



ADDENDUM

EIA PROJECT REPORT- PROPOSED 400KV POWER TRANSMISSION LINE FROM LOIYANGALANI TO SUSWA

PROJECT PROPONENT: **KETRACO**

KENYA ELECTRICITY TRANSMISSION CO. LTD.

2nd Floor • Capitol Hill Square • Chyulu Rd • Upper Hill
P. O. Box 34942 - 00100, NAIROBI
Phone: +254 20 4956000
Cell: +254 719018000
Cell: +254 732128000

EIA LEAD EXPERT: **PROF B.N.K NJOROGE**

ENG. DR. AYUB N. GITAU (1773)

DR. MARY W. KIMANI (1129)

P.O. Box 12101-00400 NAIROBI

JULY 2008 - UPDATE MAY 2013

TABLE OF CONTENTS

TABLE OF CONTENTS	2
ABBREVIATIONS AND ACRONYMS.....	3
PREAMBLE.....	5
1.1. INTRODUCTION	5
1.2. CHANGES TO THE ALIGNMENT	6
1.2.1. NORTHERN CORRIDOR.....	7
1.2.2. SOUTHERN CORRIDOR	9
2. STATEMENT(S) OF CONCERN	14
2.1. CLARIFICATION SOUGHT BY FINANCING INSTITUTIONS	14
2.1.1. INTRODUCTION	14
2.1.2. CONSERVANCY SITES AND BIOPHYSICAL ASPECTS	15
2.1.3. ETHIOPIAN TRANSMISSION LINE	23
2.1.4. GEOTHERMAL PROJECTS	27
2.1.5. OIL EXPLORATION AND OTHER PROPOSED WIND-FARMS.....	28
Appendices	49

ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank;
DIA	Direct Impact Area;
EIA	Environmental Impact Assessment;
EMI	electromagnetic interference;
EMF	Electro Magnetic Fields;
ESAP	Environmental and Social Assessment Procedures;
ESIA	Environmental and Social Impact Assessment;
GoK	Government of Kenya;
IFC	International Financing Corporation;
EP	Equator Principles;
kV	1,000 volts;
ECA	Export Credit Agency;
LTWP	Lake Turkana Wind Power;
EIB	European Investment Bank;
UTM	Universal Transverse Mercator coordinates;
RAP	Resettlement Action Plan;
OHS	Occupation Health and Safety;
PAP	Project affected Persons;
PAH	Project Affected Households;
PCB	Polychlorinated Biphenyls;
KWS	Kenyan Wildlife Society;
EMP	Environmental Management Plan;
EAPP	Eastern Africa Power Pool;

AC	Alternating Current;
DC	Direct Current
MW	1,000 watts;
Km	Kilometres;
NEMA	National Environmental Management Authority;
PSs	World Bank Performance Standards;
SF6	Sulphur hexafluoride;
SME	Small Medium Enterprises;
ROW	Right of Way;

DRAFT

PREAMBLE

1.1. INTRODUCTION

This report is an addendum to the EIA (Environmental Impact Assessment) for the 400kV Power Transmission Line from Loiyangalani to Suswa a distance of 428km, submitted to NEMA (National Environmental Management Authority) July 2008 and subsequently approved on 24th July 2009, Registration No. 0003865.

The licence was granted in the name of Lake Turkana Wind Power (LTWP) who at that time were the proponents developing the transmission line and a 300MW wind-farm 10km south east of Lake Turkana.

LTWP had selected a Spanish contractor to undertake the construction of the transmission line following a competitive tendering process; Isolux Corsán of Spain an international company with activities linked to the production, transmission and distribution of electrical power. The Government of Kenya (GoK) through its ministries were able to obtain concessional funding for the transmission line from the Spanish Export Credit Agency (ECA) that would reduce the electricity tariff cost to consumers if the line was constructed by the government.

LTWP and government agreed to transfer the rights and the ongoing future development process to GoK. The line will be constructed and owned by Kenya Transmission Company (Ketraco), a government owned corporation mandated to plan, design, construct, own, operate and maintain high voltage (132kV and above) electricity transmission infrastructure that will form the backbone of the Kenyan national grid and regional interconnection.

The license was duly transferred in accordance with the Environmental Management and Coordination Act from LTWP to Ketraco on July 18, 2011 under Transfer EIA Regulations with licence number PR\5965.

The environmental and social policies of the main funding institution associated with the financing of the wind-farm project, African Development Bank (AfDB), European Investment Bank (EIB) considered the transmission line is considered an '*associated facility*' to the Lake Turkana Wind Project. An '*associated facility*' is a sub-project that is being planned, developed, carried out, contemporaneously as a consequence of another project and relies upon the existence of the sub-project as an essential component to the construction or operation of the project being financed by LTWP lenders. Any sub-project and the transmission line in this case must therefore conform to the policies, procedures and guidelines of the Lenders. Ketraco has agreed to abide by AfDB and EIB's environmental and social policies as well as World Bank Operational Policy (O.P.) 4.12 - Involuntary Resettlement.

1.2. CHANGES TO THE ALIGNMENT

Since the submission and approval of the EIA in 2008 several changes have occurred to the transmission line route necessitating that stakeholders are informed of these changes. In addition to the physical and administrative changes mentioned above LTWP financiers sought clarification on various matters via letter submitted to Ketraco in May 2013. The proponent has commissioned Prof B.N.K Njoroge the lead EIA author and associates eng. Dr. Ayub N. Gitau, Dr. Mary W. Kimani to prepare an addendum detailing the changes and responding to the clarification sought.

This addendum of May 2013, amends the EIA Report of 2008, the latter is incorporated herein by reference. The conclusion and recommendation of the EIA Report 2008 remain valid.

1.2.1. NORTHERN CORRIDOR

- In the northern corridor, two (#2) minor rerouting of the way-leave trace were agreed between the contractor and Ketraco. These changes came about following identification of an inaccessible areas that would be difficult to access during construction or when undertaking maintenance. The net result of these changes from a technical/ construction perspective are access will be improved, design/ technical and construction impacts will be reduced and the route will be shortened marginally; from angle point AP17 to AP12 with UTM coordinates of (229269 and 10130969) and from AP10 to AP08 with UTM coordinates of (242346 and 10130969).
- From an environmental and social perspective the way-leave area where the changes are necessary is Trust Land, is unoccupied and the land is mainly used from grazing purposes by pastoralists. Overall the impact of these changes will provide a marginally improvement, of shorter length, compared to the original alignment. The figures below illustrate graphically the alignment changes. The alignment deviates a distance of (300m) from the way-leave centre line. The LIDAR image is 400m width.

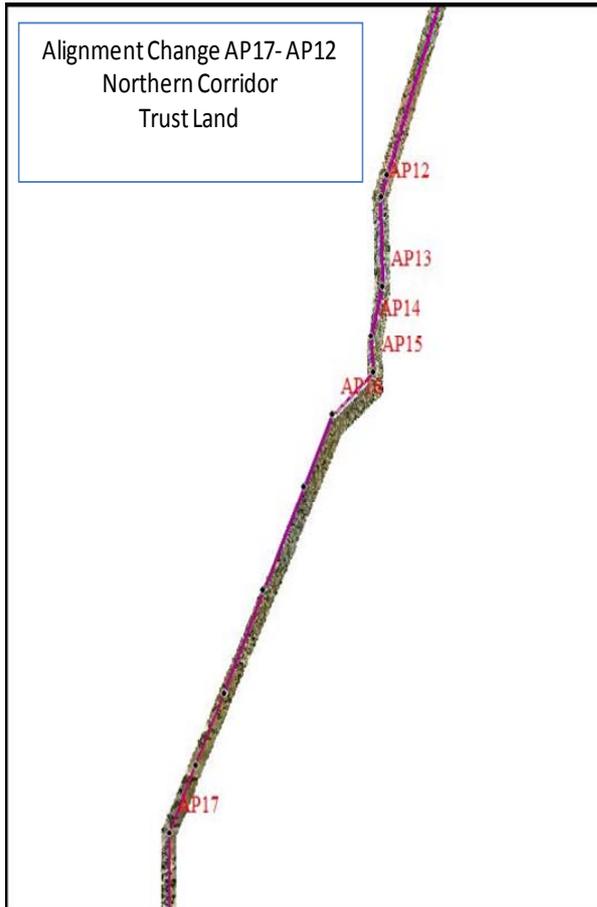


Figure 1: Alignment Change 1

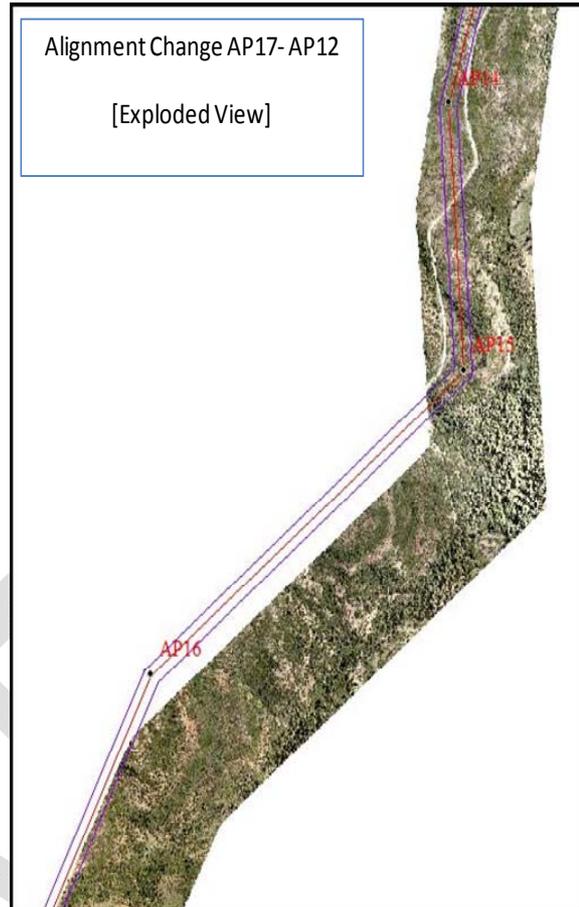


Figure 1.1: Detailed view

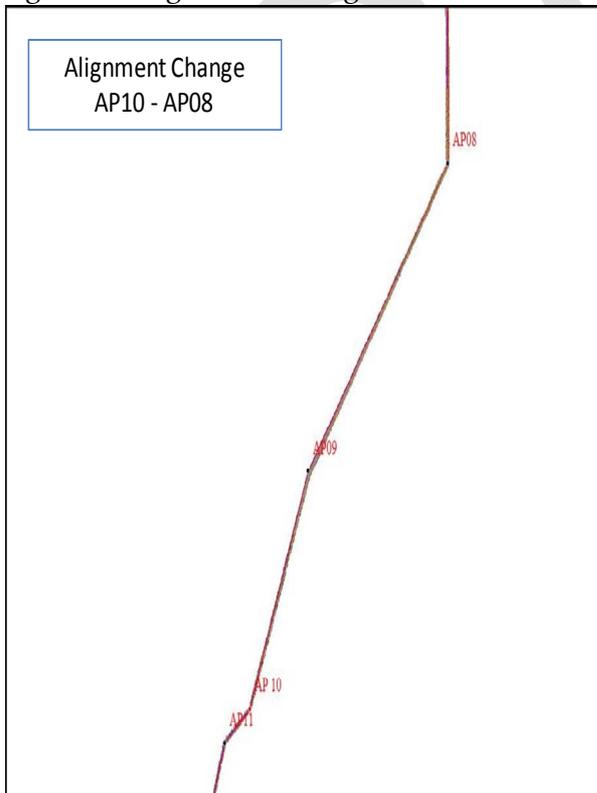


Figure 1.2: Alignment Change 2



Figure 1.3 Detailed View

1.2.2. SOUTHERN CORRIDOR

In the southern sector, between the then angle towers AP31 and AP28 with UTM coordinates of (216798 and 9932418), an objection was raised by a private company on environmental grounds citing; that the proposed transmission route would traverse one of the last remaining indigenous cedar forest and as such have devastating impact on biological diversity and the aesthetics of the land. Amongst other issues the claimant also cited impacts to tourism, constraint to the flight path of the private airstrip, health, and land value as other considerations.

Ketraco, taking cognisance of this objection investigated a number of realignment options. The two main potential realignments to avoid the cedar forest were to reroute to the west or east of the forest. Various realignment options were considered and illustrated the below figures. In each of the alignment variations cognisance was taken of the environmental, social, commercial, and constructability aspects, and as a point of clarification in this addendum an assessment of cumulative impacts¹ of the potential now existing and or proposed future transmission lines as well as infrastructure projects in or around this location including various other constraints that may impact either positively or negative upon the preferred alignments has been investigated.

In the valley below the Malu foothills there are a number of Flower Farms with existing planning for extensions to their business and in addition construction of Aberdare Golf and Country Club had commenced.

The outcome of the study and optimum way-leave route selected was a realignment of the transmission line to the eastern side of the Malu Lodge avoiding any impact on the cedar forest and away from the adjacent foothills. Existing large infrastructure projects in this location are flower farms and of late a new development, Aberdare

¹ See Section XYZ

Golf and Country Club that is under construction: a self-contained residential resort with all recreation and leisure facilities and amenities that will offer a unique and luxurious lifestyle. It is focused around a championship golf course and a commercial centre; in addition there is an existing 220kV transmission line of which the alignment runs through the flower farm and to the western side of Malu. As depict by the red western line in the figures below.

The existing 220kV line curtailed any possibility of rerouting the Loiyangalani line in a westward direction. The flower farm in combination with Aberdare Golf and Country Club also curtailed alignments through the centre section of this valley. Following analyses of all the options the only alternative was a route along the Malu foothills to the east of the cedar forest. The various options are depict in the figures below. All of which had challenges.

The selection resulted in a slightly shorter route, but over undulating hills with poor topography and through a more densely populated area consisting of small scale farming that ultimately increased the number of affected plots and PAPs (project affected person) along the original route but negating the impact on the environment/ cedar forest. There are two options i.e. the (red & white) straight lines on the eastern side curtailed any meaningful investigation along this far eastern options as this area had been earmarked for the Ethiopian Kenyan interconnector route as discussed below.

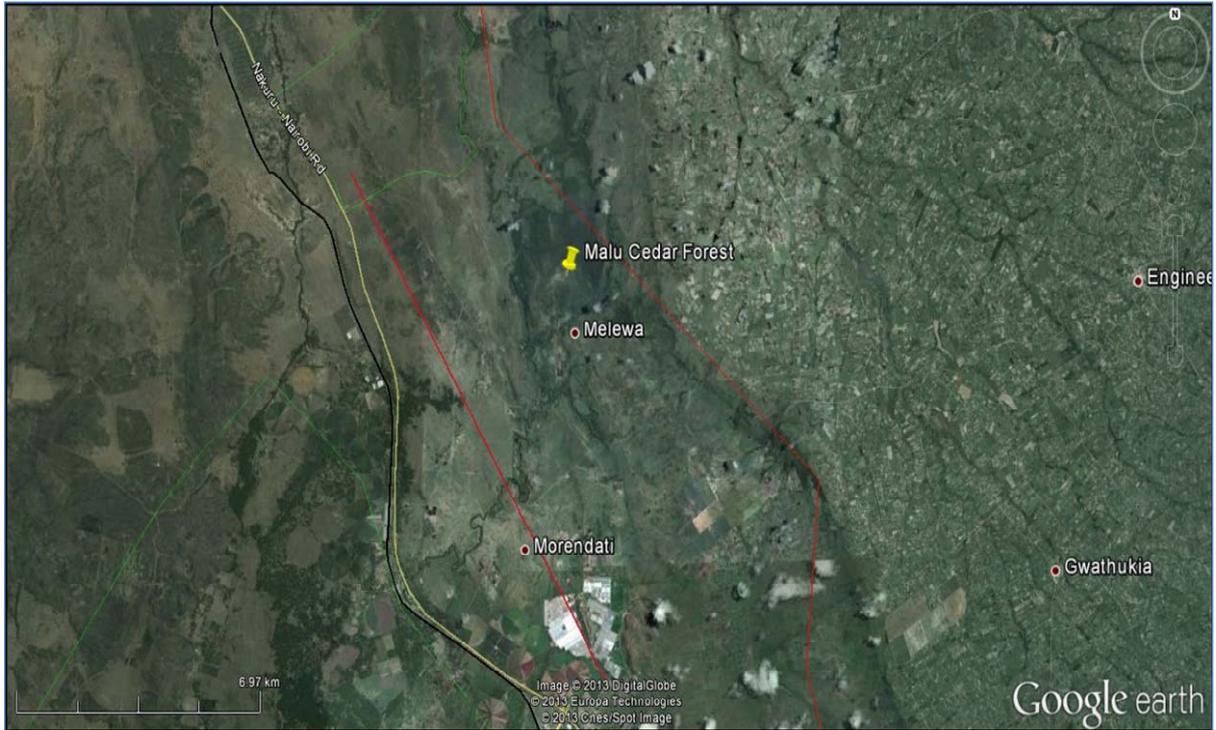


Figure 1.4 Location of Cedar Forest
(Western red line is the existing 200kV line and Eastern red line is Loiyangalani line)

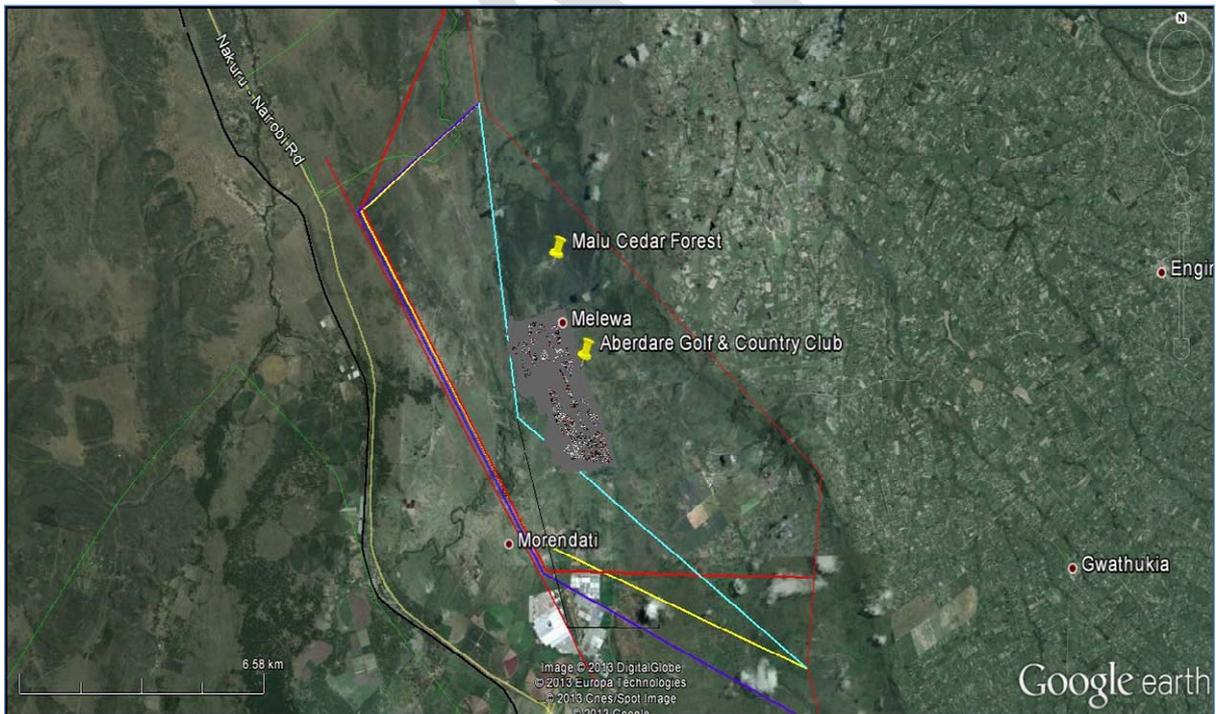


Figure 1.5 Western Alignment Options

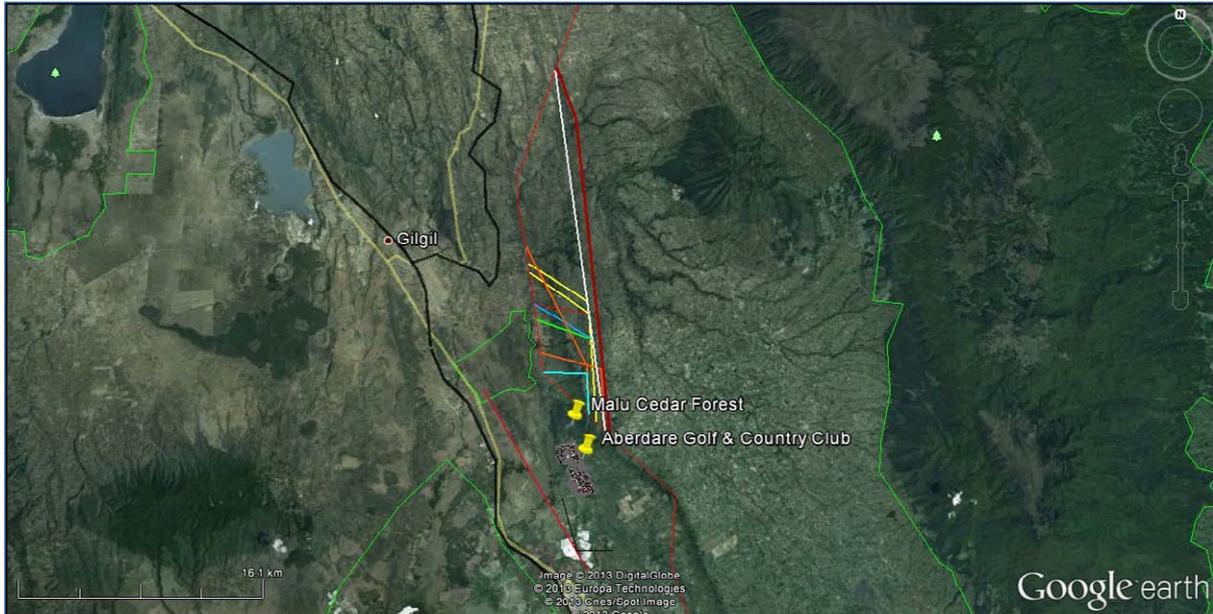


Figure 1.6 Alignment Easter Options

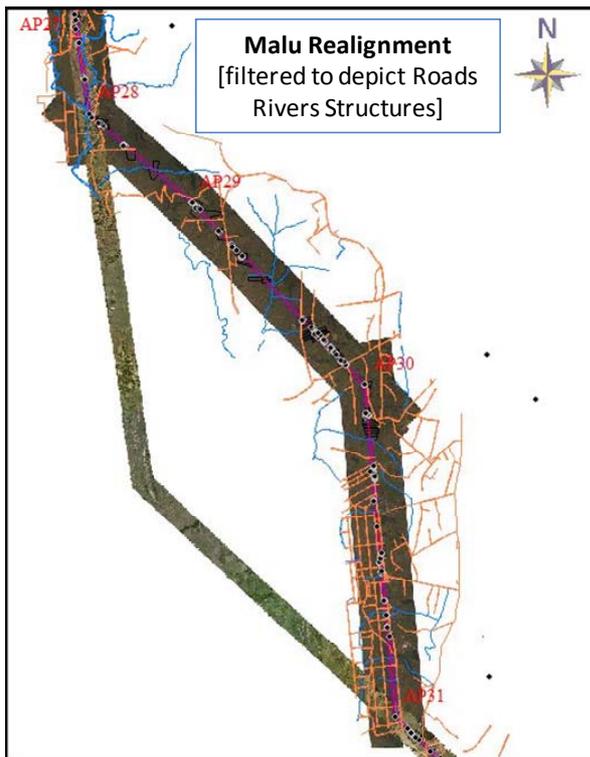


Figure: 1.6 Malu Eastern Alignment

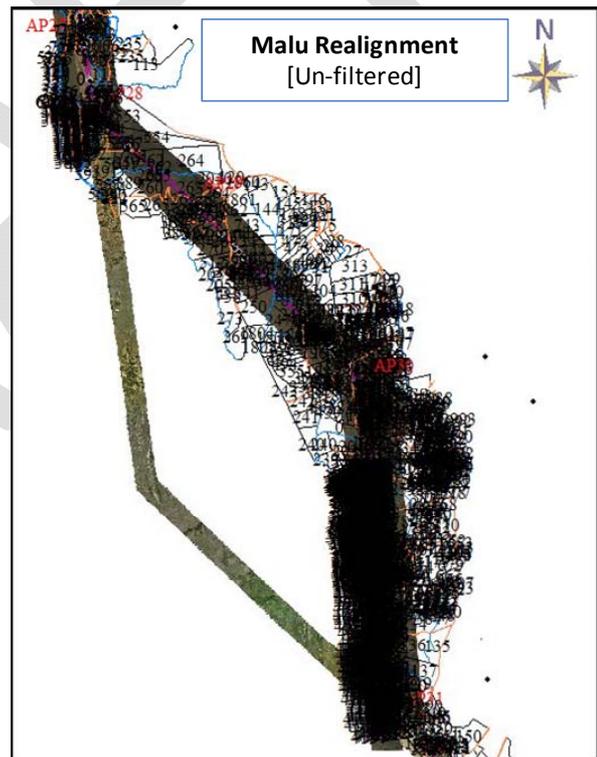


Figure 1.7: Detailed View

The above figures depict the eastern route selected to avoid the cedar forest as well as the infrastructure project existing in the valley which limited the options to realign the route in a westerly direction. Figure 1.6 is a filtered projection showing the LIDAR base image and the existing road network (tan colour) and the rivers

(blue colouring). The black dots indicate structures that exist in the way-leave trace. These structures need to be relocated within the existing plot or if displaced due to the extent of way-leave encumbrance then these PAPs need to be resettled.

Figure 1.7 above is an unfiltered view from Global-Mapper software showing in black the extensive cadastral mapping detail of the various plots and their LRN (land registry number).

Figure 1.8 below is an unfiltered exploded view of the small scale farming that exist in this locality and are affected by the way-leave trace. The Malewa river tributaries, roads, way-leave trace, plots and their boundaries, registration numbers as well as affected structures can clearly be seen in detail.

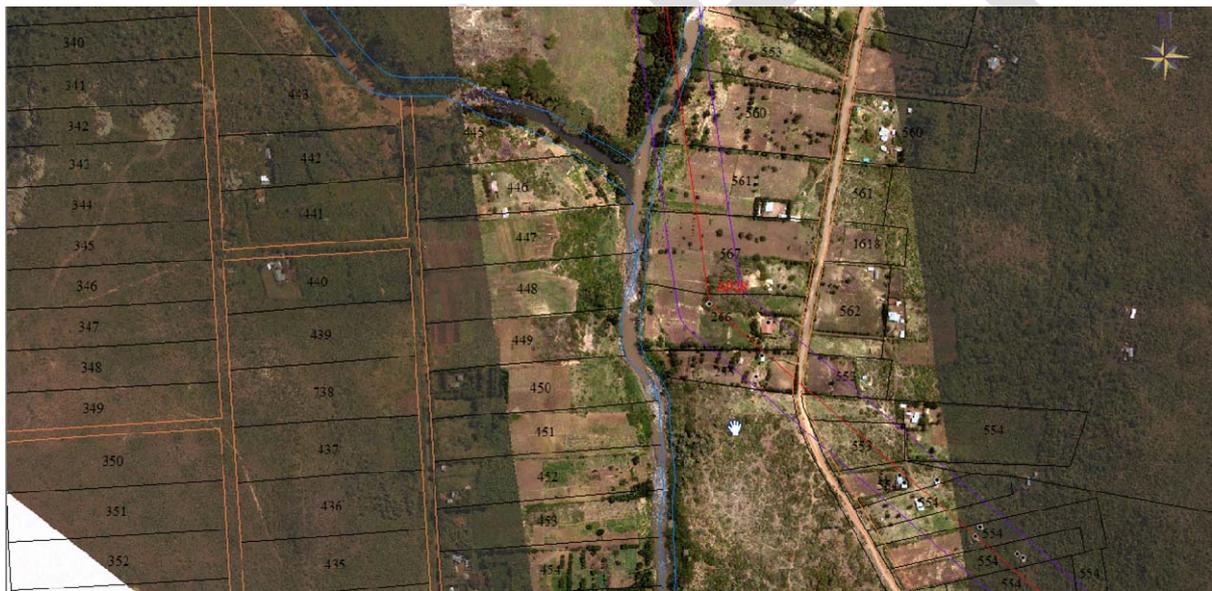


Figure 1.8 Malu detailed LIDAR Image

2. STATEMENT(S) OF CONCERN

The construction of the proposed line is anticipated to result in adverse environmental and social impacts such as involuntary displacement along with disruption to and loss of livelihoods for PAPs if not implemented through a transparent, consultative, and equitable process. A Resettlement Action Plan (RAP) has been submitted to NEMA and subsequently approved. Please refer to the draft RAP Loiyangalani - Suswa 400kV Transmission line Report of January 2012 prepared by Log Associates for Ketraco or as amended for information concerning any or all social and resettlement activities.

As discussed briefly above lenders/ financiers to the LTWP project following their due diligence mission has sought clarification on certain aspects from the proponent/ Ketraco. This section list the clarification sought and provides responses following transit walks and consultation with available stakeholders. The Appendix to this Addendum contains the list of clarification sought.

2.1. CLARIFICATION SOUGHT BY FINANCING INSTITUTIONS

2.1.1. INTRODUCTION

The development of the transmission route, inception stage, studied (6) alternatives alignments and various options of these alignments before selecting the preferred route. The main consideration were, to the extent possible, aim to avoid interference/encroaching on large settlement areas, conservancy sites, wildlife sanctuaries, terrestrial habitats, aquatic habitats, cultural sites and sensitive receptors. The route selected does this and consultations with stakeholder agree with the findings of the EIA that the transmission line when implemented in accordance with the mitigation guidelines in the EMP (Environmental Management Plan) will

not pose adverse environmental impacts on nature conservation sites, wildlife sanctuaries or terrestrial and aquatic habitats.

There are a number of wildlife conservancies shown in the figures below especially in the Rumuruti area. From the inception stage through to the selected alignment, the transmission line route avoids any interference /encroaching on wildlife sanctuaries.

CLARIFICATION (1A)

C1-(a) Location of nature conservation sites, wildlife sanctuaries, terrestrial habitats, aquatic habitats, cultural sites etc, relative to the route of the T-line.

2.1.2. CONSERVANCY SITES AND BIOPHYSICAL ASPECTS

The figures below illustrate the transmission line route from Suswa to Loiyangalani with the various nature conservancy sites, names clearly shown. The nearest encroachment of the transmission line is at Mugie Wildlife Conservancy where particular attention was paid to the alignment due to the sensitive nature of the area, refer to Figure 2.1 for general location of the conservancy area that exist along the transmission line route. The alignment, taking cognisance of wildlife, terrestrial fauna will run adjacent to the western boundary and parallel to the existing murram road that runs around the perimeter of the conservancy. The impact will be of a temporary nature during construction of the works. The road along this section is frequently traversed by visitors to this privately run conservancy by patrons on safari and Malu administration vehicles.

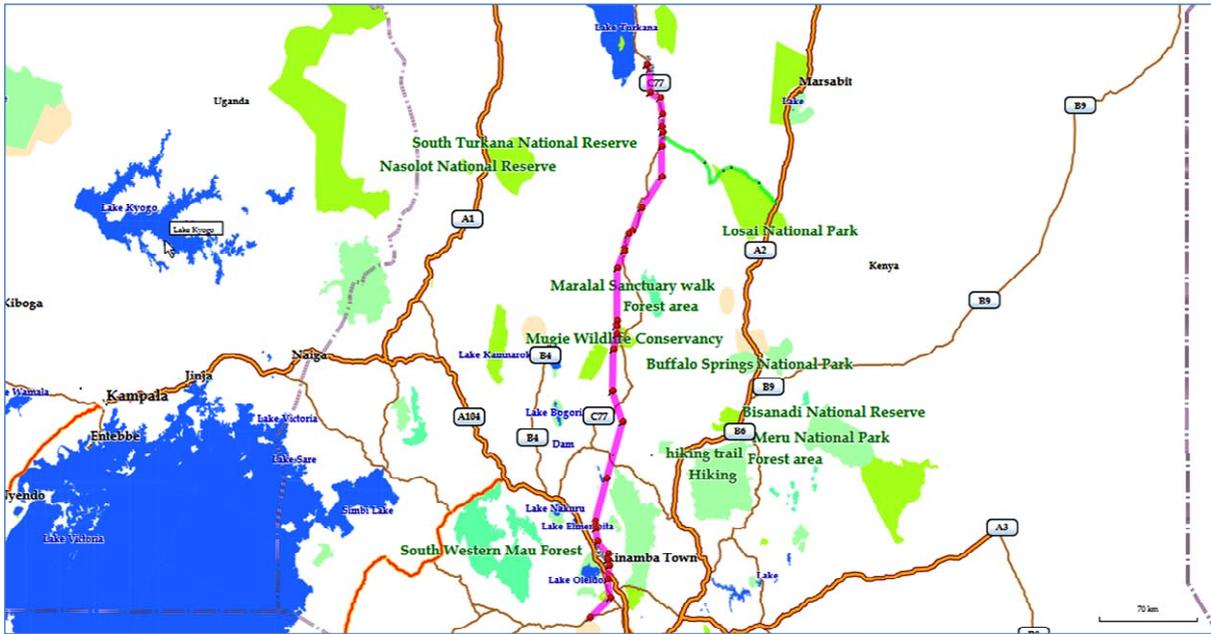


Figure 2.1: Conservancy General Locations

Figure 2.2 below depicts the minor encroachment upon Mugie Wildlife Conservancy perimeter.



Figure 2.2: Detailed View Mugie Alignment

The EIA confirms that the encroachment on conservancies is assessed as a minor impact and “*Consultation with KWS (Kenyan Wildlife Society) officials in the Mt Kenya and Central Rift Conservation areas indicated that the proposed line does not have negative impact on the wildlife, environment, dispersal areas, habitats and migratory route of wild animals*”.

Consultations were recently undertaken in respect to potential conservancy encroachment/ impact of the Loiyangalani line in Laikipia County. A meeting was convened with Laikipia tourism stakeholders and outcome of the meeting confirmed that these stakeholders are happy with the alignment of the Loiyangalani line as it does not encroach nor will the route impact on the livelihoods of the Laikipia conservancy tourism sector as the line avoids this ‘wilderness area’ that they are endeavouring to protect.

Given the above studies undertaken and feedback from stakeholders it is recommended that Ketraco work closely with the owners of Mugie Wildlife Conservancy during the period of construction in this section of the corridor and ensure that the construction works are in compliance with recommendations in the EMP.

CLARIFICATION [C1-B]: AQUATIC HABITAT

The main aquatic habitat that the transmission line traverses is the Pesi swamp however concern was also raised regarding the Malewa River. The EMP details the mitigation measures to be undertaken during construction of the transmission line in this location, AP23. During the alignment survey, particular attention was paid to the crossing of the swamp and identified a point where the span was minimal and the selected crossing point is estimated to be around 500m to 550m.

The area is inhabited with small scale farming nearby with associated roads and paths traversing the swamp as shown by the light grey lines in the figure below. The area around where the transmission line will cross has been disturbed and impacted by local settlement.

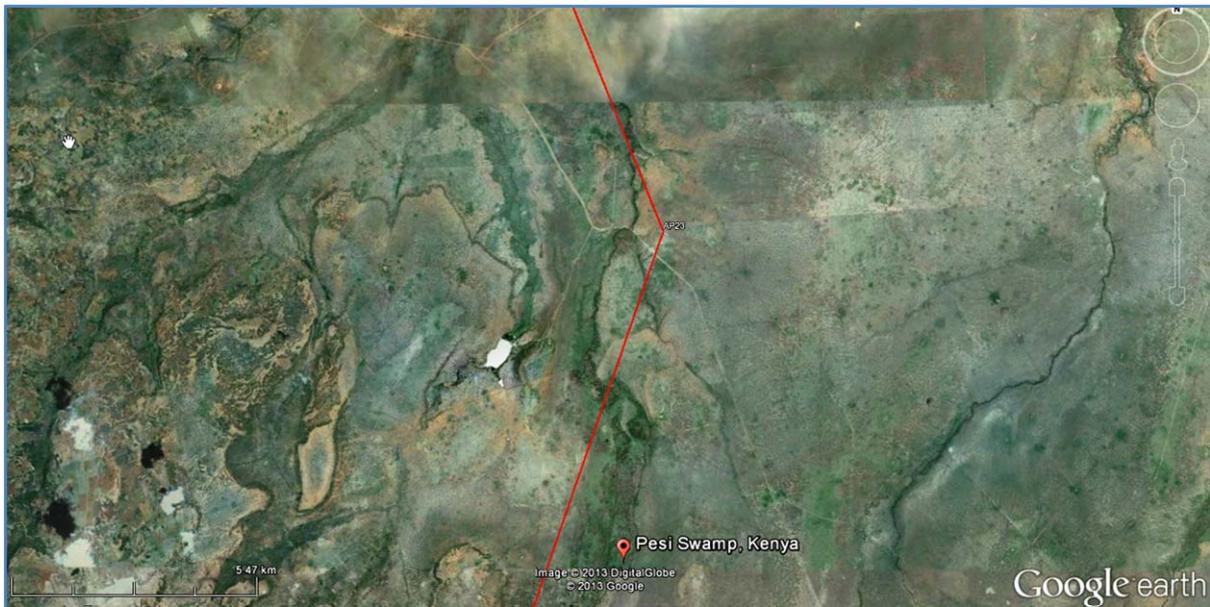


Figure 2.3: Pesi Swamp Crossing Illustration

In order to minimise further degradation it is recommended that towers should ideally be placed such that they avoid the marsh habitats of about 500m width. Vegetation clearance in this habitat will be minimised and following completion of the works restoration of the area by the contractor should be confirmed as satisfactory by Ketraco. The impact from construction of (2 to 3 towers) in this marshy land will be of a temporary nature and Ketraco should ensure strict monitoring of the contractor during the works period to certify that mitigation measures in the EMP are adhered.

The Malewa River rises in the western slopes of Aberdare Range in Kenya and meanders south and west into Lake Naivasha in the Great Rift Valley. The Malewa River has a basin catchment area of 1,730 square kilometres and provides about 90%

of the water flowing into Lake Naivasha, with most of the remainder coming from the Gilgil River. The Malewa River water quality has deteriorated over time due to human settlement activities in the upper catchment area and down the rift valley by Kikuyu farmers since 1960, ploughing much of the land to grow maize, wheat, cabbage and potatoes. The river is threatened by deforestation and siltation, increasing diversion of water for irrigation, and pollution by fertilisers and pesticides. The transmission line will traverse the Malewa River and associated tributaries along the Turasha ridge and Malu area between AP25 and AP31 many times as shown in the figure below. Fortunately the river at its largest crossing is around 50m and easy span for transmission towers. It is essential that construction works do not add to the siltation impact and it is recommended that Ketraco once the detail tower spotting has been completed ensures that tower foundations are not closer than 30m to nearest banks.

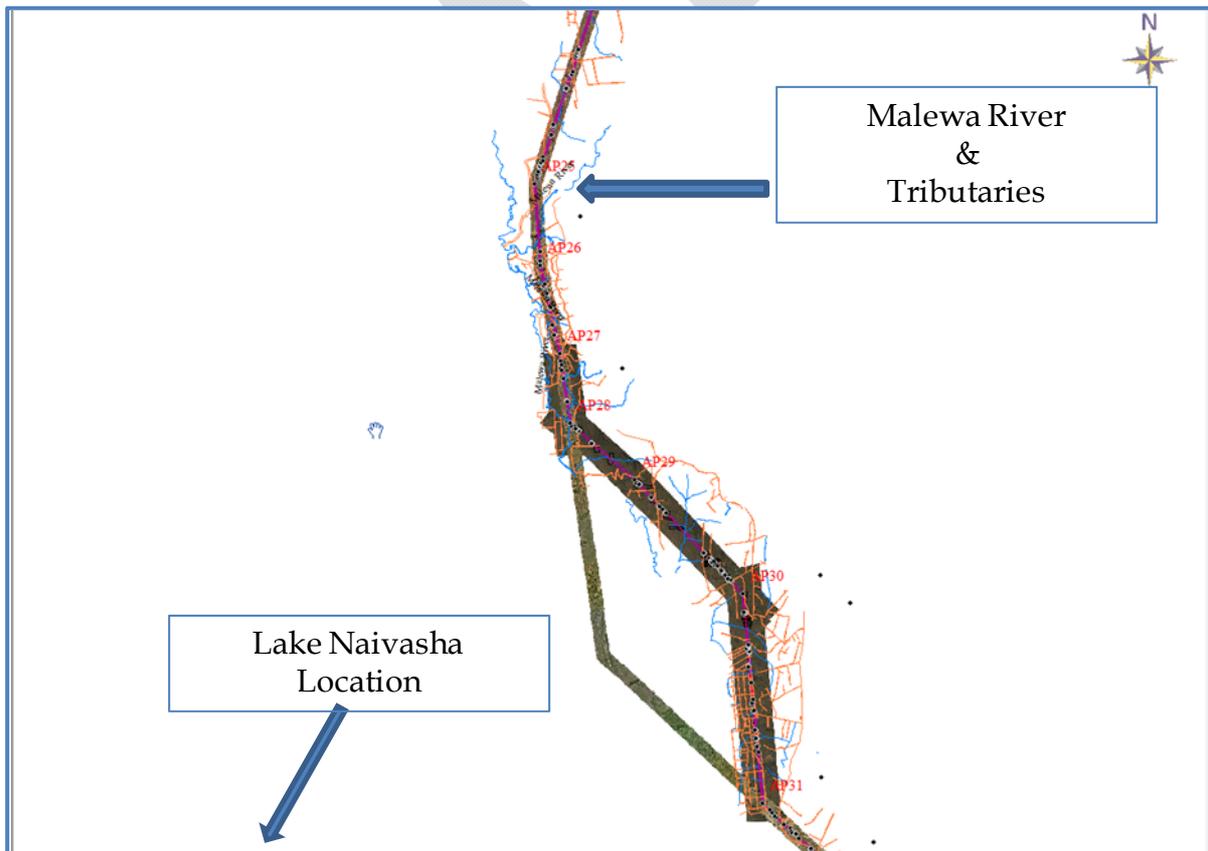


Figure 2.4: Malewa River and Tributaries

CLARIFICATION (1C):

C1-(c). - Better understanding of the transmission line way-leave captured using Geographical Positioning System (GPS). This will enable a better understanding of the specific immediate environment of the line's way leave.

The figures below provide an illustration of the major towns and cities along the 428km transmission line route from Lake Turkana to Nairobi. The source of the figures and alignment is from AutoCad superimposed on Google Earth. Unfortunately the only way to better understand the specific environment is through transit walks however digital software or A1 sized pictorials maps can assist to give a general perspective.

These figures show the Angle Point (AP01) from the termination point at the wind-farm switchyard boundary down to the substation at Suswa (AP38) approximately 50km northwest of Nairobi. In the Appendices to this Addendum is a table detailing the Angle Points coordinates is provided using UTM grid and WGS84 datum format.

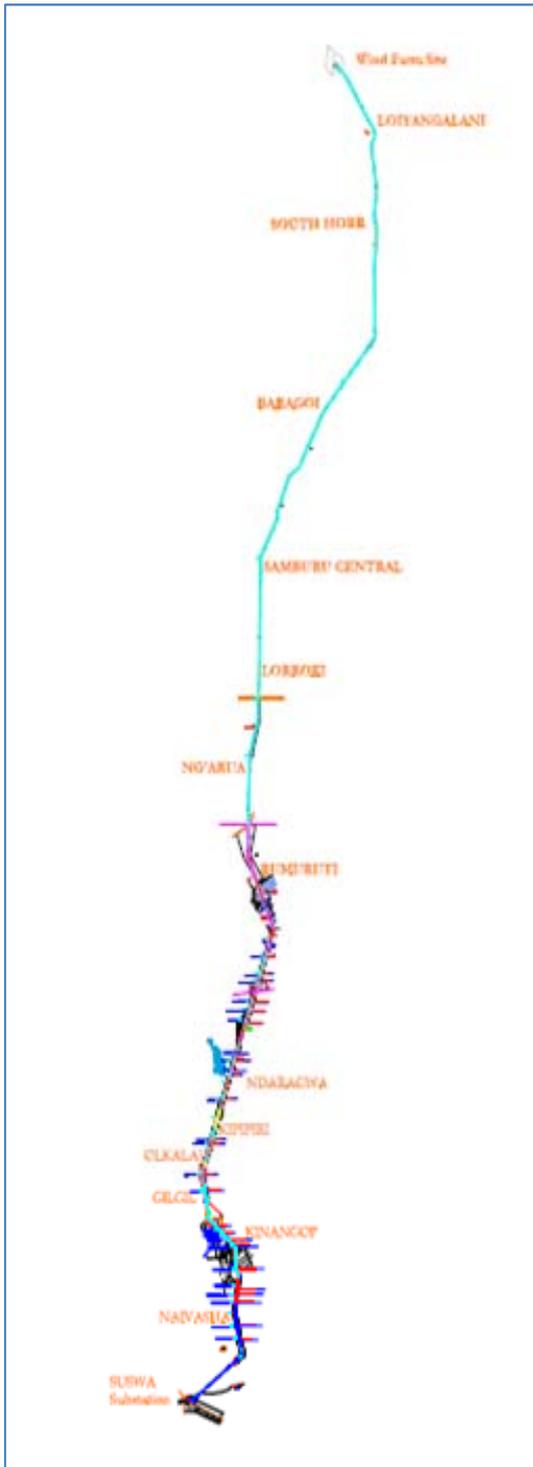


Figure 2.2: Towns along the Route



Figure 2.3: Angle Points

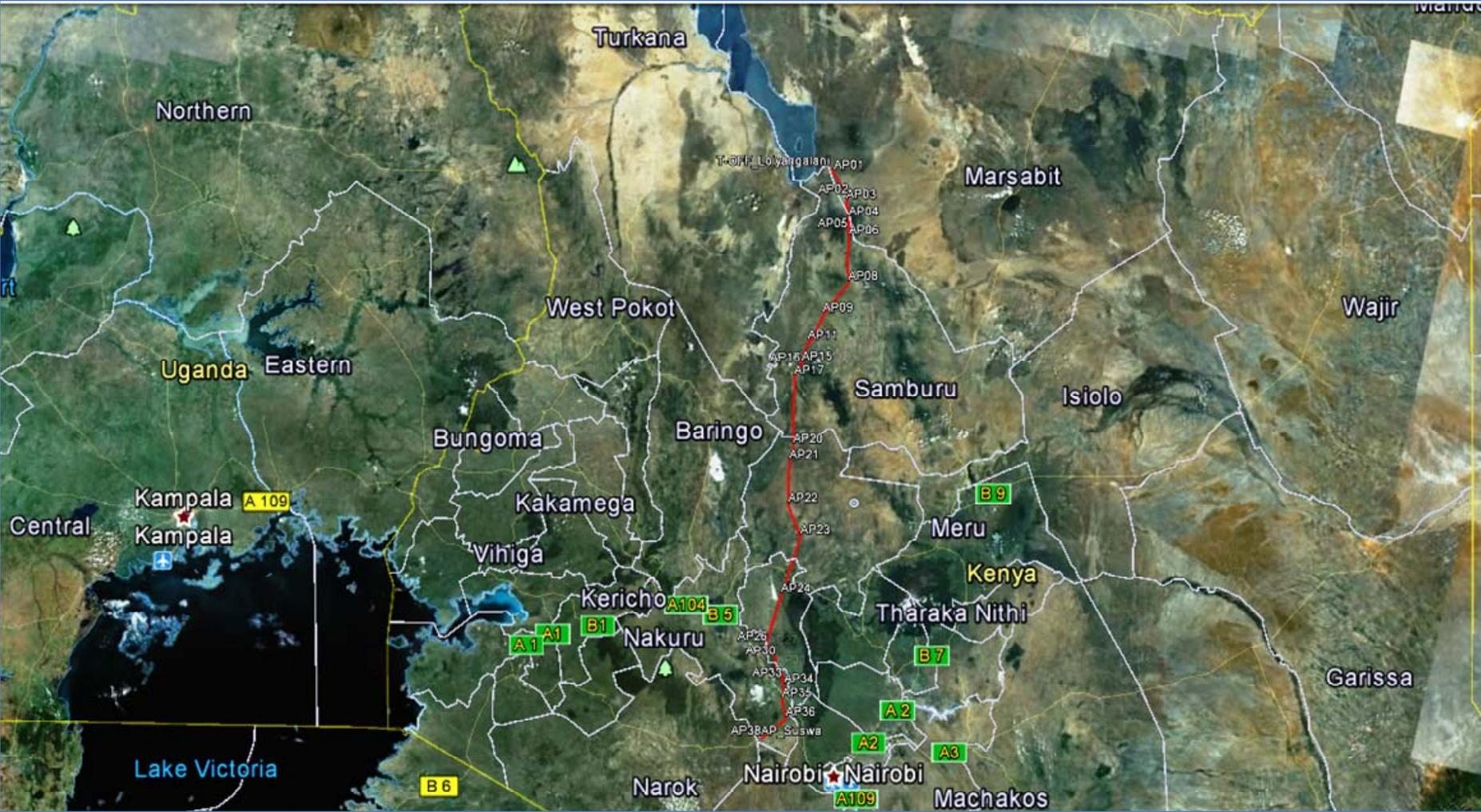


Figure 2.5: Angle Point Location along the route

CLARIFICATION (2):

C2-(a): Understanding of Cumulative Impacts is required; regarding existing and planned large scale infrastructure projects and whether they will add or detract from the subject project impacts. Major concern is if the cumulative impacts exacerbate population displacement, direct impact of the subject area should be specified.

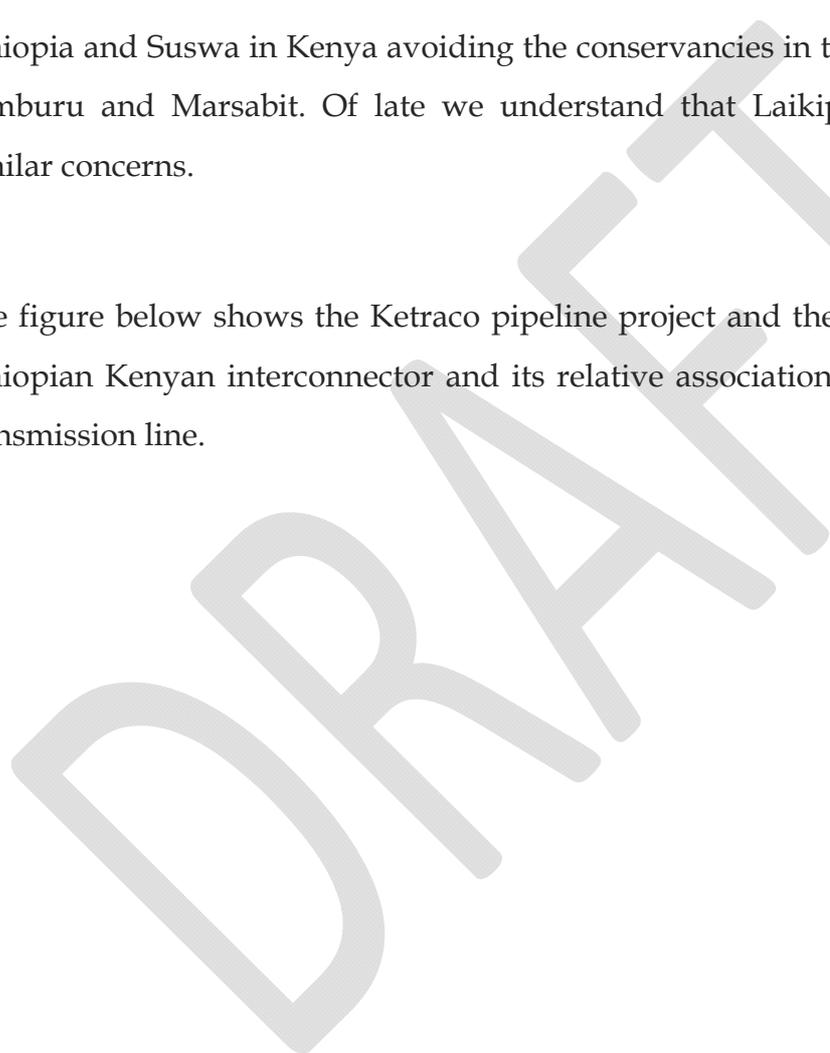
Research of the above subject matter revealed that the main proposed large scale infrastructure projects are; the Ethiopian transmission line, expansion of geothermal energy, oil exploration and other small wind-farms. The readily available literature is inconclusive as to whether these projects will be developed except for the Ethiopian transmission line which is part of Ketraco's pipeline of project current being developed.

2.1.3. ETHIOPIAN TRANSMISSION LINE

The Ethiopia - Kenya Transmission Line is a major part of the proposed Ethiopia - Kenya Power Systems Interconnection Project which was conceived by governments of the two countries as a precursor to future energy trade between the two countries and in the region as part of the Eastern Africa Power Pool (EAPP). Ethiopia and Kenya signed a memorandum of understanding, on May 7, 2006 which underscored the need to recognise the comparative advantage of power system interconnection between the two countries. The Ethiopian line is double circuit high voltage 500kV DC (direct current) line and capable of carrying 2,000MW. This project is expected to help overcome the insufficient transmission infrastructure between the two countries and in addition create transmission capacity needed in interchange of electric power between Ethiopia and Kenya, and the larger East African region in the long run. Inception reports were undertaken and the transmission line will be in the order of 1,066km of which ~600km will traverse Kenya to the new Suswa substation to be constructed at Longonot north of Nairobi.

An ESIA has been completed and submitted to NEMA covering the Kenyan portion of the project. Ketraco is the proponent. Concerns were raised about environmental hotspots mainly around Matthews Range and Losai Game Reserve in Samburu and Mandera Counties respectively. Stakeholders were concerned about the impact to birds and wild animals' migratory routes and that appropriate mitigation measures should be put in place against these impacts. It is understood that a more direct and shorter route could be established to link the terminal substations at Sodo in Ethiopia and Suswa in Kenya avoiding the conservancies in the northern counties of Samburu and Marsabit. Of late we understand that Laikipia tourism has raised similar concerns.

The figure below shows the Ketraco pipeline project and the proposed route of the Ethiopian Kenyan interconnector and its relative association with the Loiyangalani transmission line.



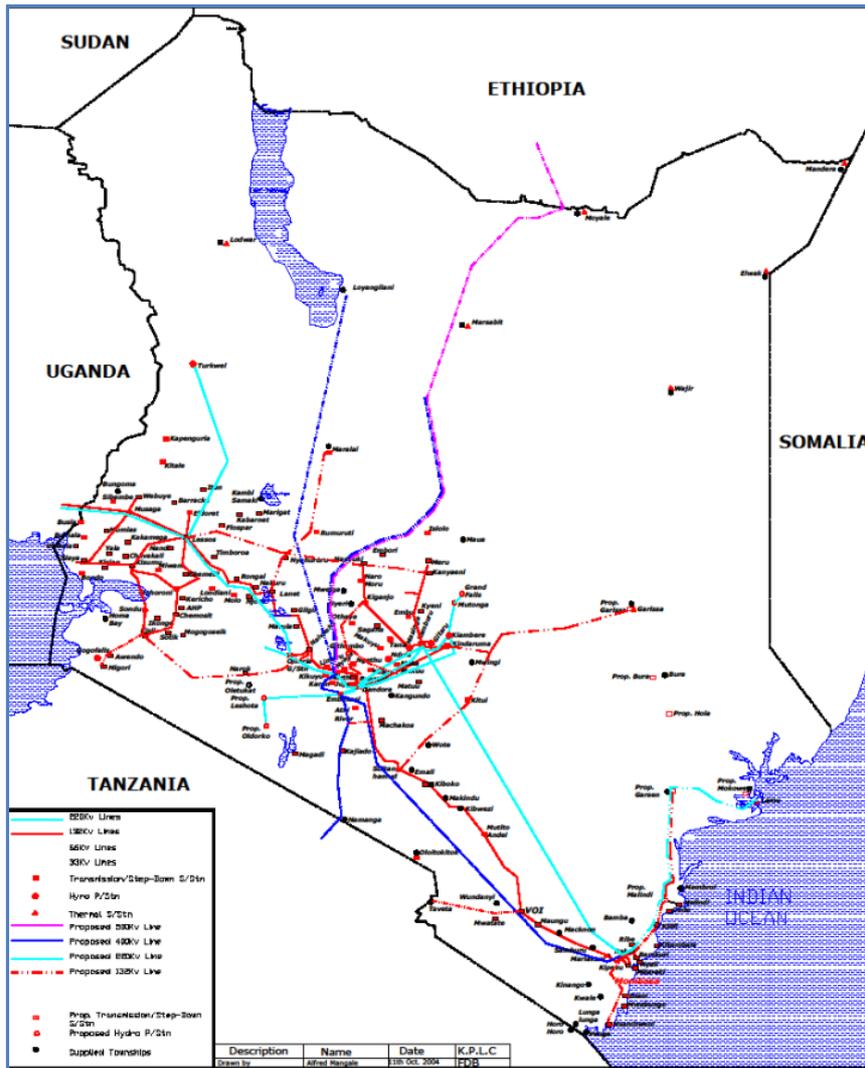


Figure 2.5: Ketraco Pipeline Transmission Projects

In order to understand the cumulative impact of the Ethiopian and the Loiyangalani line the proposed alignments of each project were imported into Google Earth from MapSource software in order to illustrate the separation between the route alignments. The figure below illustrates their relative alignments. It is clear that the lines converge from their respective north easterly and north westerly projection in Laikipia and run adjacent to each other in a southerly direction for a distance of circa 160km to their termination points at Suswa substation. On close inspection the nearest point between the two lines is circa 2km and varies to around a maximum of 3km at various points.

The Loiyangalani to Suswa is a 400kV AC (alternating current) transmission line and as such the two lines are not compatible due to induction forces of the different currents and for safety reasons need to be separated by at least 1.5km. We understand that this is an industry standard.

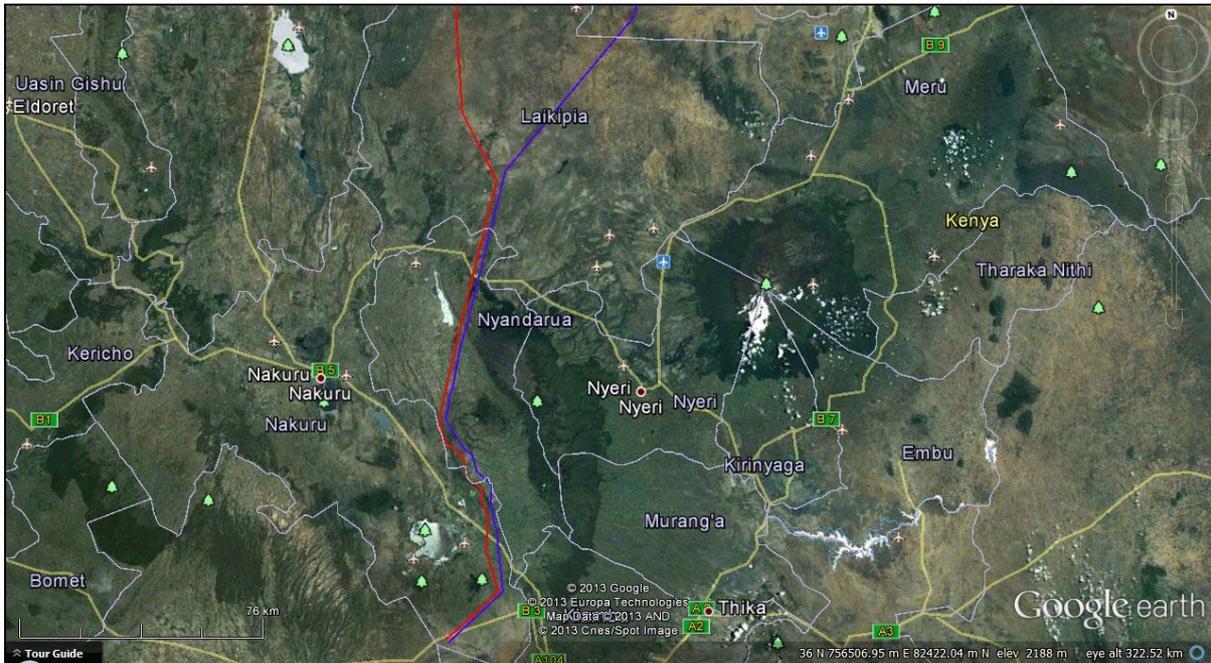


Figure 2.6: Illustration of Way-leave Cumulative Impact

Given that the Loiyangalani transmission line avoided, to the extent possible, the large settlement schemes that exist mostly to the western side of the Loiyangalani line it can be assumed that the Ethiopian line will displace a larger population than the Loiyangalani transmission line. The magnitude of the displacement is not quantifiable without having a breakdown of the PAP (project affected person) matrix for the Ethiopian transmission line. The Loiyangalani transmission line affects (1,890) PAH (project affected households) of which there are only (502) residential dwellings affected in (230) plots. From the information provided from the RAP team, the large proportion of these PAH will be able to relocate within the unaffected area of the land parcel. The land parcels towards the boundaries of settlement schemes are usually larger and hence these PAH can relocate rather than be physically displaced from their plot. Given the above it is possible that the Ethiopian line will

cause a further population displacement magnitude around twice that of the Loiyangalani transmission line. This assertion is a best guess given the lack of information regarding the numbers of PAH, PAPs and household members. Much as the Ethiopian line for the most part traverses the same (31) settlement schemes as the Loiyangalani transmission line and we can only assume that the impact will be of a similar nature albeit the Loiyangalani route was developed prior to the Ethiopian and will be completed before the Ethiopian line. For further details on displacement, PAH and PAPs please refer to the Loiyangalani RAP report. The figure below shows the minimum safety separation distance between the two lines and generally the cumulative potential impact on populations due to paralleling of the way-leave traces.

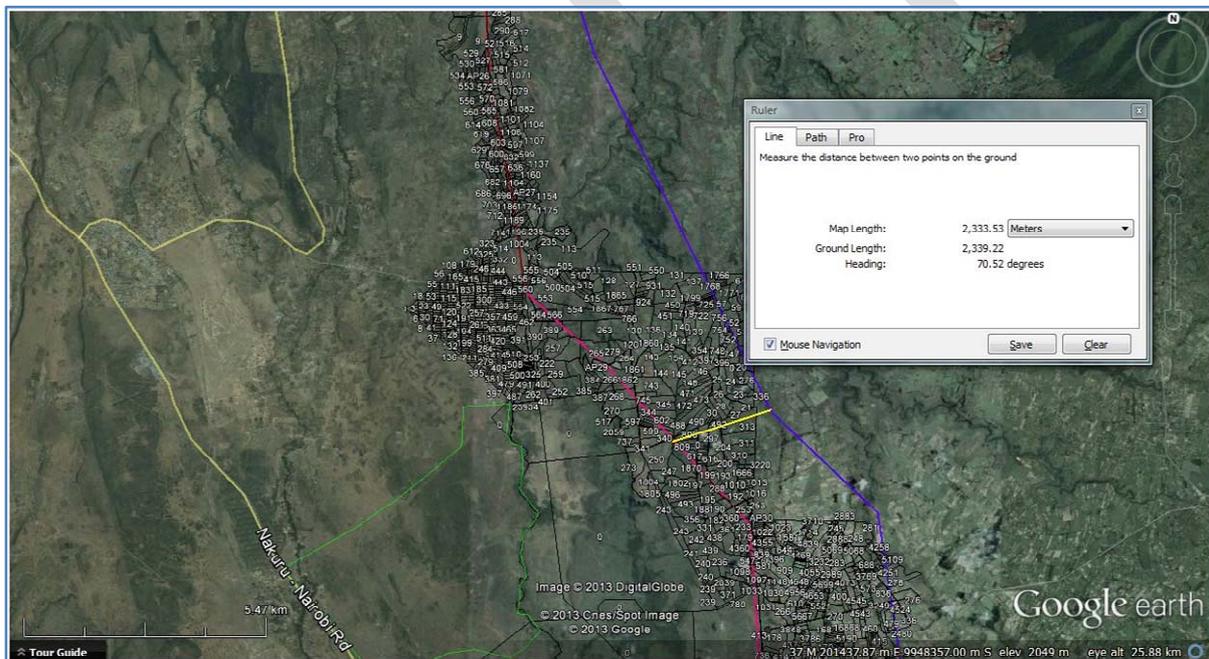


Figure 2.7: Cumulative Impact & Safety margin

2.1.4. GEOTHERMAL PROJECTS

Kenya has a substantial geothermal resource and the Ministry of Energy is endeavouring to exploit this resource. A number of geothermal projects are in operation and a pipeline in development. The impact from existing geothermal is not thought to be relevant for this assessment as they already exist. Those in development we understand could be connected to the Loiyangalani transmission line as they will be AC and therefore compatible to interconnect. Ketraco confirmed

that geothermal plants where possible will connect with the Loiyangalani line. At this juncture it is unknown which project will reach operation. However it is clear to assume given the above assertion that geothermal plants that connect to the Loiyangalani line will minimise land take and population displacement. This would therefore be a positive cumulative impact.

The project is part of the national plan of electric power grid improvement in the Eastern Africa region. Other projects also associated with this plan include the Ethiopia - Kenya 400kV line, Mombasa-Nairobi 400kV power line, the Nairobi 220/400kV ring, among others. Furthermore, the Loiyangalani - Suswa line will be linked to future interconnections within the Eastern Africa region expected to be constructed in 2014 - 2015 under the auspices of the Nile Basin, which will create a power pool composed of Burundi, Democratic Republic Congo, Rwanda, Uganda, Kenya and Tanzania. This power sharing will minimise the need for thermal power generating plants in each country, thus reducing globally the production of GHG and other environmental impacts associated with energy produced from heavy fuel oil.

2.1.5. OIL EXPLORATION AND OTHER PROPOSED WIND-FARMS

Not enough information is currently available about the status of these projects however, given that Ketraco has confirmed that is endeavouring to interconnect geothermal projects to the Loiyangalani transmission line it is safe to assume that Ketraco will also connect some of these oil projects albeit not directly. It is therefore a reasonable assumption that if these facilities are connected to the grid then a positive cumulative impact can be assumed. These oil exploration facilities are currently utilising generators power by diesel and when the facility is constructed and connected to the grid there will be an additional positive impact on the environment by reduction of gases emissions.

CLARIFICATION (3):

C3. - Legal and policy framework analysis should include AfDB and World bank IFC PSs guidelines

The revision envisages the level of application and adherence with the African Development Bank (AfDB) and World Bank Performance Standards (PSs) by International Financing Corporation (IFC) and Equator Principles (EP). They are as detailed below;

AFRICAN DEVELOPMENT BANK'S POLICIES AND GUIDELINES

AfDB integrates environmental considerations into major infrastructure projects, i.e. those exceeding 50 km and needing major rehabilitation or upgrading. They are classified as Category I projects which require detailed ESIA investigations. The projects must meet the basic goals and objectives of AfDB environmental policies and guidelines. Further AfDB policies relevant to the project include:

AFDB ENVIRONMENTAL POLICY

AfDB policy framework on environment policy has been anchored in the concept of sustainable development. The policy stresses the anticipatory nature of sustainable development rather than the reactive responses so predominant in development related decisions.

AfDB PRINCIPLE AND GUIDELINES

AfDB assess projects according to the cross cutting themes or issues, poverty, environment, population, gender, health and participation which are considered within the ESIA process and critical to achieving sustainability.

This ESIA report for the T-line was therefore carried out in consideration of sustainable development of the electricity transmission, while identifying possible negative and positive impacts on both the natural and human environment.

- AfDB Policies and guidelines typically applicable to ESIA process are as follows:
- Policy for Integrated Water Resources Management (2000);
- Procedures in Environmental Study on Private Sector Operations (2001);
- Handbook on Stakeholder Consultation and Participation (2001);
- Integrated Environmental and Social Impact Assessment Guidelines (2003);
- Involuntary Resettlement Policy (2003);
- AfDB Group's Policy on the Environment (2004);
- Environmental and Social Assessment Procedures (2009);
- Energy Sector Policy of the African Development Bank (Draft, 2011); and
- AfDB Bank Group Policy on Disclosure and Access to Information (May 2011).

AFDB INVOLUNTARY RESETTLEMENT POLICY

The primary goal of the involuntary resettlement policy is to ensure that when people must be displaced they are treated equitably and that they share in the benefits of the project that involves their resettlement.

The objectives of the policy are to ensure that the disruption of the livelihood of people in the project's area is minimised, ensure that the displaced persons receive resettlement assistance so as to improve their living standards, provide explicit guidance to Bank staff and to borrowers, and set up a mechanism for monitoring the performance of the resettlement programs. Most importantly, the resettlement plan (RP) should be prepared and based on a development approach that addresses issues of the livelihood and living standards of the displaced person as well as compensation for loss of assets, using a participatory approach at all stages of project design and implementation. Further details can be obtained from the RAP report.

AFDB ENVIRONMENTAL AND SOCIAL ASSESSMENT PROCEDURES (ESAP)

The main purpose of the Environmental and Social Assessment Procedures (ESAP) is to improve decision making and project results in order to ensure that Bank-financed projects, plans and programs are environmentally and socially sustainable as well as in line with Bank's policies and guidelines.

The primary objective of the ESAP is to provide a formal process for the internal and inter-departmental environmental and social review of Bank-financed projects, programs and plans. The procedures highlight the various steps that shall be followed to assess environmental and social risks and benefits along the project cycle. In addition, the ESAP aim to ensure the integration of environmental and

social dimensions into the public sector project cycle from country programming to post-evaluation. An integrated approach allows to take into account interrelations between environmental and social issues and to favour a multidisciplinary review of key concerns in a timely manner.

This ESIA project report for the proposed initiative complies with the AfDB ASAP main purpose and primary objectives. Impact areas and mitigation measures raised within the Environmental and Social Management Monitoring Plan for the project are environmentally and socially sustainable.

PERFORMANCE STANDARDS BY IFC

The "Equator Principles" constitutes a financial industry benchmark for determining, assessing and managing social and environmental risk in project financing. The principles apply to all new projects with total project capital costs of US\$10 million or more and across all industrial sectors. In addition, while the Principles are not intended to be applied retroactively, they apply to all project financings covering expansion or upgrade of an existing facility where changes in scale or scope may create significant environmental and/or social impacts, or significantly change the nature or degree of an existing environment.

The International Finance Corporation (IFC) World Bank group uses 10 principles, 4 exhibits and 8 standards to ensure that the projects they finance are developed in a manner that is socially responsible and reflect sound environmental management practices that are sustainable. Thus, the project is expected to abide by the IFC and AfDB requirements as well as the Kenyan regulations.

THE TEN (10) 'EQUATOR PRINCIPLES' REQUIRED FOR PROJECTS PROPOSED FOR FINANCING BY IFC ARE;

- I. Review and Categorization

- II. Social and Environmental Assessment
- III. Applicable Social and Environmental Standards
- IV. Action Plan and sustainable Management System
- V. Consultation and Disclosure
- VI. Grievance Mechanism
- VII. Independent Review
- VIII. Covenants to abide by laws, regulations and permits
- IX. Independent Monitoring and Reporting and
- X. Reporting annually on the principles implementation processes and experience

THE FOUR (4) EXHIBITS ARE;

- I. Categorization of projects depending on the magnitude of impacts understood as a result of assessment.
- II. Illustrative list of potential social and environmental issues to be addressed in the Social and Environmental Assessment documentation
- III. IFC Performance Standards on Social and Environmental Sustainability and
- IV. Industry-Specific Environmental, Health and Safety (EHS) Guidelines

THE EIGHT (8) IFC PERFORMANCE STANDARDS ON SOCIAL AND ENVIRONMENTAL SUSTAINABILITY ARE;

- **PS1: Assessment and Management of Environmental and Social Risks and Impacts**

Ketraco is responsible for managing community engagement relating to the transmission line. However, LTWP will maintain an interface with Ketraco, to the extent permitted by Ketraco, to ensure that community engagement activities are in line with PS1 requirements.

- **PS2: Labour and Working Conditions**

The employment opportunities associated with the transmission line will be temporary in nature with a peak of opportunities associated with the construction stage. A Labour Plan has been developed for the transmission line by Ketraco and the contractor. An Occupation Health and Safety (OHS) plan taking into account the specific provisions of the relevant EHS Guidelines will be prepared. This plan should include specific provisions for the handling of emergency situations.

- **PS3: Resource Efficiency and Pollution Prevention**

Construction related noise and air quality impacts can be expected during site clearance and construction of the transmission line. Given that the transmission line is a linear construction the impact will be of a temporary nature and as such insignificant but needs to be managed appropriately. The ESIA for the transmission line identifies that the low frequency noise emissions emanate from the power lines and transformer buildings. It discounts the impacts, as insignificant. However, this is not substantiated. This should be accommodated in the design process through appropriate set-back distances.

The associated transmission line crosses major rivers and passes through differing types of habitat and land-use. No significant impacts are anticipated. However, following observations from the site visit it is considered that impacts on rivers etc can be avoided through design and good construction management practices.

Sulphur hexafluoride (SF₆) will be used in the electrical switchgear. SF₆ may also be pertinent to switch gears used on the wind-farm; it has a very high global warming potential, but does have a number of technological advantages. The management of SF₆ as an insulator should be reviewed in the design process against current Good International Industry Practice.

The ESIA identifies typical construction related wastes (including hazardous wastes) from machinery and maintenance activities as well as domestic wastes from construction workers. An extensive list of potentially hazardous wastes and gases

associated with the transmission line and transformers are listed, including non polychlorinated biphenyls (PCB)-containing insulating oils, and SF6. The ESMP includes recommendations for the segregation and proper disposal of wastes.

- **PS4: Community Health, Safety and Security**

The ESIA identifies that in some of the areas of the route alignment, intercommunity rivalries exist. In other parts of the country where such conditions are prevalent, locals typically use high points in the landscape as observatory points to monitor movements of their adversaries. In the absence of suitable hills and tall trees, this can include transmission towers and there are reported fatalities as a result. The design includes measures to prevent attempts at illegal connections.

The detailed design of the pylons and route alignment is developed to actively avoid the potential for accidents arising from electrocution, and also exposure to electric and magnetic fields.

- **PS5: Land Acquisition and Involuntary Resettlement**

A visual survey of the alignment for the transmission line was carried out via helicopter on 3 August 2010. This allowed both confirmation of the findings of the reports to date and assurances that there were no apparent significant issues along the alignment hitherto unreported. By its nature, the process of resettlement and land acquisition is slow and issues can be expected. However, along the length of the 428km of preferred alignment, the majority of the requirements for resettlement are concentrated within the southern portion, between the Terminal Point at Suswa and Angle Point (AP) 12, (a distance of 158km) and compensation has commenced. The remaining distance of 270km from AP12 north to the windfarm site is primarily through trust land. The requirements for physical resettlement in this area will be limited.

- **PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources**

Pesi swamp and Malewa River were noted as areas of interest warranting further consideration in the designing of the project. For Pesi Swamp, it is recommended that towers should ideally be placed such that they avoid the marsh habitats of about circa 500m width. Vegetation clearance in these habitats will be minimised. Marker buoys will be placed on the cables to make them more visible to larger water birds, reducing the potential for collisions. With regard to Malewa River, it is recommended that the any loss of Cedar woodland is compensated through the planting of new native woodlands. The T-line ESMP include the requirements to manage the impacts on ecological resources along the route, including replacement planting along the line and the need to ensure provisions in the Contract against hunting of bush-meat by Contractors' staff.

- **PS7: Indigenous Peoples**

The proposed project will exacerbate the delicate situation with regard to relationships among the pastoral communities if it is perceived to benefit certain communities more than others. The RAP for the project is developed with cognisance and sensitivity to rights and issues of the communities that may be affected by the way leave corridor.

- **PS8: Cultural Heritage**

Locals concerns regarding areas of land which are of cultural value was accommodated, and the issues managed with relevant communities via the ESMP. However no major cultural heritage sites are over passed by the T-line.

Details of the principles, exhibits and standards are available in the IFC guidelines under websites: www.ifc.org/environ; www.ardf.org/environ; www.equatorprinciples.com. Also the URS Scott Wilson report on IFC

CLARIFICATION (4):

C4: Estimates of the direct employment that will be created due to the construction and operation of the project

When large infrastructure project are executed local employment rises significantly as do expectations and from a capacity building perspective there is always the passing of skills. Contractors normally bring their skilled people to the work site to undertake all of the technical functions and activities and uses local people for unskilled work on a temporary basis to match the work load.

Typically the types of skill for local people are mainly drivers, security guards, watchmen, cooks, journey men and cleaners etc. In respect to the transmission employment activities will involve bush clearing, access roads, foundation, erection and stringing of the conductors. Employment for locals will depend upon the machinery and available access to utilise thia machinery and when access is constrained the above activities are undertaken by local people. This constraint brings employment and capacity building whereby locals will be trained as riggers, and used for excavation of foundations and stringing. Where local skills are available such as engineers, graduates these people normal become supervisors of the local employment are employed depending on availability.

At present the project has indirectly and directly employed an average of minimum 50 people. The project, at the onset of construction activities, plans to employ approximately directly 300 people throughout the project period. And at certain period this number may escalate to around 1,000 people both directly and indirectly employed by the project.

Given that the work will mostly be of a physical in nature this from a gender aspect will to some extent preclude women however during curing of foundations women are usually employed to ensure that the concrete foundation do not dry quickly and when machinery is being used or vehicles traversing in and out of access roads

women are used to control the flow of traffic and also to manage safety aspects for other road users and pedestrians. In additions there will be a requirement for cleaning and cooking for the workforce. For these roles local women from the nearest village are normally employed. There will be a rotation of locals as it is normal practice with a linear project that the contractor will hire locals on a temporary basis from the various villages that the project traverses. From a gender aspect if we were to disaggregate the jobs as defined in the table below women could amount to between 10% and 15% of the unskilled workforce and maybe 5% of the skilled workforce undertaking roles such as administration, stores, health and safety, nursing/ medical and in the restaurant.

The table below provides the typical makeup of the employment roles and numbers of the people required. Isolux's contract indicates that there will be three (3) teams working in parallel sections along the way leave corridor. It is recommended that the contractor employs a favourable discrimination employment policy were and to the extent possible employ women in roles that they can undertake and make use of Local SME (Small Medium Enterprises)

The tables below indicate the typical make up of expatriate and local employment the roles that will be undertaken. Temporary employment of additional local will be on and a need basis usually depending upon machinery access incapability.

Table 1.0: Employment Figures

				No of Camps =3
				Months = 19
PERSONAL		Expatriate	Locals	Total Personal
Skilled				
	Site Supervisor 1	1		3
	Logistic	1		3
	Store	2		6
	Administration	1		3
	H&S	2		6
	Quality	1		3
	Technical Office	1		3
	Garage	2		6
	Concrete Works Supervisors	1		3
	Erection Supervisors	2		6
	Stringing Supervisors	1		3
	Security	1		3
	Surveyors	2		6
Un-Skilled		18		54
	Local assistants (store)		6	18
	Drivers		3	9
	Nurse+medic staff		2	6
	Administration		1	3
	Technical Office		1	3
	Garage		3	9
	General Services		5	15
	Security		0	0
	Restaurant		5	15
	Iron workers (reinforcing)		10	30
	Sub-totals		36	108
	Totals		54	162

Table 2.0: Monthly Employment Figures

EXPATRIATES																												
No. of Teams	Time (months)		mo	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11	m12	m13	m14	m15	m16	m17	m18	m19	m20	m21	m22	m23	m24	
3	10	Concrete				6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6						
5	13	Tower Pre-assembly GROUP 1						15	15	15	15	15	15	15	15	15	15	15	15	15	15	15						
2	7	Tower Pre-assembly GROUP 2								4	4	4	4	4	4	4	4	4	4	4	4	4	4					
2	7	Tower Erection										10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
2	10	Stringing											50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
TOTAL EXPATRIATES						6	6	21	25	25	35	85	85	85	85	85	85	85	85	85	85	85	70	64	60	60	50	0
LOCAL																												
No. of Teams	Time (months)		m4	m5	m6	m7	m8	m9	m10	m11	m12	m13	m14	m15	m16	m17	m18	m19	m20	m21	m22	m23	m24					
3	10	Concrete			36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	0	0	0	0	0	
5	13	Tower Pre-assembly GROUP 1			0	0	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	0	0	0	0	0	0	
2	7	Tower Pre-assembly GROUP 2			0	0	0	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	0	0	0	0	0	
2	7	Tower Erection			0	0	0	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	
2	10	Stringing			0	0	0	0	0	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	54	0	
TOTAL LOCAL					36	36	111	125	125	129	183	183	183	183	183	183	183	183	183	183	183	108	72	58	58	54	0	
TOTAL MEN/MONTH					42	42	132	150	150	164	268	268	268	268	268	268	268	268	268	268	268	178	136	118	118	104	0	

CLARIFICATION (5):

C5: *Construction and opening of access roads.*

When detailed design of tower location spotting is complete the contractor will submit drawings detailing the various types' torsion, suspension and their respective coordinates to the client. Following preliminary approval by the employer (Ketraco), the Contractor shall at an early stage of the contract agree all points of access with landowners or other stakeholders. Access maps will be developed and supplied to the Employer for approval. The Contractor shall then submit the approved access maps to the Employer for settlement of way-leave arrangements and compensation claims. The contractor to the extent possible shall use the way-leave corridor and existing road network and pathways along the corridor for access purposes. The current proposal is for three (3) access points along the southern corridor and (3) teams working in parallel for (7) months.

After getting the access coordinates from the client, all necessary arrangements are made by the contractor for cutting and removal of bushes and trees along the corridor up to the required height and width as per the instruction of the client. Removal of cultivated trees, pipes, field drains, village houses or huts, telephone, telegraph and power lines that are preventing the erection of the permanent works, if required, shall be undertaken by the Client.

Also temporary provisions are made to prevent straying of or damage to, livestock during the execution of the Works and until the permanent reinstatement of fences, walls, hedges, gates and the like is completed.

Individual trees, groups of trees, and other vegetation are thoroughly protected from damage.

Once the bush cutting is completed, opening of the access road along the corridor is

normally undertaken with the use of dozer or excavator to prepare the road so that it should be motor/ drivable for heavy vehicles. Access width will only be opened to the extent required that safe and unobstructed passage is sufficient for vehicle passage. The tower foundation foot print area is normally opened to the extent of the way-leave (60m) providing a temporary lay-down area for materials and adequate space for working. Maintenance of the access road and route passage maintained during the period of the contract including restoration of the same as per the satisfaction of the Client. In respect of any rectification of damage which may be caused during the period of the Contract and the subsequent maintenance period.

Where crossing of pipelines by vehicles and equipment is necessary, permission is obtained to cross from the relevant authority or owner. Existing tracks are jointly inspected prior to their use and their condition recorded and agreed.

Provisions are to be made to establish a vehicle access track along the length of the cleared strip to each tower location for purposes of construction.

The access road is useful for future maintenance of the transmission line by the Client. The access road can also be used by the local inhabitants for transportation.

CLARIFICATION (6):

C6: Electric and magnetic fields (EMF) associated with high tension transmission lines and potential impacts and mitigation for close populations with reference to IFC guidelines

• **ASSESSMENT METHODOLOGY**

The procedure employed is proximity evaluation and best practice as described in the IFC EHS guidelines for wind power generation (2007) and pertinent literature for T-line on electromagnetic interference, radiation and aircraft safety.

- **BASELINE DESCRIPTION**

Transmission lines could potentially cause electromagnetic interference with aviation radar and telecommunication systems (e.g. microwave, television, and radio). This interference could be caused by three main mechanisms, namely near-field effects, diffraction, and reflection or scattering. The nature of the potential impacts depends primarily on the location of the transmission line relative to the transmitter and receiver, characteristics of the rotor blades, signal frequency receiver, characteristics, and radio wave propagation characteristics in the local atmosphere.

- **POTENTIAL IMPACTS AND THEIR SIGNIFICANCE**

Transmission lines have the potential to interfere with electromagnetic signals that make up a large part of modern communication networks (Burton et al., 2001). In addition to radar, electromagnetic interference (EMI) with other electromagnetic transmissions can occur when high Voltage transmission line is placed between a radio, television, or microwave transmitter and receiver. The materials of construction can affect the interference potential, depending on whether the material absorbs or reflects incident electromagnetic waves. EMI from transmission lines is affected by constructed structural sizes (Manwell et al. 2002).

Electric and magnetic fields may exist within certain portions of the transmission line and along the transmission line that connects the facility to the grid.

Extensive epidemiological studies have been undertaken to understand the impact of EMF to humans and some have suggested that a link may exist between exposure to power-frequency, electric and magnetic fields to certain types of cancer, primarily leukaemia and brain cancer. Other studies namely by WHO (World Health Organisation) have found no such link. Research has been ongoing for more than 20 years and at this point, there is still no scientific consensus about the EMF issue except a general agreement that better information is needed to understand the matter and as such the precautionary distance principle should be adapted. However, the transmission line will be built to international standards, taking cognisance of the safety distances

between conductors, ground and nearby dwellings and as such the transmission line is not expected to have any impact on any residential population along the line.

CLARIFICATION (7):

C7: That the proposed way-leave of 60m is the best option keeping in mind the impact especially in forest and densely populated areas

Trees and shrubs where required will be cleared to a distance of 30m on either side of the centre-line of the route creating a way leave of 60 m. Trees and plants will be cut down to a height of not more than 1.25m above ground level hence not completely eliminated. In addition, tall trees outside the cleared area, of such height that they could fall within 2m of conductors shall be felled by the contractor after obtaining the necessary permission from owners. Compensation will be paid to the owner for damaged crops and trees.

The standard international accepted way leave for a 400 kV transmission line is 56m. Thus the 60m way leave trace adopted by Ketraco is acceptable meeting international standards and includes a safety margin.

Wayleave Maintenance Activities

A temporary area (60m in width, i.e. 30m of either side of the route centre line) of land will be required to accommodate the construction of the transmission line. For access a parallel strip (approximately 15m) of land through those sections of the route which pass through vegetation shall be completely cleared. The width of the strip may vary according to the mean height of the vegetation and shall be determined during construction on a need/ requirement basis. For safety reasons, any structure and trees above three metres that may fall within the way-leave corridor will be cleared, valued and compensated.

Valuation will be undertaken by Ketraco experts (Land Economists) using

conventionally accepted procedures and internal RPF guidelines using market rates. Valuation for land will be guided by the current open market value on a square meter/acre basis for the specific portion of land being valued.

Valuation and compensation for crops for crops and trees will follow the Ministry of Agriculture (crops) and Kenya Forest Service (trees) guidelines respectively these rates are updated on an annual basis. Compensation for structures will be undertaken on a two - tier basis. Seventy (70%) of the property value plus 15% disturbance allowance will be paid to the owner/ PAP of the structure to enable the affected person to relocate the affected structure out of the way-leave. The PAP will be given 90-day notice to vacate/ remove the structure from the way-leave trace. The remaining payment, thirty (30%) ,will be paid following confirmation that the structure has been relocated outside of the way-leave. Salvage of materials is allowed. The compensation rates for structures will be 15% above the market value (disturbance allowance).

Routine maintenance is carried out along the ROW to ensure the appropriate clearances between towers, conductors and vegetation and other objects are maintained according to the required safety/operation specifications. A 10m to 15m wide path along the line route will be required in the absence of a public road. Maintenance is normally carried out twice a year (dependent on site conditions).

CLARIFICATION (8):

C8: *Ecological study (covering fauna, avifauna and flora) of the Direct Area of Impact (DIA) of the project particularly over forested areas*

Transmission line route was viewed by helicopter on the 3rd August 2010 and transit walks undertaken during the EIA process. The route is shown on figures below. Points along the transmission line referred to in the text are shown on Figures below. At AP2 there were numerous vulture nests located within tall trees nearby the proposed route. Consideration will need to be given to avoid removal of the trees containing vulture nests. Where tree removal is required this should be undertaken in consultation with an

ornithologist who can advise on avoidance during the sensitive nesting season (e.g. February to April for Egyptian Vultures.)

At about AP4 there is a reservoir and then open semi-desert (AP5), that gradually gets more vegetated and greener with low shrubs and grassland. At AP8 there were three stream crossings then lush forested valleys with numerous stream crossings at AP9. The transmission line towers will need to be spaced to span these watercourses and allow a buffer (e.g. >10 metres) from the tower to the watercourses to prevent run-off, siltation and bank disturbance during construction. Any removal of trees along river banks may cause bank instability and will be carefully planned.

Consideration should be given to nesting birds and bats roosts in mature trees prior to removal. At AP10 there were grazing land with steep wooded valleys and a lake with an African Fish Eagle (AP11). A few small reservoirs were seen up to 2km from the transmission line route, with a stream crossing at AP16. At AP17 there is a largely forested area with scattered small pools and at AP18 a marshy area (600m in length), but with no obvious water birds in the vicinity. This water bodies would form a source of construction water. From AP18 to 21 the habitats were open savannah plains with zebra and oryx. From AP21 to 26 were irrigated crops, small river crossings and a small lake at AP25 containing egrets and Egyptian geese. At AP26 was a small river with zebra and gazelle.

Between APs22 and 23 was Pesi Swamp. This was dominated by Papyrus with some small areas of open water nearby. The distance the transmission line would pass over the swamp would be a maximum of 600m. Ibis and egrets were seen here. It is recommended that at this swamp/marshy area vegetation clearance is not undertaken within these habitats. The towers should ideally be placed either side of these habitats on more solid ground to avoid any habitat loss and disturbance.

Where the transmission line passes over the Pesi Swamp and other such wetlands some large water birds may be killed if they fly into the cables. Where there is a recognized

flight path, and thus a danger to birds, marker buoys, placed on these cables, make them more visible and greatly reduce the numbers of these fatal collisions.

At about AP35 Malewa River is located which the proposed transmission line crosses up to mature cedar woodland on a ridge at AP36. The transmission line has been rerouted to avoid any impact on the cedar forest. From AP36 south the transmission line passes small scale settlements with cattle ranches, crops to AP42 with shrubs and dry rivers.

The evaluation of impacts on biodiversity presented in the ESIA for the transmission line was deemed limited in providing a full understanding of the various geographical distribution of the corridor. Pesi swamp and Malewa River were noted as areas of interest warranting further consideration in the designing of the project. For Pesi Swamp, following the latest evaluation, it is recommended that towers should ideally be placed such that they avoid the marsh habitats. Vegetation clearance in these habitats should be minimised. It is also recommended that that marker buoys, are placed on the cables to make them more visible to larger water birds, reducing the potential for collisions. With regard to Malewa River, it is recommended that any loss of woodland is off-set/compensated through the planting of new native woodlands. Ketraco has transmission mitigation reforestation policies that will compensation for loss of woodlands.

The transmission line ESMP includes the requirements to manage the impacts on ecological resources along the route, including replacement planting along the line and the need to ensure provisions in the Contract against hunting of bush-meat by Contractors' staff.

Given the relative few sensitive receptors and the temporary nature and minor impact of the transmission line a survey would be required to provide a quantifiable figures measure of species that could be impacted by the construction and as detailed tower spotting is still outstanding the survey would be limited as to potential verses actual. As to number of trees the figure extrapolated from areas and counts is in the order of 55,000 of which compensation will be paid as per the RAP report.

The figure below depicts in graphical format the typical biophysical landscape along the various sections of the transmission line route.

DRAFT

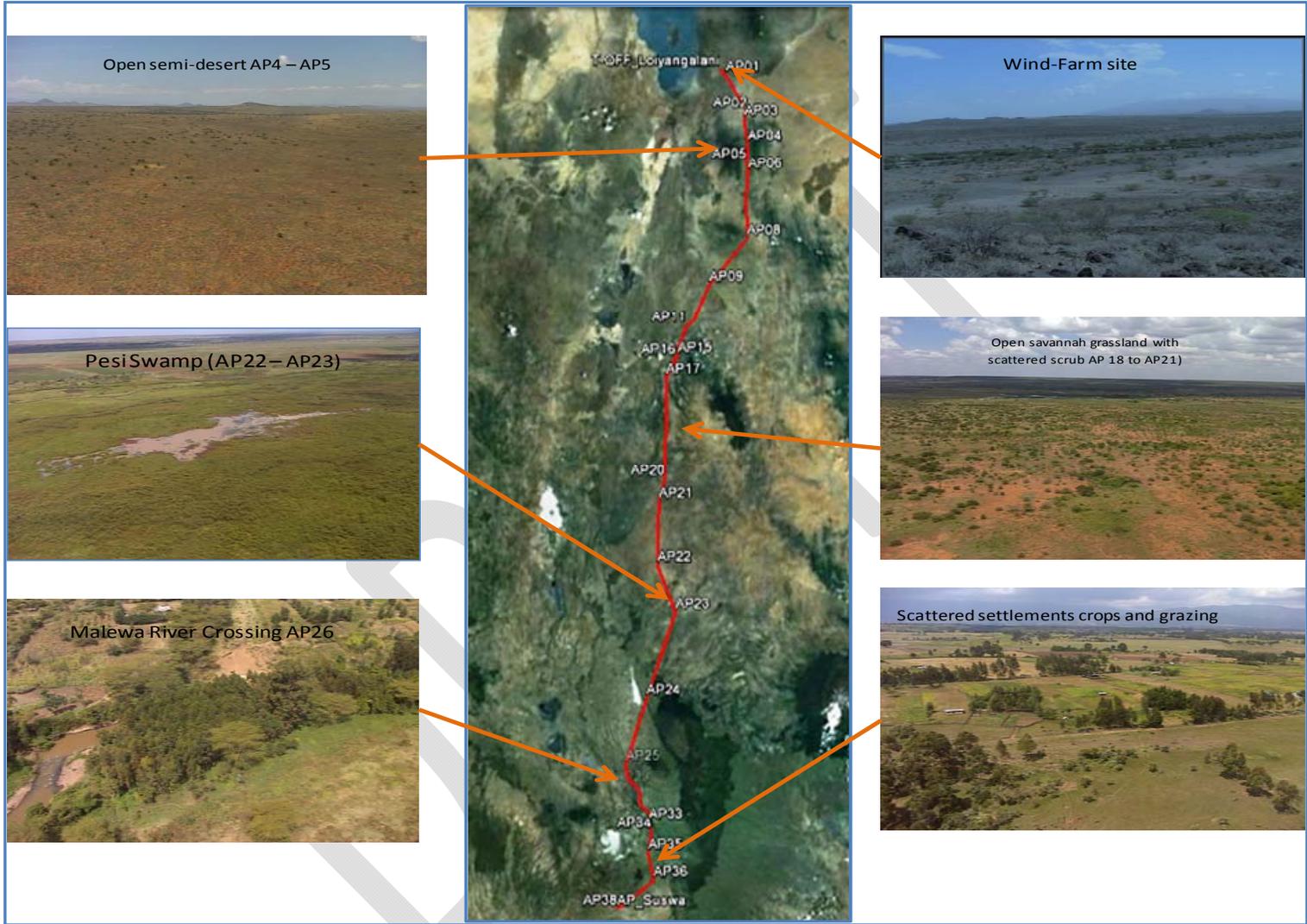


Figure 2.8: Collage of Biophysical Locations along the Route

Appendices

DRAFT

A. Angle Point UTM Coordinates

The table below details the angle point (AP) coordinates for the Loiyangalani to Suswa in UTM WGS84 format.

UTM WGS84		
Angle Points	Eastings	Northings
TOFF	254950	10275248
AP01	257862	10272557
AP02	268013	10255576
AP03	266586	10251877
AP04	268332	10240086
AP05	267748	10231497
AP06	268515	10227022
AP07	267749	10217234
AP08	267879	10195721
AP09	249860	10174172
AP10	242346	10157542
AP11	239096	10155146
AP12	235103	10144748
AP13	235151	10142791
AP14	234833	10141739
AP15	234886	10140937
AP16	233773	10140027
AP17	229269	10130969
AP18	228936	10093700
AP19	228636	10089698
AP20	228675	10083857
AP21	225793	10073197
AP22	225067	10043680
AP23	233768	10021988
AP24	219931	9981735
AP25	209986	9951121
AP26	210140	9948654
AP27	210724	9946016
AP28	211030	9943902
AP29	212980	9942199
AP30	216214	9938754
AP31	216798	9932419
AP32	221212	9928267
AP33	220892	9923732
AP34	222110	9919684
AP35	220702	9909706
AP36	223193	9896956
AP37	208743	9885511
AP38	205674	9883593

Table A1: Angle Points

B. Clarifications sought by Lenders

These are the different aspect of the ESIA report that could be improved:

1. Presentation of information (using adequately scaled maps and tables) to indicate the location of relative to the route of the T-line
 - nature conservation sites, wildlife sanctuaries,
 - aquatic habitats terrestrial habitats,
 - cultural sites.
 - Better understood of the transmission line route could be better captured using Geographical Positioning System (GPS). This will enable a better understanding of the specific immediate environment of the line's way leave. It is important to ascertain the actual length of the line. Different reports and publicly available information are not consistent
2. Cumulative Impact Assessment identifying the following;
 - existing and planned large scaled development projects within the direct area of impact of the project (DIA)
 - analyzing how the impacts from these project may add to or subtract from the positive or negative impacts of the subject project.
 - For example we would like to know if there are other projects in the area that may exacerbate the impacts of population displacement due to the T-line project.
 - the DIA of the T-Line project should be specified in the report.
3. The legal and policy framework analysis should include the provision of the Bank's environmental and social policies and procedures.

4. Employment estimate of the direct employment that will be created due to the construction and operation of the project.
 - this should be disaggregated into permanent and temporary opportunities.
 - This issue should be further analyzed to understand implications for social and gender inclusiveness – that is how many jobs may be available or targeted for women and also how many may be targeted or available for the local community.
 - An analysis should also be provided to identify and enhance opportunities for SME businesses locally and nationally who may be able to provide services directly to this project.
 - In the same light, the socio-economic baseline analysis should see to understand the level of education and skills available in the communities as well as other issues such that are applicable to health, gender etc. For example what the prevalent diseases in the area that may be impacted by the project, these should be discussed as quantitatively as possible.
5. The report should clarify whether the project would involve the construction or opening of access roads.
 - The nature of this activity should be lucidly captured.
 - Understand as to the estimated length of the access roads envisaged and if these would impact on environmental components of the project area.
6. The ESIA report is simply silent on discussions regarding electric and magnetic fields associated with high tension transmission lines and potential impacts and mitigation for close populations.
 - Consult IFC guideline on Transmission and distribution lines.
7. The report should provide an analysis that the proposed way leave of 80m is the best option keeping in mind the impact especially in forest and densely populated areas.

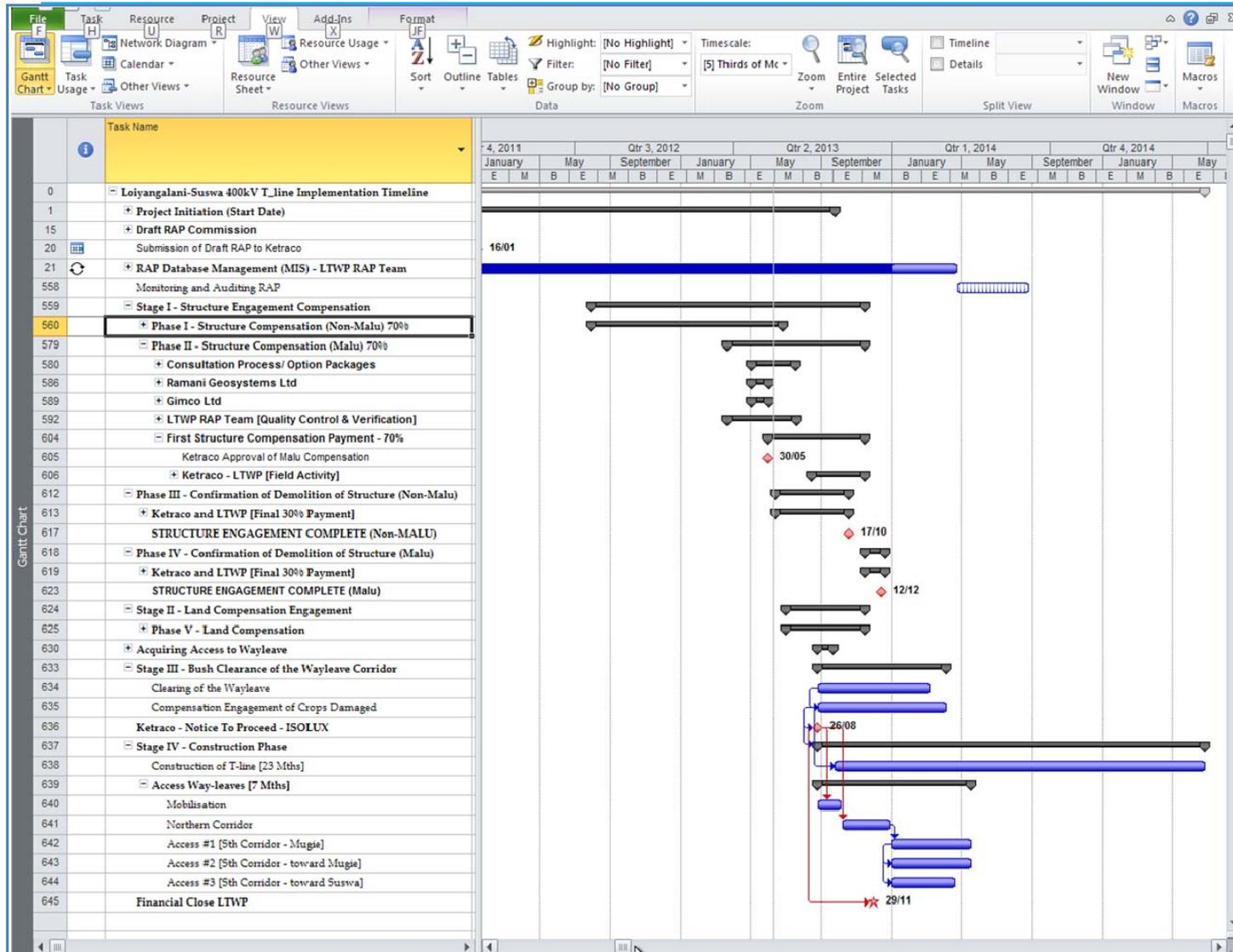
- Are there other possible options that can minimize the impact of this way leave?
 - A more detailed explanation should be provided on the work planned for the creation of the way leave. At present, the information provided in the report appears to indicate that clearing will be done over 80m for the entire length of the line.
 - How will this way leave be created and maintained in practice?
8. The report should include a detailed ecological study (covering fauna, avifauna and flora) of the Direct Area of Impact (DIA) of the project particularly over forested areas.
- We would want to have a reasonable quantitative measure of the species and number of trees that will be affected.
 - Likewise, the report should provide a quantitative measure of the number of trees to be planted and the exact implementation arrangement for the tree planting activity.
9. The report should also provide a census of the social amenities (schools, hospitals, water sources etc) available to the communities.
- It should also provide detailed information for the implementation of the recommendations provided by the communities during the stakeholder engagement processes.
10. The ESMP should be revised paying particular attention to provide definite time schedules for monitoring and reporting activities.
11. The quantitative results from environmental sampling (for air, water and soil) carried out should also be provided.
12. The report should also contain justifications and limitations for the methodologies applied in the study, it should also provide literature references where applicable.

13. The ESMP should also reflect more analysis on mitigation measures for wildlife including avifauna and other terrestrial fauna. The issue of wildlife poaching, if applicable in the area should be discussed.

14. It should be noted that the project is in the area of Lake Turkana, which has already received considerable international attention given developments such as GIBE III and the Wind Farm project. So the issue of wildlife protection and conversation would be under the spotlight for this project.

DRAFT

C. RAP Schedule



D. Revised Environmental & Social Management Plan Matrix

Design & Construction Phase

Potential Impact	Proposed Mitigation/ Reason	Responsibility for Monitoring	Monitoring Indicator	Monitoring Means	Time Frame	Cost (Ksh)
Public Consultation and Community Engagement	<ul style="list-style-type: none"> - Dissemination of project information - Public safety - Minimisation of disturbance 	KETRACO	Consultation/ community engagement meetings held	Meeting reports	Continuous	
Employment	Statement of intent.	Contractors	Reports listing permanent and temporary employees by function and gender and days/ months employed and salary paid. The minimum salary should not be below Kenyan rate.	Client Monthly Reports	monthly basis	

Addendum to ESIA 'Loiyangalani Suswa Proposed Transmission Line 400kV'

Management of change and chance find procedure for natural and cultural habitat	Minimise impact on cultural heritage.	Contractors	Statement of finds and actions taken	Client Reports	Monthly Reports	
Training	Organise environmental management and occupational health and safety training. All contractors, their employees both contractual and temporary shall attend the training and receive accreditation certificate confirming understanding and completion of the course.	Contractors	Staff trained	Training reports	On site at least 1 month prior to commencement of construction	30,000
Public & Occupation Health and Safety e.g. accidents resulting from sharp and falling objects	Preparation of a Health and Safety Plan for workers and impacted communities addressing issues including: <ul style="list-style-type: none"> - Education of workers and impacted communities - Provision of appropriately fitting personal protective equipment (PPE) to workers during construction - Incident/accident reporting through keeping log of incidents/accidents and remedial actions (in the event of an accident) - Emergency contingency plan - Work instructions - Use of child labour to be prohibited 	KETRACO & Contractors	Protected workers at sites Workers using appropriate and fitting PPE	- Monthly meeting reports - Site inspection reports	Before commencement of construction and statement to effectiveness in Monthly Reports	1,000,000
Road safety	- Enforce speed limits for construction vehicles; where possible design separate vehicle entries different from the common	KETRACO & Contractors	Reduced accidents	Number of reported cases/	Continuous throughout the construction	40,000

	<p>entrances with the residents; streamline traffic flow into and out of the premises; initiate changes in traffic flow in the micro-area upon commissioning; install approximate cautionary signage for motorists entering the premises.</p> <ul style="list-style-type: none"> - Ensure appropriate road safety signage - Ensure all drivers adhere to the traffic laws and requirements <p>Erection of bumps where human and vehicular traffic have high interaction opportunities</p>			complaints from the residents & inconveniences from visiting motorists	phase and statement to effectiveness in Monthly Reports	
Risk of leaks or spills	<ul style="list-style-type: none"> - Regular maintenance of site equipment - Safety procedures for fuel storage and refuelling - Dispose of oil residues carefully 	KETRACO & Contractors	Spot checks by KETRACO	Regular inspection	Continuous and statement to effectiveness in Monthly Reports	110,000
Noise and vibration	<ul style="list-style-type: none"> - Sensitise the workforce and truck drivers on issues of equipment maintenance. - Supervise construction traffic - Maintain plant and equipment - Undertake construction only during the daytime for peace of the neighbours - Workers to wear ear plugs, muffs as part of their PPE 	KETRACO & Contractors	<ul style="list-style-type: none"> - Not to exceed 84 decibels - Not to exceed 40 working hours/per week - Sound proofing material 	Routine inspection	Continuous and statement to effectiveness in Monthly Reports	100,000

<p>Canteen eating areas and washing facilities</p>	<ul style="list-style-type: none"> - Housekeeping standards employed by the Contractors and any sub-contractors must be as good as that of KETRACO - Food and drink should not be consumed in any area where Lead work is being carried out - Washing of hands and face and changing of contaminated clothes should take place before entering canteen areas. 	<p>KETRACO & Contractors</p>	<p>Sound housekeeping practices</p>	<p>Quarterly monitoring reports</p>	<p>During construction</p>	
<p>Contractor camps</p>	<ul style="list-style-type: none"> - All sewage and waste water discharges from contractor camps shall be collected and treated in an approved system installed on site; - Solid wastes shall be stored in proper containers, collected and disposed of using public or private companies entrusted with solid waste collection in the communities where such wastes are collected (camp sites) and disposed in landfills/dumpsites approved by NEMA; - Erosion shall be minimised and sedimentation prevented through a drainage system with sedimentation traps and/or screens; - All refuelling and servicing areas shall be situated on impermeable surfaces served by an oil trap and run-off collection facilities; <p>Upon completion of the contract, all elements of the camp shall be removed and the site, as far as possible, be</p>	<p>KETRACO & Contractors</p>	<p>Sound environmental practices in camps</p>	<p>Quarterly monitoring reports</p>	<p>Construction phase</p>	<p>300,000</p>

	returned to its original condition unless designated for alternative uses with approval of the Ministry of Public Works.					
Abnormal loads	<ul style="list-style-type: none"> - Develop and implement measures to prevent damage to regularly used roads - Ensure that contractor vehicles comply with axle load limits. 	KETRACO, Contractor & Ministry of Roads	Roads kept in a motorable state	Quarterly monitoring reports	Continuous	
Workshop, equipment maintenance and storage areas	Good housekeeping practices	KETRACO & Contractors	Clean and hazard free	Weekly	Continuous	
Material handling use and storage	Develop procedures	Contractor	Sound SHE practices	Weekly	Continuous	
Hazardous Substances use storage and disposal	Develop procedures	Contractor	Sound SHE practices	Weekly	Continuous	
Temporary fuel storage	Develop procedures	Contractor	Sound SHE practices	Weekly	Continuous	
Access roads(if applicable)	Develop procedures	Contractor	Sound SHE practices	Quarterly	Continuous	
Bridges and culverts (if applicable)	Develop procedures	Contractor	Sound SHE practices	Quarterly	Continuous	
Cement and concrete	Develop procedures	Contractor	Sound SHE	Weekly	Continuous	

batching			practices			
Crushing (if applicable)	Develop procedures	Contractor	Sound SHE practices	Weekly	Continuous	
Earth works & restoration and replacement offsets	Develop procedures	Contractor	Sound SHE practices	Quarterly	Continuous	
Power tools	Develop procedures	Contractor	Sound SHE practices	Weekly	Continuous	
Lay-down areas	Develop procedures	Contractor	Sound SHE practices	Weekly	Continuous	
Pumping and sumping (if applicable)	Develop procedures	Contractor	Sound SHE practices	Weekly	Continuous	
Contaminated water	Treating contaminated water before release to the aquatic environment	KETRACO & Contractors	Biodiversity health (both terrestrial and aquatic)	Quarterly monitoring reports	Continuous	100,000
Storm water control	Providing, installing, maintaining, removing and disposing of storm water - control measures such as gravel filter berms, dykes, catch basin inlet protection, end of pipe filtering devices, silt fences, dams, sediment basins, netting, bale barriers, slope drains and other erosion control	KETRACO & Contractors	Storm water well channelled	Quarterly monitoring reports	During construction	300,000

	devices or methods.					
Water abstraction	<p>Small scale activities with abstraction volumes less than 10m³ per day are not required to notify the relevant Water Regulatory Agency but must adhere to Permitted Controlled Activities (PCA) conditions ensuring that:</p> <ul style="list-style-type: none"> - there is a means of measuring the volume abstracted; - water leakage shall be kept to a minimum; - the activity will cause no contamination or pollution; - operators with abstraction volumes between 10m³ and 20m³ per day must notify the Relevant Regulatory Agency of the location of the activity and show compliance to the PCA. - Abstraction volumes greater than 20m³ per day require a formal licence from the Relevant Regulatory Agency which may stipulate conditions. 	KETRACO & Contractors	<ul style="list-style-type: none"> - Water volume in reservoirs (if any) - Status of underground aquifers 	Quarterly reports	Continuous	50,000
Retaining walls and Gabions	Develop procedures	Contractor	Sound SHE practices	Quarterly	Continuous	
Emergency contingency plan	Develop procedures	Contractor	Sound SHE practices	Monthly	Continuous	

Environmental incident register	Develop procedures	Contractor	Sound SHE practices	Quarterly	Continuous	
Method statements (as required)	Develop procedures	Contractor	Sound SHE practices	Quarterly	Continuous	
Land Acquisition - Loss of land due to construction of temporary and permanent access routes leading to the transmission lines, tower sites and sub-stations - Temporary loss of land use during establishment of right-of-way (ROW)	Complete all necessary land acquisition in accordance with RAP and entitlement Framework prior to the commencement of any construction works.	KETRACO	Completed acquisition process	Quarterly monitoring reports	Before commencement of construction	
Terrestrial Habitat Alteration Protection of flora & fauna	<ul style="list-style-type: none"> - Re-vegetation of disturbed areas with native plant species; - Undertake selective clearance by removing tall woody species leaving saplings, for quick regeneration of vegetation along the way-leave (sections where vegetation clearance will be done); - No pesticides will be used during bush clearing; - Stipulate no hunting of bush meat or cutting of firewood by contractor staff 	KETRACO & Kenya Forest Service	Re-vegetation of disturbed areas	Routine inspection	Continuous	130,000

<p>Aquatic habitat alteration (including wetlands)</p>	<ul style="list-style-type: none"> - Minimising clearing and disruption to riparian vegetation; - Consider rerouting to avoid or minimise effect on wetlands e.g. Pesi Swamp 	<p>KETRACO & Contractors</p>	<ul style="list-style-type: none"> - Siltation of soil in rivers from construction activities - Physical water quality - Species diversity 	<p>Routine Maintenance</p>	<p>Continuous</p>	<p>Nil</p>
<p>Power line related avifauna mortalities</p>	<ul style="list-style-type: none"> - To minimise collision, undertake wire-marking to alert birds to the presence of power line - Build raptors platforms on top of pylons for roosting and nesting 	<p>KETRACO & Contractors</p>	<p>Physical structures</p>	<p>Routine Maintenance Inspection Records</p>	<p>Continuous</p>	<p>180,000</p>
<p>Soil erosion</p>	<ul style="list-style-type: none"> - Soils excavated for the erection of towers should be used for re-filling and should not be left exposed to wind or water for long periods; - 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 protection; - Re-plant degraded areas with local species common in the area to complement natural vegetation regeneration to improve ground cover. 	<p>KETRACO & Contractors</p>	<p>Status of ground cover in constructed areas</p>	<p>Re-vegetation</p>	<p>Continuous</p>	<p>90,000</p>

Air Pollution (dust, fuel, emissions)	<ul style="list-style-type: none"> - Control speed of construction vehicles; - Prohibit idling of vehicles; - Water should be sprayed during the construction phase on excavated areas; - Regular maintenance of plant and equipment; - Provision of dust masks for use when working in dusty conditions; - Sulphur hexafluoride (SF₆) switchgear - Ensure factory acceptance test is carried out to ensure switchgear is sealed tightly; - Regular inspection and pressure monitoring to ensure zero leakages 	KETRACO & Contractors	<ul style="list-style-type: none"> - Visible particulate matter in the air; - Increase in upper respiratory tract ailments; - Number and status of PPE; - Vehicle service. 	Respiratory Protection devices	Continuous	20,000
Contamination of ground and surface water	<ul style="list-style-type: none"> - Maintenance of construction vehicles should be carried out in the contractor's camps and a recognised garage; - Proper storage, handling and disposal of oil wastes from machinery, discourage servicing of machinery and vehicles in construction sites. 	KETRACO & Contractors	Water quality. Nature of surface runoff from the site	Routine inspection	Continuous	30,000
Management of Solid Waste	<ul style="list-style-type: none"> - Contractors must dispose solid wastes away from the site to an approved disposal site; - Temporary pit latrine for construction workers. 	KETRACO & Contractors	Nil visible solid waste heaps on site	Routine maintenance	Continuous through construction	30,000

Risk of fire	<ul style="list-style-type: none"> - Establishing a network of fuel breaks of using inflammable materials or clearing land to slow progress of fires and allow fire fighting access; - Provision of fire safety system that includes training, fire fighting equipment; regular maintenance of machinery, vehicles and equipment; and no burning activities to be allowed close to or within the site. 	KETRACO & Contractors	Records	Routine maintenance	Continuous	70,000
Electrocution from Live Power Lines	<ul style="list-style-type: none"> - A maintenance system to ensure physical integrity of structures is maintained; - Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines; - Ensuring that live-wire work is conducted by trained staff; - Workers should not approach an exposed energized or conductive part even if properly trained unless the worker is : - properly insulated from the energised part with gloves or other approved, insulation; the energized part is properly insulated from the worker and any other conductive object; the worker is properly isolated and insulated from any other conductive object (live-line work); - Installation of anti-climbing, devices. 	KETRACO supervising Engineer Contractors	Medical Records	Provision of PPE	Continuous	20,000

Addendum to ESIA 'Loiyangalani Suswa Proposed Transmission Line 400kV'

Working at heights	<ul style="list-style-type: none"> - Testing structures for integrity prior to undertaking work; - Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; - Inspection, maintenance, and replacement of fall protection equipment; - Installation of fixtures on tower components to facilitate fall protection systems; - An approved tool bag should be used for raising or lowering tools or materials to workers on structures; - Use of helmets and other protective devices will mitigate against scratches, bruises, punctures, lacerations and head injuries due to dropping objects. 	KETRACO supervising Engineer Contractors	Medical Records Test records Training records	<ul style="list-style-type: none"> - Climbing equipment - Initial integrity tests - Training of staff 	Continuous	30,000
Spread of Diseases	<ul style="list-style-type: none"> - Education, guidance and counselling on HIV/AIDS and other sexually transmitted diseases - construction staff; - Avail condoms to construction staff. 	KETRACO & Contractors	Medical Records	Regular inspection on availability of condoms	Continuous	10,000
Spread of HIV/AIDS	<ul style="list-style-type: none"> - Review activities of the project to integrate with HIV/AIDS campaigns; - Develop appropriate training and awareness materials on HIV/AIDS; - Identify other players like community and non-governmental organisations etc on HIV/AIDS for 	KETRACO	-		Continuous	80,000

	<p>enhanced collaboration;</p> <ul style="list-style-type: none"> - Integrate monitoring of HIV/AIDS proactive activities. 					
Land acquisition and Resettlement	<p>Ensure that the displaced persons are:</p> <ul style="list-style-type: none"> - Informed about their options and rights pertaining to resettlement; - Consulted on, offered choices among, and provided with alternatives; - Provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project; - Offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living; - Provided with development assistance in addition to compensation measures. 	Contractors & KETRACO	<p>Relocation</p> <ul style="list-style-type: none"> - Compensation for loss - Compliance with KETRACO RPF 	No complaints for lack of compensation	Before commencement of construction	To be covered under RAP
Visual impact	Public consultation during the planning of power line and power line RoW locations	KETRACO	Complaints	No. of complaints forwarded	Before construction commencement	160,000
Alteration of land sites with cultural and religious significance	Detailed design alignment or rerouting to avoid these areas	KETRACO	Cultural sites preserved	No. of cultural sites preserved	Before commencement of construction	-