project benefits.
- Before and after the compensation process, conduct focused groups sensitization fora and counselling sessions to discuss social vices associated with receiving an unexpected (large) income.
- To manage community expectations, the proponent to discuss and agree with the affected communities compensation modes for being disturbed. The compensation should either be in-kind or cash compensation.
- Reroute the line to avoid Nentekeny Primary School.
- Land for ancillary facilities will be acquired by the contractor on a willing seller willing buyer basis, while ensuring that the full replacement cost principles of OP 4.12 are adhered to.

6.3.2; Project Induced Labour Influx

The Kilgoris-Kehancha Transmission line will involve construction of civil works for which the required labour force and associated goods and services cannot be fully supplied locally for a number of reasons, among them worker unavailability and lack of technical skills and capacity. In this case, a majority of the labour force will need to be brought in from outside the project area. This in-flux may be compounded by an influx of other people who follow the incoming workforce with the aim of selling them goods and services, or in pursuit of job or business opportunities. This labour influx may have some impacts on the local communities including:

- Social conflict between the local community and the construction workers due to religious, cultural or ethnic differences or competition for labour opportunities or local resources.
- Increase in illicit behavior and crime including theft, physical assaults, substance abuse, and prostitution which will be felt more in urban centers like Kilgoris, Nentekeny, and Kehancha where the workers will seek accommodation.
- Increased burden on and competition for public service provision including water, energy, medical services, transport, and education in urban centers like Kilgoris, Nentekeny, and Kehancha where the workers will seek accommodation.
- Spread of diseases such as HIV/AIDS, STDs and other communicable diseases.
- Gender Based Violence such as sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors.
- Child labor and school dropout.

- Local inflation of prices due to increase in demand for goods and services in urban centers like Kilgoris, Nentekeny, and Kehancha where the workers will seek accommodation.
- Disregard of important cultural norms.

Proposed Mitigation measure

To reduce the impacts of labour influx, the proponent and the contractor should;

- Develop and implement a Local Recruitment Plan that will ensure employment of as many locals as is possible. Local laws require 30% of labour force to come from the locals.
- Formulate and implement a Labor Influx Management Plan that will ensure harmony between non-local workers and the locals and minimize effects of labour influx.
- Conduct sensitization fora for employees on ethics, morals, general good behaviour, GBV-SEA/SH, and the need for the project to co-exist with the neighbours. The fora should be guided by the Stakeholder Engagement Plan.
- Provide guidance and counselling on drug abuse, HIV/AIDS, and other STDs to employees.
- Sensitize local community on communicable diseases (STDs and HIV/AIDS) and GBV-SEA/SH.
- Provide male and female condoms to workers.
- Cooperation with local law enforcement and introduction of sanctions (e.g., dismissal) for workers involved in criminal activities.
- Provision of water supply source to workers and prohibition of use from other community sources or ensure the project and community agree on the right to access water from community sources.
- Create and implement a GBV Management Action Plan to mitigate and respond to Sexual Exploitation and Abuse (SEA) and workplace Sexual Harassment (SH) due to labor influx. The management action plan should take cognizance of 1. sensitivity of GBV, and 2. the need to ensure confidential reporting and responding to GBV cases reported.
- Mandatory and regular training for workers on required lawful conduct in relation to GBV in host community in addition to social and cultural inductions to workers. The project should support survivors who choose the legal redress route by referring them to the legal redress referral pathway – which could include legal entities (NGOs, lawyers, police stations etc.).
- Provision of opportunities for workers to regularly return to their families;

- Provision of opportunities for workers to take advantage of entertainment opportunities away from rural host communities.
- Ensure that children and minors are not employed directly or indirectly on the project.
- Sensitize construction site manager and project manager on how to handle criminal cases.
- Maintain an updated employee database on site.
- Issue construction workers with identification cards to access construction site.
- All criminal cases involving workers to be reported to the relevant authorities through appropriate channels.

6.3.3; Impacts on Culture, Heritage, and Norms

The project site hosts the Maasai community which has certain distinct cultural practices that it hold dear and that act as an important ingredient to its unity. Incoming workers from other regions may affect these cultural practices by interference with cultural sites such as initiation grounds, burial sites, sacred trees, shrines etc., having sexual relations with local communities, cutting down culturally sacred trees, and eroding local cultures as a result of introduction of new ways of life.

Proposed Mitigation measure

To ensure the project has minimal impacts on culture, heritage, and norms for the affected communities the proponent should ensure that:

- The contractor to engage a local liaison (cultural ambassador) to guide and advice the project on all issues regarding culture, heritage and norms.
- Graves should never be excavated. Should they accidentally be excavated, certain traditional rituals must be performed with KETRACO bearing the cost of the rituals. The cultural ambassador to advice on required rituals. Contractor to design the towers so as to avoid marked graves.
- During the traditional ceremony of Rite of Passage (circumcision), the “morans’ live in ‘manyattas’. With the assistant of the cultural ambassador, the proponent, should consult local elders and ensure such ‘manyattas’ are not put up on the wayleave. Should they be on the wayleave, works in the location must be skipped until the occasion ends which can take up to 3 months.
- Workers from other cultures especially women are not allowed anywhere near the manyattas.
- Certain sacred trees, like the *mugiet (*a tree on which the sticks that were used in roasting meat during circumcision and other traditional ceremonies) cannot be felled

until elders perform the necessary rituals. All sacred trees and cultural sites along the route should be identified and listed.

- Workers should avoid sexual relationships with locals. Sexual relations with local married women is considered to be a taboo and could lead to conflict or violence.
- Contractor to prohibit workers from wearing clothes that are too revealing.
- The contractor shall sensitize workers to respect the culture of the local community and not to impose their culture on the community.

6.3.4; Effects on Livestock farming

One of the project area's main socio-economic activity is livestock rearing. The Maasai community regard livestock with high esteem and see them as a measure of one's wealth. Livestock is also a common feature in most Maasai traditional rituals. Community conflicts based on livestock are known to happen here. Any activity that affect livestock production is therefore, most unwelcome and requires mitigation. The transmission line project may affect livestock production sector in the following ways:

- Animals may fall into the excavated pits for tower foundation
- Vegetation clearance may reduce animal fodder
- Abstraction of water for construction from local water reserves may reduce availability of water to animal
- Livestock death from falling objects during tower erection; being hoisted up during conductor stringing; and traffic accidents
- Noise, movement of equipment and staff, and general construction works may be a nuisance to the grazing animals

Proposed Mitigation measure

To ensure minimal effects to pastoralist, the proponent should ensure:

- Excavated foundation pits are well secured to avoid animals from falling into them. Foundation pits thought to take long must be secured by barbed or mesh wire.
- Excavated pits are backfilled as soon as possible
- Contractor to conduct selective vegetation clearance by only clearing what is necessary to ensure animals have enough fodder
- Contractor develops water pans at strategic points where water can collect during wet seasons for his construction activities and for livestock.
- During dry seasons no water is extracted from the local water resources. The contractor to use water-bowsers with water from water companies in Kilgoris and Kehancha

- During conductor stringing one person is posted on each tower with red and green flags and whistle so that he can give a signal, which is relayed to the pulling end by other similarly placed persons, to stop the paying out operation if any incident of animal hoisting is encountered.
- Set speed limits in sections where there is high concentration of animals

6.3.5; Women Inclusion and Empowerment

During stakeholder consultation, it was identified that, women attendance in project meetings was very low. This could partly be attributed to the patriarchal nature of the Maasai community in the project area where women are not allowed to head households, make community decisions, or attend public meetings when adult males are present. Furthermore, the many household and field chores that women have to take care of, leave them with little if any time to attend meetings.

Proposed Mitigation measure

To enhance inclusion of women in project meetings and other decision making fora and to empower them, the following measures are proposed;

- Develop and implement a Gender Mainstreaming Plan to reduce the risk of gender inequality and biases and ensure participation of women in decision making and sharing of project benefits.
- For the employment of project staff, the proponent and contractor to give more preference to women applicants and to encourage women to apply.
- In developing a Stakeholder Engagement Plan, the proponent and contractor to ensure women are identified as an important focus group and the plan's implementation to be sensitive to women's availability to attend meetings.
- For any community meetings held, the announcement to encourage women to attend and the organizers to design initiatives that reach out to more women to attend the meetings.
- The proponent to ensure all women PAPs are compensated and in a fair and timely manner. Where possible create joint accounts between spouses for disbursement of compensation funds.
- Inclusion of women representatives in the Grievances Redress Mechanism.
- Conduct sensitization fora about the importance of women participation in the project.
- Identify and address women employee security issues, including their safety while traveling to and from work and on project-related business.

- Proactively recruit and appoint women workers to senior, managerial, and executive positions and give them opportunities to lead on important assignments and task forces.
- Offer flexible work options for women workers, accord them their leave days, and where possible support their access to child and dependent care.
- Eliminate all forms of Gender Based Violence such as Sexual Exploitation and Abuse (SEA) and workplace Sexual Harassment (SH of women and girls, exploitative sexual relations, and illicit sexual relations with minors.

Environmental Impacts

6.3.6; Community Health and Safety

During the construction implementation, and decommissioning phases phases of the project, a number of project process namely tower foundation, erection of towers, and the conductor stringing may have some negative impacts to the surrounding communities including the following:

- Children may fall into excavated tower foundations
- Children may drown in water filled excavated tower foundations
- Children may try to climb erected towers and risk falling or electrocution
- People may accidentally be hoisted up by conductors during stringing
- Traffic accidents.

For transmission lines in the range above 400kV, noise in the form of buzzing or humming can often be heard producing corona. Ozone, a colorless gas with a pungent odour, may also be produced. Buzzing/humming is also heard from substations. In quiet rural areas this can even be heard up to 300m or more, depending on topography, vegetation etc. Neither the noise nor ozone produced by power distribution lines or 132kV transmission lines carries any known health risks.

Proposed Mitigation measure

To ensure the safety of children and other community members, the proponent should ensure that:

- Excavated foundation pits are well secured to avoid children from falling into them. Foundation pits thought to take long must be secured by barbed or mesh wire and any water in the pit drained every morning.
- Excavated pits are to be backfilled as soon as possible
- The proponent should conduct sensitization fora on the dangers posed by the transmission line (especially on children) and ways of staying safe.

- Safety features including danger warning sign and perimeter barbed wire surrounding each tower are put in place.
- Contractor facilitates the community to keep vigil or employ security guards to ensure no kids climb the towers.
- During conductor stringing one person to be posted on each tower with red and green flags and whistle so that he can give a signal, which is relayed to the pulling end by other similarly placed persons, to stop the paying out operation if any incident of a child hoisting is encountered.
- Within settled areas, speed limits are imposed and people, especially children, are given the right of way.
- To reduce the corana effect the overhead line insulator sets should be provided with grading rings at the bottom of insulator string (corona rings).
- To reduce effects of the noise from corona effect on population, final detailed design should avoid densely populated areas.
- The substations shall be 132/33kV substations and the buzzing/harming sound is not predicted but should this be the case, the proponent should consider creating noise shields. Creating a tree canopy (along the safe sections of the perimeter fence) can also help in shielding the noise.

6.3.7; Destruction of Existing Vegetation and Habitats

The project will require a way-leave of 30 meters width for the 34km. Within the way-leave, selective clearing of vegetation will be necessary to (1) remove any tall trees that pose a risk to the transmission line, (2) give way for the construction of the towers; and (3) give room for workers to do survey work and stringing of the transmission line. It is estimated that, over 4,000 trees of various ages, height, width, and species may be affected by the project. Vulnerable indigenous tree species like *Dioyspyros abyssinca* (Olenatuyian), and *Olea africana* (Oloiren) as well as exotic trees such as *Eucalyptus spp* and *Grevillea robusta* may also be affected by the project. Main uses for the exotic species are fuelwood and construction. At Nyamache tea factory up to 2,000 trees may be affected.

The impact will be more felt in areas with high vegetation density including gallery forests (which are modified natural forest patches along riverine areas. Most are barely 50m), eucalyptus plantation belonging to Nyamache Tea Factory, and Masurura area. It will be long-term, as it would persist as long as the facility is in operation. However, the overall intensity of this impact is rated as medium, as much of the line is on agricultural land and that, the impact is not likely to be of wider significance given the paucity of species of conservation concern in the area, the overwhelmingly intact nature of the surrounding landscape as well as the fact

that average tree/shrub height in the transmission line corridor is less than 6ft (1.8m) and may require no clearing.

Proposed Mitigation measure

To minimize destruction of existing vegetation and habitats, KETRACO should ensure that;

- The Contractor to conduct selective vegetation clearance by only clearing what is necessary
- Trees that have no ability to grow beyond 6 ft (1.8m) tall, such as *Erythrian abyssinica, Rhus natalensis* etc., are not cut except if within the tower plinth area.
- Vegetation that needs to be reduced in height is cut to an acceptable height, and not to ground level except where necessary. This shall be especially true for vulnerable or endangered species like *Dioyspyros abyssinca*, *Kigelia Africana*, and *Olea africana*
- Bush clearing shall be to no more than absolutely necessary extent; At completion of construction work, areas not needed anymore should be replanted/reforested as far as the line security is not impeded;
- Collection or harvesting of any plants or fuel wood is strictly forbidden as it can exacerbate more clearing
- As far as possible, bush clearing be manual as opposed to mechanical or chemical methods
- Construction equipment is properly cleaned to avoid accidental spreading of invasive species.
- Fair compensation (full replacement cost) to the affected PAPs with the cut trees remaining the property of the PAPs
- With the assistant of KFS and KWS, KETRACO to facilitate community to initiate tree planting drives.
- As much as is possible avoid disruption and alteration of habitat during RoW maintenance.

6.3.8; Avifauna Mortalities

During the assessment, various types of avifauna were recorded including threatened, endangered, endemic and long distance migratory birds (Appendix III). The transmission line therefore, is quite likely to have impacts on birds and bats. The impacts will be as a result of destruction of habitats including their breeding areas, noise pollution, or collision with transmission line cables.

In Sugarcane farms, there is an abundant occurrence of the common bulbul (*Pycnonotus barbatus*), the Common stone chat (*Saxicola torquatus*), Eurasian bee eater (*Merops*

apiaster), and Common waxbill (*Estrilda astrild*). In the scattered forests and woodlands, the Common bulbul (*Pycnonotus barbatus*), Grey throated barbet (*Gymnobucco bonabartei*), Speckled mouse bird (*Colius striatus*), and Double toothed barbet (*Lybius bidentatus*) are abundant.

Notable mammals include the rare *Cephalophus silvicultor* (LR/nt), the little-known *Felis aurata* and the very sparsely distributed bat *Stenonycteris lanosus*. There are also reported cases of Hamiltons tomb bat *Taphozous hamiltoni and* Kenyan big eared free-tailed bat - *Tadarida lobate.* A number of regional endemics occur such as *Tauraco hartlaubi* and the restricted-range *Cisticola hunteri* and *Francolinus jacksoni*. Regionally threatened species include *Hieraaetus ayresii* (scarce and local); *Stephanoaetus coronatus* (resident in small numbers); *Tyto capensis* (no recent records); *Bubo capensis*; *Glaucidium tephronotum* (fairly common); *Indicator exilis*; *Sheppardia polioptera* (uncommon and local); and *Campephaga quiscalina* (uncommon resident).

Avifauna mortality by transmission lines can either be due to electrocution or strikes by the conductors. The separation between the conductors of the transmission line (132kV) shall be a minimum of 3m and therefore, bird and bat electrocution will be highly unlikely (electrocution can only occur if the bird or bat touches at least two conductors). Bird and bat strike by the conductors is however, likely and in a few circumstances may lead to mortality. Bird mortality from collisions with power lines is well documented (Bevanger, 1994, Lehman *et al.* 2007; Jenkins *et al.* 2010). Collisions occur most often where transmission lines intercept them in areas where birds concentrate, such as migratory flyways, feeding areas, and nesting/roosting sites (Savereno et al., 1996). In addition, collisions are more likely to occur during periods of high winds or low visibility such as on rainy days. Although some avian collisions with power lines occur during migration, most collisions take place during flights within a daily use area.

Proposed Mitigation measure

To minimize effects on avifauna habitats and collisions leading to their mortality;

- In consultation with KFS, KWS, Nature Kenya, and any other organization that deals with bird conservation, map important bird migration corridors. These should include areas around the galaxy forests, the eucalyptus plantation belonging to Nyamache Tea Factory, and the wooded areas in Masurura location.
- In the identified corridors, use bird flight diverters placed 7.5 m apart along the shield wire. The shield wire is the most dangerous section of line for flying birds and it's usually much thinner and difficult to see. Many birds do not see well in front of them

during flight. It is important that the flight diverters are reflective as well as contrasting, as many birds migrate at night.

- To avoid electrocution in the identified migration corridors, provide sufficient separation between energized phase conductors to accommodate at least the wrist-to-wrist or head-to-foot distance of a bird (approximately 1.8m) or insulate the conductors.
- Provide artificial bird safe perches and nesting platforms which are placed at a safe distance from the energised parts.
- Use perch management techniques i.e, cross-arms, insulators and other parts of the power lines can be constructed so that there is no space for birds to perch where they can be proximate to energised wires.
- Avoid wooded areas which act as bird breeding areas or areas with high concentration of birds especially in Lepolosi, Osinoni, Nentekeny, Moita, and Masurura.
- Limit noise pollution in bird habitats including Lepolosi, Osinoni, Nentekeny, Moita, and Masurura.
- Any avifauna mortality due to collision should be recorded, including the species affected and the date. If repeated collisions occur, then further mitigation and avoidance measures may need to be implemented.

6.3.9; Effects on Community Water Reserves

The project site has a number of water resources that the communities depend on for their daily use. The water resources traversed or close to the transmission line include:

- River Enkare Ngetwa
- River Naboda
- Enkare Ibi stream
- River Enkare Enesoit
- River Kapnor
- River Enkir Kor
- River Ole Katuna/Endonyo Narok
- River Moita
- Ndiiru River,
- Narolong River,

Project impacts on these water resources may including:

- Encroachment of river riparian zone.
- Destruction of riverine herbaceous plant cover.
- Abstraction of water by the contractor.
- Silt deposit in surface water reserves during tower foundation.
- Contamination of water by project workers when crossing, washing, or drawing water for drinking.
- Motor equipment crossing these rivers may result in some shoreline erosion or disturbance to banks and river bottoms.
- Leachates from open defecation by project workers.

- Oil contamination from motor equipment.
- Solid waste pollution.
- Effects on existing water pipelines.

Proposed Mitigation measure

To minimize effects on community water reserves;

- Avoid locating towers within the riparian zones
- Locate towers far enough back from river banks to prevent erosion related to the tower foundation and destruction of riverine herbaceous plant cover.
- Contractor should not be allowed to abstract water from the community water resources. The contractor to use water-bowsers with water from water companies in Kilgoris and Kehancha
- Contractor to develop and implement an oil spill minimization and cleanup plan to avoid contamination of the rivers by oil
- Avoid motor vehicles crossing rivers and streams from undesignated points to only use existing bridges or designated crossing points
- Contractor to provide mobile toilets
- Contractor to enact integrated solid waste management to reduce or completely stop contamination of water systems by solid waste.
- Avoid interfering with existing water infrastructure.

6.3.10; Impacts on Workers' Health and Safety

Workers in the project area may be exposed to various risks and hazards. The most serious hazards in the construction of transmission lines include:

1. Falling objects i.e. from high levels of towers and excavations.
2. Collapsing of excavations.
3. Poor hygiene as the contractor may find it difficult to provide sanitary welfare in the bushes.
4. Road accidents.

Other hazards may include; slips and trips, electrical shocks, electrocution, dust, noise and vibrations, fire, bruises and cuts, etc. This impact will be felt in construction, implementation, and the decommissioning phases of the project.

Proposed Mitigation measure

The proponent will implement all necessary measures to ensure health and safety of the project workers and the general public during construction, operation and decommissioning of

the proposed project as stipulated in the Occupational Safety and Health Act, 2007 including General Provisions (ensure the workplace is dully registered as a workplace, has a safety and health policy, has a safety and health committee, is always clean, have enough lighting and ventilation, sanitary conveniences are provided and are always clean, and provide clean drinking water to the workers), Machinery safety (ensure all machines requiring inspection are dully inspected by a DOSHS approved inspector and that inspections records are maintained on site, only approved/licensed workers operate machines such as cranes, excavators, graders, rollers, vehicles etc., machines and equipment are dully serviced as per manufacturers' manual and that service records are maintained on site), Chemical safety Material Safety (maintain a Material Safety Data Sheet for all chemicals at the site, provide appropriate personal protective equipment to workers handling chemicals, ensure all chemicals are labeled and appropriate warning signs are put in place).

Other measures will include but not limited to;

- Employing an Environmental, Health and Safety Officer.
- Formulate and implement a Labor Management Plan that will ensure among others child and forced labor are not engaged.
- Ensure the construction site is dully registered as a workplace.
- Establish a health and safety committee as per Factories and other places of Work (Safety and Health Committee Rules) requirements.
- Conduct job safety analysis for high risk activities and document safe work procedures.
- Identify all hazards before undertaking a process.
- Conduct and continually review a risk assessment.
- Hold daily morning toolkit talks where safety is the key issue.
- Train workers on health and safety.
- Ensure first aid kits and trained first aiders are available on site.
- Identify and train fire marshals and provide them with firefighting equipment.
- Ensure only qualified personnel operate construction equipment and vehicles.
- Ensure each worker is covered under an insurance policy as per WIBA.
- Ensure construction equipment and vehicles are regularly inspected by approved inspectors and inspection records maintained.
- Collect daily security briefs and avoid insecure places.
- Place warning signs where necessary.
- Provide all necessary PPEs including helmets, ear muff/plug, hand gloves, dust/respiratory mask, reflective jacket, goggles, safety boots, double hook safety harness, etc.
- Only allow trained and certified workers to conduct repair and maintenance of the TL.

6.3.11; Working at Height (Transmission Line Towers)

Though this falls under health and safety, in this ESMP, it is treated separately as it can lead to fatalities, as has indeed happened in some of the KETRACO lines. This, it is assumed, will lay enough emphasize to the contractor and the proponent of its importance and therefore, help achieve a 100% fall protection advised by the World Bank. It is probably one of the riskiest/most dangerous processes in the erection of transmission lines.

Proposed Mitigation measure

To ensure no injury or fatality is encountered due to falls from towers;

- The client/consultant must implement a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among other measures.
- Only qualified and experienced personnel, who have undergone medical tests, training, and have height passes, should be allowed to climb the towers.
- Every morning before beginning the works, there should be a tool box talk emphasizing on safety at heights.
- Structures and hoisting/height equipment must be tested for integrity prior to undertaking work.
- No personnel should be allowed to climb the towers while drunk or under the influence of drugs
- There should be a ground supervisor constantly observing and conversing with the workers atop the towers. The officer should ensure workers observe safety precautions at all the times and should have emergency telephone contacts.
- Use approved tool bag for raising or lowering tools and materials to workers atop the towers.
- Workers climbing the towers must be provided with non-slip footwear, gloves, helmet, and double hook safety harness and should be compelled to use them all the time. The PPEs should constantly be inspected, maintained, and replaced where necessary.
- Safety belts should be of not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident.

6.3.12; Solid and Liquid Waste Generation

It is expected that solid waste will be generated in all phases of the project.

During construction, generated waste will include; excavated soil and rocks, residual loose and fine aggregates, cement bags, reject PPEs, wooden boxes used to deliver tower parts, conductors, steel, metal, plastic, glass, paper, organic, paints, adhesives, sealants, fasteners, wastewater, sewage etc.

Cement will be used in large quantities during the construction period. This will in essence mean production of a quite substantial amount of cement bags. If not properly disposed, the bags litter the area, pollute the environment, are an eyesore, and become the most noticeable thing (poor environmental management by the proponent) by the community. This therefore, calls for the contractor and the proponent to ensure collection of all used cement bags and their proper disposal. PPE provided to the workers, including masks, reflective jackets, boots, helmets, etc., get worn-out after some time. A waste disposal plan for worn-out PPEs, that include collection and proper disposal, should be developed and implemented.

Experience from the already built transmission lines in Kenya show that, many contractors fail to collect (effectively) the remnants of the loose aggregates (locally known as kokoto) and concrete from the tower bases. This creates a small patch that is not ecologically productive and can be seen many years after construction. Nothing can grow on this patch. Assuming that, this transmission line will have an approximated 100 towers and that each patch is about a meter square, the transmission line will create a desert equivalent to 100 square meters which is about 0.025 of an acre. Not big but a significant figure.

Proposed Mitigation measure

To avoid waste generation or to minimize the amount of waste generated, the following measures are recommended;

- Provide mobile toilets for construction workers to manage human waste.
- Provide well labeled waste collection bins at designated points on site to handle solid waste. Ensure segregation of waste.
- Implement sustainable waste management principles of reduction, reuse and recycling.
- Contract a NEMA licensed waste handler to collect and dispose waste. Ensure updated waste tracking sheets are maintained for collected waste.
- Ensure collection and proper disposal of all used cement bags.
- Develop and implement a waste disposal plan for reject PPEs.
- Sensitize construction workers on best waste management practices.
- Accurately estimate the dimensions and quantities of materials required especially fine and loose aggregates for tower bases.

- Reduce material and energy consumption.
- Ensuring that, all remnants of loose gravel and concrete are effectively collected from the tower bases and re-used or disposed of in an environmentally friendly manner.
- Construction waste shall not be left in stockpiles along the wayleave, but removed and reused or disposed of on a regular basis.

6.3.13; Noise and vibrations

The construction and decommissioning works of the project will most likely be noisy due to the moving machines (concrete mixers, tippers, drilling etc.) and incoming vehicles to deliver construction materials to site or take away debris. This impact can lead to; hearing problems, disruption of animal behaviors, and psychological and physical stress among workers which can reduced their productivity.

Machines like tippers and concrete mixtures produce continuous high levels of noise over a long period of time every day. Operators of these machines are therefore exposed to high levels of noise over long period which is continuous. This as a stand-alone can be rated as high but overall noise impact for this project is however rated moderate to low.

For transmission lines in the range above 400kV, noise in the form of buzzing or humming can often be heard producing corona. Ozone, a colorless gas with a pungent odour, may also be produced. Buzzing/humming is also heard from substations. In quiet rural areas this can even be heard up to 300m or more, depending on topography, vegetation etc. Neither the noise nor ozone produced by power distribution lines or 132kV transmission lines carries any known health risks.

Proposed Mitigation measure

Ensure that noise levels emanating from machinery, vehicles and noisy construction activities (e.g., excavation, blasting) are kept at a minimum for the safety, health and protection of workers within the vicinity of site and nearby communities. This can be achieved by regular maintenance and servicing of machine and vehicles, reducing idling of vehicles and equipment, sensitizing drivers against unnecessary hooting, blasting only when very necessary, among other measures. No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day. In addition no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dBC. Employees working in continuous loud noise should be provided with the necessary PPEs and impelled to use them.

Exposure to hand-arm vibration from equipment such as hand and power tools or whole-body vibrations from surfaces on which the worker stands or sits shall be controlled through selection of equipment and limitation of time of exposure. The limits for vibration and action values, i.e. the level of exposure at which remediation should be initiated, should not exceed a daily exposure limit value standardized to an 8-hours reference period of 5 meters per square second (m/s^2) for hard-arm and $1.15m/s^2$ for whole-body.

The contractor will adhere to the EMCA Noise and Excessive Vibration Pollution Control Regulation, 2009 and will be required to implement noise control measures amongst exposed work force and community. This will include provision of hearing protective devices such as ear plugs and ear muffs; avoiding construction or demolition activities during the night (where there will be need to work at night or where noise levels may be breached, the contractor will have to seek approval from NEMA), education and awareness programmes and creation of a buffer to propagate against noise pollution among other noise control measures.

Rock blasting for this project may not be necessary as no serious rock outcrops were identified but should the contractor encounter underground hard rocks, blasting may become necessary. Blasting will be guided by the Explosives Act, 2012 which requires one to have a permit to acquire or use blasting materials and to follow rules under section 30 – referred to as Explosives (Blasting Explosives) Rules, 1962. The rules include; licensing and permits, packaging, transportation, dealing with, usage, storage, sale, record keeping, and accidents (reporting and enquiry). Blasting may also require a variation of the NEMA License.

6.3.14; Air Pollution

Exhaust emissions are likely to be generated by the motored equipment during the construction and decommissioning phase of the proposed project. Ozone may be produced due to corona discharge, but it is likely not to be a significant amount and would be easily dispersed. Motor vehicles that will be used to ferry construction materials, take away debris during decommissioning phase or those used for general operation activities (operation phase) will also have impacts on air quality. Diesel operated power back-ups (Generators) if used may also produce exhaust emission.

The construction phase of transmission line projects requires use of large amounts of cement. Workers, especially, those who work on the concrete mixers will therefore be exposed to cement dust. Dust emission is also likely to occur during site clearance, excavation of foundation for steel towers, vehicles moving on dirt roads, and by uncovered trucks delivering

loose aggregates to the site. Dust emissions are also likely to occur during the decommissioning phase.

Exhaust and dust emissions will mainly affect workers and community members. Workers will be affected in the entire line while effects on community will be more pronounced in areas like Lepolosi, Osinoni, Endonyo Narok, Moita, Narolong, and Game where settlements are close to the TL.

Proposed Mitigation measure

To mitigate against exhaust emissions, the proponent is advised to sensitize truck drivers and machine operators to switch off engines when not in use; regularly service engines and machine parts to increase their efficiency and reduce generation of exhaust emission; and where feasible use alternative non-fuel construction equipment.

The proponent will endeavor to minimize the effect of dust on the surrounding environment resulting from use of cement, site clearance, excavation, demolition works, and temporary access roads to ensure protection of health and safety of workers and communities. Control measures will include, use of PPE; regular sprinkling of water on dusty areas and temporary access roads; and observing set speed limits among other measures.

6.3.15; Soil Erosion

Certain sensitive areas prone to impacts of soil erosion, were identified. These included hilly areas and areas with rivers, streams, and springs (given in section 3.5). In these areas, if not checked, soil erosion from the loose excavated soil, may lead to; land degradation, loss of soil fertility, and siltation of water resources which affects water quality and productivity in aquatic ecosystems.

Proposed Mitigation measure

To reduce soil erosion, the following mitigation measures are important:

- Soils excavated for the tower foundations should be used for refilling and should not be left exposed to wind or water for long periods.
- Apply soil erosion control measures such as levelling of the towers to reduce run-off velocity and increase infiltration of storm water into the soil.
- Ensure that construction vehicles are restricted to use existing graded roads.
- Contractors should avoid steep terrain during the transportation of construction material by using alternative routes or use light vehicles where appropriate.

- Riverine vegetation should be minimally disturbed during the construction phase to reduce soil erosion and safeguard riverbank. This may include realigning the transmission line route and redesigning the tower placement to avoid the riverine vegetation.
- Re-plant degraded areas with local species common in the area to complement natural vegetation regeneration to improve ground cover.

6.3.16; Archeological and Historical sites

The archaeological Baseline Survey identified some locations that may have archaeological material. Further, during excavations for the tower bases, workers may come across Archaeological finds. No historical sites were identified. Project effects on archeological and historical sites may include:

- Damage or interference with archeological and historic sites.
- Chance encounter of archaeological material during construction phase.
- Destruction of buried archaeological materials by heavy machinery, earthworks and excavation during the construction phase.
- Unearthing of unexpected/unmarked/unidentified graves.

Proposed Mitigation measure

To reduce impacts on Archeological and Historical sites;

- Train KETRACO and construction staff on identification of archeological objects.
- If there is a chance encounter of archaeological material during construction, employ Chance Find Procedures. Chance Find Procedures include stopping construction works at the site, confining the site using tapes or local materials, and informing relevant authorities including local administration officers and the National Museums of Kenya (NMK) for further direction.

6.3.17; Aircraft Navigation Safety

The Kenya Civil Aviation Authority (KCAA) regulations, establish standards for determining obstructions in navigable airspace. Issues such as size and height of tower/poles, right-of-way needs, maintenance access, and impacts to the approach zone, clear zone, or safety zone has to be evaluated and approved by KCAA to utilize property near airports and airstrips.

The consultant in consultation with KCAA identified the following airstrips:

- Kilgoris airstrip which is 9.91 km from TL,
- Intona airstrip, 5.17 km from the TL and

- Kehancha airstrip 2.02 km from the TL.

To ensure the safety of aircrafts within these sections, KETRACO will be required to acquire a KCAA license for this transmission line. This may involve overflying the transmission line with KCAA officials. Where it is likely that the power line is hazardous to aviation safety because of its height or location, spherical markers will be used to identify overhead power lines or KETRACO will consider reducing the size of its towers in such sections.

6.3.18; Traffic disruption on road crossings during stringing

The transmission line will cross a number of roads including; Kilgoris-Awendo, Kilgoris-Nentekeny, Moita-Narolong, and Narolong-Kehancha. GPS coordinate of these roads are given in section 2.2. Effect of the transmission line on the roads will include; encroachment of road reserve, and disruption of traffic flow during conductor stringing.

To avoid encroachment of road reserve and reduce traffic disruption on road crossings during tower erection and stringing:

- Seek necessary approvals from the roads' authorities.
- Inform community on the time and dates prior to disruptions of traffic.
- Involve local traffic police and/or administration.
- Put up clear signs and provide traffic marshals to guide motorists during conductor stringing.

6.3.19; Visual and Aesthetic Impacts

The physical presence and profile of the proposed transmission line will alter the visual and aesthetic effects of the surrounding area. The project terrain in most section is rather flat and concealing the tall pylons of the TL will be a difficult challenge.

Contractor's materials' yard/camp sites and any temporary structures (e.g., toilets) built/placed on the way-leave by the contractor will also impact on visual and aesthetic nature of the surrounding areas.

Proposed Mitigation measure

To reduce impacts on visual and aesthetic values of the area, the project proponent will;

- Undertake extensive public consultation during the planning of the project.
- Design structures at the site in such a way as to improve the beauty of the surroundings.

- Restore site areas through backfilling, landscaping and planting of trees, shrubs and grass on the unused areas to re-introduce visual barriers.
- Design and implement an appropriate landscaping programme.

6.3.20; Perceived Danger of Electrostatic and Magnetic Force

Electric power lines are considered a source of power frequency, electric and magnetic fields, which may have a perceived health effect. The strength of both electric and magnetic fields is a function of the voltage and the lateral distance from the power lines to the receptor. Many studies published during the last decade on occupational exposure to Electro-Magnetic Fields (EMF) have exhibited a number of inconsistencies and no clear, convincing evidence exists to show that residential exposures to electric and magnetic fields are a threat to human health. However, the EMF decrease very rapidly with distance from source (over 30m high) and there should be no potential health risks for people living outside of 30m corridor.

Proposed Mitigation measure

The proponent will take the precautionary principle approach and ensure that a safe distance is maintained between residential units and the TL and conduct education and awareness campaigns to dispel fear among communities on the effects of electrostatic and magnetic forces.

6.3.21; Fire outbreak

Fire outbreak due to electrical faults in the TL and flammable substances is a possible effect of the proposed TL. If underlying growth is left unchecked, or slash from routine maintenance is left to accumulate within the way-leave, sufficient fuel can accumulate that may promote fires. Fire outbreak from electrical faults is highly unlikely given that, modern technology, allows for a split second circuit break in case of an electrical fault but use of match boxes and lit cigarettes by workers can indeed cause fire.

Proposed Mitigation measure

To reduce the risk of fires in the project area, the following mitigation measures are proposed;

- Conduct fire risk assessment and prepare a Fire Response Plan
- Advise workers not to smoke in forested areas.
- Ensure compliance with fire safety regulations and ensure availability of all necessary fire safety equipment.
- Conduct regular training and fire drills for employees
- Regularly monitor the way-leave and ensure there is no accumulation of flammable substances including plant material.

- Create fire-breaks (ploughed strips) on strategic areas of the TL
- Build capacity for workers and community on fire related issues including sources, fighting, and vigilance.

6.3.22; COVID-19

Since the emergency of Coronavirus (COVID-19) pandemic in the country in March, 2020, the number of infections continue to raise. For this project, due to interactions between consultant staff, KETRACO staff, and community members, the spread of COVID-19 among workers, KETRACO staff, and community members is highly probable. Impacts COVID-19 may have for this project include;

- Increased high expectations on the project e.g., higher demand for jobs, CSR activities, compensation monies, salaries/wages etc.
- Psychological effects of Covid-19 and social isolation may lead to increased cases of GBV including, GBV-SEA, workplace Sexual harassment, as well as other forms of GBV at the community or family level attributable to the project.
- Due to COVID-19 effects the burden of taking care of the household might fall disproportionately on women, therefore making it difficult for them to take part in e.g., including consultation fora, decision making etc.
- External sourcing of labour may be impeded by, (a) cessation of movement; and (b) unwillingness of some workers to live in unfamiliar locations during a pandemic (fear of contracting the virus), and especially in locations with a high number of infections/pandemic epicenters.
- Stigma and social discrimination of outsiders who might be viewed by locals as spreaders of COVID-19. This might lead to social divisions in the project area between the locals and outsiders who will be working on the project such that the relations will be strained.

Proposed Mitigation measure

To reduce the risk and effects of COVID-19, the following mitigation measures are proposed; All staff and community members should;

- Regularly and thoroughly clean their hands using soap and running water or with an alcohol-based hand rub.
- Maintain at least 1 metre distance between themselves and others.
- When coughing or sneezing, cover mouth and nose with flexed elbow or use disposable tissue and discard after use.
- Avoid touching eyes, nose and mouth.
- Always wear a mask in public and safely dispose used masks.

- Greet people with a wave, a nod, or a bow instead of shaking their hands.
- Avoid going to crowded places.
- If they have a fever, cough, difficulty breathing, or any other COVID-19 symptom, they should seek medical attention.

The proponent must;

- Every morning monitor staff health for symptoms such as fever, cough, or difficulty in breathing.
- Make sure workplaces and equipment are clean and hygienic and are regularly disinfected.
- Put sanitizing hand rub dispensers in project vehicles.
- Develop a response plan in case someone becomes ill with symptoms of COVID-19.
- Give additional support to those disadvantaged and vulnerable groups who have been further disenfranchised due to negative social and economic impacts of Covid-19.
- Manage increased high expectations on the project e.g., higher demand for jobs, CSR activities, compensation monies, salaries/wages etc. through training and information dissemination.
- Assist people to cope with stress and psychological effects during the COVID outbreak.
- Develop and implement a Gender Mainstreaming Plan with COVID-19 effects in mind to reduce the risk of gender inequality and biases.
- In sourcing external labour (adverts and interviews), ensure people know measures employed to protect them from contracting COVID-19.
- Organize with the MoH on how project workers can be tested for COVID-19 from time to time.

6.4 Potential threats to the Transmission Line

Threats to transmission lines include Vandalism, Natural Disasters, Local Conflicts, Terrorist Attacks, and Manufacture or Installation Defects.

Vandalism involves destruction or damage of transmission line components by thieves or hateful/deliberate persons. Vandalism mainly happen in remote areas with no settlement and very low human activity. The most affected parts include tower angle bars, nuts, barb wire, warning plates, stay, and earth wire. This may lead to weakening of the tower and possible collapse. The collapse of one tower on the network leads to uneven stress on the two adjacent towers leading to a possibility of a domino effect which may lead to power outage.

Natural disasters like earthquake, landslides, lightening, and torrential rains can also affect the integrity of the transmission line components that may lead to the collapse of towers and subsequent power outages.

Nentekeny location has been known to host a number of conflict which revolve around land conflicts between the Siria and the Uasin Gishu clans . These conflict sometimes involve gun fights and may lead to evacuation of project staff from the area. If the TL staff are evacuated due to such conflicts, the power system will be left un-attended and may lead to power outages.

Terrorists may aim to sabotage the power system. This may include physical assault of towers and their components, substation equipment, or project staff.

Manufacture or Installation Defects are as a result of use of sub-standard and defective equipment, installation of the TL by unqualified contractors who were never keen on details, week foundation bases for the towers, siting of towers on riparian zones or weak grounds, failure to strictly adhere to set standards, weak supervision of construction activities among other reasons.

To counter these threats, the following measures are proposed;-

- Use of anti-theft bolt and fasteners and an anti-climbing spike system.
- Use of lightening arrestors at strategic areas of the TL.
- Locate towers away from the highest recorded flood level of any water-way and in soils that can effectively support the towers. Similarly the towers should not be locate in areas prone to landslides.
- Supervision of project construction should be of the highest standard.
- Regular surveillance of the TL and advocate and support community surveillance mechanisms.
- Creation of a department that will be responsible of monitoring the integrity of the TL equipment and responding to any threat to the transmission line. Empower this department with all required staff and resources so as to be able to quickly respond to emergencies to avoid long duration of power outages.
- Develop and implement a Security Management Plan to deal with these situations
- With time ensure more inter-connected systems e.g., creation of other TL in this area, to reduce over-reliance on this particular TL.

6.5: Impacts Characteristic Table

Table 6.1: Impacts Characteristic Table

Impacts	Nature	Magnitude	Timing (phase)	Duration	Extent	Reversible Irreversible	Likelihood	Significance
Reliable and secure electricity power	+ve	High	Operations	Long term	Large	Reversible	Certain	Regional
Big Four Agenda	+ve	High	Operations	Long term	Medium	Reversible	Certain	Regional
Reduced greenhouse gas emissions	+ve	Low	Operations	Long term	Large	Reversible	Probable	Regional
Low cost of electricity	+ve	High	Operations	Long term	Large	Reversible	Highly probable	Regional
Employment	+ve	Medium	All phases	Short term	Medium	Reversible	Certain	National
Reduced pollution	+ve	Low	Operations	Long term	Small	Reversible	Certain	Regional
Economic growth	+ve	High	All phases	Long term	Large	Reversible	Highly probable	National Regional
Informal Sector Benefits	+ve	Low	All phases	Long term	Small	Reversible	Probable	Regional
Development of other Sectors	+ve	Medium	Operations	Long term	Small	Reversible	Probable	Regional
Improved security	+ve	Low	Operations	Long term	Small	Reversible	Probable	Regional
Acquisition of wayleaves and land for substation, contractor facilities, and workers camps	-ve	High	Prior to construction	Long term	Large	Irreversible	Certain	Local
Livelihood restoration	-ve	Low	Prior to construction	Short term	Small	Reversible	Probable	Local
Gender biases	-ve	Low	All phases	Short term	Small	Reversible	Probable	Local
Inadequate stakeholder engagement and grievances management etc.	-ve	Low	All phases	Short term	Small	Reversible	Probable	Local
Inability for all community segments to access project benefits and opportunities including employment, local sourcing, capacity building etc.	-ve	Low	Preconstruction Construction and Decommissioning	Short term	Small	Reversible	Probable	Local
COVID-19	-ve	High	All phases	Short term	Large	Irreversible	Probable	Local
Project Induced Labour Influx	-ve	Low	Preconstruction, construction, operations, and decommissioning	Short term	Small	Reversible	Certain	Local
Culture, Heritage, and Norms	-ve	High	Construction	Short term	Large	Reversible	Probable	Local
Livestock farming	-ve	Low	Construction	Short term	Large	Reversible	Certain	Local
Community health and safety	-ve	High	All Phases	Short term	Large	Reversible	Probable	Local
Destruction of existing vegetation and habitat	-ve	High	Construction	Short term	Small	Reversible	Certain	Local
Avifauna disturbance and mortality	-ve	High	Construction Operations	Short term	Large	Irreversible	Probable	Local

Impacts	Nature	Magnitude	Timing (phase)	Duration	Extent	Reversible Irreversible	Likelihood	Significance
Water pollution	-ve	High	Construction	Long term	Large	Reversible	Probable	Regional
Worker health and safety	-ve	High	Construction, Operations, and Decommissioning	Long term	Large	Irreversible	Probable	Local
Working at height	-ve	High	Construction Decommissioning	Long term	Large	Irreversible	Probable	Local
Waste handling, storage and disposal	-ve	Medium	Construction, Operations, and Decommissioning	Long term	Small	Reversible	Certain	Local
Noise and vibrations	-ve	High	Construction, Operations, and Decommissioning	Long term	Small	Irreversible	Certain	Local
Air pollution	-ve	Medium	Construction, Operations, and Decommissioning	Short term	Large	Irreversible	Certain	Local
Soil erosion	-ve	Low	Construction	Short term	Small	Reversible	Probable	Local
Archaeological and historic sites	-ve	Low	Construction	Short term	Small	Irreversible	Unlikely	Local
Air craft navigation safety	-ve	High	Operations	Long term	Large	Irreversible	Unlikely	Local
Traffic disruptions	-ve	Medium	Construction	Short term	Small	Reversible	Probable	Local
Visual and aesthetic impacts	-ve	Low	Construction, Operations, and Decommissioning	Long term	Small	Irreversible	Certain	Local
Perceived Danger of EMF	-ve	Low	Operations	Long term	Small	Irreversible	Probable	Local
Fire outbreaks	-ve	Low	Construction, Operations, and Decommissioning	Short term	Small	Irreversible	Probable	Local

CHAPTER 7: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

7.1: ESMP for the Pre-construction Phase

Table 7.1: ESMP for the pre-construction phase of the proposed project

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KES)	Responsible party
Social Impacts				
Acquisition of wayleaves and land for substation, contractor facilities and workers camps	✓ Loss of land, structures, crops and trees ✓ Loss/Disruption of livelihoods/income ✓ Effects on family set-up due to unexpected large income from compensation including domestic violence/Wife battering, drunkenness, marrying more wives, running to far urban Centers to seek worldly pleasures, misuse of money, and gambling. ✓ Delay in compensation for PAPs due to land disputes and lack of land ownership documents. ✓ Gender inequality, e.g., lack or inadequate participation of women in project meetings and other activities and unequal access to compensation for women etc. ✓ Denied physical access to social facilities e.g., health centers, schools, water points, etc.	✓ Develop and implement a Resettlement Action Plan (RAP) and a Livelihoods Restoration Plan (LRP) and ensure that all community segments including vulnerable individuals and households are fairly and promptly compensated, and their livelihoods improved or restored to pre-project levels. ✓ Compensate PAPs fairly (full replacement cost) and promptly ✓ Give PAPs adequate time to relocate ✓ Salvaged materials from structures, crops, and trees will be accessible to PAPs. ✓ Develop and implement a Livelihood Restoration Plan to cushion economic displacement and loss of livelihoods. This should include sugarcane farming, woodlot for Nyamache Tea Factory, and for any other businesses and livelihoods affected by the project. ✓ Develop and implement a Gender Mainstreaming Plan to reduce the risk of gender inequality and biases and ensure participation of women in decision making and sharing of project benefits including compensation. ✓ Before and after the compensation process, conduct focused groups sensitization fora and counselling sessions to discuss social vices associated with receiving an unexpected (large) income. ✓ Constitute Resettlement Action Plan Committees comprising of representation from all community segments to manage all aspects related to land acquisition and compensation. ✓ Develop a Stakeholder Engagement Plan and Grievances Redress Mechanism to guide stakeholder engagement and grievances management during all phases of the project and ensure all community segments including vulnerable individuals and households are promptly engaged, participate in the project, and equally access project benefits and opportunities. ✓ Ensure resettled PAPs enjoy or get access to social facilities like schools, health centres and water points to enable them to resettle with minimal distress. ✓ To manage community expectations, the proponent to discuss and agree with the affected communities on their preferred	Total budget for wayleaves acquisition as per the RAP is KES 136, 091,731 Budgets for acquiring land for substation, contractor facilities and workers camps will be determined once specific sites for the said facilities have been established and a cost analysis/valuation undertaken.	✓ KETRACO ✓ Contractor

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KES)	Responsible party
		compensation modes whether land, cash, or in-kind. ✓ For delayed compensation, KETRACO to deposit compensation monies on an interest earning escrow account until such cases are resolved. The proponent to ensure that information regarding the escrow account is timely disseminated to all PAPs in subsequent consultation fora. ✓ Land for ancillary facilities (including contractor facilities, and workers camp) will be acquired by the contractor on a willing seller willing buyer basis. ✓ The substation land to be completely purchased from a vendor (private land as there are no community land in the project area). ✓ Ensure compensation take into consideration temporary loss of use of land (some households will only be affected during construction) as well as permanent loss of use of land (the affected portion of land will remain unutilized for the entire period of existence of the transmission line) of the RoW. ✓ Proponent to ascertain property ownership through land searches, local administration, village elders, and local leaders before compensation. ✓ Where land documents are missing, proponent to give adequate time and any other necessary support to PAPs to get the ownership documents. ✓ Proponent to use available and culturally appropriate dispute resolution mechanism. ✓ In case of an unresolved dispute, proponent to deposit compensation money in an escrow account to be paid to PAPs upon resolution of the disputes etc. ✓ For the school land (Nentekeny Primary School) the proponent to re-route the line to avoid the school compound. This would call for creating a small angle point and then bring the line back to its course. Alternatively, the line can overfly the school compound (no tower to be located in the school compound) but the client to offer the school, land for land compensation. The replacement land must have productive potential and locational advantages equivalent to or higher than the advantages of land taken. It is suggested that, the compensated land be adjacent to the school land and that the affected land remains the school property. A third alternative is for the proponent to give an in-kind compensation which would involve implementation of a social investment project in the school as compensation for land impacted.		
Livelihood restoration	✓ Effects on farming and livestock rearing ✓ Impact on production of woodlot for use in provision	✓ Develop and implement a livelihoods restoration plan. ✓ The PAPs will to the extent possible be allowed to harvest seasonal crops (maize,	✓ Farmer and pastoralist Training and facilitation @ 500,000	KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KES)	Responsible party
	of energy by Nyamache Tea Factory ✓ Loss of businesses ✓ Loss of formal and/or informal employment ✓ Denied access to Social facilities e.g., health centers, schools, water points, etc. ✓ Extra burden to vulnerable PAPs who include household headed (HH) by an elderly person, HH by a child, HH by a single parent, HH by a chronically ill person, or HH by a PWD as they may require to hire other people to support them in the resettlement process since they may not have the time, energy/strength, education, various abilities (have disability), ability to comprehend the process, ability to negotiate etc.	beans etc.) nearing maturity as well as transfer fruit trees, where feasible. ✓ For fruit trees, compensation should be based on the value of the harvests lost until the replacement trees come into full production. In the case of immature trees, it is proposed to directly supply seedlings as a replacement and provide compensation for the resulting delay in reaching fruit-bearing capacity. ✓ Identification of local institutions where farmers can go for training on good farming techniques and animal husbandry. ✓ Facilitation of farmers and pastoralist to obtain inputs like seeds, fertilizer, animal feeds, veterinary services, etc. and markets for farm and livestock products. ✓ Training of farmers and pastoralists on proper ways of handling and storage of farm and animal produce to avoid wastage and losses. ✓ Buy an insurance cover for animals that may be involved in any accident (e.g., traffic, falling on open pits, or being hoisted during conductor stringing). ✓ Develop water pans at strategic points where water can collect during the wet season for use by livestock during the dry seasons. ✓ Provide additional assistance to the Nyamache Tea Factory to cut and transport the logs. ✓ Provide additional cash assistant to landowner (on whose land the tea factory has planted its woodlot) as compensation for lost income opportunity. ✓ Compensate PAPs for loss of businesses. ✓ Ensure PAPs are relocated near their current dwelling sites to avoid affecting their current formal or informal sources of livelihood ✓ Ensure resettled PAPs enjoy or get access to social facilities like schools, health centres and water points to enable them resettle with minimal distress. ✓ Provision of additional assistance to vulnerable PAPs to cushion them from the impacts of resettlement and loss of livelihoods.	✓ Insurance @ 200,000 ✓ Lost business @ 500,000 ✓ Assistance to vulnerable PAPs @ 2,000,000 ✓ Cushion PAP against contractual agreement @ 300,000 ✓ Cut and transport the logs @ 200,000	
Project Induced Labour Influx related impacts e.g., GBV-SEA/SH	✓ Spread of diseases such as HIV/AIDS, STDs and other communicable diseases. ✓ Gender Based Violence such as sexual exploitation and abuse of community members by project workers (SEA) and workplace sexual harassment (SH), and exploitative sexual relations and illicit sexual relations with minors. ✓ Gender mainstreaming issues including the two-thirds gender rule, gender	✓ Develop and implement a Local Recruitment Plan that will ensure employment of as many locals as is possible. Local laws require 30% of labour force to come from the locals. ✓ Develop and implement a Labor Influx Management Plan that will ensure harmony between non-local workers and the locals and minimize effects of labour influx ✓ Conduct sensitization fora for employees on ethics, morals, general good behaviour, GBV-SEA/SH, and the need for the project to co-exist with the neighbours. The fora should be guided by the Stakeholder Engagement Plan.	Sensitization fora @ 500,000 Condoms @ 200,000 Training on GBV @ 200,000	✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KES)	Responsible party
	inequality, gender equity, women participation in project meetings and activities etc. ✓ Child labour (employment of minors) and school dropout. ✓ Disregard of important cultural norms.	✓ Provide guidance and counselling on drug abuse, HIV/AIDS, and other STDs to employees. ✓ Sensitize local community on communicable diseases (STDs and HIV/AIDS) and GBV-SEA/SH. ✓ Provide female and male condoms to construction workers. ✓ Cooperation with local law enforcement and introduction of sanctions (e.g., dismissal) for workers involved in criminal activities. ✓ Develop and implement the GBV Management Plan (Cognizant of 1. sensitivity of GBV, and 2. the need to ensure confidential reporting and responding to GBV cases reported); including plans for prevention, response and Grievance Redress Mechanism, and ensure that the project does not trigger or exacerbate other forms of GBV at the community level. Further, ensure codes of conduct are signed by all with physical presence on project site. ✓ Mandatory and regular training for workers on required lawful conduct in relation to GBV in host community in addition to social and cultural inductions to workers. The project should support survivors who choose the legal redress route by referring them to the legal redress referral pathway – which could include legal entities (NGOs, lawyers, police stations etc.). ✓ Commitment to cooperate with law enforcement agencies investigating perpetrators of gender-based violence. However, survivors or guardians of survivors (in the case of minors) can choose to involve the police or not. The project, therefore, can support survivors who choose the legal redress route by referring them to the legal redress referral pathways mapped by the project-which could include legal entities (NGOs, lawyers, police stations, etc.) in the project area working in the GBV space, but the decision to follow this route must be made by the survivor or their guardian. Further, the survivor will be facilitated to understand that they may be required to cooperate with law enforcement. ✓ Ensure that children and minors are not employed directly or indirectly on the project. To ensure minors or children are not employed directly or indirectly in the project, the proponent/contractor will monitor the employment register; in addition to ensuring that workers have valid national identification cards. ✓ All criminal cases to be reported to the relevant authorities through appropriate channels. ✓ Develop and implement a Gender Mainstreaming Plan to reduce the risk of gender inequality and biases.		

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KES)	Responsible party
Gender biases	✓ Gender mainstreaming issues including the two-thirds gender rule, gender inequality, gender equity etc. ✓ Inability of women to attend project meetings and other decision-making fora. ✓ Unfavorable employment conditions for women including salary, maternity leave, working hours, security, periodic time off to to afford them access to child and dependent care, etc.	✓ Develop and implement a Gender Mainstreaming Plan to reduce the risk of gender inequality and biases and ensure participation of women in decision making and sharing of project benefits. The plan should also ensure gender is mainstreamed in all aspects of the project. ✓ For the employment of a wayleaves officer, Community Liaison Officer, drivers, and any other staff working in the project, KETRACO to give more preference to women applicants and to encourage women to apply. ✓ In developing a Stakeholder Engagement Plan, the proponent to ensure women are identified as an important focus group and the plan's implementation to be sensitive to women's availability to attend meetings. ✓ For any community meetings held, the announcement to encourage women to attend and the organizers to design initiatives that reach out to more women to attend the meetings. ✓ The proponent to ensure all women PAPs are compensated and in a fair and timely manner. Where possible create joint bank accounts between spouses for disbursement of compensation funds, and ensure both spouses consent to joint bank accounts. ✓ Inclusion of women representatives on Grievances Redress Committees ✓ Conduct sensitization fora with all community segments about the importance of women participation in the project. ✓ Identify and address women employee security issues, including their safety while traveling to and from work and on project-related business. ✓ Proactively recruit and appoint women workers to decision-making positions. ✓ Offer flexible work options for women workers, accord them their leave days, and where possible support their access to child and dependent care.	Sensitization fora @ 100,000	KETRACO
Stakeholder engagement and grievances management.	✓ Stakeholder engagement is not aligned with the Stakeholders Engagement Plan. ✓ Inadequate or partial stakeholder identification. ✓ Lack of or inadequate stakeholder engagement. ✓ Untimely disclosure of relevant project information ✓ Inadequate or partial disclosure of relevant project information. ✓ Grievances are not managed and resolved in a timely manner ✓ Process of grievances management is not aligned with the Grievances Redress Mechanism,	✓ Develop and implement a Grievances Redress Mechanism (GRM) to manage all grievances in a timely manner and ensure the grievances management process is aligned with the GRM. ✓ Periodic review of the SEP and GRM ✓ Continual improvement of the SEP and GRM ✓ Ensure that all stakeholders are identified and are included in the SEP, and engaged meaningfully, including vulnerable individuals and households. ✓ Conduct Free Prior Informed Consultations to ensure affected VMGs are engaged meaningfully and access culturally appropriate social and economic benefits. ✓ Implement project structured interventions to ensure vulnerable individuals and households effectively participate in, and benefit from the project.	✓ Development and implementation of SEP @ 3,820,000 ✓ Develop and implementation of GRM @ 2,000,000	KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KES)	Responsible party
	leading to escalation into legal claims. ✓ Exclusion of vulnerable individuals and households from the engagement process.	✓ Implement the SEP and ensure all stakeholder engagement is aligned to the SEP ✓ Ensure timely disclosure of relevant project information, e.g., project instruments, project risk management plans, positive and negative impacts, full rights and entitlements of project-affected persons, project benefits, and project opportunities.		
Project benefits and opportunities including employment, local sourcing, capacity building etc.	✓ Failure by contractor and the proponent to prioritize locals for jobs. ✓ Perception by the locals that labour is imported from outside the project area. ✓ Project benefits and opportunities (e.g., employment, project-structured interventions for disadvantaged groups, etc.) are inaccessible to project-affected persons, including vulnerable individuals and households (elderly, PWD, etc.) and VMGs.	✓ Develop and implement a Local Recruitment Plan that will ensure employment of as many locals as is possible and manage all aspects related to local employment. Local laws require 30% of labour force to come from the locals. ✓ Manage negative public perception through community sensitization and training ✓ All job advertisements to be made available to the local population/placed in locations accessible to locals. ✓ Develop and implement a Corporate Social Responsibility (CSR) Plan in consultation with all community segments. ✓ Implement project structured interventions to ensure vulnerable individuals and households effectively participate in, and benefit from the project.	✓ Sensitization and training @ 300,000 ✓ CSR at 1,500,000	KETRACO
COVID-19	Spread of the disease due to; ✓ Interaction of KETRACO staff and community members during RAP implementation, disclosure of ESIA findings, engagement on CSR implementation, and sensitization sessions on HIV/AIDs, GBV-SEA/SH etc. ✓ RAP team seeking accommodation within project areas. Increased high expectations on the project e.g., higher demand for jobs, CSR activities, compensation monies, salaries/wages etc Psychological effects of Covid-19 e.g., due to negative socio-economic effects, social isolation may lead to increased cases of GBV including, GBV-SEA, workplace Sexual harassment, as well as other forms of GBV at the community or family level attributable to the project. Due to COVID-19 effects the burden of taking care of the household might fall disproportionately on women, therefore making it difficult for	All staff, visitors, and community members should adhere to the government's covid-19 regulations, including; ✓ Regularly and thoroughly clean their hands using soap and running water or with an alcohol-based hand rub. ✓ Maintain at least 1 metre distance between themselves and others. ✓ When coughing or sneezing, cover mouth and nose with flexed elbow or use disposable tissue and discard after use. ✓ Avoid touching eyes, nose and mouth. ✓ Always wear a mask in public and safely dispose used masks. ✓ Greet people with a wave, a nod, or a bow instead of shaking their hands. ✓ Avoid going to crowded places. ✓ If they have a fever, cough, difficulty breathing, or any other COVID-19 symptom, they should seek medical attention. The proponent must; ✓ Every morning monitor staff health for symptoms such as fever, cough, or difficulty in breathing. ✓ Make sure workplaces and equipment are clean and hygienic and are regularly disinfected. ✓ Put sanitizing hand rub dispensers in project vehicles. ✓ Develop a response plan in case someone becomes ill with symptoms of COVID-19. ✓ Give additional support to disadvantaged and vulnerable groups/locals who have been further disenfranchised due to negative social and economic impacts of Covid-19.	Thermometers @ 6,000 each. Face masks@ 500 a pack and transparent plastic protective face shield@ 300 each. Disinfecting workplaces@5,000 a month. Alcohol based sanitizers, soaps and disposable tissue@ 5,000 a month.	✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KES)	Responsible party
	them to take part in e.g., consultation fora, decision making etc. External sourcing of labour may be impeded by, (a) cessation of movement; and (b) unwillingness of some workers to live in unfamiliar locations during a pandemic (fear of contracting the virus), and especially in locations with a high number of infections/pandemic epicenters.	✓ Manage high expectations on the project e.g., higher demand for jobs, CSR activities, compensation monies, salaries/wages etc. through training and information dissemination. ✓ Assist people to cope with stress and psychological effects during the COVID outbreak. ✓ Develop and implement a Gender Mainstreaming Plan with COVID-19 effects in mind to reduce the risk of gender inequality and biases. ✓ In sourcing external labour (adverts and interviews), ensure people know measures employed to protect them from contracting COVID-19.		

7.2: ESMP for the Construction Phase

Table 7.2: ESMP for the construction phase of the proposed project

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
Social Impacts				
Project Induced Labour Influx related impacts e.g., GBV-SEA/SH	✓ Social conflict between the local community and the construction workers due to religious, cultural or ethnic differences or competition for local resources. ✓ Increase in illicit behavior and crime including theft, physical assaults, substance abuse, and prostitution. ✓ Increased burden on and competition for public service provision including water, energy, medical services, transport, and education. ✓ Spread of diseases such as HIV/AIDS, STDs and other communicable diseases. ✓ Gender Based Violence such as sexual exploitation and abuse of community members by project workers (SEA) and workplace sexual harassment (SH), and exploitative sexual relations and illicit sexual relations with minors. ✓ Gender mainstreaming issues including the two-thirds gender rule, gender inequality, gender equity, women participation in project meetings and activities etc. ✓ Child labor and school dropout	✓ Develop and implement a Local Recruitment Plan that will ensure employment of as many locals as is possible. Local laws require 30% of labour force to come from the locals. ✓ Develop and implement a Labor Influx Management Plan that will ensure harmony between non-local workers and the locals and minimize effects of labour influx. ✓ Conduct sensitization fora for employees on ethics, morals, general good behaviour, GBV-SEA/SH, and the need for the project to co-exist with the neighbours. The fora should be guided by the Stakeholder Engagement Plan. ✓ Provide guidance and counselling on drug abuse, HIV/AIDS, and other STDs to employees. ✓ Sensitize local community on communicable diseases (STDs and HIV/AIDS) and GBV-SEA/SH. ✓ Provide female and male condoms to construction workers. ✓ Cooperation with local law enforcement and introduction of sanctions (e.g., dismissal) for workers involved in criminal activities. ✓ Provision of water supply source to workers and prohibition of use from other community sources or ensure the project and community agree on the right to access water from community sources. ✓ Develop and implement the GBV Management Plan (Cognizant of 1. sensitivity of GBV, and 2. the need to ensure confidential reporting and responding to GBV cases reported); including plans for prevention, response and Grievance Redress Mechanism, and ensure that the project does not trigger or	Sensitization fora @ 500,000 Condoms @ 100,000 Free screening @100,000 Training on GBV @ 200,000	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
	✓ Local inflation of prices due to increase in demand for goods and services ✓ Disregard of important cultural norms	exacerbate other forms of GBV at the community level. Further, ensure codes of conduct are signed by all with physical presence on project site. ✓ Mandatory and regular training for workers on required lawful conduct in relation to GBV in host community in addition to social and cultural inductions to workers. The project should support survivors who choose the legal redress route by referring them to the legal redress referral pathway – which could include legal entities (NGOs, lawyers, police stations etc.). ✓ Commitment to cooperate with law enforcement agencies investigating perpetrators of gender-based violence. However, survivors or guardians of survivors (in the case of minors) can choose to involve the police or not. The project, therefore, can support survivors who choose the legal redress route by referring them to the legal redress referral pathways mapped by the project-which could include legal entities (NGOs, lawyers, police stations, etc.) in the project area working in the GBV space, but the decision to follow this route must be made by the survivor or their guardian. Further, the survivor will be facilitated to understand that they may be required to cooperate with law enforcement. ✓ Provision of opportunities for workers to regularly return to their families; ✓ Provision of opportunities for workers to take advantage of entertainment opportunities away from rural host communities. ✓ Ensure that children and minors are not employed directly or indirectly on the project. To ensure minors or children are not employed directly or indirectly in the project, the proponent/contractor will monitor the employment register; in addition to ensuring that workers have valid national identification cards. ✓ Maintain an updated employee database on site. ✓ Issue construction workers with identification cards to access construction site. ✓ All criminal cases to be reported to the relevant authorities through appropriate channels. ✓ Develop and implement a Gender Mainstreaming Plan to reduce the risk of gender inequality and biases.		
Culture, Heritage, and Norms	✓ Interference with (damage to, relocation of, or limited access to) cultural sites such as initiation grounds, burial sites, sacred trees, shrines etc. ✓ Sexual relations with local communities.	✓ The contractor to engage a local liaison (cultural ambassador) to guide and advice the project on all issues regarding culture, heritage, and norms. ✓ Conduct Free Prior Informed Consultations to ensure the culture, norms, and heritage of affected VMGs are not adversely affected by their project.	Remuneration for the Cultural Ambassador @ 20,000 a month Settling disputes for interfering with cultural sites	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
	✓ Cultural erosion as a result of introduction of new ways of life.	✓ Workers from other cultures especially women are not allowed anywhere near the *manyattas*. ✓ Workers should avoid sexual relationships with locals. Sexual relations with local married women are considered to be a taboo and could lead to conflict or violence. ✓ Contractor to prohibit workers from wearing clothes that are too revealing. ✓ The contractor shall sensitize workers to respect the culture of the local community and not to impose their culture on the community. ✓ Graves should never be excavated. Should they accidentally be excavated, certain traditional rituals must be performed with KETRACO bearing the cost of the rituals. The cultural ambassador to advice on required rituals. Contractor to design the towers so as to avoid marked graves. ✓ During the traditional ceremony of Rite of Passage (circumcision), the "morans' live in 'manyattas'. With the assistant of the cultural ambassador, the proponent, should consult local elders and ensure such 'manyattas' are not put up on the wayleave. Should they be on the wayleave, works in the location must be skipped until the occasion ends which can take up to 3 months. ✓ Certain sacred trees, like the *mugiet (*a tree on which the sticks that were used in roasting meat during circumcision and other traditional ceremonies) cannot be felled until elders perform the necessary rituals. All sacred trees and cultural sites along the route should be identified and listed.	including cleansing rituals @ 70,000 per case	
Livestock farming	✓ Animals may fall into the excavated pits for tower foundation ✓ Vegetation clearance may reduce animal fodder ✓ Abstraction of water for construction from local water reserves may reduce availability of water to ✓ Livestock death from falling objects during tower erection; being hoisted up during conductor stringing; and traffic accidents ✓ Noise, movement of equipment and staff, and general construction works may be a nuisance to the grazing animals	✓ Excavated foundation pits to be well secured to avoid animals from falling into them. Foundation pits thought to take long must be secured by barbed or mesh wire. ✓ Excavated pits to be backfilled as soon as possible ✓ Selective vegetation clearance by only clearing what is necessary to ensure animals have enough fodder ✓ During dry seasons no water to be extracted from the local water resources. The contractor to use water-bowsers with water from water companies in Kilgoris and Kehancha ✓ During conductor stringing one person be posted on each tower with red and green flags and whistle so that he can give a signal, which is relayed to the pulling end by other similarly placed persons, to stop the paying out operation if any incident of animal hoisting is encountered. ✓ Speed limits to be enforced by all project vehicles, and in all areas within the project area of influence.	Design cost	✓ Contractor ✓ KETRACO
Gender biases	✓ Gender mainstreaming issues including the two-thirds gender rule, gender	✓ Develop and implement a Gender Mainstreaming Plan to reduce the risk of gender inequality and biases and ensure	Sensitization fora @ 100,000	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
	inequality, gender equity etc. ✓ Inability of women to attend project meetings and other decision-making fora. ✓ Unfavorable employment conditions for women including salary, maternity leave, working hours, security, periodic time off to afford them access to child and dependent care, etc.	participation of women in decision making and sharing of project benefits. The plan should also ensure gender is mainstreamed in all aspects of the project. ✓ During the employment of project staff, the Contractor to give more preference to women applicants and to encourage women to apply. ✓ In implementing the Stakeholder Engagement Plan, the proponent to be sensitive to women's availability to attend meetings. ✓ For any community meetings held, the announcement to encourage women to attend and the organizers to design initiatives that reach out to more women to attend the meetings. ✓ Inclusion of women representatives on Grievances Redress Committees. ✓ Conduct sensitization fora with all community segments about the importance of women participation in the project. ✓ Identify and address women employee security issues, including their safety while traveling to and from work and on project-related business. ✓ The contractor to proactively recruit and appoint women workers to decision-making positions. ✓ Offer flexible work options for women workers, accord them their leave days, and where possible support their access to child and dependent care.		
Stakeholder engagement and grievances management.	✓ Stakeholder engagement is not aligned with the Stakeholders Engagement Plan. ✓ Inadequate or partial stakeholder identification. ✓ Lack of or inadequate stakeholder engagement. ✓ Untimely disclosure of relevant project information ✓ Inadequate or partial disclosure of relevant project information. ✓ Grievances are not managed and resolved in a timely manner ✓ Process of grievances management is not aligned with the Grievances Redress Mechanism, leading to escalation into legal claims. ✓ Exclusion of vulnerable individuals and households from the engagement process.	✓ Develop and implement a Grievances Redress Mechanism (GRM) to manage all grievances in a timely manner and ensure the grievances management process is aligned with the GRM. ✓ Periodic review of the SEP and GRM ✓ Continual improvement of the SEP and GRM ✓ Ensure that all stakeholders are identified and are included in the SEP, and engaged meaningfully, including vulnerable individuals and households. ✓ Conduct Free Prior Informed Consultations to ensure affected VMGs are engaged meaningfully and access culturally appropriate social and economic benefits. ✓ Implement project structured interventions to ensure vulnerable individuals and households effectively participate in, and benefit from the project. ✓ Implement the SEP and ensure all stakeholder engagement is aligned to the SEP. ✓ Ensure timely disclosure of relevant project information, e.g., project instruments, project risk management plans, positive and negative impacts, full rights and entitlements of project-affected persons, project benefits, and project opportunities.	✓ Development and implementation of SEP @ 2,000,000 ✓ Develop and implementation of GRM @ 1,000,000	✓ KETRACO ✓ Contractor
Project benefits and opportunities	✓ Failure by contractor and the proponent to prioritize locals for jobs.	✓ Develop and implement a Local Recruitment Plan that will ensure employment of as many locals as is	✓ Sensitization and training @ 200,000	✓ KETRACO ✓ Contractor

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
including employment, local sourcing, capacity building etc.	✓ Perception by the locals that labour is imported from outside the project area. ✓ Project benefits and opportunities (e.g., employment, project-structured interventions for disadvantaged groups, etc.) are inaccessible to project-affected persons, including vulnerable individuals and households (elderly, PWD, etc.) and VMGs.	possible and manage all aspects related to local employment. Local laws require 30% of labour force to come from the locals. ✓ Manage negative public perception through community sensitization and training ✓ All job advertisements to be made available to the local population/placed in locations accessible to locals. ✓ Develop and implement a Corporate Social Responsibility (CSR) Plan in consultation with all community segments. ✓ Implement project structured interventions to ensure vulnerable individuals and households effectively participate in, and benefit from the project.	✓ CSR at 1,500,000	
COVID-19	Spread of the disease due to; ✓ Workers seeking accommodation within project areas. ✓ Contractor/KETRACO engaging local workforce. ✓ Contractor and KETRACO involving communities in project monitoring. ✓ CSR implementation. ✓ Sensitization sessions on HIV/AIDs, GBV-SEA/SH etc. Increased high expectations on the project e.g., higher demand for jobs, CSR activities, salaries/wages etc. There will be a risk of engaging children/minors to work in the project or engage in business activities to supply goods and services to the project, in order to supplement dwindling household income sources due to effects of COVID-19 Psychological effects of Covid-19 e.g., due to negative socio-economic effects, social isolation may lead to increased cases of GBV including, GBV-SEA, workplace Sexual harassment, as well as other forms of GBV at the community or family level attributable to the project. Due to COVID-19 effects the burden of taking care of the household might fall disproportionately on women, therefore making it difficult for them to take part in e.g., including consultation fora, decision making etc.	All staff, visitors, and community members should adhere to the government's covid-19 regulations, including; ✓ Regularly and thoroughly clean their hands using soap and running water or with an alcohol-based hand rub. ✓ Maintain at least 1 metre distance between themselves and others. ✓ When coughing or sneezing, cover mouth and nose with flexed elbow or use disposable tissue and discard after use. ✓ Avoid touching eyes, nose and mouth. ✓ Always wear a mask in public and safely dispose used masks. ✓ Greet people with a wave, a nod, or a bow instead of shaking their hands. ✓ Avoid going to crowded places. ✓ If they have a fever, cough, difficulty breathing, or any other COVID-19 symptom, they should seek medical attention. The proponent and contractor must. ✓ Monitor everyone's health for symptoms such as fever, cough, or difficulty in breathing. ✓ Ensure workers who have returned from an area where COVID-19 is spreading monitor themselves for symptoms for 14 days and take their temperature twice a day. ✓ Make sure workplaces are clean and hygienic and are regularly disinfected. ✓ Put sanitizing hand rub dispensers in prominent places around the workplace and ensure that workers and visitors have access to places where they can wash their hands with soap and running water. ✓ Display posters and use other communication measures such as toolbox talks, briefings at meetings, and internet to promote handwashing, respiratory hygiene, keeping social distance and other measures of combating COVID-19. ✓ Develop a response plan in case someone becomes ill with symptoms of COVID-19. ✓ Give additional support to disadvantaged and vulnerable groups/locals who have been further disenfranchised due to negative social and economic impacts of Covid-19.	Thermometers @6,000 each. Face masks@500 a pack and transparent plastic protective face shield@ 300 each. Disinfecting workplaces@5,000 a month. Alcohol based sanitizers, soaps and disposable tissue@ 20,000 a month. Hand washing systems@ 5,000 each. Posters@ 500 each.	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
	External sourcing of labour may be impeded by, (a) cessation of movement; and (b) unwillingness of some workers to live in unfamiliar locations during a pandemic (fear of contracting the virus), and especially in locations with a high number of infections/pandemic epicenters.	✓ Manage high expectations on the project e.g., higher demand for jobs, CSR activities, salaries/wages etc. through training and information dissemination. ✓ Ensure that children and minors are not employed directly or indirectly on the project. ✓ Assist people to cope with stress and psychological effects during the COVID outbreak. ✓ Develop and implement a Gender Mainstreaming Plan with COVID-19 effects in mind to reduce the risk of gender inequality and biases. ✓ In sourcing external labour (adverts and interviews), ensure people know measures employed to protect them from contracting COVID-19.		
Environmental Impacts				
Community health and safety	✓ Children may fall into excavated tower foundations ✓ Children may drown in water filled excavated tower foundations ✓ Children may try to climb erected towers and risk falling ✓ People may accidentally be hoisted up by conductors during stringing ✓ Traffic accidents ✓ If blasting is used as a method of tower foundation, people may accidentally get injured or may mistake it for gun fighting hence create tension ✓ Open defecation is a community health hazard which can cause spread of diseases. ✓ Noise from corona discharge and buzzing/humming sound from substations.	✓ Excavated foundation pits to be well secured to avoid children from falling into them. Foundation pits thought to take long must be secured by barbed or mesh wire and any water in the pit drained every morning. ✓ Excavated pits to be backfilled as soon as possible ✓ Conduct sensitization fora on the dangers posed by the transmission line (especially on children) and ways of staying safe. ✓ Safety features including danger warning sign and perimeter barbed wire surrounding each tower must be put in place. ✓ Contractor to facilitate the community to keep vigil or employ security guards to ensure no kids climb the towers. ✓ During conductor stringing one person be posted on each tower with red and green flags and whistle so that he can give a signal, which is relayed to the pulling end by other similarly placed persons, to stop the paying out operation if any incident of a child hoisting is encountered. ✓ Within settled areas, impose speed limits and ensure people, especially children, have the right of way. ✓ Should blasting be used, give prior warning to the surrounding communities and ensure no one is near the site of blasting ✓ Contractor to provide mobile toilets. ✓ To reduce the corana effect the overhead line insulator sets should be provided with grading rings at the bottom of insulator string (corona rings). ✓ To reduce effects of the noise from corona effect on population, final detailed design should avoid densely populated areas. ✓ The substations shall be 132/33kV substations and the buzzing/harming sound is not predicted but should this be the case, the proponent should consider creating noise shields. Creating a tree canopy (along the safe sections of the perimeter fence) can also help in shielding the noise.	Sensitization fora on dangers of transmission lines@ 300,000 Support for community to keep vigil to ensure people especially kids do not climb towers or fall into open pits @ 7,000 per month Provision of mobile toilets @ 70,000 each	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
Destruction of existing vegetation and habitat	✓ Trees and Shrubs estimated to be over 4,000 trees of various age, height, width, and species may be affected by the project ✓ Clearing of vulnerable tree species including the *Dioyspyros Abyssinca*, *Kigelia Africana*, and *Olea Africana* ✓ Interference with water catchment areas ✓ Forest fragmentation ✓ Fragmentation is likely to make interior forest species more vulnerable to predators and competition from edge and colonizing species ✓ Introduction of invasive species	✓ Selective vegetation clearance by only clearing what is necessary ✓ Trees that have no ability to grow beyond 6ft (1.8m) tall should not be cut except if within the tower plinth area. ✓ Vegetation that needs to be reduced in height will be cut to an acceptable height, and not to ground level except where necessary. This shall be especially true for vulnerable or endangered species like *Dioyspyros abyssinca*, *Kigelia africana,* and *Olea africana.* ✓ Bush clearing shall be to no more than absolutely necessary extent; At completion of construction work, areas not needed anymore should be replanted/ reforested as far as the line security is not impeded; ✓ Collection or harvesting of any plants or fuel wood is to be strictly forbidden as it can exacerbate more clearing ✓ As far as possible, bush clearing be manual as opposed to mechanical or chemical methods ✓ Ensure that construction equipment is properly cleaned to avoid accidental spreading of invasive species. ✓ Undertake regular monitoring to ensure that alien and potentially invasive plant species (*lantana camara, solanum mauritianum, prosopis juliflora, ipomoea spp.* and others) are not increasing as a result of the disturbance that has taken place. ✓ Fair compensation (full replacement cost) to the affected PAPs with the cut trees remaining the property of the PAPs ✓ With the assistant of KFS and KWS, KETRACO to facilitate community to initiate tree planting drives.	Tree planting drives @ 500,000	✓ Contractor ✓ KETRACO
Avi-fauna disturbance and mortality	✓ Collision of birds with transmission line cables. ✓ Destruction of habitats for birds including breeding areas ✓ Noise pollution	✓ Map important bird migration corridors ✓ In the identified corridors, use bird flight diverters placed 7.5 m apart along the shield wire. The shield wire is the most dangerous section of line for flying birds and it's usually much thinner and difficult to see. Many birds do not see well in front of them during flight. It is important that the flight diverters are reflective as well as contrasting, as many birds migrate at night. ✓ To avoid electrocution in the identified migration corridors, provide sufficient separation between energized phase conductors to accommodate at least the wrist-to-wrist or head-to-foot distance of a bird (approximately 1.8m) or insulate the conductors. ✓ Provide artificial bird safe perches and nesting platforms which are placed at a safe distance from the energised parts. ✓ Use perch management techniques i.e, cross-arms, insulators and other parts of the power lines can be constructed so that there is no space for birds to perch where they can be proximate to energised wires.	Mapping of important bird migration corridors @70,000	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
		✓ Avoid wooded areas which act as bird breeding areas or areas with high concentration of birds especially in areas such as Lepolosi, Osinoni, Nentekeny, Moita, and Masurura. ✓ Limit noise pollution in bird habitats including those listed above		
Surface and underground water reserves including Rivers, Streams, Marsh-areas, springs, wells, and boreholes.	✓ Encroachment of river riparian zone ✓ Destruction of riverine herbaceous plant cover. ✓ Abstraction of water by the contractor ✓ Silt deposit in surface water reserves during tower foundation ✓ Contamination of water by project workers when crossing, washing, or drawing water for drinking ✓ Motor equipment crossing these rivers may result in some shoreline erosion or disturbance to banks and river bottoms ✓ Leachates from open defecation by project workers ✓ Oil contamination from motor equipment ✓ Solid waste pollution ✓ Effects on existing water pipelines	✓ Avoid locating towers within the riparian zones. ✓ Locate towers far enough back from riverbanks to prevent erosion related to the tower foundation and destruction of riverine herbaceous plant cover. ✓ Contractor should not be allowed to abstract water from the community water resources. The contractor to use water-bowsers with water from water companies in Kilgoris and Kehancha. ✓ Contractor to develop and implement an oil spill minimization and cleanup plan to avoid contamination of the rivers by oil ✓ Avoid motor vehicles crossing rivers and streams from undesignated points to only use existing bridges or designated crossing points ✓ Contractor to provide mobile toilets ✓ Contractor to enact solid waste management to reduce or completely stop contamination of water systems by solid waste ✓ Avoid interfering with existing water infrastructure.	Developing and implementing an oil spill plan@ 200,000 Mobile toilets @ 70,000 each Waste management @ 30,000 per month	✓ Contractor ✓ KETRACO
Workers Health and Safety	✓ Falling objects i.e. from high levels of towers and excavations, ✓ collapsing of excavations, ✓ poor hygiene as the contractor may find it difficult to provide sanitary welfare in the bushes. ✓ road accidents, ✓ Occupational diseases. ✓ Electrocution of workers, animals, or public.	✓ Employing an Environmental, Health and Safety Officer. ✓ Formulate and implement a Labor Management Plan that ensure among others child and forced labor is not engaged. ✓ Ensure the construction site is dully registered as a workplace. ✓ Establish a health and safety committee as per Factories and other places of Work (Safety and Health Committee Rules) requirements. ✓ Conduct job safety analysis for high risk activities and document safe work procedures. ✓ Identify all hazards before undertaking a process ✓ Conduct and continually review a risk assessment ✓ Hold daily morning toolkit talks where safety is the key issue ✓ Train workers on health and safety ✓ Ensure first aid kits and trained first aiders are available on site. ✓ Identify and train fire marshals and provide them with firefighting equipment. ✓ Ensure each worker is covered under an insurance policy as per WIBA ✓ Ensure only qualified personnel operate construction equipment and vehicles. ✓ Ensure construction equipment and vehicles are regularly inspected by	EHS officer @70,000 a month Reg. of workplaces @ 3,000 per site, Training workers on health and safety @ 100,000, Provision of insurance policy for workers @ 200,000 a year, PPE:dust mask @ 200 each, earmuff @ 1,000 each, Safety goggles @ 1,000 each, Reflective jacket @ 1,000 each, safety boots @ 5,000 a pair, gloves @ 1,000 a pair, helmet @ 2,000 each,	✓ Contractor

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
		approved inspectors and inspection records maintained. ✓ Collect daily security briefs and avoid insecure places ✓ Place warning signs where necessary ✓ Provide all necessary PPEs including helmets, ear muff/plug, hand gloves, dust/respiratory mask, reflective jacket, goggles, safety boots, double hook safety harness, etc.		
Working at Height – transmission line towers	✓ Injury or fatality due to a fall from the tower	✓ The client/consultant must implement a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among other measures ✓ Only qualified and experienced personnel should be allowed to climb the towers. ✓ Every morning before beginning the works, there should be a tool box talk emphasizing on safety at heights. ✓ Structures must be tested for integrity prior to undertaking work. ✓ No personnel should be allowed to climb the towers while drunk or under the influence of drugs ✓ There should be a ground supervisor constantly observing and conversing with the workers atop the towers. The officer should ensure workers observe safety precautions at all the times and should have emergency telephone contacts. ✓ Use approved tool bag for raising or lowering tools and materials to workers atop the towers. ✓ Workers climbing the towers must be provided with non-slip footwear, gloves, helmet, and double hook safety harness and should be compelled to use them all the time. The PPEs should constantly be inspected, maintained, and replaced where necessary. ✓ Safety belts should be of not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident.	Safety gear; non –slip footwear @ 5,000 a pair, gloves @ 1,000 a pair, helmet @ 2,000 each, double hook safety harness @ 20,000 each. Inspecting the harnesses (all) @ 20,000 every 3 months	✓ Contractor ✓ KETRACO
Waste handling, storage and disposal	✓ Public nuisance ✓ Health problems ✓ Contamination of soil and water resources ✓ Eye sore	✓ Provide mobile toilets for construction workers to manage human waste. ✓ Provide well labeled waste collection bins at designated points on site to handle solid waste. Ensure segregation of waste. ✓ Implement sustainable waste management principles of reduction, reuse and recycling. ✓ Contract a NEMA licensed waste handler to collect and dispose waste. Ensure updated waste tracking sheets are maintained for collected waste. ✓ Ensure collection and proper disposal of all used cement bags. ✓ Develop and implement a waste disposal plan for reject PPEs.	Mobile toilets @ 70,000 each Provision of colour coded waste collection bins@ 5,000 each Contracting NEMA licensed waste handler @ 10,000 per month.	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
		✓ Sensitize construction workers on best waste management practices. ✓ Accurately estimate the dimensions and quantities of materials required especially fine and loose aggregates for tower bases; ✓ Ensuring that, all remnants of loose gravel and concrete are effectively collected from the tower bases and re-used or disposed of in an environmentally friendly manner. ✓ Construction waste shall not be left in stockpiles along the wayleave, but removed and reused or disposed of on a regular basis.		
Noise and vibrations	✓ Hearing problems. ✓ Public nuisance. ✓ Interference with communication on site which could result to accidents/injuries. ✓ Psychological and physical stress among workers hence reduced productivity. ✓ If explosives are used for tower foundation, people might confuse it with gun fight and hence tension. ✓ Noise from corona discharge and buzzing/humming sound from substations.	✓ No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day. In addition no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dBC. ✓ Exposure to hand-arm vibration from equipment such as hand and power tools or whole-body vibrations from surfaces on which the worker stands or sits shall be controlled through selection of equipment and limitation of time of exposure. The limits for vibration and action values, i.e. the level of exposure at which remediation should be initiated, should not exceed a daily exposure limit value standardized to an 8-hours reference period of 5 meters per square second (m/s2) for hard-arm and 1.15m/s2 for whole-body. ✓ Limit construction activities to be between 6.00 am to 6.00 pm. Where there will be need to work at night or where noise levels may be breached, the contractor will have to seek approval from NEMA. ✓ Reduce idling of vehicles and construction equipment. ✓ Provide workers in noisy areas with appropriate personal protective equipment (ear muffs/ear plugs). ✓ Drivers to be sensitized against unnecessary hooting. ✓ Ensure construction vehicles and equipment are well maintained and serviced as per manufacturer's guidelines. ✓ Where explosives are used, give prior warning to the surrounding communities. ✓ To reduce the corana effect the overhead line insulator sets should be provided with grading rings at the bottom of insulator string (corona rings). ✓ To reduce effects of the noise from corona effect on population, final detailed design should avoid densely populated areas. ✓ The substations shall be 132/33kV substations and the buzzing/harming sound is not predicted but should this be the case, the proponent should consider creating noise shields. Creating a tree canopy (along the safe sections of the perimeter fence) can also help in shielding the noise.	Provision of ear plugs @ 500 each and Ear muffs @ 1,000 each	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
Air Pollution	✓ Dust Emission ✓ Exhaust emission	✓ Water sprinkling to suppress dust emission. ✓ Impose a maximum speed limit supported by speed limit signs. ✓ Cover vehicles transporting loose materials such as sand, spoil and stone aggregate to prevent escape ✓ Wetting loose materials before, after and when handling loose materials. ✓ Provide workers working in areas likely to have dust emissions with suitable protective equipment (dust masks, eye protection and coveralls) ✓ Reduce idling of vehicles and construction equipment. ✓ Ensure construction vehicles and equipment are well maintained and serviced as per manufacturer's guidelines. ✓ Burning of solid waste on site will be prohibited.	Water sprinkling @ 10,000 per month. Provision of dust masks @ 200 each, eye protection @ 1,000 a pair, and coveralls@ 5,000 each	✓ Contractor ✓ KETRACO
Soil Erosion	✓ Land degradation ✓ Loss of soil fertility ✓ Siltation of water resources	✓ Soils excavated for the tower foundations should be used for refilling and should not be left exposed to wind or water for long periods. ✓ Apply soil erosion control measures such as levelling of the tower sites to reduce run-off velocity and increase infiltration of storm water into the soil. ✓ Ensure that construction vehicles are restricted to use existing graded roads. ✓ Contractors should avoid steep terrain during the transportation of construction material by using alternative routes or use light vehicles where appropriate. ✓ Riverine vegetation should be minimally disturbed during the construction phase to reduce soil erosion and safeguard riverbank. This may include realigning the transmission line route and redesigning the tower placement to avoid the riverine vegetation. ✓ Re-plant degraded areas with local species common in the area to complement natural vegetation regeneration to improve ground cover.	Reforestation of degraded areas with native species @ 200,000	✓ Contractor ✓ KETRACO
Archeological and historical sites	✓ Damage or interference with Archeological and historic sites. ✓ Chance encounter of archaeological material during construction phase. ✓ Destruction of buried archaeological materials by heavy machinery, earthworks and excavation during the construction phase ✓ Unearthing of unexpected/unmarked/unidentified graves.	✓ Training of KETRACO and construction staff on identification of archeological objects. ✓ If there is a chance encounter of archaeological material during construction, employ Chance Find Procedures. Chance Find Procedures include stopping construction works at the site, confining the site using tapes or local materials, and informing relevant authorities including local administration officers and the National Museums of Kenya (NMK) for further direction.	Training on identification of archeological objects@ 100,000	✓ Contractor ✓ KETRACO
Aircraft navigation safety	✓ Damage to transmission lines and towers ✓ Damage to aircrafts ✓ Injuries to aircraft operators, construction workers, public and animals.	✓ Ensure necessary approvals are acquired from Kenya Civil Aviation Authority (KCAA) ✓ Take KCAA recommendations on tower height, aerodromes flight paths, and placement of ball markers while designing the transmission towers and lines.	Acquisition of approvals from KCAA@ 500,000 (Assuming	✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
			KCAA requests to fly the line)	
Traffic disruption on road crossings during stringing	✓ Encroachment of the road reserve ✓ Disruption of Traffic flow during conductor stringing	✓ Seek necessary approvals from the roads' authorities ✓ Inform community on the time and dates prior to disruptions of traffic. ✓ Involve local traffic police and/or administration. ✓ Put up clear signs and provide traffic marshals to guide motorists during conductor stringing	Cost of traffic signs and hiring traffic marshals @ 30,000 per month	✓ Contractor ✓ KETRACO
Visual and Aesthetic Impacts	✓ Effect on Visual and Aesthetic	✓ Undertake extensive public consultation during the planning of the project. ✓ Design structures at the site in such a way as to improve the beauty of the surroundings. ✓ Restore site areas through backfilling, landscaping and planting of trees, shrubs and grass on the unused areas to re-introduce visual barriers. ✓ Design and implement an appropriate landscaping programme.	Public consultation@ 100,000 Site restoration @ 800,000	✓ Contractor ✓ KETRACO
Fire Outbreaks	✓ Fire Outbreaks	✓ Conduct fire risk assessment and prepare Fire Response Plan. ✓ Advise workers not to smoke on forested areas. ✓ Ensure compliance with fire safety regulations and ensure availability of all necessary fire safety equipment. ✓ Conduct regular training and fire drills for employees. ✓ Regularly monitor the way-leave and ensure there is no accumulation of flammable substances including plant material. ✓ Create fire-breaks (ploughed strips) on strategic areas of the TL ✓ Build capacity for workers and community on fire related issues including sources, fighting, and vigilance.	Training and fire drills for employees @ 300,000 Building capacity for workers and community on fire related issues @ 300,000	✓ Contractor ✓ KETRACO
Total estimated cost for the pre-construction and construction phases (KES)				

7.3: ESMP for the Operation Phase

Table 7.3: ESMP for the operation phase of the proposed project

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
Social Impacts				
Project Induced Labour Influx related impacts e.g., GBV-SEA/SH	✓ Social conflict between the local community and the transmission line operation and maintenance workers due to religious, cultural, or ethnic differences or competition for local resources. ✓ Increase in illicit behavior and crime including theft, physical assaults, substance abuse, and prostitution.	✓ Develop and implement a Local Recruitment Plan that will ensure employment of as many locals as is possible. Local laws require 30% of labour force to come from the locals. ✓ Formulate and implement a Labor Influx Management Plan that will ensure harmony between non-local workers and the locals and minimize effects of labour influx ✓ Conduct sensitization fora for employees on ethics, morals, general good behaviour, GBV-SEA/SH, and the need for the project to co-exist with the	Sensitization fora @ 500,000 a year Condoms @ 100,000 a year Training on GBV @ 200,000 a year	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
	✓ Spread of diseases such as HIV/AIDS, STDs and other communicable diseases. ✓ Gender Based Violence such as sexual exploitation and abuse (SEA) of community members by project workers and workplace sexual harassment (SH), and exploitative sexual relations and illicit sexual relations with minors. ✓ Disregard of important cultural norms ✓ Gender mainstreaming issues including the two-thirds gender rule, gender inequality, gender equity, women participation in project meetings and activities etc.	neighbours. The fora should be guided by the Stakeholder Engagement Plan. ✓ Provide guidance and counselling on drug abuse, HIV/AIDS, and other STDs to employees. ✓ Sensitize local community on communicable diseases (STDs and HIV/AIDS) and GBV-SEA/SH. ✓ Provide female and male condoms to workers. ✓ Cooperation with local law enforcement and introduction of sanctions (e.g., dismissal) for workers involved in criminal activities. ✓ Develop and implement the GBV Management Plan (Cognizant of 1. sensitivity of GBV, and 2. the need to ensure confidential reporting and responding to GBV cases reported); including plans for prevention, response and Grievance Redress Mechanism, and ensure that the project does not trigger or exacerbate other forms of GBV at the community level. Further, ensure codes of conduct are signed by all with physical presence on project site. ✓ Mandatory and regular training for workers on required lawful conduct in relation to GBV in host community in addition to social and cultural inductions to workers. The project should support survivors who choose the legal redress route by referring them to the legal redress referral pathway – which could include legal entities (NGOs, lawyers, police stations etc.). ✓ Provision of opportunities for workers to regularly return to their families. ✓ Provision of opportunities for workers to take advantage of entertainment opportunities away from rural host communities. ✓ Ensure that children and minors are not employed directly or indirectly on the project. To ensure minors or children are not employed directly or indirectly in the project, the proponent/contractor will monitor the employment register; in addition to ensuring that workers have valid national identification cards. ✓ All criminal cases to be reported to the relevant authorities through appropriate channels. ✓ Develop and implement a Gender Mainstreaming Plan to reduce the risk of gender inequality and biases.		
Stakeholder engagement and grievances management.	✓ Stakeholder engagement is not aligned with the Stakeholders Engagement Plan. ✓ Inadequate or partial stakeholder identification. ✓ Lack of or inadequate stakeholder engagement.	✓ Develop and implement a Grievances Redress Mechanism (GRM) to manage all grievances in a timely manner and ensure the grievances management process is aligned with the GRM. ✓ Periodic review of the SEP and GRM ✓ Continual improvement of the SEP and GRM	✓ Development and implementation of SEP @ 1,000,000 a year ✓ Develop and implementation of GRM @	KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
	✓ Untimely disclosure of relevant project information ✓ Inadequate or partial disclosure of relevant project information. ✓ Grievances are not managed and resolved in a timely manner ✓ Process of grievances management is not aligned with the Grievances Redress Mechanism, leading to escalation into legal claims. ✓ Exclusion of vulnerable individuals and households from the engagement process.	✓ Ensure that all stakeholders are identified and are included in the SEP, and engaged meaningfully, including VMGs and vulnerable individuals and households. ✓ Implement the VMGP to ensure VMGs effectively participate in the project and access social and economic benefits that are also culturally appropriate. ✓ Implement project structured interventions to ensure vulnerable individuals and households effectively participate in, and benefit from the project. ✓ Conduct Free Prior Informed Consultations to ensure affected VMGs are engaged meaningfully and access culturally appropriate social and economic benefits. ✓ Implement the SEP and ensure all stakeholder engagement is aligned to the SEP. ✓ Ensure timely disclosure of relevant project information, e.g., project instruments, project risk management plans, positive and negative impacts, full rights and entitlements of project-affected persons, project benefits, and project opportunities.	500,000 a year	
COVID-19	Spread of the disease due to; ✓ KETRACO O&M staff and monitoring consultants seeking accommodation within project areas. ✓ Consultants and KETRACO involving communities in project monitoring. ✓ CSR implementation. ✓ Sensitization sessions on HIV/AIDs, GBV-SEA/SH etc.	All staff, visitors, and community members should adhere to the government's covid-19 regulations, including; ✓ Regularly and thoroughly clean their hands using soap and running water or with an alcohol-based hand rub. ✓ Maintain at least 1 metre distance between themselves and others. ✓ When coughing or sneezing, cover mouth and nose with flexed elbow or use disposable tissue and discard after use. ✓ Avoid touching eyes, nose and mouth. ✓ Always wear a mask in public and safely dispose used masks. ✓ Greet people with a wave, a nod, or a bow instead of shaking their hands. ✓ Avoid going to crowded places. ✓ If they have a fever, cough, difficulty breathing, or any other COVID-19 symptom, they should seek medical attention. The proponent must; ✓ Monitor everyone's health for symptoms such as fever, cough, or difficulty in breathing. ✓ Ensure workers who have returned from an area where COVID-19 is spreading monitor themselves for symptoms for 14 days and take their temperature twice a day. ✓ Make sure workplaces are clean and hygienic and are regularly disinfected. ✓ Put sanitizing hand rub dispensers in prominent places around the workplace and ensure that workers and visitors have access to places where they can wash their hands with soap and running water.	Thermometers @ 6,000 each. Face masks@ 500 a pack and transparent plastic protective face shield@ 300 each. Disinfecting workplaces@5,000 a month. Alcohol based sanitizers, soaps and disposable tissue@ 5,000 a month. Hand washing systems@ 5,000 each. Posters@ 500 each.	KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
		✓ Display posters and use other communication measures such as toolbox talks, briefings at meetings, and internet to promote hand-washing, respiratory hygiene, keeping social distance and other measures of combating COVID-19. ✓ Develop a response plan in case someone becomes ill with symptoms of COVID-19. ✓ Assist people to cope with stress and psychological effects during the COVID outbreak. ✓ In sourcing external labour (adverts and interviews), ensure people know measures employed to protect them from contracting COVID-19.		
Environmental Impacts				
Community health and safety	✓ Children may try to climb erected towers and risk falling or electrocution.	✓ Conduct sensitization fora on the dangers posed by the transmission line (especially on children) and ways of staying safe. ✓ Ensure safety features including danger warning sign and perimeter barbed wire surrounding each tower are in place. ✓ proponent to urge the community to keep vigil to ensure no kids climb the towers.	Sensitization fora on dangers of transmission lines@ 200,000 per quarter	✓ KETRACO
Destruction of Existing Vegetation and Habitats	✓ Vegetation clearing during RoW maintenance	✓ As much as is possible avoid disruption and alteration of habitat during RoW maintenance ✓ As far as possible, bush clearing be manual as opposed to mechanical or chemical methods		✓ KETRACO
Avi-fauna mortality	✓ Collision of birds with transmission line cables.	✓ While monitoring or working on the line, avoid interfering with bird safety features on the transmission line and bird habitats ✓ Any avifauna mortality due to collision should be recorded, including the species affected and the date. If repeated collisions occur, then further mitigation and avoidance measures may need to be implemented.	Implementation of further mitigation measures for avi-fauna mortality @300,000 a year	✓ KETRACO
Workers Health and Safety	✓ Falling objects i.e. from high levels of towers. ✓ attack by wild animals, ✓ Occupational diseases. ✓ Electrocution of workers, animals or public.	✓ Ensure the work places is dully registered as a workplace. ✓ Conduct job safety analysis for high risk activities and document safe work procedures. ✓ Identify all hazards before undertaking a process ✓ Conduct and continually review a risk assessment ✓ Hold daily morning toolkit talks where safety is the key issue ✓ Train workers on health and safety ✓ Ensure first aid kits and trained first aiders are available on site. ✓ Ensure each worker is covered under an insurance policy as per WIBA ✓ Collect daily security briefs and avoid insecure places ✓ Place warning signs where necessary ✓ Provide all necessary PPEs including helmets, ear muff/plug, hand gloves, dust/respiratory mask, reflective jacket, goggles, safety boots, double hook safety harness, etc.	PPE @ 10,000 per staff, Risk assessment @ 100,000 a year, Training @ 200,000 a year,	✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
Working at Height – transmission line towers	✓ Injury or fatality due to a fall from the tower	✓ The client/consultant must implement a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among other measures. ✓ Only qualified and experienced personnel should be allowed to climb the towers. ✓ Every morning before beginning the works, there should be a tool box talk emphasizing on safety at heights. ✓ Structures must be tested for integrity prior to undertaking work. ✓ No personnel should be allowed to climb the towers while drunk or under the influence of drugs ✓ There should be a ground supervisor constantly observing and conversing with the workers atop the towers. The officer should ensure workers observe safety precautions at all the times and should have emergency telephone contacts. ✓ Use approved tool bag for raising or lowering tools and materials to workers atop the towers. ✓ Workers climbing the towers must be provided with non-slip footwear, gloves, helmet, and double hook safety harness and should be compelled to use them all the time. The PPEs should constantly be inspected, maintained, and replaced where necessary. ✓ Safety belts should be of not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident.	Safety gear; non –slip footwear @ 5,000 a pair, gloves @ 1,000 a pair, helmet @ 2,000 each, double hook safety harness @ 20,000 each. Inspecting the harness @ 20,000 every 3 months	KETRACO
Waste handling, storage and disposal	✓ Public nuisance. ✓ Health problems	✓ Implement sustainable waste management principles of reduction, reuse and recycling. ✓ Provide solid waste handling facilities. ✓ Contract a NEMA licensed waste handler to collect and dispose waste. ✓ Sensitize workers on best waste management practices.	Colour coded waste collection bins@ 5,000 each, Contracting NEMA licensed waste handler @ 10,000 per month.	✓ KETRACO
Noise and vibrations	✓ Hearing problems. ✓ Public nuisance. ✓ Interference with communication on site which could result to accidents/injuries. ✓ Noise from corona discharge and buzzing/humming sound from substations.	✓ Provide workers in noisy areas with appropriate personal protective equipment (ear muffs/ear plugs). ✓ Drivers to be sensitized against unnecessary hooting. ✓ Ensure vehicles and equipment are well maintained and serviced as per manufacturer's guidelines. ✓ The substations shall be 132/33kV substations and the buzzing/harming sound is not predicted but should this be the case, the proponent should consider creating noise shields. Creating a tree canopy (along the safe sections of the perimeter fence) can also help in shielding the noise.	Provision of ear plugs @ 500 each and Ear muffs @ 1,000 each	KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
Air Pollution	✓ Dust Emission ✓ Exhaust emission	✓ Impose a maximum speed limit on dirt roads ✓ Provide workers working in areas likely to have dust emissions with suitable protective equipment ✓ Reduce idling of vehicles ✓ Ensure maintenance vehicles and equipment are well maintained and serviced as per manufacturer's guidelines.	Provision of dust masks @ 200 each, and coveralls@ 5,000 each	✓ KETRACO
Perceived Danger of Electrostatic and Magnetic Force	✓ Perceived Danger of Electrostatic and Magnetic Force	✓ Take the precautionary principle approach and ensure that a safe distance is maintained between residential units and the TL. ✓ Conduct education and awareness campaigns to dispel fear among communities on the effects of electrostatic and magnetic forces. ✓ No settlement should be allowed on the way-leave. ✓ Maintenance workers should work in intervals to avoid long exposure periods.	Awareness creation to dispel fear on effects of EMF @ 300,000	✓ KETRACO
Aircraft navigation safety	✓ Damage to transmission lines and towers ✓ Damage to aircrafts ✓ Injuries to aircraft operators, construction workers, public and animals.	✓ Ensure the ball markers are always in place. ✓ Surveillance, accident investigation, and corrective actions.		KETRACO
Fire Outbreaks	✓ Fire Outbreaks	✓ Conduct fire risk assessment and prepare Fire Response Plan. ✓ Advise workers not to smoke on forested areas. ✓ Ensure compliance with fire safety regulations and ensure availability of all necessary fire safety equipment. ✓ Conduct regular training and fire drills for employees. ✓ Regularly monitor the way-leave and ensure there is no accumulation of flammable substances including plant material. ✓ Create fire-breaks (ploughed strips) on strategic areas of the TL ✓ Build capacity for workers and community on fire related issues including sources, fighting, and vigilance.	Training and fire drills for employees @ 200,000 per quarter Building capacity for workers and community on fire related issues @ 200,000 per quarter	✓ KETRACO
Visual and Aesthetic Impacts	✓ Effect on Visual and Aesthetic	✓ Ensure removal of all temporary structures erected by the construction contractor and restore the sites to as close as possible to the conditions before construction. ✓ Maintain landscaping programme initiated during the construction phase. ✓ Creating a tree canopy (along the safe sections of the substations perimeter fence)	Maintaining landscaping program @50,000 a quarter, creating a tree canopy@100,000	KETRACO

7.4: ESMP for the Decommissioning Phase

Table 7.4: ESMP for the decommissioning phase of the proposed project

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
Social Impacts				
Project Induced Labour Influx related impacts e.g., GBV-SEA/SH	✓ Social conflict between the local community and the decommissioning workers due to religious, cultural or ethnic differences or competition for local resources. ✓ Increase in illicit behavior and crime including theft, physical assaults, substance abuse, and prostitution. ✓ Increased burden on and competition for public service provision including water, energy, medical services, transport, and education. ✓ Spread of diseases such as HIV/AIDS, STDs and other communicable diseases. ✓ Gender Based Violence such as sexual exploitation and abuse of community members by project workers (SEA) and workplace sexual harassment (SH), and exploitative sexual relations and illicit sexual relations with minors. ✓ Child labor and school dropout ✓ Local inflation of prices due to increase in demand for goods and services ✓ Disregard of important cultural norms ✓ Gender mainstreaming issues including the two-thirds gender rule, gender inequality, gender equity, women participation in project meetings and activities etc.	✓ Develop and implement a Local Recruitment Plan that will ensure employment of as many locals as is possible. Local laws require 30% of labour force to come from the locals. ✓ Formulate and implement a Labor Influx Management Plan that will ensure harmony between non-local workers and the locals and minimize effects of labour influx ✓ Conduct sensitization fora for employees on ethics, morals, general good behaviour, GBV-SEA/SH, and the need for the project to co-exist with the neighbours. The fora should be guided by the Stakeholder Engagement Plan. ✓ Provide guidance and counselling on drug abuse, HIV/AIDS, and other STDs to employees. ✓ Sensitize local community on communicable diseases (STDs and HIV/AIDS) and GBV-SEA/SH. ✓ Provide female and male condoms to workers. ✓ Cooperation with local law enforcement and introduction of sanctions (e.g., dismissal) for workers involved in criminal activities. ✓ Provision of water supply source to workers and prohibition of use from other community sources or ensure the project and community agree on the right to access water from community sources. ✓ Develop and implement the GBV Management Plan (Cognizant of 1. sensitivity of GBV, and 2. the need to ensure confidential reporting and responding to GBV cases reported); including plans for prevention, response and Grievance Redress Mechanism, and ensure that the project does not trigger or exacerbate other forms of GBV at the community level. Further, ensure codes of conduct are signed by all with physical presence on project site. ✓ Mandatory and regular training for workers on required lawful conduct in relation to GBV in host community in addition to social and cultural inductions to workers. The project should support survivors who choose the legal redress route by referring them to the legal redress referral pathway – which could include legal entities (NGOs, lawyers, police stations etc.). ✓ Provision of opportunities for workers to regularly return to their families; ✓ Provision of opportunities for workers to take advantage of entertainment	Sensitization fora @ 1,000,000 Condoms @ 200,000 Free screening @200,000 Training on GBV @ 200,000	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
		opportunities away from rural host communities. ✓ Ensure that children and minors are not employed directly or indirectly on the project. To ensure minors or children are not employed directly or indirectly in the project, the proponent/contractor will monitor the employment register; in addition to ensuring that workers have valid national identification cards. ✓ Maintain an updated employee database on site. ✓ All criminal cases to be reported to the relevant authorities through appropriate channels. ✓ Develop and implement a Gender Mainstreaming Plan to reduce the risk of gender inequality and biases.		
Gender biases	✓ Gender mainstreaming issues including the two-thirds gender rule, gender inequality, gender equity etc. ✓ Inability of women to attend project meetings and other decision-making fora. ✓ Unfavorable employment conditions for women including salary, maternity leave, working hours, security, periodic time off to afford them access to child and dependent care, etc.	✓ Develop and implement a Gender Mainstreaming Plan to reduce the risk of gender inequality and biases and ensure participation of women in decision making and sharing of project benefits. The plan should also ensure gender is mainstreamed in all aspects of the project. ✓ During the employment of project staff, the Contractor to give more preference to women applicants and to encourage women to apply. ✓ In implementing the Stakeholder Engagement Plan, the proponent to be sensitive to women's availability to attend meetings. ✓ For any community meetings held, the announcement to encourage women to attend and the organizers to design initiatives that reach out to more women to attend the meetings. ✓ Inclusion of women representatives on Grievances Redress Committees ✓ Conduct sensitization fora with all community segments about the importance of women participation in the project. ✓ Identify and address women employee security issues, including their safety while traveling to and from work and on project-related business. ✓ The contractor to proactively recruit and appoint women workers to decision-making positions. ✓ Offer flexible work options for women workers, accord them their leave days, and where possible support their access to child and dependent care.	Sensitization fora @ 100,000	✓ Contractor ✓ KETRACO
Stakeholder engagement and grievances management.	✓ Stakeholder engagement is not aligned with the Stakeholders Engagement Plan. ✓ Inadequate or partial stakeholder identification. ✓ Lack of or inadequate stakeholder engagement.	✓ Develop and implement a Grievances Redress Mechanism (GRM) to manage all grievances in a timely manner and ensure the grievances management process is aligned with the GRM. ✓ Periodic review of the SEP and GRM ✓ Continual improvement of the SEP and GRM ✓ Ensure that all stakeholders are identified and are included in the SEP, and engaged	✓ Development and implementation of SEP @ 1,000,000 ✓ Develop and implementation of GRM @ 500,000	✓ KETRACO ✓ Contractor

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
	✓ Untimely disclosure of relevant project information ✓ Inadequate or partial disclosure of relevant project information. ✓ Grievances are not managed and resolved in a timely manner ✓ Process of grievances management is not aligned with the Grievances Redress Mechanism, leading to escalation into legal claims. ✓ Exclusion of vulnerable individuals and households from the engagement process.	meaningfully, including vulnerable individuals and households. ✓ Implement project structured interventions to ensure vulnerable individuals and households effectively participate in, and benefit from the project. ✓ Conduct Free Prior Informed Consultations to ensure affected VMGs are engaged meaningfully and access culturally appropriate social and economic benefits. ✓ Implement the SEP and ensure all stakeholder engagement is aligned to the SEP ✓ Ensure timely disclosure of relevant project information, e.g., project instruments, project risk management plans, positive and negative impacts, full rights and entitlements of project-affected persons, project benefits, and project opportunities.		
Project benefits and opportunities including employment, local sourcing, capacity building etc.	✓ Failure by contractor and the proponent to prioritize locals for jobs. ✓ Perception by the locals that labour is imported from outside the project area. ✓ Project benefits and opportunities (e.g., employment, project-structured interventions for disadvantaged groups, etc.) are inaccessible to project-affected persons, including vulnerable individuals and households (elderly, PWD, etc.) and VMGs.	✓ Develop and implement a Local Recruitment Plan that will ensure employment of as many locals as is possible and manage all aspects related to local employment. Local laws require 30% of labour force to come from the locals. ✓ Manage negative public perception through community sensitization and training ✓ All job advertisements to be made available to the local population/placed in locations accessible to locals. ✓ Develop and implement a Corporate Social Responsibility (CSR) Plan in consultation with all community segments. ✓ Implement project structured interventions to ensure vulnerable individuals and households effectively participate in, and benefit from the project.	✓ Sensitization and training @ 200,000	✓ KETRACO ✓ Contractor
COVID-19	Spread of the disease due to; ✓ Workers seeking accommodation within project areas. ✓ Decommissioning of TL and contractor facilities etc. ✓ Contractor/KETRACO engaging local workforce. ✓ Contractor and KETRACO involving communities in project monitoring. ✓ Sensitization sessions on HIV/AIDs, GBV-SEA/SH etc. Increased high expectations on the project e.g., higher demand for jobs and high wages. There will be a risk of engaging children/minors to	All staff, visitors, and community members should adhere to the government's covid-19 regulations, including; ✓ Regularly and thoroughly clean their hands using soap and running water or with an alcohol-based hand rub. ✓ Maintain at least 1 metre distance between themselves and others. ✓ When coughing or sneezing, cover mouth and nose with flexed elbow or use disposable tissue and discard after use. ✓ Avoid touching eyes, nose and mouth. ✓ Always wear a mask in public and safely dispose used masks. ✓ Greet people with a wave, a nod, or a bow instead of shaking their hands. ✓ Avoid going to crowded places. ✓ If they have a fever, cough, difficulty breathing, or any other COVID-19 symptom, they should seek medical attention. The proponent and contractor must;	Thermometers @6,000 each. Face masks@500 a pack and transparent plastic protective face shield@ 300 each. Disinfecting workplaces@5,000 a month. Alcohol based sanitizers, soaps and disposable tissue@ 20,000 a month. Hand washing systems@ 5,000 each. Posters@ 500 each.	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
	work in the project or engage in business activities to supply goods and services to the project, in order to supplement dwindling household income sources due to effects of COVID-19 Psychological effects of Covid-19 e.g., due to negative socio-economic effects, social isolation may lead to increased cases of GBV including, GBV-SEA, workplace Sexual harassment, as well as other forms of GBV at the community or family level attributable to the project. Due to COVID-19 effects the burden of taking care of the household might fall disproportionately on women, therefore making it difficult for them to take part in e.g., consultation fora, decision making etc. External sourcing of labour may be impeded by, (a) cessation of movement; and (b) unwillingness of some workers to live in unfamiliar locations during a pandemic (fear of contracting the virus), and especially in locations with a high number of infections/pandemic epicenters.	✓ Monitor everyone's health for symptoms such as fever, cough, or difficulty in breathing. ✓ Ensure workers who have returned from an area where COVID-19 is spreading monitor themselves for symptoms for 14 days and take their temperature twice a day. ✓ Make sure workplaces are clean and hygienic and are regularly disinfected. ✓ Put sanitizing hand rub dispensers in prominent places around the workplace and ensure that workers and visitors have access to places where they can wash their hands with soap and running water. ✓ Display posters and use other communication measures such as toolbox talks, briefings at meetings, and internet to promote handwashing, respiratory hygiene, keeping social distance and other measures of combating COVID-19. ✓ Develop a response plan in case someone becomes ill with symptoms of COVID-19. ✓ Give additional support to disadvantaged and vulnerable groups/locals who have been further disenfranchised due to negative social and economic impacts of Covid-19. ✓ Manage high expectations on the project e.g., higher demand for jobs, CSR activities, salaries/wages etc. through training and information dissemination. ✓ Ensure that children and minors are not employed directly or indirectly on the project. ✓ Assist people to cope with stress and psychological effects during the COVID outbreak. ✓ Develop and implement a Gender Mainstreaming Plan with COVID-19 effects in mind to reduce the risk of gender inequality and biases. ✓ In sourcing external labour (adverts and interviews), ensure people know measures employed to protect them from contracting COVID-19.		
Environmental Impacts				
Community health and safety	✓ Children may try to climb erected towers and risk falling ✓ Traffic accidents ✓ Open defecation is a community health hazard which can cause spread of diseases.	✓ Conduct sensitization fora on the dangers posed by the transmission line (especially on children) and ways of staying safe. ✓ Contractor to facilitate the community to keep vigil or employ security guards to ensure no kids climb the towers. ✓ Within settled areas, impose speed limits and ensure people, especially children, have the right of way. ✓ Contractor to provide mobile toilets	Sensitization fora on dangers of transmission lines@ 300,000 Support for community to keep vigil to ensure people especially kids do not climb towers or fall into open pits 7,000 per month	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
			Provision of mobile toilets @ 70,000 each	
Workers Health and Safety	✓ Falling objects i.e. from high levels of towers and excavations, ✓ collapsing of excavations, ✓ poor hygiene as the contractor may find it difficult to provide sanitary welfare in the bushes ✓ road accidents, ✓ Occupational diseases. ✓ Electrocution of workers, animals or public.	✓ Conduct job safety analysis for high risk activities and document safe work procedures. ✓ Identify all hazards before undertaking a process ✓ Conduct and continually review a risk assessment ✓ Hold daily morning toolkit talks where safety is the key issue ✓ Train workers on health and safety ✓ Ensure first aid kits and firefighting equipment are available on site. ✓ Ensure only qualified personnel operate demolition equipment and vehicles. ✓ Only allow trained and certified workers to deactivate or work on live sections of the TL. ✓ Prohibit access by unauthorized personnel into the demolition site ✓ Ensure each worker is covered under an insurance policy as per WIBA ✓ Ensure demolition equipment and vehicles are regularly inspected by approved inspectors and inspection records maintained. ✓ Collect daily security briefs and avoid insecure places ✓ Place warning signs where necessary ✓ Provide all necessary PPEs including helmets, ear muff/plug, hand gloves, dust/respiratory mask, reflective jacket, goggles, safety boots, double hook safety harness, etc.	Conduct and review of risk assessment @ 60,000, Training workers on health and safety @ 100,000, Provision of insurance policy for workers@ 200,000 a year, Provision of PPE @ 10,000 per staff, and warning signs@ 30,000	✓ Contractor
Working at Height – transmission line towers	✓ Injury or fatality due to a fall from the tower	✓ Only qualified and experienced personnel should be allowed to climb the towers ✓ Every morning before beginning the works, there should be a tool box talk emphasizing on safety at heights ✓ No personnel should be allowed to climb the towers while drunk or under the influence of drugs ✓ There should be a ground supervisor constantly observing and conversing with the workers atop the towers. The officer should ensure workers observe safety precautions at all the times and should have emergency telephone contacts. ✓ Workers climbing the towers must be provided with non-slip footwear, gloves, helmet, and double hook safety harness and should be compelled to use them all the time.	Safety gear; non –slip footwear @ 5,000 a pair, gloves @ 1,000 a pair, helmet @ 2,000 each, double hook safety harness @ 20,000 each. Inspecting the harnesses @ 20,000 every 3 months	✓ Contractor ✓ KETRACO
Demolition waste	✓ Public nuisance ✓ Health problems ✓ Contamination of soil and water resources ✓ Eye sore	✓ Provide mobile toilets for decommissioning workers to manage human waste. ✓ Implement sustainable waste management principles of reduction, reuse and recycling. ✓ Contract a NEMA licensed waste handler to collect and dispose demolition waste.	Mobile toilets @ 70,000 each, NEMA licensed waste handler @ 10,000 a month,	✓ Contractor ✓ KETRACO

Environmental/ Social Aspect	Impacts	Mitigation Measures	Estimated Cost (KShs.)	Responsible party
		✓ Sensitize workers on best waste management practices. ✓ All transmission line equipment and structures not used for other purposes must be removed and recycled/reused as far as possible or they be taken to a licensed waste disposal site		
Noise and vibrations	✓ Hearing problems. ✓ Public nuisance. ✓ Interference with communication on site which could result to accidents/injuries. ✓ Disruption of animal behaviors. ✓ Psychological and physical stress among workers hence reduced productivity. ✓	✓ Install portable barriers to shield noisy equipment where necessary. ✓ Limit demolition activities to be between 6.00 am to 6.00 pm. ✓ Reduce idling of vehicles and demolition equipment. ✓ Provide workers in noisy areas with appropriate personal protective equipment (ear muffs/ear plugs). ✓ Drivers to be sensitized against unnecessary hooting. ✓ Ensure demolition vehicles and equipment are well maintained and serviced as per manufacturer's guidelines. ✓ Co-ordinate with relevant agencies and neighbouring communities regarding all demolition activities	Portable barriers @ 100,000, PPE @ 10,000 per staff, meeting with relevant authorities and community @ 100,000.	✓ Contractor ✓ KETRACO
Air Pollution	✓ Dust Emission ✓ Exhaust emission	✓ Watering all active demolition areas as and when necessary to lay dust. ✓ Cover all trucks hauling soil, sand and other loose materials or require all trucks to maintain at least two feet of freeboard. ✓ Impose speed limits. ✓ Provide workers working in areas likely to have dust or exhaust emissions with suitable protective equipment ✓ Reduce idling of vehicles and demolition equipment. ✓ Ensure demolition vehicles and equipment are well maintained and serviced as per manufacturer's guidelines.	Water sprinkling @ 10,000 a month , PPE; dust mask @ 200 each, coveralls @ 5,000 each.	✓ Contractor ✓ KETRACO
Fire Outbreaks	✓ Fire Outbreaks	✓ Conduct fire risk assessment and prepare Fire Response Plan. ✓ Advise workers not to smoke on forested areas. ✓ Ensure compliance with fire safety regulations and ensure availability of all necessary fire safety equipment. ✓ Conduct regular training and fire drills for employees. ✓ Regularly monitor the way-leave and ensure there is no accumulation of flammable substances including plant material. ✓ Create fire-breaks (ploughed strips) on strategic areas of the TL ✓ Build capacity for workers and community on fire related issues including sources, fighting, and vigilance.	Training and fire drills for employees @ 300,000 Building capacity for workers and community on fire related issues @ 300,000	✓ Contractor ✓ KETRACO
Rehabilitation of project site	✓ Visual and Aesthetic Impacts	✓ Implement an appropriate re-vegetation programme to restore the site to its original status. ✓ Consider use of indigenous plant species in re-vegetation. ✓ Restore site area through backfilling, landscaping and planting of trees, shrubs and grass on the open spaces to re-introduce visual barriers.	Revegetation program, landscaping and backfilling to restore project site @ 800,000	✓ Contractor ✓ KETRACO

CHAPTER 8: ENVIRONMENTAL MONITORING PLAN (EMoP)

8.1: Environmental Monitoring Plan

Table 8.1: Environmental Monitoring Plan (ESMoP) for the Proposed Project

Monitoring Scope	Frequency				Monitoring Indicators	Monitoring means	Cost
	Pre-construction	Construction	Operations	Decommissioning			
Social Impacts							
Acquisition of wayleaves, and land for substation, and ancillary facilities	Monthly	Quarterly	Bi-annually	-	✓ Ensure the following management plans are in place and are being implemented; Local Recruitment Plan, Resettlement Action Plan, Livelihoods Restoration Plan, Labor Influx Management Plan, Gender Mainstreaming Plan, Stakeholder Engagement Plan, Grievance Redress Mechanism, and GBV Management Action Plan. ✓ No. of vulnerable individuals and households engaged, fairly and promptly compensated, and their livelihoods improved or restored back to pre-project levels, in line with the provisions of the RPF. ✓ Monitor compensation for land, loss of use, structures, crops, pasture and trees. ✓ What % of PAPs has been compensated? ✓ Records on average time given to PAPs to relocate ✓ No. of focused groups sensitization fora and counseling sessions held to discuss social vices associated with receiving an unexpected (large) income ✓ No. of sessions held by the Resettlement Committees and their minutes of meeting. ✓ Assess if compensation and other entitlements are being delivered in line with the RAP ✓ Assess if measures to restore or enhance livelihood of PAPS are being implemented. ✓ Review records of grievances and follow up to ensure appropriate corrective actions have been implemented. ✓ Check existence of escrow account for delayed compensation. ✓ Check to ensure land for ancillary facilities was acquired by the contractor on a willing seller willing buyer basis. ✓ Check to see land ownership documents for the substation and reports on the land acquisition process for the substation. ✓ Monitor cases of land disputes and those due to lack of land ownership documents.	site visit, observation, meeting with PAPs,	Per diem and facilitation for 3no. staff @150,000 a month
Livelihood restoration	Monthly	Quarterly	Bi-annually	-	✓ Implementation of the livelihood restoration plan ✓ Records of training sessions held with all community segments including VMGs and vulnerable individuals and households. ✓ Records of insurance cover taken for livestock ✓ Records of cash compensation for lost businesses and other sources of livelihoods.		

Monitoring Scope	Frequency				Monitoring Indicators	Monitoring means	Cost
	Pre-construction	Construction	Operations	Decommissioning			
					✓ Records of extra assistance given to vulnerable PAPs, VMGs (particularly minority VMGs) and vulnerable individuals and households		
Gender biases	Monthly	Monthly by contractor and quarterly by KETRACO	-	Monthly by contractor and quarterly by KETRACO	✓ Ensure a Gender Mainstreaming Plan and a Stakeholder Engagement Plan that identifies women as an important focus group are in place and are being implemented ✓ No. of women employed in the project as a percentage to the total number of people employed. ✓ No. of sensitization meetings held with women, signed minutes and list of participants. ✓ Ensure job advertisement and recruitment drives encourage women to apply. Rate the adverts and recruitment drives held. ✓ Scrutinize attendance list of project meetings and other decision-making fora and aggregate in terms of gender. ✓ Records reported cases of GBV-SEA/SH. ✓ No. of women PAPs compensated. ✓ Reports on women employee safety and security issues. ✓ Report on women employees working conditions.		
Stakeholder engagement and grievances management	Monthly	Quarterly	Bi-annual	Bi-annual	✓ Implementation of the SEP and GRM. ✓ No. of sensitization and training sessions held, including sessions held with vulnerable individuals and households, signed minutes and lists of participants. ✓ No. of sensitization and training session held ✓ No. of meetings held to review SEP and GRM ✓ Attendance list and minutes for meetings held during stakeholder consultation ✓ Attendance list and minutes for meetings held during disclosure of project information, ✓ No. of reported grievances ✓ No. of cases of successfully resolved grievances by the GRM ✓ No. of grievance cases not successfully by GRM ✓ No. of grievance cases escalated to the law courts, and to the World Bank Grievances Redress System and Inspection Panel. ✓ Evidence of Free Prior Informed Consultations held with affected VMGs.		
Project benefits and opportunities including employment, local sourcing, capacity building etc.	Monthly	Quarterly	-	Bi-annual	✓ Proof of a Local Recruitment Plan ✓ Proof of job advertisements being made available to the local population ✓ Attendance list and minutes for sensitization meetings ✓ Proof of CSR Plan ✓ No. of CSR projects completed. ✓ No of vulnerable individuals and households accessing project benefits and opportunities. ✓ Project structured interventions accessible to vulnerable individuals and households.		
COVID-19	Daily	Daily by contractor and quart	Weekly	Daily by contractor and	✓ Check to see workers and visitors keep social distance, sanitize their hands, and wear mask. ✓ Ensure proponent and contractor monitor workers and visitor for symptoms of COVID-19, regularly disinfect workplaces and keep them		

Monitoring Scope	Frequency				Monitoring Indicators	Monitoring means	Cost
	Pre-construction	Construction	Operations	Decommissioning			
		erly by KETRACO.		quarterly by KETRACO.	hygienic, provide sanitizing hand rub dispensers and hand washing systems, and display posters. ✓ Ensure the formulated Gender Mainstreaming Plan is aligned with COVID-19 effects in mind to reduce the risk of gender inequality and biases. ✓ Confirm minutes of meetings, trainings, and briefs to manage increased high expectations on the project. ✓ Confirm sessions held to assist people cope with stress and psychological effects.		
Project Induced Labour Influx related impacts e.g., GBV-SEA/SH etc.)	Monthly	Weekly by contractor and quarterly by KETRACO	Quarterly	Weekly by contractor and quarterly by KETRACO	✓ Implementation of the GBV Management Plan. ✓ Check employment records to ensure locals have been employed and minors are not employed. ✓ Minutes of sensitization meetings on morals, ethics, communicable diseases, HIV/AIDs, and GBV. ✓ Records of provision of both male and female condoms. ✓ Report of reported cases of GBV-SEA/SH. ✓ Check if contractor has contracted security guards and workers have badges or identification cards to access construction site. ✓ Verify Presence of an up-to-date employee database on site. ✓ No. of criminal cases reported to the relevant authorities through appropriate channels?	site visit, observation, meeting with contractor, interview some employee, meeting with community members	Per diem and facilitation for 3no. staff @150,000 per quarter
Culture, Heritage, and Norms		Weekly by contractor and quarterly by KETRACO	-	-	✓ Check whether contractor has contracted a cultural ambassador to guide and advice the project on issues of culture, heritage, and norms. ✓ Minutes of meeting for sensitizations conducted for the contractor and their workers on culture, heritage, and norms to avoid conflicts with communities ✓ Records of gravesite excavations, cutting of sacred trees or interference with cultural sites by the contractor and procedures followed in line with acceptable community practices.	site visit, meeting with contractor, meeting with community members	
Livestock farming		Weekly by contractor and quarterly by KETRACO.	-	-	✓ Check if excavated pits are well secured and guards are on standby to prevent livestock from falling into the pits. ✓ Check if there is unnecessary vegetation clearing. ✓ Check if water resources have been polluted by the contractor. ✓ Verify that sensitization fora have been conducted among workers and drivers on livestock safety. ✓ Records of any incident or accident involving livestock and corrective measures taken.	site visit, observation, meeting with contractor, meeting with community members	
Environmental Impacts							
Community health and safety		Daily by contractor and quarterly by KETRACO.	-	-	✓ Minutes of meeting for sensitization fora on community health and safety. ✓ Confirm excavated foundation pits are barricade and warning signs are well displayed. ✓ Confirm presence of safety features on each tower. ✓ Confirm that security guards have been contracted or community empowered to prevent people from accessing construction areas.	site visit, observation, meeting with contractor, meeting with community members	

Monitoring Scope	Frequency				Monitoring Indicators	Monitoring means	Cost
	Pre-construction	Construction	Operations	Decommissioning			
					✓ Records of traffic signs and adherence to speed limits within settled areas to ensure there is road safety. ✓ Records of any incident or accident involving children and any other community member and corrective measures taken. ✓ Records of grievances/complaints of noise/vibration ✓ No. of mobile toilets provided		
Destruction of existing vegetation and habitat		Weekly by contractor and quarterly by KETRACO.	-	-	✓ Records of sensitization meetings for workers to avoid unnecessary vegetation clearance. ✓ Verify vegetation clearing is selective and that it is cleared manually with no chemicals used. ✓ Check if unnecessary vegetation clearing has occurred and advise accordingly. ✓ No. of tree planting drives held and status of trees planted ✓ Check spread of invasive species (*Lantana camara, Solanum mauritianum, Prosopis juliflora, Ipomoea spp* and others) in the project area and make recommendations	site visit, observation, meeting with contractor, meeting with KFS, meeting with community members	Per diem and facilitation for 3no. staff @150,000 per quarter.
Avi-fauna disturbance and mortality		Weekly by contractor and quarterly by KETRACO	Quarterly	-	✓ Report on mapping of important bird migration corridors ✓ Records of bird safety features on the line ✓ Records of bird collision incidences or bird mortality due to collision and any further mitigation measures employed for repeated collision.	site visit, observation, meeting with contractor.	
Surface and underground water reserves including Rivers, Streams, Marsh-areas, springs, wells, and boreholes		Weekly by contractor and quarterly by KETRACO with water quality analysis done bi-annually	-	-	✓ Records of towers on the riparian zone and corrective measures taken. ✓ Ensure contractor has developed and is implementing an oil spill minimization and clean up plan. ✓ No. of mobile toilets provided ✓ Ensure contractor is not abstracting water from local water resources illegally. ✓ Check if there is waste dumping or effluent discharge into water resources by the contractor/workers ✓ Bi-annual water quality analysis	site visit, observation, meeting with contractor, meeting with community members, lab analysis.	Per diem and facilitation for 3no. staff @150,000 per quarter. Water quality analysis @ 300,000 bi-annually
Workers Health and Safety		Daily by contractor and quarterly by KETRACO	Quarterly	Daily by contractor and quarterly by KETRACO	✓ Ensure existence of an Environment, Health, and Safety Officer. ✓ Check to see the Labor Management Plan has been developed and is being implemented. ✓ Inspect health and safety documentation as per the Occupational Health and Safety Plan (OHSP) ✓ Check number of reported accidents, incidents and near misses and actions taken. ✓ Verify PPEs has been provided to workers and are used.	Site visit, observation, meeting with contractor, interview some employee.	Per diem and facilitation for 3no. staff @150,000 per quarter.

Monitoring Scope	Frequency				Monitoring Indicators	Monitoring means	Cost
	Pre-construction	Construction	Operations	Decommissioning			
					✓ Verify presence of trained first aiders and fire marshals at site and well equipped first aid boxes and fire equipment. ✓ Records of training held on health and safety. ✓ Records of insurance premiums. ✓ Records of morning tool kit talk. ✓ Records of incidents and accidents involving workers.		
Working at Height – transmission line towers		Daily by contractor and quarterly by KETRACO	-	Daily by contractor and quarterly by KETRACO	✓ Verify that work at height training has been provided to workers. ✓ Records of morning tool kit talk. ✓ Verify if workers have been provided with appropriate PPE for work at height and are using them. ✓ Records of incidents and accidents involving workers.	Site visit, observation, meeting with contractor, interview some employee.	
Waste handling, storage and disposal		Weekly by contractor and quarterly by KETRACO	Weekly by contractor and quarterly by KETRACO	Weekly by contractor and quarterly by KETRACO	✓ Verify waste receptacles have been provided ✓ Confirm records of waste disposal through a NEMA licensed waste handler. ✓ Ensure sanitary conveniences have been provided to manage human waste. ✓ Check if there is evidence of waste burning on site ✓ Minutes of sensitization meetings on waste reduction. ✓ Ensure all remnants of loose gravel and concrete are effectively collected from the tower bases.	site visit, observation, meeting with contractor, interview some employee, meeting with community members	
Noise and vibrations		Weekly by contractor and quarterly by KETRACO with bi-annual noise level analysis	Quarterly	Weekly by contractor and quarterly by KETRACO	✓ Records of workers' exposure to noise and whether contractor limit work to daytime only. ✓ Check vehicle and equipment maintenance and inspection records ✓ Verify that appropriate PPE has been provided to workers in high noise areas and that workers are using the PPEs. ✓ Conduct bi-annual noise level analysis	site visit, observation, meeting with contractor, interview some employee, meeting with community members, noise measurements	Per diem and facilitation for 3no. staff @150,000 per quarter. Hiring of NoiseLevel Meter @20,000 bi-annually.
Air Pollution		Weekly by contractor and quarterly by KETRACO	Quarterly	Weekly by contractor and quarterly by KETRACO	✓ Inspect fugitive dust emissions from construction sites and exhaust emission from vehicles and machines. ✓ Check water sprinkling records to suppress dust emission. ✓ Check presence of speed limit signs. ✓ Verify appropriate PPE has been provided including dust masks, eye protection and coveralls) ✓ Check vehicle and equipment maintenance and inspection records.	site visit, observation, meeting with contractor, interview some employee, meeting with community members	Per diem and facilitation for 3no. staff @150,000 per quarter.

Monitoring Scope	Frequency				Monitoring Indicators	Monitoring means	Cost
	Pre-construction	Construction	Operations	Decommissioning			
Soil Erosion		Quarterly	-	-	✓ Records of soil erosion mitigation measures implemented. ✓ Investigate effects on riverine vegetation. ✓ Records on rejuvenation of degraded areas with native vegetation species to improve ground cover.	site visit, observation, meeting with contractor.	
Archeological, and historical sites		Quarterly	-	-	✓ Verify No. of training sessions of KETRACO and construction staff on identification of archeological objects; No. of staff trained. ✓ Check No. of Chance Find cases of archaeological material reported and procedures followed.	site visit, observation, meeting with contractor, meeting with community members	
Air craft navigation safety		Quarterly	-	-	✓ Ensure KCAA approval is received. ✓ Check if conditions of approval from KCAA are implemented. ✓ Check conditions of ball markers. ✓ Records of aircraft accidents	Site visit, observation.	Per diem and facilitation for 3no. staff @150,000 per quarter.
Traffic disruption on road crossings during stringing		Quarterly	-	-	✓ Check availability of approval from Roads' Authorities. ✓ Check if conditions set in permit from relevant road authorities have been met. ✓ Check presence of road signs. ✓ Verify contractor has contracted traffic marshals to guide construction vehicles and other motorists in risky areas.	site visit, observation, meeting with contractor, interview some employee, meeting with community members	
Visual and Aesthetic Impacts		Quarterly	-	-	✓ Minutes of public consultation meeting. ✓ Comment on ancillary structures erected by contractor. ✓ Verify that backfilling, landscaping and planting of trees, shrubs and grass in disturbed areas has been done.	site visit, observation, meeting with contractor, interview some employee, meeting with community members	
Perceived Danger of Electrostatic and Magnetic Force		-	Quarterly	-	✓ Minutes of education and awareness campaigns held to dispel fear among communities on the effects of EMFs ✓ Ensure there is no settlement on the way-leave.	site visit, meeting with contractor.	
Fire outbreaks		Quarterly	Quarterly	Quarterly	✓ No. trainings and sensitization fora for workers and community held ✓ No. of fire outbreak incidents and how handled	site visit, observation, meeting with contractor, meeting with community members	

Monitoring Scope	Frequency				Monitoring Indicators	Monitoring means	Cost
	Pre-construction	Construction	Operations	Decommissioning			
Demolition waste		-		Quarterly	✓ No. of mobile toilets provided. ✓ Confirm records of waste disposal through a NEMA licensed waste handler.	site visit, observation, meeting with contractor, meeting with community members	
Rehabilitation of project site		-		Quarterly	✓ Verify implementation of an appropriate re-vegetation programme to restore the site to its original status ✓ Verify that backfilling, landscaping and planting of trees, shrubs and grass in disturbed areas has been done.	site visit, observation, meeting with contractor, meeting with community members	

CHAPTER 9: ANALYSIS FOR ALTERNATIVES

9.1: Introduction.

One of the functions of the Environmental and Social Impact assessment process is to describe and evaluate various alternatives to the proposed project. Alternatives examined during the study are discussed below;

9.2: The "Do Nothing" Option

For this project, the no-development option would mean the proposed project will not be implemented. The implications of this would be no additional reliability and security of electricity supply to Narok and Migori Counties, the economic status of people in the project area will not change, and there will be no creation of job and business opportunities. Given that the level of impacts associated with the project are low and that there is high probability of mitigation of these negative impacts, the "no-go" option would not be the most viable option in this instance.

9.3: Demand-Side Management Option

Demand Side Management (DSM) is a function carried out by the electricity supply utility aimed at encouraging a reduction in the amount of electricity used at peak times. This is achieved by influencing customer usage to improve efficiency and reduce overall demand. These efforts are intended to produce a flat load duration curve to ensure the most efficient use of installed network capacity. By reducing peak demand and shifting load from high load to low load periods, reductions in capital expenditure (for network capacity expansion) and operating costs can be achieved. One of the basic tools is the price differentiation (such as time-of-use tariffs) between peak demand time and low demand time. This option is practiced to a certain extent, but is currently not considered feasible for managing the level of growth forecast for Narok and Migori Counties.

9.4: Line Routing Alternatives

In proposing the above line route, consideration was given to social and environmental impacts of the project over and above KETRACO's route selection criteria (highlighted in section 4.4.3). The proposed transmission line has been located to avoid areas of dense settlement and where impacts on environment and local people including; loss of farmland, structures, grazing land and environmentally sensitive areas area minimal.

The transmission line will however, overfly a school compound in Nentekeny village. Nentekeny Primary School owns a piece of land outside its fenced compound. The land, at the time of the assessment, was un-used and laid fallow. Options available here include;

1. Re-route the line to avoid the school compound. This would call for creating a small angle point and then bring the line back to its course.
2. Overfly the school compound (no tower in the school compound) but the client to offer the school, land for land compensation. The replacement land must have productive potential and locational advantages equivalent to or higher than the advantages of land taken. It is suggested that, the compensated land be adjacent to the school land and that the affected land remains the school property. Alternatively, the proponent can give an in-kind compensation which would involve implementation of a social investment project in the school as compensation for land impacted.
3. Use underground cable within the school compound.

Option 3 would be quite expensive.

Option 1 and 2 would be ideal. The chairperson of the school's Board of Governors and the Head teacher preferred option 2

9.5: Alternative processes and materials

The table below presents an analysis of alternatives materials and processes for the proposed electricity transmission project.

Alternative construction materials and processes	**Advantages**	**Disadvantages**
Use of wooden poles	✓ Low installation cost. ✓ Easy to transport. ✓ Readily available.	✓ Not durable due to rot and decay. ✓ Can easily collapse. ✓ Susceptible to insect and animal attack.
Use of concrete poles	✓ Less costly compared to steel structures. ✓ Not susceptible to rot and decay. ✓ Not susceptible to insect and animal attack.	✓ Likely to collapse due to loose soils ✓ Suitable for lower voltage electricity lines ✓ Requires heavy machinery for installation because they are heavy ✓ Have low tensile strength and needs to be reinforced ✓ Low ground clearance of cables
Steel towers (proposed option)	✓ Low maintenance costs ✓ High conductor ground clearance ✓ Durable	✓ High installing costs ✓ Installation is time consuming ✓ Susceptible to corrosion

Alternative construction materials and processes	Advantages	Disadvantages
	✓Not affected by extreme weather	
Underground transmission line	✓Aesthetics will be maintained ✓Suitable for short transmission distance ✓Safe to people, wildlife and livestock ✓Not affected by weather, trees, animals and other physical factors.	✓High installation costs ✓Not suitable for long distance transmission ✓Difficult to repair and maintain compared to overhead transmission lines ✓Not suitable for areas with hills
Overhead transmission line (proposed option)	✓Less civil works compared to underground transmission ✓Easy to repair and maintain ✓Lower installation costs ✓Appropriate for long distance transmissions ✓More durable compared to underground transmission lines.	✓Affected by extreme weather and may cause outages ✓Susceptible to lighting strikes ✓May interfere with flight paths and communication lines ✓

9.6; Conclusion

From the alternatives analysis, it can be concluded that the most feasible alternative is to implement the proposed project following the proposed line route and using the proposed materials and technologies. Mitigation measures will be applied to mitigate any adverse environmental, social, or cultural impact associated with the proposed project.

CHAPTER 10: RECOMMENDATIONS AND CONCLUSION

10.1: Introduction

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

A monitoring plan has also been developed and highlights 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.

It is strongly recommended that a concerted effort is made by both KETRACO and the contractor to implement the Environmental and Social Management and Monitoring Plan provided herein. After commissioning of the transmission line project, statutory Environmental and Safety Audits must be carried out in compliance with the national legal requirements.

It is quite evident from this study that the construction and operation of the proposed transmission line project will bring positive effects in the project area including improved supply of electricity, cleaner environment, creation of employment opportunities, gains in the local and national economy, provision of market for supply of building materials, Informal sectors benefits, increase in revenue, improvement in the quality of life for the workers and community members, and Improved security.

Considering the proposed location, construction, management, mitigation and monitoring plan that will be put in place, the project is considered important, strategic and beneficial and given that no immitigable negative impacts were encountered and that no community objection was received, the project may be allowed to proceed.

10.2: Recommendations

Following the impact analysis presented in the previous sections, the following recommendations were made

- The proposed project to be implemented in compliance with the relevant legislation and planning requirements.
- The proponent to ensure implementation of the mitigation measures provided in the ESMP.
- The proponent to monitor implementation of the ESMP using the developed ESMoP
- The proponent to conduct an elaborate Resettlement Action Plan (RAP) to ensure that affected individuals and households are meaningfully consulted and are adequately and fairly compensated.
- Since the Maasai, who are also VMGs, are the overwhelming majority in the project area (95.4% of the population), elements of the VMGP or appropriate mitigation measures have been integrated into the ESMP to ensure their full participation and access to culturally appropriate social and economic benefits. Further, the proponent will implement project structured interventions to ensure since vulnerable individuals and households are found amongst VMGs and non-VMGs effectively participate and benefit from the project.
- The proponent to create and implement a Community Development Plan/Corporate Social Responsibility Plan, to plan, implement and monitor CSR projects, therefore, managing community expectations.
- The proponent to carry out a detailed Biodiversity Impact Assessment in areas of influence of the project prior to finalization of the TL alignment.
- The proponent to conduct an Avifauna survey especially in areas identified in the study prior to finalization of the TL alignment.
- The proponent to conduct a detailed noise mapping and assessment prior to finalization of the TL alignment. The noise assessment needs to include modelling to establish noise contours.
- The proponent to update this report after every 24 months or when unforeseen impacts are identified in the course of project implementation through monitoring.
- The proponent to conduct annual Environmental Audits and submit to NEMA.
- NEMA to consider, approve and grant an Environmental Impact Assessment License to the proponent.

10.3: Conclusion

From the foregoing, it is noted that;

- no immitigable negative impacts were encountered
- No objection from the community was received
- Identified potential negative impacts can be mitigated
- Benefits to the community, region, and the country at large are immense

The ESIA team, therefore, recommends to NEMA to consider, approve and grant an **Environmental Impact Assessment License** to the proponent and the proponent to implement the project with strict adherence to the proposed ESMP.

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