



Kenya National Highways Authority

Quality Highways, Better Connections

**REQUEST FOR PROPOSAL (RFP) STAGE ENVIRONMENTAL AND
SOCIAL IMPACT ASSESSMENT (ESIA) REPORT**

NAIROBI – NAKURU – MAU SUMMIT HIGHWAY

DESIGN, BUILD, FINANCE, OPERATE, MAINTAIN AND TRANSFER

PUBLIC PRIVATE PARTNERSHIP (PPP) PROJECT

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AC	Asphalt Concrete
ACH	Archaeological Cultural Heritage
ATM	Automated Teller Machine
AWSB	Athi Water Services Board
CA	Contracting Authority
CBD	Convention on Biological Diversity
CC	County Commissioners
CDF	Constituency Development Fund
CEDAW	Convention on Elimination of all forms of Discrimination Against Women
CHS	Critical Habitat Screening
CLO	Community Liaison Officer
CO	Carbon monoxide
CO2	Carbon dioxide
CRC	Convention on the Rights of the Child
CSW	Commercial Sex Workers
DBFOMT	Design Build Finance Operate Maintain Transfer
DCC	Deputy County Commissioners
DMU	Discrete Management Units
DRC	Dispute Resolution Centre
EA	Environmental Audit
EACC	Ethics and Anti-Corruption Commission
ECD	Early Childhood Development
EHS	Environment, Health and Safety
EIA	Impact Assessment
EMCA	Environmental Management and Coordination
ENSO	El Nino/ Southern Oscillation
ESAPs	Environmental and Social Action Plans
ESIA	Environmental and Social Impact
FPIC	Free, Prior, and Informed Consent
GoK	Government of Kenya
GRMC	Grievances Redress Mechanism Committees
HDI	Human Development Index
HIV	Human immunodeficiency virus infection
ICP	Consultation and Participation
IFPPP	Infrastructure Finance and Public Private Partnerships Project
ILO	International Labour Organization
ITCZ	Intertropical Convergence Zone
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Areas
KeNHA	Kenya Highways Authority
KeRRA	Kenya Rural Roads Authority
KBA	Key Biodiversity Areas
KFS	Kenya Forest Service
KNHRC	Kenya National Human Rights Commission

KNUT	Kenya National Union OF Teachers
KPLC	Kenya Power and Lighting Co. Ltd
KURA	Kenya Urban Roads Authority
KWS	Kenya Wildlife Service
LATF	Local Authority Transfer Fund
LCH	Living Cultural Heritage
LDF	Lane Distribution Factor
LPAs	Legally Protected Areas
LSC	Logistic Supply Centers
MIR	Minimum Internal Requirements
MLFF	Multi-Lane Free Flow
MoF	Ministry of Finance
NBSAP	Kenya National Biodiversity Strategy and Action Plan
NEMA	National Environmental Management Agency
NLC	The National Land Commission
NMK	National Museums of Kenya
OSHA	Occupational Safety and Health Act
PAHs	Project Affected Households
PIT	Project Implementation Team
PIU	Project Implementation Unit
PPP	Public Private Partnership
PPPU	Public Private Partnership Unit
RAP	Resettlement Action Plan
ROW	Right of Way
SPV	Special Purpose Vehicle
STIs	Sexually Transmitted Infections
TA	Transactional Advisors
TCP	Toll Charging Points
TSP	Total Suspended Particle
UNCBD	United Nations Convention on Biological Diversity
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
VDF	Vehicle Damage Factor
VOC	Vehicle Operating Cost
WRA	Water Resources Authority
WSPs	Water Service Providers
YDI	Youth Development Index

EXECUTIVE SUMMARY

**This document is provided to the bidders on a confidential basis with the sole purpose of helping them to prepare their bids. It is not the final version, and further changes are expected to be made prior to clearance from the World Bank. This document has not been cleared by the World Bank.*

Project Background

The Government of Kenya (GoK), has embarked on a strategic program to attract private investment in the infrastructure through Public Private Partnership (PPP) mechanism and to create an enabling environment for the same. To facilitate this program and to prepare a pipeline of financially viable PPP projects the GoK has received financing from the World Bank titled the Kenyan Infrastructure Finance and Public Private Partnerships Project (IFPPP).

Accordingly, the GoK, under the provisions of the PPP Act of 2013, represented by the Kenya Highways Authority (KeNHA), defined as the Contracting Authority (CA), with technical assistance from the Public Private Partnership Unit (PPPU) at the National Treasury, wishes to award the Project for the Design, Build, Finance, Operate, Maintain and Transfer (DBFOMT) basis, Nairobi-Mau Summit A8 Highway (175 km) into a 4 (four) lane dual carriageway and in the due course its further development into a 6 (six) lane carriageway in sections depending upon traffic volumes; strengthening of 57.8 km of the A8-South highway between Rironi and Naivasha via Mai Mahiu through competitive bidding under the PPP Act 2013 as a Concession Agreement to a Special Purpose Vehicle (SPV) to be created by a Private Concessionaire.

This Project forms a part of the Trans-African Highway (Northern Corridor), part of the main transport route serving East and Central African Countries through the Indian Ocean seaport of Mombasa. The concession agreement shall provide among others, specifications for the scope of work, provisions for tariff rate setting and adjustments, and may include a minimum revenue guarantee by GoK.

Project Justification and Benefits

The Northern Corridor is the busiest and most important transport corridor in East and Central Africa, providing a gateway through Kenya from Mombasa Port via road, rail and pipeline to the landlocked countries of Uganda, Rwanda, Burundi, South Sudan and Eastern Democratic Republic of Congo.

The vehicular traffic on the current highway is estimated at 16,000 per day almost 5.8 million per year and this traffic is project to increase tenfold yet the road is single land a factor contributing to increased accidents of people, livestock and wildlife. Increased traffic and congestion is also exacerbating air pollution and hence as discussed below, upgrading the road for better safety and movement is an urgent priority. The benefits of the proposed road upgrades along the Project Road with required timely maintenance include: -

a) Savings in Vehicle Operating Cost

As the road is proposed to be upgraded to dual carriageway and operation and maintenance for the entire appraisal period there are major savings anticipated in vehicle operating cost. It may also be noted that improvement of much worse road requiring higher investment, may yield

much higher benefits to the road users in terms of higher savings in the Vehicle Operating Costs (VOCs) as the incremental benefits of an improved road that would be higher compared to the bad state, if not timely maintained, it will cause more damage to vehicles besides consuming more fuel and leading to frequent break down, higher wear and tear of tyres, reduced level of vehicle and crew utilization, higher probability of road accidents, etc.

b) Travel Time Savings

There would be significant savings in the travel time to its users, mainly on account of increased speed, timely delivery of the commodities under transportation, probably reduced waiting time forgetting the transport for freight and passenger movement, higher utilization of vehicle and crew, etc. Improved road conditions would bring considerable time savings while travelling.

c) Improved Transport Infrastructure

Availability of reliable transport infrastructure and efficient transport services is an essential requirement for achieving goals of any development plan. It is a pre-requisite for initiation of any economic development process. Therefore, improved and well maintained road in the national road network of the country becomes more important for realization of benefits to the society. As the project road is part of Northern Corridor, the proposed road improvement will facilitate efficient transport of freight to and from Mombasa port. The proposed road improvement would also attract public and private investments in several areas of trading and commerce, accelerating economic development and diversification of the economy, etc.

d) Employment

Road upgrades and maintenance activities provide employment opportunities—directly and indirectly—to skilled as well as unskilled manpower primarily to local manpower. The employment opportunities may vary on the deployment of technological choices while undertaking the road improvement and maintenance activities, i.e. with different combinations of capital–labor options.

Improvement of the Nairobi-Nakuru-Mau Summit Road followed by yearly routine and periodic maintenance activities during the appraisal period would generate direct employment to skilled and unskilled workforce including women in the areas surrounding project road. The income, thus

enhanced, of the local skilled and unskilled work force would also bring out a multiplier effect to other sectors of the economy.

e) Road Accidents and Safety Concerns

The proposed road upgrade includes provision of dual carriageway that will reduce likelihood of head-on collision of vehicles by great extent. Other proposed measures such as intersection improvements, improvement of road surface, provision of sealed shoulders, and removal of roadside hazards will help in reducing number of road crashes. Thus, reduction in number of fatal and severe injuries will add in the benefits likely to be generated by proposed improvement of Nairobi-Nakuru- Mau Summit highway. Current infrastructures are not able to accommodate the increasing traffic, leading the extended travel times and worsening road safety (575 people were killed between 2012 and 2014 according to police statistics).

f) Tourism

It is a fact that Kenya has several places of tourist interest for the domestic and international tourists. The road would provide efficient and economic road transport infrastructure for the domestic and international tourists coming from various parts of Kenya as well as neighboring African and other countries of the world. This road is a part of national road network serving various major towns of Kenya and would help tourism industry to grow at higher rate. It is rather difficult to make estimation for the arrivals of tourists in future in the present analysis, as the level of tourism would depend on the overall development and plans for the tourism sub-sector and related infrastructure. However, the proposed improvement on the Project Road would provide economical, reliable and convenient transport infrastructure for any domestic and foreign tourists, which would, in turn, give boost to the tourism industry in general and also to establish additional hotels and resorts and other facilities of tourist attraction in particular.

Purpose of RFP Stage ESIA Document

The construction of roads is associated with adverse environmental and social risks and impacts and in effect, an Environmental and Social Impact (ESIA) assessment is necessary in order to anticipate and identify the adverse environmental and social risks and develop robust mitigation measures through application of mitigation hierarchy. This is therefore a Request for proposal (RFP) ESIA which has been prepared based on the feasibility study report prepared by Intercontinental Consultants and Technocrats (ICT), who are the Transactional Advisors (TA) and is aimed at enabling project bidders (future private concessionaires) to among others: -

- a) Understand the risks and impacts of the project including ensuring that bidders fully understand their expected obligation with respect to environmental and social risks during the construction and operation phase of the project.
- b) Help bidders to undertake reliable financial cost estimates at this bidding stage with respect to environmental and social risks management during the construction and operation phase
- c) Clearly understand the changes expected from them during the design stage with respect to avoiding, minimizing, mitigating or compensating for environmental and social risks e.g. wildlife corridor designs changes,
- d) This RFP stage ESIA contains a chapter 8 which identifies the Environmental and Social Management Programs which the winning bidder will be expected to prepare during different phases of the project implementation. The objective is therefore to make bidders aware of this expectation
- e) Clearly understand and internalize their environmental and social obligations, roles, responsibilities, accountability monitoring and reporting as Private Concessionaire through-out the project phases
- f) Clearly understand the environmental and social roles and responsibilities accountability monitoring and reporting of all the other key partners in the project including Kenya National Highways Authority (KeNHA), Kenya Wildlife Service (KWS), National Environment Management Authority (NEMA), Kenya Forest Service (KFS), National

Land Commission (NLC).

ESIA Study Limitations

This RFP ESIA has been prepared against a backdrop of certain unknown project aspects which will only be known at the stage of preparation of detailed designs, a task of the future Private Concessionaire and therefore this document fails to rigorously analyse the risks associated with a number of key project components which will only be analysed when their designs, descriptions and locations are identified and confirmed by the private concessionaire. These include project components like workers' accommodation, material sites, construction site, road side stations among others as described below all which have potential adverse environmental and social risks.

Detailed risks associated with proposed project and impacts on biodiversity including natural and critical habitats, water courses and wildlife movement have not been analyzed and therefore include areas of further studies and surveys at the stage of preparation of the detailed design.

This RFP stage ESIA has not collected certain baseline information including water quality, noise and vibration quality, air quality and biodiversity baseline which will be collected and analysed during the completion of final RFP Stage ESIA for approval by the Bank.

This RFP stage ESIA has also excluded and not analyzed for reasons stated above the risks and impacts associated with the following components namely: -

- **Workers Accommodation Camps:** -The construction of the highway will attract workers who are estimated to be about 500. Of these, an estimated 150 workers will be accommodated in workers' camps this is based on KeNHA's estimate which shows that 70% of the total work force are going to be unskilled and sourced from project locality and hence not requiring accommodation and will instead reside in their homes. Construction of workers' camps is associated with a number of social and environmental risks including displacement of communities, gender based violence, sexual exploitation and abuse, disease burden especially increase in communicable diseases, destruction of flora and fauna, competition and strain over resources between project workers and the host communities, cultural erosion (in-migration) among others. The locations of the workers' accommodation camps will be identified by the private concessionaire during the preparation of detailed designs and associated risks and impacts will be identified conclusively at that point in time. This document therefore excludes the analysis of risks and impacts associated with this component. Nevertheless, the Concessionaire will be required to prepare and implement a management plan acceptable to the Client, for avoiding, minimizing or compensating for risks associated with labour influx.
- **Material Sites:** - Potential sites (quarry and borrow areas) for obtaining construction materials (soil and gravel, stones) have been identified by the TA who prepared the feasibility study. However, the private concessionaire will not be obligated to source materials from these sites and may identify own sites based on several factors. Borrow pits and quarries, are known to have potential adverse environmental and social impacts

including destruction of flora and fauna, community health and safety risks, workers' safety, displacement of communities among others. The private concessionaire is expected to identify material sites during the phase of detailed design development and consequently determine risks and impacts associated with the identified sites including mitigation measures. This document therefore excludes the analysis of risks and impacts associated with this component. The purchase of land for material sites is expected to be based on the "willing-seller-willing buyer principle. However, should potential material sites be located within Indigenous Peoples (IP) areas, the Concessionaire will be required to consult with the IPs through the free, prior and informed consultations principle, to ensure that they are not harmed in any way by such facilities.

- **Construction Sites:** Construction of the highway will require the establishment of construction site (s) for operation purposes. The construction site is where among other batching plants, asphalt plants, hot mix, garages, offices and other infrastructures are located. Such sites are associated with activities that pose environmental and social risks and impacts including destruction of flora and fauna, community health and safety risks, workers' safety, displacement of communities among others. However, the locations of the sites are unknown and will be identified by the private concessionaire and hence the associated risks cannot be determined at this point in the preparation of this document. This document therefore excludes the analysis of risks and impacts associated with this component. Nevertheless, when the impacts are identified, the Concessionaire will be required to develop environmental and community health and safety management plan that will stipulate how such risks will be avoided, minimized, mitigated or compensated.

Project Description

The proposed Project is an expansion and improvement of the existing Nairobi-Nakuru-Mau Summit highway. It is part of the A8 highway and of the Northern Corridor that connects the Port of Mombasa via Nairobi to Malaba at the border with Uganda and onwards to Kampala. The Northern Corridor is the busiest and most important transport corridor in East and Central Africa, providing a gateway through Kenya from Mombasa Port via road, rail and pipeline to the landlocked countries of Uganda, Rwanda, Burundi, South Sudan and Eastern DR Congo.

The A8 and A8 South road connections are unable to accommodate the ever-increasing traffic leading to extended travel times and worsening road safety. The slow moving heavy goods vehicles that do not have the power to maintain their speed in the hilly terrain, slow down the traffic which leads to dangerous situations upon overtaking. Average speed is rarely more than 60 km/hr which is below the desired level for an international standard highway. Between 2012 and 2014, 575 people were killed on the highway according to police statistics. The main risks are lack of barriers, poor condition of vehicles, poor driving techniques and inclement weather.

To address these problems, the GoK, through Kenya National Highway Authority (KeNHA) as the Contracting Authority) has undertaken to improve the road safety and quality, through a PPP scheme. Towards this end, the project has been designed under a 30-year Design Build Finance Operate Maintain Transfer (DBFOMT) arrangement. The total cost is estimated at about US\$700 million, to be financed by a private Concessionaire. The private Concessionaire, through a special purpose vehicle (SPV) is expected to undertake widening, improvement, and

operations and maintenance of the highway, which is separated into following segments:

- a) Widening of 176km of the A8 highway between Rironi and Mau Summit and turning it into a four-lane dual carriageway, including operation and maintenance;
- b) Strengthening of 58km of the A8-South highway between Rironi and Naivasha, including operation and maintenance; and

The concession agreement shall provide among others, specifications for the scope of work, provisions for tariff rate setting and adjustments, and may include a minimum revenue guarantee by GoK.

a) Rironi-Mau Summit Highway Road A8 Section (176km)

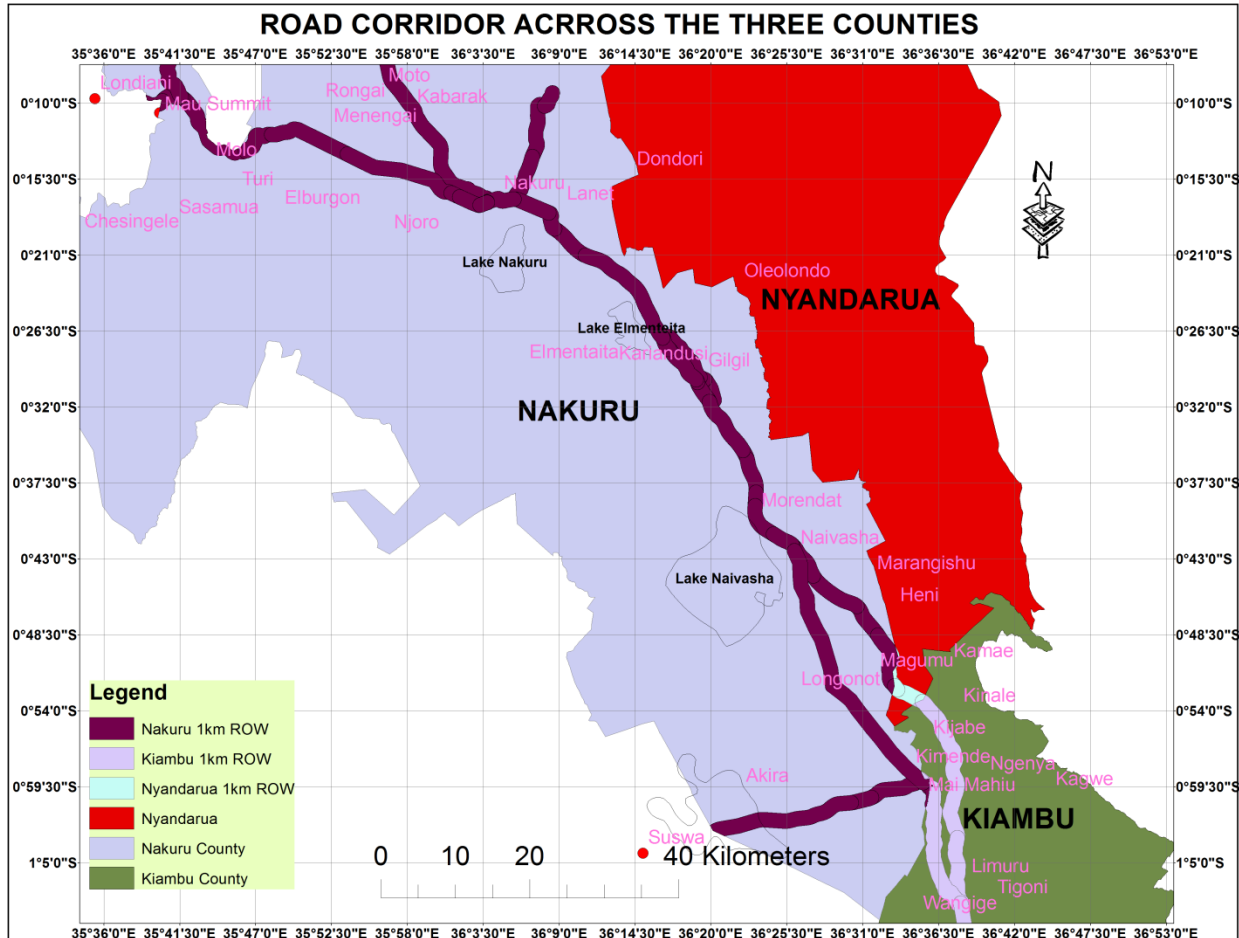
Development, Operation and Maintenance of Nairobi-Nakuru Highway under the envisaged PPP program of GoK, consists of Class A8 Category Road which is located majorly in Kiambu and Nakuru Counties and partly in Nyandarua County of Kenya. It has an approximate length of 176km from Rironi all through to the junction at Mau Summit (approx. 50 km beyond Nakuru Town). The project road starts at (x) coordinates 236820.65, (y) 9874606.05 (Arc_1960_UTM _zone_37S) and ends at (x) 799767.25 (y) 9982461.45 (Arc_1960_UTM _zone_36S). The project road has bitumen surface all through and connects various centers along the way as well as other towns. As indicated above, this section of the Northern Corridor starts in Nairobi at Rironi, which marks the end of the existing dual section of the Nairobi–Nakuru road (altitude of 2,280 meters above sea level) and approximately 35 km North West of Nairobi’s Central Business District. The route bears a northerly direction past Limuru Township over a bridge ascending to an altitude of 2,480 meters at the Kijabe Escarpment on the eastern rim of the Rift Valley. From Kijabe, it takes a northwesterly direction to Kinungi in Nyandarua County, before descending to Naivasha at the bottom of the Rift Valley (km 90) with an altitude of 1,900 meters. It bypasses Gilgil Township and traverses Nakuru Town (km 158), which has a population of 260,000. The road continues in a northwesterly direction to Salgaa truck stop and market, and climbs to Mau Summit on the western rim of the Rift Valley (about km 211). The road is located mainly in Kiambu and Nakuru counties with only a small portion located in Nyandarua County.

b) Kamandura – Mai Mahiu – Narok A-8 South Road 58km

A8 South Road also called Kamandura – Mai Mahiu – Narok Road starts from Rironi to Naivasha using Rironi Interchange and passes through rolling terrain open fields till Km 3.400 after which it travels through hilly terrain of Great Rift Valley and Ngubi forest zone/Kikuyu Escarpment forest zone till km 18.300. Heavy truck movements are observed in this stretch due to which a lot of pavement distress, rutting and potholes are also observed. From Km 18.800 to Km 20.400 the alignment passes through the built up section of Mai Mahiu town. At Km 19.750 B3 road takes off towards south west to Narok town Narok Junction and the alignment towards Naivasha is taken through C88 (Old Naivasha road). C88 (Old Naivasha Road) transits through plain terrain with few stretches of rolling terrain in between and horizontal geometry is impeccably straight with scarcer curves at few locations. The alignment generally passes through open lands till Km 53.00 having fewer settlement of Longonot Town between Km 34.000 to Km 35.000. From Km 54.000 to Km 57.180 the alignment passes through the thickly built up Naivasha Town and joins back to Km 59.000 of A104 main alignment through Naivasha Interchange. The roadway configuration from Km 0.000 to Km 19.750 of B3 Road and Km

19.750 to Km 55.000 of C88 Road is 2 lane with paved shoulders and at km 55.000 the two lane road transits to 4 lane divided carriageway section with median varying from 5m-10m this portion of the road is called Moi south lake road. There is an existing roundabout at Km 55.950 at the entry of the Naivasha town.

Figure 0-1. Map of Project Highway Routing



Legal and Policy Framework

A number of legal and institutional framework in Kenya including international conventions which GoK has ratified apply to this proposed highway project. These are outlined below and the implementation of the project must comply with these statutory provisions.

Box 0-1. Legal Framework

- Constitution of Kenya
- Water Act
- Land Act
- Environment Management and Coordination Act
- Wildlife Management and Conservation Act

- Forest Act
- Occupational Safety and Health Act
- Physical Planning Act
- National Land Commission Act
- Labor Act
- County Government Act

World Bank Policies and Procedures

This RFP stage ESIA has been developed in accordance with World Bank’s OP. 4.03 which is a policy that aims to facilitate Bank financing¹ for private sector led economic development projects by applying environmental and social policy standards that are better suited to the private sector, while enhancing greater policy coherence and cooperation across the World Bank Group. The assessment has adopted the eight IFC Performance Standards adopted by the Bank as the World Bank Performance Standards for Projects Supported by the Private Sector (“WB Performance Standards”) for application to Bank support for projects (or components thereof) that are designed, owned, constructed and/or operated by a Private Entity (as defined below), in lieu of the World Bank’s safeguard policies (“WB Safeguard Policies”).² The project will apply the World Bank Group Environmental, Health and Safety (EHS) Guidelines which are designed to assist clients with relevant industry background and technical information.

Project Features and Design

Intercontinental Consultants and Technocrats (ICT) was hired by Private Public Partnership (PPP) Unit of the National Treasury as the Transactional Advisor (TA) to prepare feasibility study documents for the proposed expansion of the Nairobi-Mau Summit Highway Project. Below are key design features of the proposed highway expansion.

Box 0-2 Summary of Project Features

- Rehabilitation and upgrading to 4-Lane Road with geometric improvement and six lane structures.
- Capacity Augmentation from 4-Lane to 6-Lane highway as per augmentation

¹ In this OP, unless the context requires otherwise, the term: (a) “Bank” means IBRD and IDA (whether acting in its own capacity or as administrator of trust funds funded by other donors); (b) “WB Group Entity” means IFC or MIGA (or both); and (c) “financing” means any loan, credit, or grant made, or any guarantee issued, by the Bank from its resources or from trust funds funded by other donors and administered by the Bank, or a combination of these.

² See, Proposed Adoption and Application of World Bank Performance Standards for Private Sector Projects Supported by IBRD/IDA; June 26, 2012; R2012-0130; IDA/R2012-0161. The IFC Performance Standards which comprise the WB Performance Standards can be found at [www.worldbank.org/safeguards]. IFC’s “Policy on Environmental and Social Sustainability” and IFC’s “Access to Information Policy” are not Bank policies and are therefore not included in the WB Performance Standards. While the Guidance Notes and Interpretation accompanying the IFC Performance Standards are similarly not Bank policies, and therefore not included in the WB Performance Standards, they may be consulted for good practice guidance. For purposes of this OP, the World Bank Safeguard Policies comprise the following: OP/BP 4.00, Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank-supported Project, OP/BP 4.01, Environmental Assessment, OP/BP 4.04, Natural Habitats, OP 4.09, Pest Management, OP/BP 4.10, Indigenous People, OP/BP 4.11, Physical Cultural Resources, OP/BP 4.12, Involuntary Resettlement, OP/BP 4.36, Forests, OP/BP 4.37, Safety of Dams, OP/BP 7.50, Projects on International Waterways, and OP/BP 7.60, Projects in Disputed Areas.

schedule/plan for each homogenous sections.

- Construction of new semi-rigid pavement and improving existing road by overlay with asphalt concrete/bituminous concrete and surface dressing.
- The provision of service road /slip road near town stretches.
- Provision of climbing lane at steep gradient locations based on prevalent standards.
- Provision of protection work as metal guard rail and breast at high embankments and escarpment locations.
- Improvements of major and minor junctions at grade level.
- Construction of interchange in major junctions
- Provision of flyover cum viaduct of 2.6 km length in Nakuru Town
- Construction of wildlife and livestock crossing points
- Establishment of workers' accommodation camps
- Establishment of construction operation sites
- Establishment of material sites
- Construction of culverts
- Construction of overpasses
- Construction of bridges
- Construction of underpasses
- Construction of road furniture,
- Construction of pedestrian facilities,
- Construction of bus bays and shelters,
- Construction of truck lay-byes,
- Construction of street lighting and high mast lighting facilities
- Construction of gantries
- Construction of gabions
- Landscaping

Project Activities

The design, construction and operation activities associated with the proposed highway expansion project are described below to the possible extent known and based on the feasibility study report. Additional activities may be included by the private concessionaire during the preparation of the detailed design report.

Activities during pre-construction

- a) **Feasibility Study Design:** - Feasibility study has been undertaken for this project by ICT who are the Transactional Advisors (TA) for this project recruited by Public Private Partnership (PPP) Unit through the Infrastructure Finance Public Private Partnership Project (IFPPP) through International Development Association (IDA) loan to the Government of Kenya. The feasibility study report is the basis for the preparation of this RFP stage ESIA document.
- b) **Detailed Study Design:** - The future private concessionaire will prepare a detailed design of the proposed project which may vary albeit not significantly from the feasibility study

design already prepared and will equally update this RFP stage ESIA report to detailed design ESIA.

- c) **Acquisition of Right of Way:** Prior to commencement of construction activities, the concessionaire will have to possess the Right of Way (ROW), through a site hand over which will be facilitated by KeNHA and the respective county governments where the highway passes. KeNHA has the Right of Way on all the alignment, and only 4.6 acres of land acquisition are planned for the interchanges. An RFP stage Resettlement Action Plan (RAP) report has been prepared and has identified locations where land take for the interchanges will be required. It also spells out compensation measures/entitlements and the livelihood restoration process for the Project Affected Persons who are physically and economically displaced as a result of the project.

- d) **Obtaining Necessary Permitting Requirements:** A number of environmental and social permitting requirements will be required to be obtained by private concessionaire for this project as per the statutes of the Government of Kenya before the construction commences.

Activities during construction

Key activities during the construction of the road including equipment and construction material is presented to the extent known and is subject to change depending on final methodology that will be adopted by the private concessionaire. Activities during the construction of the highway will include among others: -

Box 0-3. Construction Activities

- Clearing and grubbing
- Excavations
- Mounting
- Fine Grading
- Aggregate Base
- Asphalt Paving
- Installation of culverts, via ducts, interchanges
- Installation of road furniture (lighting, guard rails, road markings)

Box 0-4. Road Construction Equipment

Equipment Type

- Graders
- Mechanical Spreaders
- Trucks
- Multi Tyer Rollers
- Asphalt Paver
- Dozers
- Rollers
- Excavators
- Water Tankers

- Mixers (concrete and pulvi)
- Hot Mix Plant
- Batching Plant

Box 0-5. Construction Materials

- Bituminous Materials
- Soil
- Aggregates
- Portland cement concrete
- Admixtures
- Pavement marking materials
- Structural steel
- Stone
- Sand
- Boulders
- Course Aggregate
- Earth

Activities during operation of highway

- a) **Use of highway:** During the operation phase of the project, the completed highway will be open for motorized and non-motorized traffic.

- b) **Maintenance:** In order to preserve the project road, a proper maintenance mechanism supported with adequate fund is highly desirable; otherwise the road asset will be deteriorated to considerable extent, resulting in heavy losses. Routine and periodic maintenance of the road is proposed over the 30-year concession period. Road maintenance activities include includes patch repairs, crack sealing, edge repair, cleaning of road side drains/cross drainage structures, repairing of shoulders, painting of road signs and km stones, turfing, road markings, removal of litter, debris, replacement of damaged signs and maintenance of culverts, etc. and also operation of maintenance cost of toll plaza equipment.

Project Risks and Impacts

The expansion of the Nairobi-Mau Summit highway will lead to environmental and social risks at different phases of its development. In general, the environmental and social risks are likely to be moderate in terms of significance, temporary/short term in terms of duration and reversible in nature (especially construction phase risks and impacts), and low in severity, because KeNHA has the Right of Way along all the existing road alignment, and only 6.4 acres of land have to be acquired for the interchanges. Most risks and impacts are avoidable and mitigatable through the application of good design and construction management practices for Toll Roads. Permanent impacts include those related to human, livestock and wildlife crossings. In the determination of risks as summarized below, a 15km buffer zone on either side of the Right of Way (RoW) was considered as the project foot print in order to establish a wide area of influence and thereby effectively identify and predict direct and indirect risks and impacts.

a) Barrier Effect on Wildlife Movement

The proposed expansion of the highway traverse areas where wildlife is known to exist. Wildlife cross the existing highway along various points in search of pasture and the expansion of the highway which will include erection of medians and barriers for safety purposes will block the movement of the wildlife from one side of the highway to the other and hence adversely affect them.

b) Barrier Effect of Livestock Movement

Along the highway in certain areas, the local communities especially the Maasai rear livestock which graze on both sides of the road. Especially in Eburru area near Gilgil, the presence Maasai communities has been observed and they use the current ROW to graze livestock. The proposed highway expansion including installation of median and barriers for safety reasons, will block livestock from grazing on either side of the highway which is likely to lead to conflict between the Maasai and the project. In addition, the Maasai also cross the road with their livestock in search of water and pasture especially during the dry seasons of the year.

c) Water Quality Risks

Poor design of the road and culverts in the highway sections crossing rivers and are likely to adversely impact on the water bodies, wetlands and aquatic species through pollution, sedimentation effects or hydrological disruptions. The highway crosses 7 permanent rivers in Kiambu and Nakuru Counties which is home to Critically Endangered species, and qualifies for Tier 1 Critical Habitat.

d) Induced Access Risks and Impacts

New or upgraded roads frequently facilitate unsustainable use of natural resources through making human access easier. In the Marula-Kigio-Soysambu area, bush-meat poaching is largely carried out near the existing A8 highway (KWS, pers. comm) as this allows poachers to make a speedy getaway.

e) Invasive Species Risks and Impacts

Road-building activity can promote the spread of invasive in a number of ways, e.g. by providing them a foothold in disturbed ground where they tend to flourish, by bringing in seeds or propagules with building materials, or by moving them to new sites through earth-moving operations.

f) Land Acquisition and Involuntary Displacement Risks

This expansion of the Nairobi-Mau Summit Highway will lead to impacts and risks associated with land use and land-based livelihoods during construction. Potential impacts include:

- Physical displacement;
- Economic displacement;

Physical Displacement

- The proposed expansion of the highway will not acquire land for the expansion because the project routing is aligned on the existing Right of Way (ROW) and the additional land acquired for expansion (80 metres) on either side of the highway is within KeNHA's ROW and not on private or communal. Land will however be required for the

interchanges which are outside of the ROW. A total of 4.6053 acres of land will be required for the interchanges. The construction of other project components including associated facilities are also likely to lead to land acquisition for instance workers' accommodation camps, construction sites, material sites (borrow pits, quarry sites). The locations of these other components of project are not yet determined and will be identified by the private concessionaire and therefore this ESIA and RAP is unable to determine the risks associated with land acquisition.

Socio-Economic and Displacement

- Loss of Trees /Perennial Crops: The project will lead to the loss of trees
- Loss of structures: A total of 1,621 temporary and 301 permanent structures will be lost
- Loss of Graves: 2 graves will be affected as a result of the project
- Loss of Communal Facilities: 1 water borehole will be affected as a result of the project
- Loss of livelihood opportunities by informal traders on the ROW
- Loss of access or restricted access to grazing areas on the ROW by the Maasai community

Construction related impacts

The construction of the highway will lead to the typical construction related impacts associated with highway construction including: -

Table 0-1. Construction Risks and Impacts

Construction Risks and Impacts
Noise Pollution Risks
Air Pollution Risks
Water Quality and Supply Risks
Occupational Health and Safety Risks
Risks related to Community Health and Safety
Labour and Working Condition Risks
In-Migration Risks
Workers Accommodation Risks
Traffic Management Risks
Biodiversity Risks
Waste Management Risks

Operation Related impacts

The operation of the highway will lead to increased vehicular traffic and impacts associated with same including: -

Table 0-2. Increased Vehicular Risks and Impacts

Construction Risks and Impacts
Noise Pollution Risks
Air Pollution Risks

Water Quality and Supply Risks
Occupational Health and Safety Risks
Waste Management Risks
Vehicular and pedestrian related accidents

Stakeholder Consultations

In the development of this document, stakeholders³ were identified and mapped and meaningfully consulted with a view of ensuring that their views, perceptions and concerns with regards to the proposed highway expansion are documented and used in environmental and social risk minimization. Consultations of stakeholders began during the preparation of the feasibility stage ESIA by the TA which has been incorporated in this RFP stage ESIA. Further consultations with stakeholders will occur once this document is completed which will be consulted upon through prior disclosure to stakeholders before meaningful engagement in line with Free Prior and Informed Consultations (FPIC) requirements. This document will be re-disclosed once consulted upon with issues emerging from the consultation of the document reflected into the final disclosed version. In addition, the concessionaire will be required to develop a robust stakeholder engagement and communication plan for consultations and communication with all identified stakeholders, including IPs (as necessary).

Environmental and Social Management Programs

This RFP stage ESIA has identified several Environmental and Social Management Programs which are mandatory and must be developed by KeNHA and Private Concessionaire institutions at different stages of the project (design, construction and operation) as indicated in table 0-3 below in order to avoid, minimize, mitigate or compensate for the risks and impacts identified.

Table 0-3. Environmental and Social Management Programs

Item	Basis (PS requirements)	Description	Deadline
E&S monitoring and oversight system	PS1	<p>KeNHA will establish and maintain, throughout the duration of the concession, an E&S monitoring and oversight system that will:</p> <ul style="list-style-type: none"> • Ensure that concessionaire, EPC and O&M contractors and their subcontractors are in compliance with the requirements of the Performance Standards, ESAP, and requirements under the national law • Establish and maintain, throughout the duration of the concession, adequate institutional E&S capacity and competency for monitoring and oversight of E&S issues the concession / PPP • Concessionaire will ensure that identification of locations for project facilities to be purchased or leased done in compliance with World Bank OP4.12, where applicable, and are informed by community-level consultations. • Incorporate a grievance mechanism (GM) at the level of the government to ensure transparency and accessibility for raising complaints and concerns for Affected Communities and with a clear interface and division of responsibilities with the concessionaire’s GM • Provide for regular reporting to the WB on the E&S performance of the concession / PPP <p>As part of its monitoring program, KeNHA will engage an Independent E&S Consultant to:</p> <ul style="list-style-type: none"> • Review compliance with the E&S obligations of the concessionaire under the WB guarantee • Report the outcomes of the review and present all areas of compliance and non-compliance and, where applicable, advise on corrective measures to be undertaken by the relevant party, define a timeline for their completion and report when completed • Review, the E&S impact studies, the ESMS and related plans/procedures prepared by the concessionaire or contractors before starting of operations • Semiannually during the time of construction activities and annually for the time the guarantee is effective, review compliance of the concessionaire, contractors, and subcontractors with requirements of the Performance Standards and the ESAP • Specifically review the implementation of the E&S mitigation programs and plans/procedures, and undertake independent verification field monitoring as needed • Review and analyze the functioning of the Grievance Mechanism at KeNHA and concessionaire level 	Before effectiveness of the guarantee
Baseline study on wildlife crossings and agreement to ensure connectivity between natural habitats on both sides of the road	PS6	<p>Commission a study to confirm (i) viability for expansion of existing wildlife crossing; (ii) exact locations of proposed wildlife crossings (especially the two proposed overpasses for large mammals), (iii) exact design parameters for all wildlife crossings to be constructed or modified. The study will, among other sources, take into account Kenya Wildlife Service (KWS) report dated November 2017, unless more recent relevant KWS data becomes available. The report must establish the baseline for monitoring of wildlife populations, and more specifically, those for which the area qualifies as Critical Habitat under PS6 in in order to ensure adequate monitoring of compliance with PS6 requirements for achieving net gain.</p> <p>KeNHA will create an obligation on the concessionaire, through contractual clauses, to design, construct and maintain the identified wildlife crossings as part of the concession.</p>	Before effectiveness of the guarantee

		KeNHA will also facilitate engagement between KWS and private land owners (in particular, Soysambu, Kigio, and Marula ranches) regarding connectivity of habitats on both sides of the road in order to assure effectiveness of the wildlife crossings in achieving PS6 requirements (specifically those for no net loss and/or net gain).	
Study on IP migration corridors	PS7	KeNHA to commission a study on Masaai migration corridors to determine the patterns for crossing the road with livestock as part of their normal grazing patterns to confirm locations of livestock crossings and other necessary actions to increase effectiveness of such crossings in mitigating impacts on IPs to be implemented by the concessionaire as part of project design. KeNHA will consult and agree with the Maasais on the proposed livestock crossing sites.	Before effectiveness of the guarantee
Project's Environmental and Social Management System (ESMS)	PS-1: Assessment and Management of Environmental and Social Risks and Impacts	<p>Develop and implement policies and procedures for identifying and managing environmental and social risks including through an Environmental and Social Management System (ESMS), which will be an umbrella system to include:</p> <ul style="list-style-type: none"> • E&S policy statement approved by concessionaire's senior management • Sub-management plans at the concessionaire level (as identified below) • Sub-management plans at the contractor level (as identified below) • Internal Monitoring • Record-keeping • Compliance Reporting (as part of ESMS) • Procedures for oversight of EPC and O&M contractors and their subcontractors, including clear E&S performance criteria • Clear assignment of the concessionaire and contractors E&S responsibilities • Independent Audits (Construction and Operations phases) <p>Concessionaire will implement the Project's ESMS for the life of the Project and will provide notice to KeNHA prior to implementing any ESMS updates/revisions.</p>	Before financial close
Comprehensive Environmental and Social Assessment (ESIA)	PS1	<p>Prepare a comprehensive ESIA that will follow the principles of PS1 and:</p> <ul style="list-style-type: none"> • Clearly identify project area of influence based on full scope of the concession (including project facilities, associated facilities, and cumulative impacts) • Establish and maintain a process for identifying the environmental and social risks and impacts of the project • Identify specific E&S risks and impacts using preliminary ESIA provided by KeNHA as the basis • Will be based on most recent environmental and social baseline data • Take into account the findings and conclusions of related and applicable plans, studies, or assessments prepared by relevant government authorities or other parties that are directly related to the project and its area of influence • Serve as the basis for preparing specific E&S management plans • Incorporate specific analysis on wetlands in the project area of influence order to determine potential presence (or absence) of Critically Endangered species that may be impacted by the project due to pollution of water sources, especially through drainage of untreated water into the hydrological network • In case ESIA confirms that the proposed location of a project is in the area where cultural heritage is expected to be found, concessionaire will establish and maintain, and require contractor(s) to establish and maintain provisions for managing chance finds in accordance with PS8. 	Before financial close

Stakeholder Engagement Plan (SEP), including Community Grievance Mechanism (Project-level)	PS1	<p>Develop SEP that will, at a minimum:</p> <ul style="list-style-type: none"> • Tailored to the characteristics and identified interests of the Affected Communities, including IPs • Include stakeholder mapping, disclosure, consultation, negotiation and partnerships, reporting to stakeholders, grievance redress, and community participation in project monitoring • Capacity for SEP implementation <p>As part of SEP, develop Project's Community Grievance Mechanism:</p> <ul style="list-style-type: none"> • Minimum of two (2) modes of communication between the Project and the public and a clear and accessible process for sensitization of stakeholders on GM design and application • Record-keeping • Requirement for EPC and O&M contractors to adopt Project's GM and extend it to sub-contractors (as part of contract clauses) 	Before financial close
Traffic Management Plan	PS4	Concessionaire will prepare traffic management plan that will detail traffic, parking, and pedestrian management techniques to mitigate anticipated negative impacts. The plan will, at a minimum, take into account disaster risk management and measures for reduction of road accidents / fatalities through cost-effective measures to integrate this aspect in project design and operation	Before start of operational phase
Security Assessment and Plan	PS4	Concessionaire will prepare, and require contractor(s) to adopt and implement, a Security Assessment and Plan to include a statement that guards will be vetted before they are employed, and monitored and trained in use of force. Contractors will be required to provide worker code of conduct so that workers do not access unsafe areas, have in place policies on appropriate use of force, and include provisions for managing relations with public security forces.	Construction and operation phases
Biodiversity Management Plan (BMP)	PS6 - Biodiversity Conservation and Sustainable Management of Living Natural Resources	<p>Biodiversity Management Plan will take into account findings of the ESIA and the screening study conducted by the World Bank in January 2018, and address, at a minimum:</p> <ul style="list-style-type: none"> - Measures to be taken to ensure compliance with Performance Standard 6 for no net loss and net gain for biodiversity values identified in the project area of influence - Responsibilities for constructing and managing overpasses and underpasses as identified by KeNHA and provide support to managing connectivity agreements reached with private land owners - Avoiding or minimizing natural habitats / forest loss within the right of way to ensure proper application of the mitigation hierarchy to the final project design. This may, among other things, include application of micro-siting technique on order to reduce natural habitat loss - put in place measures, as technically and financially feasible, for improving connectivity for small animals (such as culverts); these measures must be particularly suitable for species for which the area qualifies as Critical Habitat under PS6 	Before financial close
Indigenous Peoples Plan(s) (IPP(s))	PS7	<p>Prepare an IPP in accordance with the Indigenous Peoples Planning Framework (IPPF) prepared by KeNHA, that will, at a minimum: (i) identify IP groups present in the project's area of influence (in particular Maasai and Ogiek); (ii) clearly state stakeholder engagement actions that will target IPs located in the project's area of influence; (iii) proposes mitigation measures commensurate with the impacts identified, if any, as part of preparing a comprehensive ESIA and that are within control of the concessioner; (iv) integrate livestock crossings into project design, in line with the requirements specified by KENHA based on the study of IP migration corridors; (v) specifies interactions with relevant authorities and other stakeholders.</p> <p>Where necessary, additional IPPs may need to be prepared when additional project facilities are identified</p>	Before financial close

		during the construction or operation of the project.	
Contractor Management Plan	PS1	<p>Prepare a Contractor Management Plan that will, at a minimum:</p> <ul style="list-style-type: none"> • Ensure that concessionaire, EPC and O&M contractors and their subcontractors are in compliance with the requirements of the Performance Standards, ESAP, and requirements under the national law • Integrate key risks and issues at the contractor level - as identified by the comprehensive ESIA - through requiring contractors to develop a clearly identified set of management plans at their level • In particular, concessionaire will ensure - through consistent oversight and monitoring - that, at a minimum, the following plans are prepared and adequately implemented by the contractor(s), compliant with the in line with Performance Standards and WBG EHS Guidelines: <ul style="list-style-type: none"> ○ Labor Recruitment Plan that provides an analysis on how the project will be staffed (number of workers in construction phase, ratio of local workers to migrant workers, direct recruitment versus agency) ○ HR Policy/ Manual compliant with Performance Standard 2 and national regulations (in languages accessible to workers), including adequate provisions on workers' organizations and worker grievance mechanism⁴ ○ Migrant Labor Management Plan (including both community-related aspects and migrant workers' protection aspects, such as adequate accommodation, and clear identification of locations and organization of worker / labor camps, as well as analysis and mitigation of all related impacts in line with Performance Standards) ○ Hazard and Risk Assessment and Management ○ Occupational Health and Safety Plan (including PPE, regular training, and other aspects in conformance with the World Bank Group EHS Guidelines) ○ Community Health and Safety Plan, including impacts associated with project vehicle traffic and access roads, noise, dust etc. ○ Hazardous Materials Handling Procedures ○ Waste Management Plan, emphasizing, among other aspects, handling of spoils from hill cutting ○ Monitoring procedures for air, water,⁵ and noise pollution ○ Emergency Preparedness and Response Plan ○ Clearing and Revegetation Plan ○ Erosion Control and Sedimentation Plan ○ Emissions Control Plan ○ Invasive plant management protocol compliant with Performance Standard 6 (in particular, for Opuntia) aimed at prevention of spreading them into areas in which they have not already been established.⁶ 	Before financial close

⁴

⁵ Concessionaire will ensure that contractors pay specific attention is paid to pollution monitoring with regard to lakes Naivasha, Elementaita, and Nakuru⁵ and measures are taken through application of good practices for construction management, in line with WBG Environmental, Health, and Safety Guidelines, to reduce / minimize contribution of the overall pollution of these water bodies through project construction and operation activities. Ramsar sites (Lakes Elementaita and Naivasha) and World Heritage Site (Lake Nakuru). Management plans for these sites must be taken into account.

⁶ Suggested best practice technique would be burning opuntia after removal.

		<ul style="list-style-type: none">• Concessionaire will ensure that contractor-level plans have clearly identified procedures for monitoring of construction works, including frequency; monitoring indicators; process for recording, escalating, and resolving non-compliance; responsible staff; detailed description of capacity for implementation, oversight and monitoring• Integrate tracking (i.e. recording incident statistics, including total work hours, lost time incidents, major injuries, fatalities, etc.) and prompt reporting of incidents and accidents• Require contractors to increase awareness about the availability of the workers' grievance mechanism among contractors and sub-contractors' employees• Provide for regular reporting by contractors to the concessionaire on E&S performance	
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Institutional Roles and Responsibilities

The proposed expansion of the proposed Nairobi-Mau Summit Highway Project encompasses several institutions who have diverse roles and responsibilities to ensure that environmental and social risks identified are managed through the mitigation hierarchy of avoid, minimize, mitigate and compensate. Table 0-4 below outlines these institutions and their respective roles and responsibilities during the different project phases.

Table 0-4. Environmental and Social Roles and Responsibilities

Institution	Mandate	Roles and Responsibilities
Kenya National Highways Authority	KeNHA is responsible for the management, development, rehabilitation and maintenance of National trunk roads comprising classes A, B, and C roads. KeNHA is the client for the Nairobi-Mau Summit Highway Project.	<p>KeNHA will establish and maintain, throughout the duration of the concession, an E&S monitoring and oversight system that will:</p> <ul style="list-style-type: none"> Ensure that concessionaire, EPC and O&M contractors and their subcontractors are in compliance with the requirements of the Performance Standards, ESAP, and requirements under the national law Establish and maintain, throughout the duration of the concession, adequate institutional E&S capacity and competency for monitoring and oversight of E&S issues the concession / PPP Concessionaire will ensure that identification of locations for project facilities to be purchased or leased done in compliance with World Bank OP4.12, where applicable, and are informed by community-level consultations. Incorporate a grievance mechanism (GM) at the level of the government to ensure transparency and accessibility for raising complaints and concerns for Affected Communities and with a clear interface and division of responsibilities with the concessionaire’s GM Provide for regular reporting to the WB on the E&S performance of the concession / PPP As part of its monitoring program, KeNHA will engage an Independent E&S Consultant to: <ul style="list-style-type: none"> Review compliance with the E&S obligations of the concessionaire under the WB guarantee Report the outcomes of the review and present all areas of compliance and non-compliance and, where applicable, advise on corrective measures to be undertaken by the relevant party, define a timeline for their completion and report when completed Review, the E&S impact studies, the ESMS and related plans/procedures prepared by the concessionaire or contractors before starting of operations Semiannually during the time of construction activities and annually for the time the guarantee is effective, review compliance of the concessionaire, contractors, and subcontractors with requirements of the Performance Standards and the ESAP

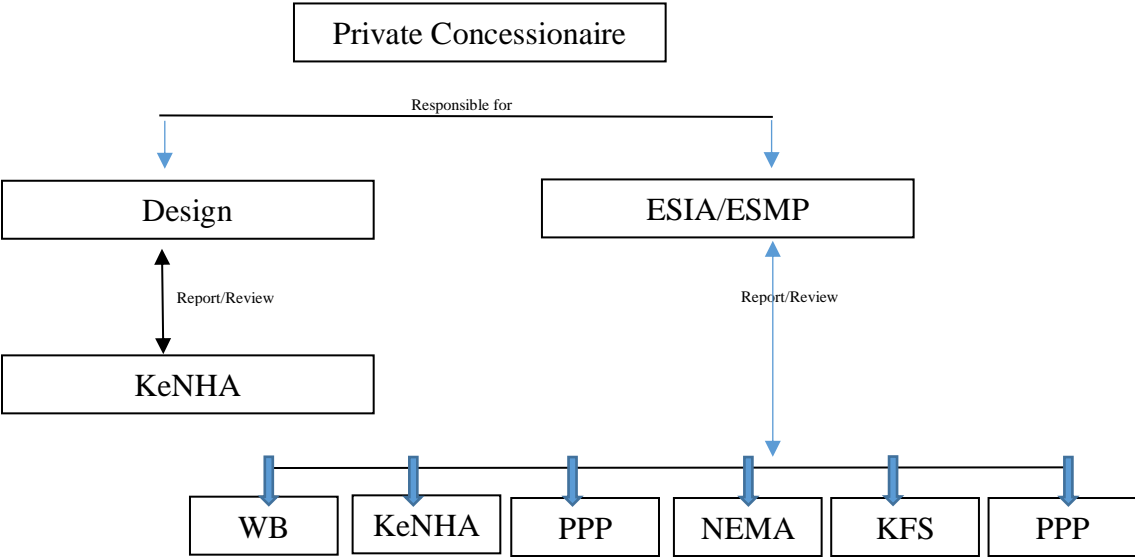
		<p>Specifically review the implementation of the E&S mitigation programs and plans/procedures, and undertake independent verification field monitoring as needed</p> <p>Review and analyze the functioning of the Grievance Mechanism at KeNHA and concessionaire level</p> <p>Commission a study to confirm (i) viability for expansion of existing wildlife crossing; (ii) exact locations of proposed wildlife crossings (especially the two proposed overpasses for large mammals), (iii) exact design parameters for all wildlife crossings to be constructed or modified. The study will, among other sources, take into account Kenya Wildlife Service (KWS) report dated November 2017, unless more recent relevant KWS data becomes available. The report must establish the baseline for monitoring of wildlife populations, and more specifically, those for which the area qualifies as Critical Habitat under PS6 in in order to ensure adequate monitoring of compliance with PS6 requirements for achieving net gain.</p> <p>KeNHA will create an obligation on the concessionaire, through contractual clauses, to design, construct and maintain the identified wildlife crossings as part of the concession.</p> <p>KeNHA will also facilitate engagement between KWS and private land owners (in particular, Soysambu, Kigio, and Marula ranches) regarding connectivity of habitats on both sides of the road in order to assure effectiveness of the wildlife crossings in achieving PS6 requirements (specifically those for no net loss and/or net gain).</p> <p>KeNHA to commission a study on Masai migration corridors to determine the patterns for crossing the road with livestock as part of their normal grazing patterns to confirm locations of livestock crossings and other necessary actions to increase effectiveness of such crossings in mitigating impacts on IPs to be implemented by the concessionaire as part of project design.</p>	
National Treasury	<p>Ministry of Finance (MoF) is spearheading the development of PPP in Kenya and is responsible for developing the legal, institutional, and regulatory framework for PPP programs. MoF is also responsible for the issuing of standardized PPP provisions and PPP Manual/Guidelines for effective management of PPP Projects.</p>	<p>-Make available financial resources for the compensations of Project Affected Households (PAHs) who are going to be physically and economically displaced as a result of the project.</p>	
Ministry of Transport and Infrastructure	<p>The Ministry of Transport and Infrastructure has the overall responsibility for the provision of an efficient road network in Kenya.</p> <p>The Ministry provides the regulatory framework, co-ordination, oversight, supervision, liaison with other state agencies and any services necessary for the smooth functioning of the roads sub-sector.</p>	<p>-The Ministry of Transport and Infrastructure will be responsible for requesting funds from the National Treasury for compensation of the Project Affected Households (PAHs) who are going to be physically and economically displaced as a result of the Project.</p>	
Public	Private	The key role of the PPPU is the	-The PPP Unit's environmental and social safeguards

Partnership Unit	coordination of policy implementation across the participating Ministries and Departments of Government. The PPPU manages donor relations in respect of the Policy, and provide a range of advisory and oversight functions.	advisor will provide oversight, review and support to KeNHA of all the environmental and social management risk documents prepared by the Private Concessionaire as stipulated in the Environmental and Social Action Plan (ESAP) including clearance of the documents prior to construction commencement. -During construction and operation, the PPP Unit will provide supervisory and monitoring role to ascertain compliance with the ESAP.
Private Concessionaire	Construction of the highway and operation and maintenance for a period of 30 years	-Develop detailed design for the project and ensure that environment and social aspects related to minimizing adverse impacts are integrated in the final detailed design -Develop and implement policies and procedures for identifying and managing environmental and social risks including through an Environmental and Social Management System (ESMS), which will be an umbrella system -Concessionaire will implement the Project's ESMS for the life of the Project and will provide notice to KeNHA prior to implementing any ESMS updates/revisions. -Prepare a comprehensive ESIA that will follow the principles of PS1 -Develop the various Environmental and Social Management Plans as outlined in this document and in the ESAP
Contractors and sub-contractors	Construction, operation and maintenance of the highway	-Meet all the impacts and risks obligations transferred by private concessionaire
National Environment Management Authority		-The principal role of NEMA in this project will be to review this bidding stage Environmental and Social Impact Assessment (ESIA) report and issue a license (EIA) for the project. -NEMA will also further review the final ESIA prepared by private concessionaire at the detailed design stage and issue EIA licence. -During the implementation of the project (construction and operation phase), NEMA will supervision and monitoring to ensure that the mitigation measures as specified in the ESIA are being followed and adhered to. -NEMA will issue improvement orders to contractors in the event that non-compliance to the ESAP is observed. -NEMA will review Environmental Audit reports submitted by private concessionaire during project implementation as required by the EIA/EA regulations (2003).
National Land Commission	-Independent government commission whose establishment was provided for by the Constitution of Kenya, 2010 to, amongst other things, manage public land on behalf of the national and county governments, initiate investigations into present or historical land injustices and recommend appropriate redress, and monitor and	-The National Land Commission will undertake compensation of all the Project Affected Households (PAHs) identified by the Resettlement Action Plan prepared for this project in accordance with NLC Act 2012. The National Land Commission (NLC) will be engaged in the project on matters related to land acquisition as a result of physical displacement and will facilitate the compulsory acquisition of all land to be acquired in accordance with the Land Act 2012.

	<p>have oversight responsibilities over land use planning throughout the country.</p> <p>-It was officially established under the National Land Commission Act, 2012.</p>	
National Museums of Kenya	<p>NMK is a multi-disciplinary institution whose role include being a repository for things that are of scientific, cultural and human value; Research and document natural and cultural heritage; promoting sustainable utilization of Kenya's heritage for development and information dissemination.</p>	<p>-NMK will review the Chance Finds Procedure and Cultural Heritage Plan prepared by the private concessionaire to determine the extent to which they have mitigation measures for protecting archeological and cultural sites and provide approval for these plans.</p> <p>-During the construction phase, NMK will be involved in the project by providing guidance when Chance Finds are encountered.</p>
Kenya Wildlife Service	<p>Conserve and manage national parks, wildlife conservation areas, and sanctuaries under its jurisdiction.</p>	<p>-KWS will review the designs of wildlife crossings prepared by the private concessionaire</p> <p>-Coordinate in undertaking monitoring of wildlife populations in the project corridor</p>
Kenya Forest Service	<p>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.</p>	<p>-Review biodiversity management plans prepared by private concessionaire to conserve the forest ecosystems within the vicinity of the road alignment and would be directly or indirectly affected by the project.</p> <p>-Undertake monitoring of forest ecosystems in the project corridor to determine any impacts</p>
Third party independent monitoring advisory firm of experts	<p>Responsible for supervision and monitoring of construction works and the other during operation of the highway.</p>	<p>-The independent experts will be responsible for supervision and ensuring compliance in engineering and works related as well as environmental and social risks.</p>
The Transactional Advisor	<p>Prepare feasibility studies for the Nairobi-Mau Summit Highway Project.</p>	<p>The role of the transaction advisor ceases upon financial closure. The TA role includes preparation of the feasibility study documents for the project</p>
World Bank/IFI	<p>Provide guarantee for the proposed project</p>	<p>Prepare Environmental and Social Action Plan (ESAP) document</p> <p>Review and provides written confirmation on Project's ESMS, ESIA Grievance Management, Stakeholder Engagement Plan among others on conformance to WB requirements</p>

Figure 0-2 below is a summary of all the institutions with roles related to environmental and social assessment, risks management and monitoring during project design, construction and operation.

Figure 0-2. Institutional Roles and Responsibility



KeNHA's Capacity for Environmental and Social Risk Management

KeNHA has a full-fledged Department in charge of managing environment and social risks headed by a Deputy Director with a staffing of 9 competent environmental and social specialists. The 9 full time staff possess graduate and post graduate qualifications in environmental and social management. KeNHA also engages short-term consultants to help in managing environmental and social risks of its projects. During implementation, the Authority will establish a Project Implementation Team (PIT), which will comprise full time senior environmental and senior social safeguards specialists to manage day to day environmental and social issues with respect to the project including monitoring and oversee the environmental and social performance of the private Concessionaire.

In view of fact that KeNHA does not have extensive experience in implementing projects that require application of OP. 4.03, a deliberate effort to build capacity of the environmental and social management specialists within the institution is proposed. Training and capacity building (short term) of KeNHA's staff is proposed including the development of a training program that is systematically thought through.

Supervision Monitoring Reporting

KeNHA has the overall responsibility for ensuring through supervision and performance monitoring that the private concessionaire manages the environmental and social risks as highlighted in table 0-3 above.

KeNHA will establish a Project Implementation Team (PIT) which will include 2 full time environmental and social specialists who will undertake routine monitoring of the performance of the private concessionaire. KeNHA will further require the private concessionaire and contractors to employ full time internal environmental and social specialists who will be the main focal point of contact between the two parties with respect to environmental and social risk mitigation.

KeNHA will expect the private concessionaire to submit quarterly progress reports of the environmental and social aspects of the project during the implementation phase. These reports will be prepared by contractors, submitted to private concessionaire for review before submission to KeNHA's Project Implementation Team where the full time environmental and social specialists will review these reports before sharing with other parties (financiers).

The private concessionaire will prepare and submit quarterly reports of the environmental and social aspects of the project during the implementation phase. KeNHA's Project Implementation Unit (PIU) environmental and social specialists will review these reports and thereafter, have the private concessionaire take corrective action in the event of non-compliance. Annually, in accordance with the Environmental Impact Assessment (EIA/EA) 2003 regulations, the private concessionaire will prepare Environmental Audit (EA) report for submission to NEMA for review and approval. These EA reports will be submitted to KeNHA for review prior to submission to NEMA.

As part of its monitoring program, KeNHA will engage an Independent Environmental and Social (E&S) Consultant to:

- Review compliance with the E&S obligations of the concessionaire under the WB guarantee
- Report the outcomes of the review and present all areas of compliance and non-compliance and, where applicable, advise on corrective measures to be undertaken by the relevant party, define a timeline for their completion and report when completed
- Review, the E&S impact studies, the ESMS and related plans/procedures prepared by the concessionaire or contractors before starting of operations
- Semiannually during the time of construction activities and annually for the time the guarantee is effective, review compliance of the concessionaire, contractors, and subcontractors with requirements of the Performance Standards and the ESAP
- Specifically review the implementation of the E&S mitigation programs and plans/procedures, and undertake independent verification field monitoring as needed
- Review and analyze the functioning of the Grievance Mechanism at KeNHA and concessionaire level

KeNHA will further hire 2 full time independent 3rd Party Monitoring Advisors (firms) who will also be responsible for monitoring the performance of the private concessionaire on a day to day basis. One firm will be hired to undertake independent monitoring during the construction period and the other during the operation of the highway. These firms will have full time environmental and social specialists who will monitor environmental and social performance of the private concessionaire and contractors as per the ESAP. The independent monitoring advisors will prepare monthly and quarterly reports on the implementation and management of environmental and social risks by private concessionaire and submit the same to KeNHA. The reports will detail their evaluation of the private concessionaire on environmental and social risks management, corrective actions needed including timelines for actions.

KeNHA will expect the private concessionaire to submit monthly progress reports of the environmental and social aspects of the project during the implementation phase. These reports will be prepared by contractors, submitted to private concessionaire for review before submission to KeNHA's Project Implementation Team.

Disclosure

This RPF stage ESIA report will also be disclosed by KeNHA in its website and shared with bidders. Hard copies will also be made available in KeNHA's office as well as the County and Sub County offices in Kiambu, Nakuru and Nyandarua. Additional stakeholder consultations are expected on this RFP stage ESIA document and therefore, the report will be submitted to the Bank for clearance and re-disclosed again upon the completion of consultations on this document. The World Bank will disclose a copy of the final report after consultations on its website. Concessionaire will prepare a comprehensive ESIA based on the final design and which will have consulted upon and submitted to the World Bank for clearance prior to the effectiveness of the guarantee (before works start).

Conclusions and Recommendations

This is a much needed project for the Government of Kenya and its citizens in view of the beneficial impacts it will have. Even though there are a number of risks and impacts identified, these are general construction risks that could be managed through application of the mitigation hierarchy and implementation of robust environmental and social management programs coupled with active supervision and monitoring by KeNHA.

The project is linear in nature, will be implemented in the RoW and will only acquire 4.6 acres of land for interchanges. In effect it has a small footprint thereby minimizing the impact footprint including displacement related impacts.

There are a number of project components whose locations are not known and will only be determined by the private concessionaire. These components have been highlighted above and could have adverse environmental and social impacts and will require studies to identify the associated risks once the locations are known.

There 15km buffer zone for the project interlinks with Key Biodiversity Areas (KBA) and Discrete Management Units (DMUs) with critically endangered species that could be impacted directly or indirectly by the proposed highway expansion. There is need for further baseline surveys and studies with respect to risks and impacts of the highway to determine the extent, type and condition of natural habitats within project foot print and targeted surveys to determine presence of critical habitats and long term monitoring of critically endangered species. Further, the proposed wildlife crossing points⁷ recommended by Kenya Wildlife Service (KWS) should be implemented and modified if necessary based on additional survey studies.

Where residual impacts on Natural Habitat or Critical Habitat-qualifying species cannot be completely avoided, quantification of losses and design of offsets to achieve no net loss of Natural Habitat and net gain of Critical Habitat is required.

Even though KeNHA has inherent capacity to manage the environmental and social risks in general including monitoring performance of the private concessionaire, it is noted that KeNHA's experience with implementation of Public Private Projects (PPPs) and specifically OP. 4.03 requirements is nascent and capacity enhancement through training and engagement of experienced consultants is recommended.

⁷ These are wildlife crossing points identified and recommended by Kenya Wildlife Service based on a detailed study.

1 CHAPTER 1. INTRODUCTION AND PROJECT DESCRIPTION

1.1 CONTEXT AND HISTORY

The Government of Kenya (GoK), has embarked on a strategic program to attract private investment in the infrastructure through Public Private Partnership (PPP) mechanism and to create an enabling environment for the same. To facilitate this program and to prepare a pipeline of financially viable PPP projects the GoK has received financing from the World Bank titled the Kenyan Infrastructure Finance and Public Private Partnerships Project (IFPPP).

Accordingly, the GoK, under the provisions of the PPP Act of 2013, represented by the Kenya Highways Authority (KeNHA), defined as the Contracting Authority (CA), with technical assistance from the Public Private Partnership Unit (PPPU) at the National Treasury, wishes to award the Project for the development, operation and maintenance of the Nairobi-Mau Summit A8 Highway (176 km) and strengthening of 57.8 km of the A8-South highway between Rironi and Naivasha via Mai Mahiu through competitive bidding under the PPP Act 2013 as a Concession Agreement to a Special Purpose Vehicle (SPV) to be created by a Private Concessionaire.

This Project forms a part of the Trans-African Highway (Northern Corridor), part of the main transport route serving East and Central African Countries through the Indian Ocean seaport of Mombasa. The concession agreement shall provide among others, specifications for the scope of work, provisions for tariff rate setting and adjustments, and may include a minimum revenue guarantee by GoK.

1.2 PROJECT PROPOSAL

The Contracting Authority's objective is to transfer development, operation and maintenance responsibilities of the Project to a private operator and assumes that the required costs for construction as well as operation and maintenance would be fully or to a large extent recouped with the proceeds of toll revenues and any associated commercial developments on either side of the road Right-of-Way (ROW). It implies that the scope of work for the envisaged PPP transaction

has to include the necessary facilities to collect tolls as well as the related operations of these facilities.

KeNHA is engaged in the development, operation and maintenance of highways and as part of this endeavor, KeNHA has decided to undertake widening, improvement and operation and maintenance of various sections of highway between Nairobi and Mau Summit through a Public Private Partnership arrangement on a Design, Build, Finance, Operate, Maintain and Transfer (DBFOMT) basis, which comprises of:(i) the widening of 175 km of the A8 highway between Rironi and Mau Summit for its development into a 4 (four) lane dual carriageway which shall be located on geographical cartesian coordinates between 236820 E, 9874600 S and 799770 E, 9982460 S and in the due course its further development into a 6 (six) lane carriageway in sections depending upon traffic volumes; and (ii) strengthening of 57.8 km of the A8-South highway between Rironi and Naivasha via Mai Mahiu (having geographical coordinates 232160

E, 9890640 S) which shall be located on geographical coordinates between 236820 E, 9874600 S and 213675 E, 9922860S (herein after referred to as the “Project Road”).

There are 3 interchanges, namely (i) B5/ Nyahururu Interchange delineated by latitude 0o16’37”S/ 0o17’02”S and longitude 36o05’08”E/ 36o06’02”E; (ii) Njoro interchange delineated by latitude 0o16’32”S/ 0o17’06.5”S and longitude 36o01’15”E/ 36o01’52.5”E; and (iii) Mau Summit interchange delineated by latitude 0o08’48”S/ 0o09’43.5”S and longitude 35o40’49”E/ 35o42’08”E, which are being constructed by KeNHA along the Project Road and shall form the part of the Project Road as the inherited stretches.

The route bears a northerly direction past Limuru Township over a bridge ascending to an altitude of 2,480 meters at the Kijabe Escarpment on the eastern rim of the Rift Valley. From Kijabe, it takes a northwesterly direction to Kinungi in Nyandarua County, before descending to Naivasha at the bottom of the Rift Valley (km 90) with an altitude of 1,900 meters. It by-passes Gilgil Township and traverses Nakuru Town (km 158). The road continues in a northwesterly direction to Salgaa truck stop and market, and climbs to Mau Summit on the western rim of the Rift Valley (about km 211). The road is located mainly in Kiambu, Nyandarua and Nakuru counties.

Rironi-Mau Summit Highway Road Section (176km)

Development, Operation and Maintenance of Nairobi-Nakuru Highway under the envisaged PPP program of GoK, consists of Class A Category Road (A104) which is located majorly in Kiambu and Nakuru Counties and partly in Nyandarua County of Kenya. It has an approximate length of 176km from Rironi all through to the junction at Mau Summit (approx. 50 km beyond Nakuru Town). The project road starts at (x) coordinates 236820.65, (y) 9874606.05 (Arc_1960_UTM _zone_37S) and ends at (x) 799767.25 (y) 9982461.45 (Arc_1960_UTM _zone_36S).

The project road has bitumen surface all through and connects various centers along the way as well as other towns. As indicated above, this section of the Northern Corridor starts in Nairobi at Rironi, which marks the end of the existing dual section of the Nairobi–Nakuru road (altitude of 2,280 meters above sea level) and approximately 35 km North West of Nairobi’s Central Business District. The route bears a northerly direction past Limuru Township over a bridge ascending to an altitude of 2,480 meters at the Kijabe Escarpment on the eastern rim of the Rift Valley.

From Kijabe, it takes a northwesterly direction to Kinungi in Nyandarua County, before descending to Naivasha at the bottom of the Rift Valley (km 90) with an altitude of 1,900 meters. It bypasses Gilgil Township and traverses Nakuru Municipality (km 158), which has a population of 260,000. The road continues in a northwesterly direction to Salgaa truck stop and market, and climbs to Mau Summit on the western rim of the Rift Valley (about km 211). The road is located mainly in Kiambu and Nakuru counties.

Kamandura – Mai Mahiu – Narok Road

B3 Road also called Kamandura – Mai Mahiu – Narok Road starts from Rironi to Naivasha using Rironi Interchange and passes through rolling terrain open fields till Km 3.400 after which it travels through hilly terrain of Great Rift Valley and Ngubi forest zone/Kikuyu Escarpment forest zone till km 18.300.

Heavy truck movements are observed in this stretch due to which a lot of pavement distress, rutting and potholes are also observed. From Km 18.800 to Km 20.400 the alignment passes through the built up section of Mai Mahiu town. At Km 19.750 B3 road takes off towards south west to Narok town Narok Junction and the alignment towards Naivasha is taken through C88 (Old Naivasha road).

C88 (Old Naivasha Road) transits through plain terrain with few stretches of rolling terrain in between and horizontal geometry is impeccably straight with scarcer curves at few locations. The alignment generally passes through open lands till Km 53.00 having fewer settlement of Longonot Town between Km 34.000 to Km 35.000. From Km 54.000 to Km 57.180 the alignment passes through the thickly built up Naivasha Town and joins back to Km 59.000 of A104 main alignment through Naivasha Interchange.

The roadway configuration from Km 0.000 to Km 19.750 of B3 Road and Km 19.750 to Km 55.000 of C88 Road is 2 lane with paved shoulders and at km 55.000 the two lane road transits to 4 lane divided carriageway section with median varying from 5m-10m this portion of the road is called Moi south lake road. There is an existing Roundabout at Km 55.950 at the entry of the Naivasha town.

1.3 PROJECT JUSTIFICATION

The Project is the expansion and improvement of the existing Nairobi-Nakuru-Mau Summit road. It is part of the A8 highway and of the Northern Corridor that connects the Port of Mombasa via Nairobi to Malaba at the border with Uganda and onwards to Kampala.

The Northern Corridor is the busiest and most important transport corridor in East and Central Africa, providing a gateway through Kenya from Mombasa Port via road, rail and pipeline to the landlocked countries of Uganda, Rwanda, Burundi, South Sudan and Eastern Democratic Republic of Congo. Current infrastructures are not able to accommodate the increasing traffic, leading the extended travel times and worsening road safety (575 people were killed between 2012 and 2014 according to police statistics).

The Kenya National Highway Authority (KeNHA) has thus undertaken to improve the road safety and quality, through a PPP scheme. A Private Concessionaire is expected to undertake widening, improvement, and operations and maintenance of the highway, which is separated into following segments: -

- Widening of 175km of the A8 highway between Rironi and Mau Summit and turning it into a four-lane dual carriageway, including operation and maintenance;
- Strengthening of 58km of the A8-South highway between Rironi and Naivasha, including operation and maintenance; and

1.4 Project Benefits

The benefits of the proposed road upgrades along the Project Road with required timely maintenance include: -

- a) **Savings in Vehicle Operating Cost**

As the road is proposed to be upgraded to dual carriageway and operation and maintenance for the entire appraisal period there are major savings anticipated in vehicle operating cost. It may also be noted that improvement of much worse road requiring higher investment, may yield much higher benefits to the road users in terms of higher savings in the VOCs as the incremental benefits of an improved road that would be higher compared to the bad state, if not timely maintained, it will cause more damage to vehicles besides consuming more fuel and leading to frequent break down, higher wear and tear of tyres, reduced level of vehicle and crew utilization, higher probability of road accidents, etc.

b) Travel Time Savings

There would be significant savings in the travel time to its users, mainly on account of increased speed, timely delivery of the commodities under transportation, probably reduced waiting time forgetting the transport for freight and passenger movement, higher utilization of vehicle and crew, etc. Improved road conditions would bring considerable time savings while travelling.

c) Improved Transport Infrastructure

Availability of reliable transport infrastructure and efficient transport services is an essential requirement for achieving goals of any development plan. It is a pre-requisite for initiation of any economic development process. Therefore, improved and well maintained road in the national road network of the country becomes more important for realization of benefits to the society. As the project road is part of Northern Corridor, the proposed road improvement will facilitate efficient transport of freight to and from Mombasa port. The proposed road improvement would also attract public and private investments in several areas of trading and commerce, accelerating economic development and diversification of the economy, etc.

d) Employment

Road upgrades and maintenance activities provide employment opportunities—directly and indirectly—to skilled as well as unskilled manpower primarily to local manpower. The employment opportunities may vary on the deployment of technological choices while undertaking the road improvement and maintenance activities, i.e. with different combinations of capital–labor options.

Improvement of the Nairobi-Nakuru-Mau Summit Road followed by yearly routine and periodic maintenance activities during the appraisal period would generate direct employment to skilled and unskilled workforce including women in the areas surrounding project road. The income, thus enhanced, of the local skilled and unskilled work force would also bring out a multiplier effect to other sectors of the economy.

e) Road Accidents and Safety Concerns

The proposed road upgrade includes provision of dual carriageway that will reduce likelihood of head-on collision of vehicles by great extent. Other proposed measures such as intersection improvements, improvement of road surface, provision of sealed shoulders, and removal of roadside hazards will help in reducing number of road crashes. Thus, reduction in number of fatal and severe injuries will add in the benefits likely to be generated by proposed improvement of Nairobi-Nakuru- Mau Summit highway. Current infrastructures are not able to accommodate

the increasing traffic, leading the extended travel times and worsening road safety (575 people were killed between 2012 and 2014 according to police statistics).

f) Tourism

It is a fact that Kenya has several places of tourist interest for the domestic and international tourists. The road would provide efficient and economic road transport infrastructure for the domestic and international tourists coming from various parts of Kenya as well as neighboring African and other countries of the world. This road is a part of national road network serving various major towns of Kenya and would help tourism industry to grow at higher rate. It is rather difficult to make estimation for the arrivals of tourists in future in the present analysis, as the level of tourism would depend on the overall development and plans for the tourism sub-sector and related infrastructure. However, the proposed improvement on the Project Road would provide economical, reliable and convenient transport infrastructure for any domestic and foreign tourists, which would, in turn, give boost to the tourism industry in general and also to establish additional hotels and resorts and other facilities of tourist attraction in particular.

1.5 RFP STAGE ESIA

The construction of roads is associated with adverse environmental and social risks and impacts and in effect, an Environmental and Social Impact (ESIA) assessment is necessary in order to anticipate and identify the adverse environmental and social risks and develop robust mitigation measures through application of mitigation hierarchy. This is therefore a Request for Proposal (RFP) ESIA which has been prepared based on the feasibility study report prepared by Intercontinental Consultants and Technocrats (ICT), who are the Transactional Advisors (TA) and is aimed at enabling project bidders (future private concessionaires) to among others: -

- a. Understand the risks and impacts of the project including ensuring that bidders fully understand their expected obligation with respect to environmental and social risks during the construction and operation phase of the project.
- b. Help bidders to undertake reliable financial cost estimates at this bidding stage with respect to environmental and social risks management during the construction and operation phase
- c. Help bidders clearly understand the changes expected from them during the development of detailed design with respect to avoiding, minimizing, mitigating or compensating for environmental and social risks e.g. wildlife corridor designs changes, wildlife corridor designs changes, culvert design changes etc. as highlighted in the environmental and social management programs.
- d. Help bidders clearly understand their environmental and social roles, responsibilities, accountability monitoring and reporting as Private Concessionaire through-out the project phases with including frequency to KeNHA
- e. Help KeNHA clearly understand the environmental and social roles and responsibilities accountability monitoring and reporting in the project and that of other stakeholders including KeNHA, Kenya Wildlife Service, National Environment Management

Authority (NEMA), Kenya Forest Service (KFS), National Land Commission (NLC) and World Bank.

ESIA Study Limitations

This RFP ESIA has been prepared against a backdrop of certain unknown project aspects which will only be known at the stage of preparation of detailed designs, a task of the future Private Concessionaire and therefore fails to analyse the risks associated with a number of key project components which will only be analysed at the detailed design stage when their designs, descriptions and locations are identified and confirmed by the private concessionaire.

Detailed risks associated with proposed project and impacts on biodiversity including natural and critical habitats, water courses and wildlife movement have not been analyzed and therefore include areas of further studies and surveys at the stage of preparation of the detailed design.

This RFP stage ESIA has not collected certain baseline information including water quality, noise and vibration quality, air quality and biodiversity baseline which will be collected and analysed during the completion of final RFP Stage ESIA for approval by the Bank.

This RFP stage ESIA has also excluded and not analyzed for reasons stated above the risks and impacts associated with the following components namely: -

- **Workers Accommodation Camps:** -The construction of the highway will attract workers who are estimated to be about 500 in number and will be accommodated in workers' camps. Construction of workers camps is associated with a number of social and environmental risks including displacement of communities, gender based violence, sexual exploitation and abuse, disease burden, especially increase in communicable diseases, destruction of flora and fauna, competition over resources between project workers and the host communities, cultural erosion (in-migration) among others. The locations of the workers' accommodation camps will be identified by the private concessionaire during the preparation of detailed designs and associated risks and impacts will be identified at that point in time. This document therefore excludes the analysis of risks and impacts associated with this component. Nevertheless, the Concessionaire will be required to prepare and implement a management plan acceptable to the Client, for avoiding, minimizing or compensating for risks associated with labour influx and abuse, disease burden, destruction of flora and fauna, competition and strain over resources,
- **Material Sites:** - Potential sites for (quarry and borrow sites) obtaining construction materials (stones, soil and gravel) have been identified by the TA who prepared the feasibility study. However, the private concessionaire will not be obligated to source materials from these sites and may identify own sites based on several factors. Borrow pits and quarries, are known to have potential adverse environmental and social impacts including destruction of flora and fauna, community health and safety risks, workers' safety, displacement of communities among others. The private concessionaire is expected to identify material sites during the phase of detailed design development and

consequently determine risks and impacts associated with the identified sites including mitigation measures. This document therefore excludes the analysis of risks and impacts associated with this component. The purchase of land for material sites is expected to be based on the “willing-seller-willing buyer principle. However, should potential material sites be located within Indigenous Peoples (IP) areas, the Concessionaire will be required to consult with the IPs through the free, prior and informed consultations principle, to ensure that they are not harmed in any anyway by such facilities.

- **Construction Sites:** - Construction of the highway will require the establishment of construction site (s) for operation purposes. The construction site is where among other batching plants, asphalt plants, hot mix, garages, offices and other infrastructures are located. Such sites are associated with activities that pose environmental and social risks and impacts including destruction of flora and fauna, community health and safety risks, workers’ safety, displacement of communities among others. However, the locations of the sites are unknown and will be identified by the private concessionaire and hence the associated risks cannot be determined at this point in the preparation of this document. This document therefore excludes the analysis of risks and impacts associated with this component. Nevertheless, when the impacts are identified, the Concessionaire will be required to develop environmental and community health and safety management plan that will stipulate how such risks will be avoided, minimized, mitigated or compensated.
- **Toll Stations:** - The construction and operation of toll stations along the highway will have potential environmental and social risks. However, their location and sizes are not known making it challenging for this document determine the risks and impacts associated with these structures. KeNHA is planning to engage an independent entity to construct and operate the toll stations and this entity once identified will be expected to identify locations for the stations and determine risks and impacts of the structures as well as mitigation measures. The proposed Toll Charging Points (TCP) are four in number and will be at Km 1+200 between Rironi and Mai Mahiu at Km 39+500 at Km 75+200 between Naivasha and Nakuru, and at Km 141+200 between Nakuru and Mau Summit.

1.6 PROJECT DESCRIPTION

The proposed Project is an expansion and improvement of an existing Nairobi-Nakuru-Mau Summit road. It is part of the A8 highway and of the Northern Corridor that connects the Port of Mombasa via Nairobi to Malaba at the border with Uganda and onwards to Kampala. The Northern Corridor is the busiest and most important transport corridor in East and Central Africa, providing a gateway through Kenya from Mombasa Port via road, rail and pipeline to the landlocked countries of Uganda, Rwanda, Burundi, South Sudan and Eastern DR Congo.

The A8 and A8 South road connections are unable to accommodate the ever-increasing traffic leading to extended travel times and worsening road safety. The slow moving heavy goods vehicles that do not have the power to maintain their speed in the hilly terrain, slow down the traffic which leads to dangerous situations upon overtaking. Average speed is rarely more than 60 km/hr which is below the desired level for an international standard highway. Between 2012 and 2014, 575 people were killed on the highway according to police statistics. The main risks

are lack of barriers, poor condition of vehicles, poor driving techniques and inclement weather.

To address these problems, the Government of Kenya (GoK), through Kenya National Highway Authority (KeNHA as the Contracting Authority) has undertaken to improve the road safety and quality, through a PPP scheme. Towards this end, the project has been designed under a 30-year Design Build Finance Operate Maintain Transfer (DBFOMT) arrangement. The total cost is estimated at about US\$700 million, to be financed by a private Concessionaire. The private Concessionaire, through a special purpose vehicle (SPV) is expected to undertake widening, improvement, and operations and maintenance of the highway, which is separated into following segments:

- a) Widening of 175km of the A8 highway between Rironi and Mau Summit and turning it into a four-lane dual carriageway, including operation and maintenance;
- b) Strengthening of 58km of the A8-South highway between Rironi and Naivasha, including operation and maintenance; and

The concession agreement shall provide among others, specifications for the scope of work, provisions for tariff rate setting and adjustments, and may include a minimum revenue guarantee by GoK.

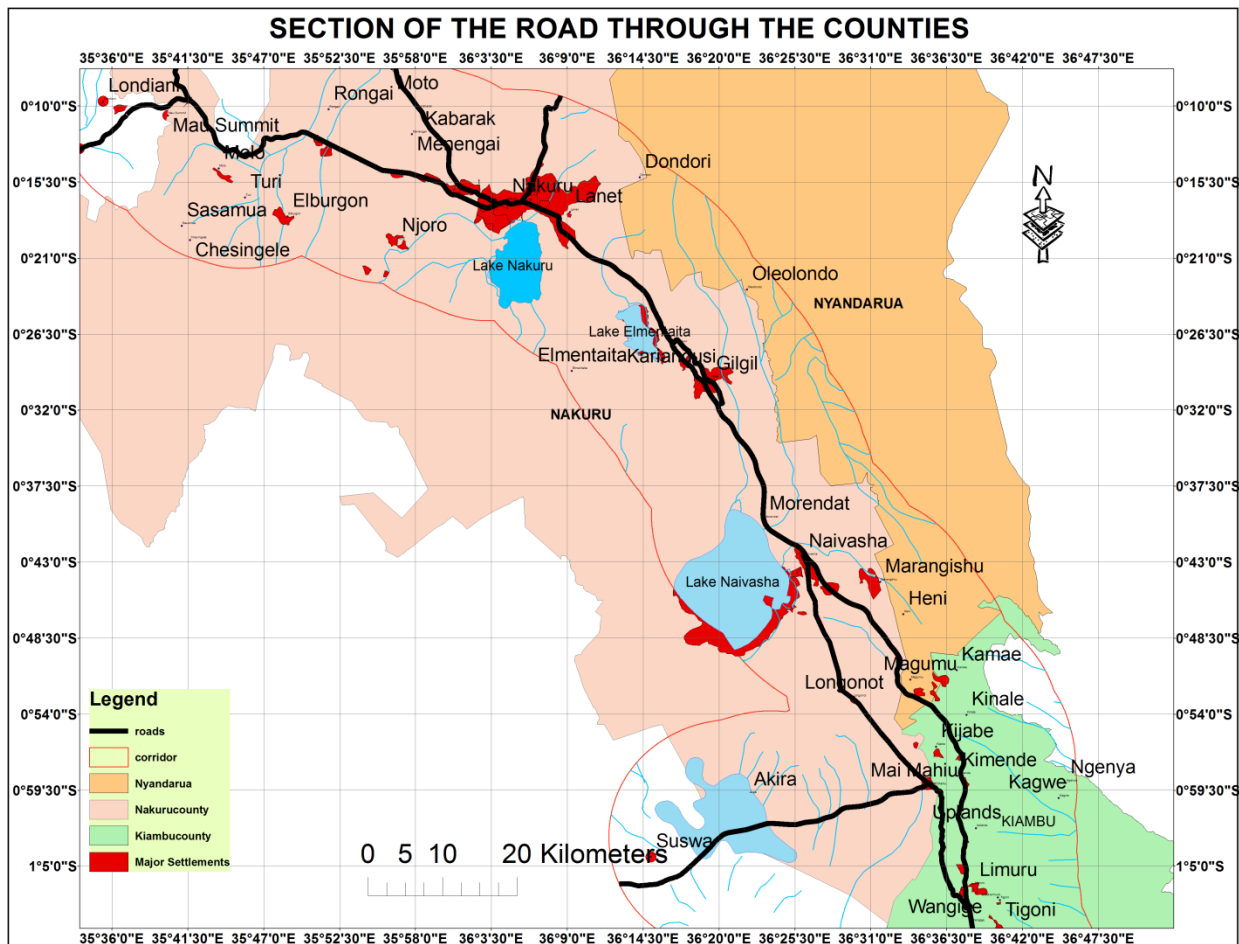


Figure 1-1. Map of Project Route

1.7 PROJECT FEATURES

The proposed highway expansion encompasses a number of features that are summarized in the box 1-1 below.

Box 1-1. Summary of Project Features

- Rehabilitation and upgrading to 4-Lane Road with geometric improvement and six lane structures.
- Capacity Augmentation from 4-Lane to 6-Lane highway as per augmentation schedule/plan for each homogenous sections.
- Construction of new semi-rigid pavement and improving existing road by overlay with asphalt concrete/bituminous concrete and surface dressing.
- The provision of service road /slip road near town stretches.
- Provision of climbing lane at steep gradient locations based on prevalent standards.
- Provision of protection work as metal guard rail and breast at high embankments and escarpment locations.
- Improvements of major and minor junctions at grade level.
- Construction of interchange in major junctions
- Provision of flyover cum viaduct of 2.6 km length in Nakuru Town
- Construction of wildlife and livestock crossing points
- Establishment of workers' accommodation camps
- Establishment of construction operation sites
- Establishment of material sites
- Construction of culverts
- Construction of underpasses
- Construction of overpasses
- Construction of bridges
- Construction of road furniture,
- Construction of pedestrian facilities,
- Construction of bus bays and shelters,
- Construction of truck lay-byes,
- Construction of street lighting and high mast lighting facilities
- Construction of gantries
- Construction of gabions
- Landscaping

1.8 PROJECT LOCATION AND FOOTPRINT

The project highway is located in Kenya and traverses the Counties of Kiambu, Nyandarua and Nakuru. The major sections of the highway to be expanded are mostly in the Counties of Kiambu and Nakuru.

1.8.1 Rironi-Mau Summit Highway Road Section

Development, Operation and Maintenance of Nairobi-Nakuru Highway under the envisaged PPP program of GoK, consists of Class A Category Road which is located majorly in Kiambu and

Nakuru Counties and partly in Nyandarua County of Kenya. It has an approximate length of 176km from Rironi all through to the junction at Mau Summit (approx. 50 km beyond Nakuru Town). The project road starts at (x) coordinates 236820.65, (y) 9874606.05 (Arc_1960_UTM _zone_37S) and ends at (x) 799767.25 (y) 9982461.45 (Arc_1960_UTM _zone_36S).

The project road has bitumen surface all through and connects various centers along the way as well as other towns. As indicated above, this section of the Northern Corridor starts in Nairobi at Rironi, which marks the end of the existing dual section of the Nairobi–Nakuru road (altitude of 2,280 meters above sea level) and approximately 35 km North West of Nairobi’s Central Business District. The route bears a northerly direction past Limuru Township over a bridge ascending to an altitude of 2,480 meters at the Kijabe Escarpment on the eastern rim of the Rift Valley.

From Kijabe, it takes a northwesterly direction to Kinungi in Nyandarua County, before descending to Naivasha at the bottom of the Rift Valley (km 90) with an altitude of 1,900 meters. It bypasses Gilgil Township and traverses Nakuru Municipality (km 158), which has a population of 260,000. The road continues in a northwesterly direction to Salgaa truck stop and market, and climbs to Mau Summit on the western rim of the Rift Valley (about km 211). The road is located mainly in Kiambu and Nakuru counties.

1.8.2 Kamandura – Mai Mahiu – Narok Road

B3 Road also called Kamandura – Mai Mahiu – Narok Road starts from Rironi to Naivasha using Rironi Interchange and passes through rolling terrain open fields till Km 3.400 after which it travels through hilly terrain of Great Rift Valley and Ngubi forest zone/Kikuyu Escarpment forest zone till km 18.300.

Heavy truck movements are observed in this stretch due to which a lot of pavement distress, rutting and potholes are also observed. From Km 18.800 to Km 20.400 the alignment passes through the built up section of Mai Mahiu town. At Km 19.750 B3 road takes off towards south west to Narok town Narok Junction and the alignment towards Naivasha is taken through C88 (Old Naivasha road).

C88 (Old Naivasha Road) transits through plain terrain with few stretches of rolling terrain in between and horizontal geometry is impeccably straight with scarcer curves at few locations. The alignment generally passes through open lands till Km 53.00 having fewer settlement of Longonot Town between Km 34.000 to Km 35.000. From Km 54.000 to Km 57.180 the alignment passes through the thickly built up Naivasha Town and joins back to Km 59.000 of A104 main alignment through Naivasha Interchange.

The roadway configuration from Km 0.000 to Km 19.750 of B3 Road and Km 19.750 to Km 55.000 of C88 Road is 2 lane with paved shoulders and at km 55.000 the two lane road transits to 4 lane divided carriageway section with median varying from 5m-10m this portion of the road is called Moi south lake road. There is an existing Roundabout at Km 55.950 at the entry of the Naivasha town.

1.9 PROJECT AREA OF INFLUENCE

The Nairobi-Mau Summit Highway project's area of influence includes and involves all the specifically identified physical elements, aspects, and facilities that are likely to generate environmental and social risks. The project area of influence is described below as screened using the Guidance Notes of PS 1 for this project and includes: -

- a) The entire project routing along the entire stretch of the road beginning from Rironi and terminating in Mau-Summit including the proposed road alignment and Right of Way (ROW), expansion and associated structures including proposed bridges, overpasses, underpasses, crossing points for livestock and wildlife, footpaths, etc.
- b) The forests, watersheds, settlements and archeological sites in the immediate vicinity of the project ROW all form part of the project area of influence. Along the project route natural forests ecosystems including Kikuyu Escarpment forest, Kinale forest, Koibatek forest, Mau forest complex, Mau-Narok Grasslands, Aberdare National Park, Kinango grasslands and conservancies (Marulla, Kigio, Soysambu, Kedong and Oserengoni) exist as well as surface water bodies (lakes and rivers) among them Lake Nakuru, Lake Naivasha and Lake Elementaita which are Protected Areas (PA), Important Bird Areas (IBA), World Heritage Sites (WHS) and Ramsar Sites. The permanent rivers which the highway crosses include River Molo, River Njoro, River Gilgil, River Malewa, River Kariandusi, River Mereroni and River Gaitamayu some of which have been noted to have critically endangered aquatic species. (Molo River). There are archeological sites including Kariandusi, Hyrax Hill and Mai Mahiu Catholic Church (Travellers Church) also within the 15km buffer and human settlements all which form part of the project's area of influence and are described in detail in chapter 4 (baseline description). The locations of other project components including workers' accommodation camp sites, material sites (quarry sites, borrow pits), batching and asphalt plant sites, water sources among others have not been identified and will be determined by the private concessionaire during the development of the detailed design. These also form the project area of influence and if and when known, the project area of influence will be re-defined accordingly by the private concessionaire.
- c) The project area of influence also includes locations where facilities to be owned and operated by private concessionaire and contractors will be established if and when the locations are determined and include among others, material sites, workers' accommodation camps, batching plants, asphalt plants, among others. The proposed sites for worker's accommodation, batching and asphalt plants are not known at this point in time and will be determined by private concessionaire which will lead to the refinement of the project area of influence.
- d) Facilities to be constructed by private concessionaire and contractors including diversions and access roads for the purpose of construction among others also form part of the project area and if and when locations are known, the project area of influence will be re-defined accordingly by the private concessionaire.
- e) Project area of influence for the Nairobi-Mau Summit highway also includes all the biodiverse resource areas and ecosystems (see b above) including floral and faunal

species identified therein along the project corridor and which are likely to be adversely affected by the project activities directly or indirectly during construction and operation phases. These ecosystems and biodiverse resources areas are described in detail in chapter 4 all which are likely to be indirectly or directly affected as a result of the project.

- f) Project area of influence also includes the Maasai community who are categorized as vulnerable and marginalized and are found along the project corridor within the 15km buffer specifically in Eburru in Gilgil area just after Naivasha Town where there is a settlement and in Nessuiet area near Longonot where there exists another settlement.
- g) All Associated Facilities⁸ also encompass the project area of influence. However, there are no associated facilities identified in this RFP stage ESIA.
- h) Cumulative impacts that will be experienced as a result of the project also encompass the project area of influence. Specifically areas where incremental contribution to gaseous emission which will be caused by the vehicular traffic during operation and construction of the project will be experienced, watersheds that are likely to experience reduction of water flows due interference with the hydrological flows or due to increases in sediment loads; sites where there are wildlife movements which will be interfered with as well as points where increased accidents due to increases in vehicular traffic on community roadways all form part of the project areas of influence. These locations have been identified in the baseline section of the report to the extent known. Any additional locations if and when identified by the private concessionaire will lead to the re-definition of project's area of influence.

1.10 PROJECT DESIGN, LAYOUT AND SIZE OF THE UPGRADED ROAD.⁹

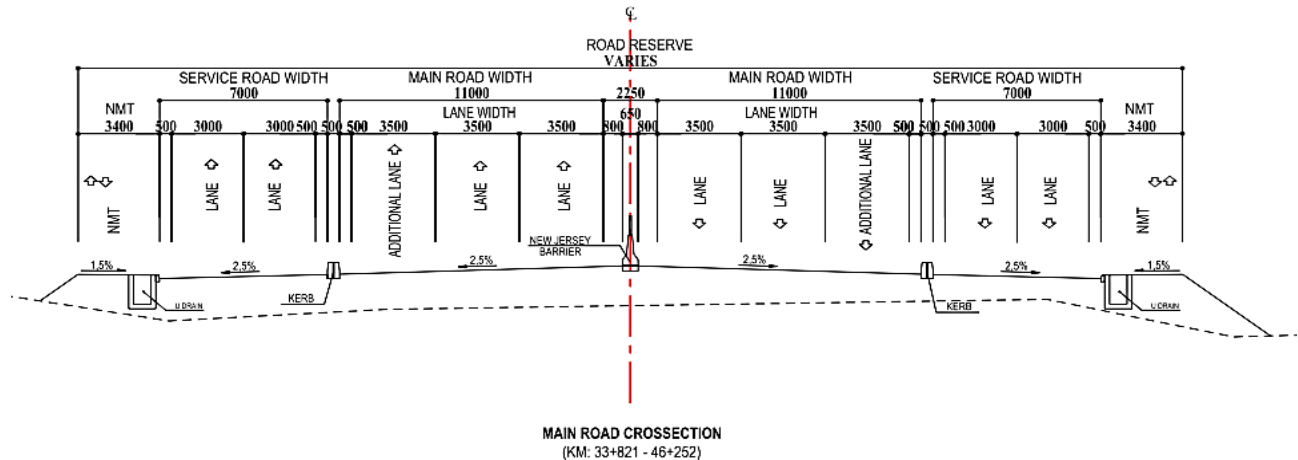
Preliminary design elements are established for the recommended scope of the project which includes:

1. Development, operation and maintenance of existing A104 from Rironi to Mau summit (174.94 Km)
2. Strengthening, operation and maintenance of B3/C88 from Rironi to Naivasha (57.18 Km) 4 Toll charging locations at Km 39.500, Km 75.200 and at Km 141.500 of existing A104 section and at Km 1.200 on B3 road.

Figure 1-2. Typical cross section

⁸ Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.

⁹ The exact alignment and location of interchanges may not be fully known until the concessionaire finalizes the design, in which case the process of more precise identification and impact analysis would become one of the items in the ESAP.



The proposed improvement involves addition of 1 lane (3.5 m) on either side, service road of 7.5 m on either side and 3.5 m track for non-motorised traffic.

Pavement Design

Table 1-2: Recommended Pavement crust for Gitaru – Rironi Section

Layer	Additional lane (outer lane 1)	Existing Pavement lane 2	Existing Pavement lane 3
Wearing course	200mm Unreinforced Concrete Slab (50 MPa)	50mm Asphalt Concrete	50mm Asphalt Concrete
Road-base		150mm Dense bitumen macadam	150mm Dense bitumen macadam
Anti-Crack		SAMI	SAMI
Upper Sub-base	150mm cement improved GCS to an E-Modulus of 2,500 MPa	150mm cement improved GCS to an E-Modulus of 2,500 MPa	150mm cement improved GCS to an E-Modulus of 2,500 MPa
Sub-base	200mm recycled asphalt pavement blended 50% / 50% with graded crushed Stone and 3.5% cement	200mm recycled asphalt pavement blended 50% / 50% with graded crushed Stone and 3.5% cement	200mm recycled asphalt pavement blended 50% / 50% with graded crushed Stone and 3.5% cement
Subgrade	300mm improved subgrade	Existing sub-base	Existing sub-base

*SAMI: Stress Absorbing Membrane Interlayer

Table 1-3. Estimated Traffic Class: T2

Pavement structure for Service roads	
Surfacing	Asphalt Concrete AC: 50mm
Base	DBM 125mm
Sub base	125mm Cement improved gravel to achieve a CBR of 160
Subgrade	Improved subgrade class S3 to 300mm thickness

Table 1-4: Schedule of Service Roads

Left hand Side			Right Hand Side		
No.	Km – km	Length (m)	No.	Km – km	Length (m)
1	36+100 – 39+900	3,800	6	33+700 – 34+900	1,200
2	42+350 – 42+700	465	7	41+500 – 42+000	635
3	42+856 – 44+500	1,700	8	42+800 – 43+030	245
4	44+500 – 45+600	1,100	9	42+900 – 45+650	1,950
Total		7,065	Total		4,030

Table 1-5: Proposed Vehicular Underpasses:

Vehicular Underpass Location			Comment
1	38+727	9.0 x 4.0 m	To replace existing 4 x 3.2m vehicular underpass after Muguga
2	44+305	9.0 x 4.0 m	To replace existing 4 x 3.2m vehicular

Table 1-6: Proposed Pedestrian Underpasses

Pedestrian Underpass Location			Comment
1	34+459	3.0 x 3.0m	To extend existing underpass after Gitaru I/C
2	39+536	3.0 x 3.0m	To extend existing underpass before Spencen I/C

Table 1-7: Proposed Overpass Bridges

Interchange Location	Km	Proposed	Existing Spans	New Spans
Spencen	40+206	New overpass bridge	n/a	21m + 21m

Table 7.10: Proposed Foot Over Bridges

No.	KM	Length
1	35+430	2 x 24m
2	36+140	2 x 27m
3	36+640	2 x 24m
4	37+425	2 x 24m
5	38+230	2 x 24m
6	41+570	2 x 24m
7	42+320	2 x 24m
8	43+160	2 x 24m
9	43+735	2 x 24m
10	44+810	2 x 24m

Table 1-8: Proposed Bus Bays

Left Hand Side		Right Hand Side	
No.	Km	No.	km
1	34+260	1	45+850
2	35+500	2	35+360
3	36+620	3	36+600
4	38+160	4	38+280

Left Hand Side		Right Hand Side	
5	38+890	5	38+980
6	39+680	6	39+640
7	41+140	7	41+350
8	43+300	8	43+250
9	44+050	9	44+040
10	44+880	10	44+680

1.10.1 Development, Operation and Maintenance of Existing A8 from Rironi to Mau Summit (176 Km)

The existing highway is mostly 2 lane with paved shoulders, 4 laning is carried out only in urban locations of Nakuru Town for approximately 16Km alignment design and upgrading includes improvements of geometrics, flattening the sharp horizontal curves and maintaining design speed of 100 km/h as per design standards. The centre line of project road is established in such a manner so as to have minimum acquisition of structures and land to avoid resettlement impacts and shifting of utilities.

The Project road is proposed to be upgraded to higher standards along with provisions for local and non-motorised traffic through service roads and cycle tracks and pedestrian facilities like footpaths and foot over bridges wherever necessary. Typical cross sections are developed as a guide for the development purpose and cost estimates. Capacity augmentation shall be carried out at stages to cater the traffic needs as per the capacity analysis carried out; Capacity augmentation plan is as indicated below:

Table 1-9: Capacity Augmentation plan for Widening of existing A104 from Rironi to Mau Summit

Description					Capacity Augmentation Plan			
Chainage		Homogenous section (HS)	From/to	Road Section	Length (Km)	2 lane to 4 lane	4 lane to 6 lane	6 lane to 8 lane
0.0	58.6	HS-1	Rironi to Naivasha	Existing A104	58.6	Immediately	by 2035	by 2045
58.6	114.4	HS-2	Naivasha to Lake Elementaita Road Intersection	Existing A104	55.8	Immediately	by 2035	by 2045
114.4	129.6	HS-3	Lake Elementaita Road Intersection to Njoro turnoff	Existing A104	15.2	Existing 4-lane	by 2030	by 2040
129.6	174.94	HS-4	Njoro turnoff to Mau Summit	Existing A104	45.34	Immediately	by 2040	Not Required

This Project road starts at Rironi at the beginning of approach to Rironi interchange's flyover

where the 4 laning section of urban A104 stretch ends. The existing road has 2 lane with paved shoulders of the carriageway width of 7.5m and 1.5 m wide paved shoulders from Km 0.000 to Km 114.300 after which it is 4 lane divided carriageway till Km 129.600 (end of Nakuru town). From Km 129.600 to Km 174.94 (End of Project road) it is 2 lane with earthen shoulders with climbing lane in between for achieving the grade compensation.

The widening proposal for the development of the existing alignment is prepared cautiously and decisions were taken upon the observation made on site and is kept mostly eccentric on to the side with minimum land impact details widening schedule is given in Table 1-10.

Table 1-10: Widening Proposal and TCS schedule

Sl. No.	Chainage (Km)		Length (Km)	Homogeneous Section	Widening Proposal for 2 lane to 4 lane			Widening Proposal for 4 lane to 6 lane
	From	To			Eccentric / concentric	Side	Applicable TCS Type	Applicable TCS Type
1	0.000	0.300	0.300	HS-1	-	-	-	-
2	0.300	2.200	1.900		Eccentric	Right	1B	12A
3	2.200	2.600	0.400		Concentric	-	1A	12A
4	2.600	3.000	0.400		-	-	-	
5	3.000	4.000	1.000		Eccentric	Left	1C	12A
6	4.000	5.100	1.100		Eccentric	Right	1B	12A
7	5.100	7.700	2.600		Concentric	-	1A	12A
8	7.700	8.200	0.500		Eccentric	Right	1B	12A
9	8.200	8.800	0.600		Concentric	-	1A	12A
10	8.800	9.300	0.500		Concentric	-	4A	12A
11	9.300	10.200	0.900		Concentric	-	1A	12A
12	10.200	11.600	1.400		Eccentric	Left	1C	12A
13	11.600	12.200	0.600		Concentric	-	1A	12A
14	12.200	14.800	2.600		Eccentric	Right	11	12B
15	14.800	17.000	2.200		Eccentric	Right	1B	12A
16	17.000	18.000	1.000		Eccentric	Left	4C	12A
17	18.000	20.000	2.000		Concentric	-	2A	12B
18	20.000	22.500	2.500		Concentric	-	4A	12A
19	22.500	23.100	0.600		Eccentric	Right	3B	12B
20	23.100	24.000	0.900		Eccentric	Left	3C	12B
21	24.000	24.650	0.650		Concentric	-	3A	12B
22	24.650	29.200	4.550		Eccentric	Left	3C	12B
23	29.200	29.700	0.500		Eccentric	Right	4B	12B

Sl. No.	Chainage (Km)		Length (Km)	Homogeneous Section	Widening Proposal for 2 lane to 4 lane			Widening Proposal for 4 lane to 6 lane	
	From	To			Eccentric / concentric	Side	Applicable TCS Type	Applicable TCS Type	
24	29.700	31.300	1.600	HS-1	Eccentric	Right	1B	12A	
25	31.300	32.100	0.800		Concentric	-	1A	12A	
26	32.100	32.300	0.200		Concentric	-	9	12A	
27	32.300	32.800	0.500		Eccentric	Right	2B	12A	
28	32.800	35.600	2.800		Eccentric	Right	11	12B	
29	35.600	36.800	1.200		Eccentric	Right	1B	12A	
30	36.800	37.600	0.800		Concentric	-	1A	12A	
31	37.600	39.000	1.400		Eccentric	Right	1B	12A	
32	39.000	40.000	1.000		Concentric	-	9/ (Toll charging locations Location as per Option-I)	12A	
33	40.000	41.500	1.500		Concentric	-	9	12A	
34	41.500	42.600	1.100		Concentric	-	2A	12A	
35	42.600	43.600	1.000		Eccentric	Left	1C	12A	
36	43.600	48.200	4.600		Eccentric	Right	10	12A	
37	48.200	49.050	0.850		Eccentric	Right	1B	12A	
38	49.050	49.900	0.850		Concentric	-	1A	12A	
39	49.900	50.400	0.500		Eccentric	Left	1C	12A	
40	50.400	51.000	0.600		Eccentric	Right	1B	12A	
41	51.000	52.500	1.500		Concentric	-	2A	12A	
42	52.500	53.000	0.500		Eccentric	Left	1C	12A	
43	53.000	53.600	0.600		Concentric	-	9	12A	
44	53.600	53.900	0.300		Eccentric	Left	1C	12A	
45	53.900	58.500	4.600		Eccentric	Right	2B	12A	
46	58.500	59.100	0.600		-	-	-		
47	59.100	60.000	0.900		Eccentric	Left	1C	12A	
48	60.000	66.000	6.000		Eccentric	Right	1B	12A	
49	66.000	73.500	7.500		Eccentric	Left	1C	12A	
50	73.500	74.700	1.200		Eccentric	Left	3C	12B	
51	74.700	75.700	1.000			Refer Toll charging locations Drawing			

Sl. No.	Chainage (Km)		Length (Km)	Homogeneous Section	Widening Proposal for 2 lane to 4 lane			Widening Proposal for 4 lane to 6 lane
	From	To			Eccentric / concentric	Side	Applicable TCS Type	Applicable TCS Type
52	75.700	77.000	1.300	HS-2	Eccentric	Left	3C	12B
53	77.000	79.800	2.800		Eccentric	Left	1C	12A
54	79.800	81.000	1.200		Concentric	-	9	12A
55	81.000	82.800	1.800		Eccentric	Right	1B	12A
56	82.800	83.600	0.800		Concentric	-	9	12A
57	83.600	84.100	0.500		Eccentric	Left	1C	12A
58	84.100	85.000	0.900		Eccentric	Left	2C	12A
59	85.000	86.000	1.000		-	-	6A	12A
60	86.000	86.500	0.500		Eccentric	Left	2C	12A
61	86.500	87.400	0.900		Concentric	-	1A	12A
62	87.400	88.800	1.400		Eccentric	Left	1C	12A
63	88.800	89.300	0.500		Eccentric	Left	2C	12A
64	89.300	89.800	0.500		Concentric	-	2A	12A
65	89.800	90.200	0.400		Eccentric	Left	2C	12A
66	90.200	91.850	1.650		Concentric	-	9	12A
67	91.850	92.500	0.650		Eccentric	Left	3C	12B
68	92.500	92.900	0.400		Concentric	-	3A	12B
69	92.900	94.800	1.900		Eccentric	Right	3B	12B
70	94.800	95.800	1.000		Concentric	-	9	12A
71	95.800	97.000	1.200		Eccentric	Left	4C	12B
-	97.000	98.000	1.000		Eccentric	Left	3C	12B
81	98.000	99.000	1.000		Eccentric	Left	9	12A
82	99.000	108.000	9.000		Eccentric	Left	1C	12A
83	108.000	109.000	1.000		Concentric	-	1A	12A
84	109.000	113.600	4.600		Eccentric	Left	1C	12A
85	113.600	114.900	1.300		-	-	6A	12A
86	114.900	121.800	6.900		Concentric	-	8A	12A
87	121.800	123.700	1.900		Concentric	-	8B	12A
88	123.700	127.800	4.100		Concentric	-	7B	12A
89	127.800	130.000	2.200	Concentric	-	7A	12A	

Sl. No.	Chainage (Km)		Length (Km)	Homogeneous Section	Widening Proposal for 2 lane to 4 lane			Widening Proposal for 4 lane to 6 lane
	From	To			Eccentric / concentric	Side	Applicable TCS Type	Applicable TCS Type
90	130.000	132.400	2.400	HS-3	Concentric	-	9	12A
91	132.400	142.200	9.800		Eccentric	Right	10	12A
92	142.200	147.600	5.400		Concentric	-	9	12A
93	147.600	148.600	1.000		Eccentric	Left	1C	12A
94	148.600	149.700	1.100		Concentric	-	9	12A
95	149.700	150.800	1.100	HS-4	Concentric	-	1A	12A
96	150.800	152.200	1.400		Concentric	-	4A	12B
98	152.200	154.000	1.800		Eccentric	Left	1C	12A
99	154.000	158.400	4.400		Concentric	-	9	12A
100	158.400	160.000	1.600		Eccentric	Right	3C	12B
101	160.000	165.400	5.400		Eccentric	Right	11	12B
102	165.400	166.800	1.400		Eccentric	Right	2B	12A
103	166.800	170.800	4.000		Concentric	-	3A	12B
105	170.800	171.500	0.700		Eccentric	Right	1B	12A
106	171.500	172.000	0.500		Eccentric	Left	1C	12A
107	172.000	174.940	2.940		Concentric	-	9	12A

1.10.2 Structural Improvement Proposals

As a part of cross drainage structures there are 4 minor bridges and 240 culverts (223 pipe culverts,

17 box culverts). All the existing minor bridges are proposed for structural rehabilitation and widening are given for 6 lane structure keeping in view of further lane augmentation. 1 minor bridge near Naivasha at Km 59.650 has to be replaced with a new 6 lane structure. Most of the pipe culverts are of 0.9 m diameter and are proposed to be replaced by 1.2 m diameter Hume pipe culverts and box culverts are to be rehabilitated and maintenance works has to be carried out for

improving its outflow capacities.

The Project road has 3 interchanges, 3 overpasses, 35 underpasses (pedestrian/cattle), 3 vehicular underpasses, 2 railway over pass and 4 railway under pass along with 1 foot over bridges which are proposed to be retained and widened along with major rehabilitation and repair works.

Elevated corridor for Nakuru town is one of the major structure proposal in the recommended option. 6 lane elevated corridor shall be built over the existing road to cater for the through

traffic and existing road under the elevated corridor to cater for the local traffic (reduced from 7.5+2 m carriageway on either side to 3.5+2 m carriageway on either side due to substructure on the median location). Typical cross section of the section is as shown below.

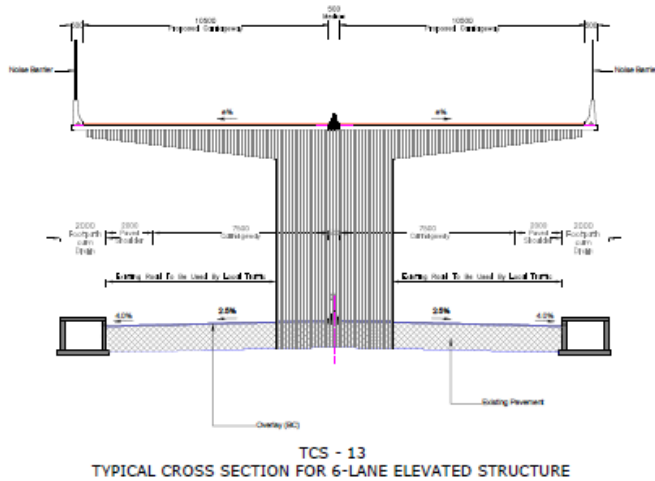


Figure 1-3. Cross section for elevated structures

1.10.3 Preliminary Pavement Design Pavement Design for recommended alignment option

Pavement design is carried out for recommended project scope i.e. widening of existing A8 from Rironi to Mau summit. While condition of the existing pavement of A8 is very good analysing the present condition of the pavement, the scope of pavement design comprises (i) strengthening of existing pavement of A8 by providing overlay and new construction in the proposed additional lane for main alignment (Existing A8 from Rironi to Mau summit).

Design Standards

The design standards followed are:

- Design Manual for Roads and Bridges – Pavement Design Manuals: Proposed Design for New and Reconstructed Bituminous, Gravel and Concrete Roads (2nd Draft – Oct, 2009).
- Guide to Pavement Technology Part 5 – Pavement Evaluation and Treatment Design (2011).

The design period of the pavement for the project road is proposed to be fifteen (15) years (2019-2034).

Vehicle Damage Factor

The VDF values adopted for the various directional considerations for the purpose of pavement design are adopted from the Traffic report and shown in **Table 1-11**.

Table 1-11: Adopted Vehicle Damage Factors

Vehicle type	Direction
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	Up	Down
LGV	0.70	0.15
MGV	1.32	1.25
HGV	2.18	2.09
MAV	13.67	6.57

Design Traffic

The Design Traffic has been estimated considering the above stated design standards, AADT enumerated in the Traffic Report based on original VDF, design period of 15 years and Vehicle Damage Factor (VDF) determined from the axle load data presented in the traffic report. The proposed road is dual carriageway with two-lanes in each direction. Thus, the lane distribution factor (LDF) is taken as 0.5 and a Directional Distribution Factor of 0.5 is adopted. Keeping the variability of the VDF data of the plying traffic in the Up and Down directions, the design traffic adopted for pavement design is considered different for either direction. The design traffic is summarized in Table 1-12

Table 1-12: Design Traffic for all Options

Homogenous Sections	From (Km)		To (Km)		Length (Km)	Design Traffic (MSA)	
						UP	DOWN
HS-I	Rironi	Km 0+000	Naivasha Interchange	Km 58+600	58.6	62	35
HS-II	Naivasha Interchange	Km 58+600	Start of Nakuru Town (Intersection of A104 with D320)	Km 114+400	55.8	92	48
HS-III	Start of Nakuru Town/Lanet	Km 114+400	End of Nakuru Town (Intersection of A104 with C57)	Km 129+600	15.2	109	59
HS-IV	End of Nakuru Town/Njoro turnoff	Km 129+600	Mau Summit	Km 174+900	45.3	83	43

Table 1-13: Design Traffic Classes

Homogeneous Sections	From (Km)		To (Km)		Length (Km)	Design Traffic (MSA)	
						UP	DOWN
HS-I	Rironi	Km 0+000	Naivasha Interchange	Km 58+600	58.6	T7	T6
HS-II	Naivasha Interchange	Km 58+600	Start of Nakuru Town (Intersection of A104 with D320)	Km 114+400	55.8	T7	T6
HS-III	Start of Nakuru Town/Lanet	Km 114+400	End of Nakuru Town (Intersection of A104 with C57)	Km 129+600	15.2	>T7	T6
HS-IV	End of Nakuru Town/Njoro Turnoff	Km 129+600	Mau Summit	Km 174+900	45.3	T7	T6

Pavement Composition

- i) New construction (widening areas/bypasses/new alignment, etc.)

The pavement composition for T7 and >T7 design traffic class is evaluated as per design chart provided in the Draft Design Manual (2009) and thus the recommended pavement composition for new semi-rigid pavement construction is included in Figure 1-4 below. For the T6 design traffic class, reference is drawn to the 2012 Feasibility Report. The pavement composition adopted is same as in the report.

- ii) Design of Overlay

For existing pavement composition for the entire project corridor along existing A104, reference is made to the 2012 report, whereby the existing pavement composition is indicated to be:

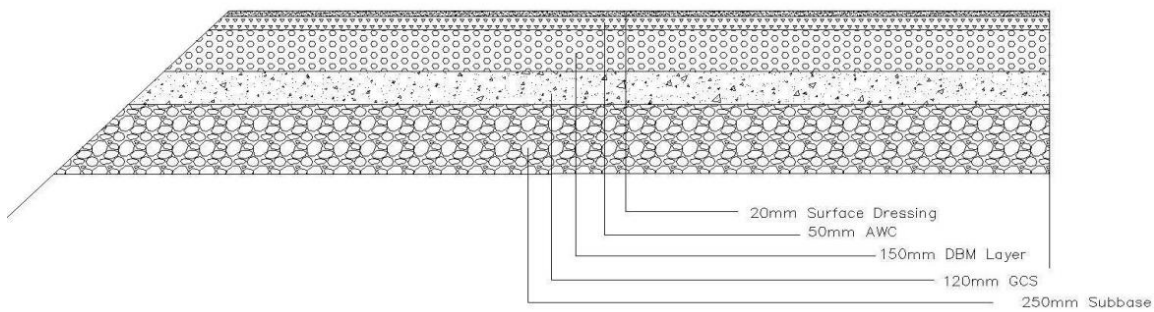


Figure 1-4: Existing Pavement Composition

As recommended in the Design Manual, Asphalt Concrete (AC) is considered to be used in the surfacing course of the pavement. Accordingly, AC overlay ($E = 4000$ MPa) is considered in the bituminous surfacing layer. The existing pavement layer is considered to exhibit $E = 3000$ MPa. For the overlay computation, the modulus value of the asphalt surfacing is taken as the weighted average of the existing layer and the new overlay.

Table 1-14: Recommended Pavement Composition

Traffic Homogeneous Sections	From (km)	To (km)	Length (Km)	Pavement Composition (New Construction), mm					Overlay Design, mm		
				Wearing Surface		Base	Inter layer	Sub-Base	Surface		
				Surface Dressing	Asphalt Concrete	Dense Bituminous macadam	Graded Crushed Stone	Cement Stabilized Sub - base	Subgrade	Type of Surface Dressing	Asphalt Concrete

Traffic Homogeneous Sections	From (km)	To (km)	Length (Km)	Pavement Composition (New Construction), mm						Overlay Design, mm	
				Wearing Surface		Base	Inter layer	Sub-Base		Surface	
				Surface Dressing	Asphalt Concrete	Dense Bituminous macadam	Graded Crushed Stone	Cement Stabilized Sub - base	Subgrade	Type of Surface Dressing	Asphalt Concrete
UP Direction											
HS-I	0+000	58+600	58.6	20	50	175	120	350	300	Single	25
HS-II	58+600	114+400	55.8	20	50	175	120	350	300	Surface dressing 10/14 mm	25
HS-III	114+400	129+600	15.2	20	50	175	120	350	300		25
HS-IV	129+600	174+940	45.3	20	50	175	120	350	300		25
DOWN Direction											
HS-I	0+000	58+600	58.6	20	50	150	120	250	300	Single	25
HS-II	58+600	114+400	55.8	20	50	150	120	250	300	Surface dressing 10/14 mm	25
HS-III	114+400	129+600	15.2	20	50	150	120	250	300		25
HS-IV	129+600	174+940	45.3	20	50	150	120	250	300		25

Extension of Pavement Design Life

The recommended pavement structure has been designed to carry the traffic estimated for 15 years

design period, which is the maximum period, a flexible pavement can be designed as per clause 2 of Road Design Manual Part III of Ministry of Transport and Communication, Kenya. While determining the recommended pavement crust, it is assumed that during 15 years of design period only ordinary maintenance will be carried out which will comprise shoulder and drainage system maintenance, erosion and vegetation control, localized patching and periodic re-sealing in the form of surface dressing or thin asphalt concrete as per pavement surface condition. This maintenance is essential and any shortcomings in that will seriously affect the pavement performance.

In order to extend the life of the recommended pavement beyond 15 years of design period, it will need to be strengthened in the form of overlay or partial reconstruction depending on the pavement condition at that time. In general, the design period for such overlay/partial reconstruction normally ranges between 7 to 15 years. In this case, the design period of the recommended pavement has been considered as 15 years and therefore its life can be extended

further for a maximum period of 15 years to cover the proposed concession period of 30 years.

1.10.4 Improvement Proposal of Major Junctions

Improvement proposal for all the major junctions are established upon the traffic projections of turning movement counts done and recognition of requirements by site inspection. Improvements are proposed for the existing interchanges and all other strategically important roads. The list of improvement proposals/junction treatments are given in Table 1-15.

Table 1-15: Improvement Proposals of Junctions

Intersection location (name of intersecting road)			Existing Intersection Type	Improvement proposal	Remarks
T1	0+000	Rironi (B3)	Partial Cloverleaf	Add loop and ramp in NW quadrant, geometric improvement of existing loop/ramps	
T2	2+800	Limuru	Partial Cloverleaf	Slip road connection to overpass to be provided.	LA may be difficult in SW quadrant
	5+900	Ngarariga Road	T-junction (at grade)	At-grade (channelized T-intersection Left-in Left-out)	
	6+500	Ngarariga Road	Overpass	Add loop in SE quadrant to facilitate RT from Ngarariga to Nairobi and Nakuru to Ngarariga. Add LT ramp in NW quadrant to facilitate Ngarariga to Nakuru movement.	
T3	9+100	Uplands (C65)	T-junction (at grade)	Flyover with slip roads	
	11+800	Rironi (Old A104 highway)	Four-arm junction (at grade)	At-grade channelized T-intersection Left-in Left-out on both sides	
T4	25+400	Gatundu – Kinale Rd (D938)	T-junction (at grade)	Short term: At-grade (channelized-T) till 2030. Long term: Flyover beyond 2030	
T5	30+700	Thika-Gatura Rd (C67)	T-junction (at grade)	At-grade (channelized T-intersection Left-in Left-out)	Right turn from proposed trumpet at 31+900
	31+900	Thika-Mangu Flyover (C66)	Flyover	Trumpet Interchange	
	35+300	Longonot road	VUP (4-arm junction)	Provide slip roads to existing VUP	
	36+700		VUP	Provide slip roads to existing VUP	
	53+700	Kenyatta Avenue (C67) in Naivasha town	T-junction (at grade)	Flyover with slip roads	
	57+100	Mbaria Kaniu Road	Overpass	Provide slip roads to existing overpass	
T6	58+600	Naivasha (C88)	Trumpet	No improvement	

Intersection location (name of intersecting road)			Existing Intersection Type	Improvement proposal	Remarks
T7	85+600	T7 Gilgil Rd (C77)	T-junction (at grade)	Trumpet Interchange	LA may be difficult
T8	114+400	T8 Elementaita Rd (D320)	Y-junction (at grade)	Flyover	
T9	116+700	C83	T-junction (at grade) left-in left-out	Flyover	
T10	121+700	Nyeri-Nyahruru (B5)	T-junction (at grade) left-in left-out	No improvement (Interchange under construction)	
T11	123+800	B4	T-junction (at grade) left-in left-out	Flyover/viaduct (covering rail line and roundabouts)	
	124+100	Mburu Gichua Rd in Nakuru town	Round about		
	125+500	Nakuru town road	Round about		
	126+400	Nakuru town road	Round about		
	127+800	Nakuru town road	Round about	No improvement	
T12	129+600	Njoro Rd (C57/C56)	T-junction (at grade)	No improvement (Interchange under construction)	
T13	166+400	Molo Rd	T-junction (at grade)	Short term: At-grade (channelized T-intersection) Long term: Flyover by 2035	
T14	174+900	T14 Mau Summit (B1)	T-junction (at grade)	No improvement (Interchange under construction)	

1.10.5 Road Users Facilities

Pedestrian Crossing Facilities

Pedestrian crossing facilities are provided at the urban locations where pedestrian crossings were observed along the project road. Foot over bridges are provided for the safety of the pedestrians crossing the project. The list is given below in Table 1-16.

Table 1-16: List of Proposed Foot over bridges

Chainage	Roadway configuration	Proposal	Location
29.400	4 lane + service road	New FOB	Near Thika Mangu flyover
42.000	4 lane + service road	New FOB	Kinungi

51.200	4 lane + service road	New FOB	Keroche
52.200	4 lane + service road	New FOB	Keroche
151.600	4 lane + service road	New FOB	Salgaa

The above provided locations are tentative and provisions may have to be made in the future stage of the project as per the minimum road user services provision drawn up in output specifications.

Bus Stops, Footpaths, Cycle Tracks

The locations of existing bus bays as provided in the inventory is proposed to be retained after the development of the existing highway. In addition to which bus bays has to be provided at all the prominent locations of urban settlements/major road crossings etc. Foot path and cycle tracks has been provided in the urban sections of Nakuru Town which are tentative and provisions may have to be made in the future stage of the project as per the minimum design provision drawn up in output specifications.

Lighting Facilities

Most of the project road passes through the rural areas and does not require any lighting facilities apart from some of the major intersections; however retro-reflective road furniture is to be provided all throughout the project road. Fewer sections of the project road pass through built up sections/urban locations for which lighting facilities are provided. It is therefore, proposed to provide street lighting in the following sections of the above roads which are passing through the Urban locations of Naivasha, Gilgil, Kikopey, Nakuru, Salgaa, Molo and Mau Summit.

Table 1-17: Street lighting for urban stretches

Sl. No.	From (Km)	To (Km)	Location	Length (km)
1	51.000	52.600	Near Naivasha	1.600
2	84.000	86.400	Gilgil	2.400
3	85.500	89.800	Kikopey	4.300
4	106.400	114.100	Nakuru	7.700
6	151.000	152.500	Salgaa	1.500
7	165.500	166.800	Molo	1.300
8	170.600	174.900	Mau summit	4.300
Total				23.100

Apart from the above locations all the grade separated structures will be provided with street lighting.

Provision of High Mast Lights

High mast lights are proposed at toll charging locations and at both the ends of elevated corridor.

Table 1-18: List of High mast lighting locations

Sl. No.	Chainage (Km)	Section	Number of High Mast lights	Remarks
1	6.600	Kerwa	2	Staggered Toll charging locations
2	75.200	Gilgil	2	Staggered Toll charging locations
3	141.500	Sobeo	2	Staggered Toll charging locations
4	124.100	Nakuru	1	Start of Elevated Corridor
5	127.800	Nakuru	1	Start of Elevated Corridor

The works shall consist of furnishing, installing, testing and putting into service a street lighting system comprising lighting poles, luminaires, cables with accessories and power supply including feeder pillars and photoelectric control and all necessary earthworks including excavation and backfilling, cable ducts, pull boxes, etc. The works also includes furnishing, installing, testing and commissioning of High Mast Lights in the selected junctions of the project road.

It is proposed to provide 10 m length G.I. octagonal poles in the central verge (median) of the roads which will be located at a distance of 35 m from pole to pole, with twin (double) arms of 1.5 m length for sections with median $\leq 5.0\text{m}$ and two separate pole with single arm of 1.5 m for sections with median $> 5.0\text{m}$. Each arm will be provided with 1x250 watts capacity luminaire of superior grade. The above arrangement is seen to deliver 30 lux of illumination on the carriageways of the roads. The foundations for the poles will be of R.C.C. with grade 20. Underground cables will be laid along the centre line of the median, connecting specified poles as per SLD to be submitted by the contractor. Power supply to the system will be through dedicated feeder pillars, fed by distribution transformers provided for different stretches of the roads.

High mast lighting with 20 m masts and HPSV fittings (400w & 250 W) have been proposed at selected locations. They will provide glare free quality light, designed for delivering 40 lux in the 45-m radius circle.

For materials and workmanship not covered by Kenyan law, standards, codes or regulations, the following standards shall apply, listed in order of priority:

- British standards and codes, in particular BS 5489 part 1 and BSEN 13201, all parts
- IEC recommendations
- Other national standards and codes subject to the Engineer's approval

Wildlife Crossings

The corridor crosses through some of the wildlife corridors and conservancies as given below for which wildlife crossings shall be provided and fencing is recommended to guide the animals to cross at the designated crossings. These wildlife crossings have been identified by the feasibility study consultant and have not been informed by further detailed studies by a biodiversity expert.

An independent biodiversity expert firm (The Biodiversity Consultancy) was engaged to

undertake critical habitat screening and the report together with the study undertaken by Kenya Wildlife Service (KWS) who also conducted independent studies on the same has proposed the same locations for wildlife crossing as is shown in chapter 6. As such, the wildlife crossing points proposed by KWS and The Biodiversity Consultancy firm will be the points considered for establishment of these wildlife access points.

3. Km 22.000 to Km 29.000 – Widening of the existing crossings have been proposed and the design covers for small mammals. Furthermore, the design also ensures the Gaitamayu Forest ecosystem and species not to be fragmented during operation.
4. Km 70.000 to Km 82.000 – Widening of the existing crossings have been proposed for the wildlife in this area. The structures cover for large herbivores (Zebras, Antelopes) and cats residing within the Kigio Conservancy and Soysambu Ranch.
5. Km 160.000 to Km 168.000 – Widening of the existing crossings have been proposed for small mammals, ecosystems and habitats linkages.

Table 1-19. List of Proposed wildlife crossings

Sl. No.	Chainage	Existing span arrangement of the structure	Proposed arrangement of the structure	Span of the	Improvement Proposal
1	22+750	1 X 9.5 X 5	1 X 9.5 X 5		Retain and Widening
2	25+250	1 X 4 X 4.5	1 X 4 X 4.5		Reconstruction
3	28+200	1 X 2.5 X 2.5	1 X 4 X 4.5		Retain and Widening
4	73+700	1 X 5 X 2.5	1 X 9.5 X 5		Reconstruction
5	74+000	1 X 2.5 X 2.5	1 X 9.5 X 5		Reconstruction
6	76+150	1 X 4 X 4.5	1 X 9.5 X 5		Reconstruction
7	78+500	-	1 X 9.5 X 5		New construction
8	79+600	-	1 X 9.5 X 5		New construction
9	163+000	-	1 X 5 X 2.5		New construction
10	165+000	-	1 X 5 X 2.5		New construction
11	167+500	-	1 X 5 X 2.5		New construction

Table 1-20. List of U-turn locations with approximate chainages to be provided on the A8 highway

Sl. No.	Chainage (Km)	Remarks
1	0.050	Existing Rironi Interchange
2	2.600	Existing Limuru Interchange
3	5.000	Existing Underpass
4	8.000	Proposed
5	9.100	Proposed
6	15.000	Proposed
7	16.900	Existing Underpass
8	18.400	Existing Underpass
9	22.750	Existing Underpass

10	25.350	Existing Underpass
11	31.900	Existing Underpass
12	35.300	Existing Underpass
13	36.700	Existing Underpass
14	40.400	Existing Underpass
15	45.150	Existing Underpass
16	48.200	Existing Underpass
17	50.100	Existing Underpass
18	53.700	Proposed
19	57.100	Existing Overpass
20	58.700	Proposed
21	65.425	Proposed
22	72.150	Proposed
23	78.875	Proposed
24	85.600	Proposed
25	92.800	Proposed
26	100.000	Proposed
27	107.200	Proposed
28	114.400	Proposed
29	116.700	Proposed
30	121.700	Interchange under construction at B5 Junction
31	124.100 to 127.800	Grade separated structure in Nakuru town
32	129.550	Interchange under construction at Njoro Turnoff
33	135.100	Proposed
34	140.650	Proposed
35	146.200	Proposed
36	151.750	Proposed
37	166.400	Proposed
38	174.940	Interchange under construction at Mau Summit

1.10.6 Road Safety Features

Proposed Retaining / Breast Wall Provisions

Some of the locations along the project highway have geological constraints/Right of Way restrictions for which brief assessment has been carried out for the locations of breast wall/retaining wall provisions.

Table 1-21: List of Proposed Retaining/Breast wall sections

Sl. No.	Chainage (Km)		Length (m)
	From	To	
1	13+000	13+900	900
2	14+300	14+900	600
3	34+000	35+000	1000
4	87+500	87+800	300
5	129+600	130+200	600
6	162+300	163+900	1600

Guard Rail/Crash Barrier Provisions

The guard rails/crash barriers are required to prevent the errant vehicles from moving from the carriageway to the road side in high embankments areas and also on the approaches of major cross

drainage structures. Based on the provision as prevalent in other countries of the sub Saharan region the guard rails have been proposed to be provided at the following locations.

- i) On high embankment (height more 3m)
- ii) On approaches of high level bridges
- iii) On deep valley locations

The lists of proposed guard rail locations are given below in Table 1-22.

Table 1-22: List of Proposed Guard Rail locations

Sl. No.	Chainage (Km)		Side	Length
	From	To		
1	2+725	2+575	BOTH	50
2	3+100	3+300	LHS	200
3	4+000		BOTH	10
4	4+250	4+350	BOTH	150
5	4+4950	5+050	LHS	50
6	4+775	5+025	BOTH	20
7	5+600	5+750	LHS	150
8	6+000		LHS	20
9	7+250		BOTH	20
10	7+450	7+550	BOTH	100
11	12+150	12+400	BOTH	150
12	12+600	13+900	LHS	1300
13	14+050	14+100	LHS	50
14	14+400	15+100	LHS	600
15	15+100	15+500	RHS	400
16	16+800	16+950	LHS	150
17	17+600	17+750	LHS	150
18	20+600	20+750	BOTH	150
19	21+000	21+250	BOTH	250
20	22+650	22+850	BOTH	200
21	25+600	25+800	BOTH	200
22	29+850	30+050	BOTH	200
23	33+700	35+400	LHS	1700

Sl. No.	Chainage (Km)		Side	Length
	From	To		
24	36+000	36+400	LHS	400
25	36+500	36+800	LHS	300
26	40+025	40+075	BOTH	50
27	40+400	40+800	BOTH	400
28	41+000	41+400	LHS	400
29	45+000	45+250	BOTH	250
30	48+150	48+300	BOTH	150
31	48+400	48+600	LHS	200
32	50+000	50+150	BOTH	150
33	52+450	52+550	BOTH	100
34	59+650	59+800	BOTH	150
35	64+600	64+700	BOTH	100
36	69+000	69+250	BOTH	250
37	87+050	87+400	BOTH	350
38	87+400	88+000	LHS	600
39	88+000	88+250	BOTH	250
40	90+150	90+250	LHS	100
41	91+950	92+000	BOTH	200
42	93+600	94+200	LHS	600
43	95+000	95+200	BOTH	200
44	95+600	96+300	BOTH	900
45	101+000	101+200	LHS	200
46	106+000	106+400	BOTH	400
47	116+000	116+350	BOTH	350
48	131+000	131+600	BOTH	600
49	132+100	132+500	BOTH	400
50	153+800	154+200	BOTH	400
51	157+400	157+800	BOTH	400
52	159+150	159+450	LHS	300
53	161+900	164+000	BOTH	2100
54	169+600	169+800	LHS	200
55	174+000	174+800	LHS	800

Road Furniture and Road Signs

Road furniture also forms an important consideration in the design of roads. A detailed study of the road has been done and safety measures like retaining wall/breast wall and crash barriers/guard rails. Road furniture shall include: -

- Directional informatory signs
- Regulatory signs
- Warning signs
- Road markings
- Road signs

Directional informatory signs have to be placed at the major crossings and gantries to be provided at all elevated structure locations. Regulatory signs priority signs, prohibitory signs and mandatory signs needs to be provided at suitable locations carrying out cautious road safety audit over the entire improvement alignment option. Road signs are the means of communication to the road users. Sharps horizontal curves, steep gradients, accident prone spots have to be identified and indicated to the road users by placing proper road signs at suitable locations. Manual for Traffic Signs in Kenya (Part 2) shall be followed for installing road signs at appropriate places along the Project road sections.

Road markings also guide the road uses and controls the traffic on highways. The markings serve as a psychological barrier and signify delineation of traffic path and its lateral clearance from traffic hazards for safe movement of traffic. Manual for Road Marking in Kenya (Part 1) shall be referred for design of road marking.

Retro reflective road studs to be provided as per international standards for lane marking and at the edge of the roadway at sharp curves which acts as a guide for vehicles travelling in night.

Delineator posts are to be provided at all the structure locations and at major junctions for cross road traffic. All the above provisions are considered in the costing as a per km cost of road furniture and road makings.

1.11 Other Project Components

There are other project components whose locations have not yet been identified and will be determined by the private concessionaire and therefore was not part of the feasibility study by ICT and equally not part of this risk analysis. These components will be funded by the project and are not considered to be associated projects but part of the project with the locations and designs still lacking. They include: -

- a) **Material Sites:** The construction of this road will require opening up of new quarries or using existing quarries as sources of materials. The materials commonly used in highway construction comprise of the following broad items: -
 - 1) Borrow materials like soil and gravel
 - 2) Quarry materials like hard stone metal (aggregates) and sand (fine aggregates)
 - 3) Manufactured materials like cement, steel, and bitumen
 - 4) Other construction materials like water fly ash, etc.

a) Borrow Area Soil

During the feasibility study, extensive survey was conducted to locate the potential source of borrow area soil required for the construction of embankment and subgrade. More emphasis was

made to identify such locations in the vicinity of the project road alignment within economical haulage on both sides of the project road. Based on reconnaissance survey and consultations with the contractors of the ongoing projects at Nakuru interchange and Mau-summit interchange, following locations were identified as potential sites for borrow areas. The details of the borrow areas and the lead distances are provided in Table 1-23 below. Of all the proposed borrow areas, the one located in Gilgil is of the most concern in terms of risks to the Maasai who are categorized as vulnerable and marginalized. Should this and any other site be confirmed for use during the construction phase, the concessionaire will be required to apply the free, prior and informed consultations principle in consultations with the Maasai to ensure that the use of such a site does not cause any harm to their livelihood strategies or culture.

Table 1-23: Locations of Borrow Area along project Road

Chainage (km)	Lead (km)	Side	Location
12.200	1.0	Left	Near Uplands
46.700	3.5	Right	Karai
59.650	3.0	Right	Naivasha
87.000	2.0	Right	Gilgil
128.850	5.0	Left	Nakuru
166.400	5.0	Left	Molo
170.400	2.0	Right	Koige
174.900	6.0	Right	Kamara

b) Stone Materials

Seven (7) stone quarries locations were identified as the potential source of coarse aggregates required for road construction, the lead distance from the project vicinity is found in the range from 1.0 KM to 50.0 Km. At Katani, on Nairobi – Mombasa road near Syokimau 5-7 number of crusher plants are available. The location and detail of the quarry is given in Table 1-24 below. The quarries are all licensed and existing material sites and do not require opening of new green fields.

Table 1-24: Locations of Quarry along project Road

Chainage (km)	Lead (km)	Side	Quarry Name	LOCATION
0.000	50.0	Left	M/s Tiptop	Katani
59.650	8.0	Left	M/s EMI Quarry	Naivasha
82.000	1.0	Left	M/s Marula Quarry	Gilgil
124.000	6.0	Right	M/s KR&SONS Quarry	Nakuru
128.850	13.0	Left	M/s PIAVE Quarry	Nakuru
128.850	13.5	Left	M/s Nyoro Quarry	Nakuru

174.900

20.0

Right

M/s Willams Quarry

Near Mau summit



Photograph 1-1: Quarry locations at Katani, near Syokimau on Nairobi – Mombasa Road



Photograph 1-2: Quarry at km 128.850

Photograph 1-3: Quarry at km 59.650



Photograph 1-4: Borrow Area at km 124.000

Photograph 1-5: Quarry at km 82.000

c) Sand

During the material survey, it was found that natural sand is not available within project road. Only available source of natural sand is from Machakos which is 85km lead from start of project road. All along the project road, crusher dust can be used in-place of natural sand.

d) Cement Suppliers

Ordinary Portland cement of Grade 42.5 manufactured by various manufacturers are locally available. Cement shall be conforming to KS 1725: 2001. During material survey, few cement factories were identified nearby the project area. List of factories are shown in Table 1-25.

Table 1-25: List of Cement factories available near the project road

Name of the Factory	Name of the City	Lead (km)
Bamburi Cement	Mombasa	500
East Africa Cement	Athi River	40
Lafarge Cement	Athi River	40
Savannah Cement	Athi River	40
Rai Cement	Awasi	280
Rhino Cement	Athi River	40
Simba Cement	Athi River	40

e) Bitumen

No source from where Bitumen can be obtained within the reasonable lead distance. As bitumen manufactures are not existing in the country, it will be imported from the neighboring countries

from Iran and South Africa and Gulf Countries.

f) Other manufactured materials

Other manufactured materials like steel are required for the construction work.

- b) **Construction and workers camp:** The construction of the road will require work force (external and internal) who must be accommodated and provided for a safe and healthy working conditions. The construction of the highway will attract workers who are estimated to be about 500. Of these, an estimated 150 workers will be accommodated in workers' camps this is based on KeNHA's estimate which shows that 70% of the total work force are going to be unskilled and sourced from project locality and hence not requiring accommodation and will instead reside in their homes. The location of workers' camps for this project is not yet known and will be identified by the private concessionaire.
- c) **Water supply:** The construction of roads require water for use during road compaction, keeping down dust, mixing of concrete, etc. The workers' accommodation camp also requires a constant supply of clean water for its workers throughout the project construction life. Water will also be needed in the operation phase especially in the operationalization of the RSSs. The quantities and sources of water for the construction of this road is unknown and will be determined by the private concessionaire.
- d) **Raw material and product storage facilities:** Facilities and structures for the storage of raw materials and products are a necessary requirement in the construction of roads. These facilities require adequate land for storage purposes. The number of and site/location of storage facilities for raw materials and products to be used in this project is not yet known and will be determined by the private concessionaire.
- e) **Concrete batching plant:** A concrete plant, also known as a batch plant or batching plant or a concrete batching plant, is equipment that combines various ingredients to form concrete. Some of these inputs include water, air, admixtures, sand, aggregate (rocks, gravel, etc.), fly ash, silica fume, slag, and cement. The number of and site/location of the concrete batching plant to be used in this project is not yet known and will be determined by the private concessionaire.
- f) **Asphalt mixing plant:** The asphalt plants or asphalt mixing plant is one plant that is used for mixing the dry warm aggregate, padding and asphalt for homogeneous mixture at the required temperature and it is widely used to the construction of highway road and parking lot. The number of and site/location of the asphalt mixing plant to be used in this project is not yet known and will be determined by the private concessionaire.
- g) **Crushing Plant:** A crushing plant is one-stop crushing installation, which can be used for rock crushing, building materials crushing and other similar operations. Crushing plants may be either fixed or mobile. The number of and site/location of crushing plants to be used in this project is not yet known and will be determined by the private concessionaire.

1.12 Expected Project Activities

The activities associated with the construction of the highway are described below to the possible extent known and based on the feasibility study report. Additional activities may be included by the private concessionaire during the preparation of the detailed design report.

1.12.1 Activities during pre-construction

Activities during pre-construction

- a) **Feasibility Study Design:** - Feasibility study has been undertaken for this project by ICT who are the Transactional Advisors (TA) for this project recruited by Public Private Partnership (PPP) Unit through the Infrastructure Finance Public Private Partnership Project (IFPPP) through International Development Association (IDA) loan to the Government of Kenya. The feasibility study report is the basis for the preparation of this RFP stage ESIA document.
- b) **Detailed Study Design:** - The future private concessionaire will prepare a detailed design of the proposed project which may vary albeit not significantly from the feasibility study design already prepared and will equally update this RFP stage ESIA report to detailed design ESIA.
- c) **Acquisition of Right of Way:** - Prior to commencement of construction activities, the concessionaire will have to possess the Right of Way (ROW), through a site hand over which will be facilitated by KeNHA and the respective county governments where the highway passes. An RFP stage Resettlement Action Plan (RAP) report has been prepared and has identified locations where land take will be required including the Project Affected Persons who are physically and economically displaced as a result of the project. It also spells out compensation measures/entitlements for such PAPs.
- d) **Obtaining Necessary Permitting Requirements:** - A number of environmental and social permitting requirements will be required to be obtained by private concessionaire for this project as per the statutes of the Government of Kenya before the construction commences.

Box 1-2. Permitting Requirements

1. Environmental Impact Assessment License issued by National Environment Management Authority
2. Energy Regulatory Commission Licence –for establishment of fuel depot for contractors
3. Water Abstraction Licence issued by Water Resources Authority (WRA) for water use
4. Emission License- issued by National Environment Management Authority
5. Occupational Health and Safety Permit issued by Department of Occupational Safety and Health
6. Blasting Permit issued by Department of Mines and Geology for any form of blasting

1.12.2 Activities during construction

A description of the key activities during the construction of the road is presented to the extent known (based on typical construction of roads) and is subject to change depending on final methodology that will be adopted by the concessionaire.

a) Clearing and Grubbing

Preparing the road right-of-way or construction area is referred to as clearing and grubbing. During the clearing phase, trees are felled. Grubbing refers to the clearing and removal of stumps and organic debris.

b) Excavations

Excavation vehicles will also dig up and remove rocks and stones from the future road's pathway.

No existing material, which will remain in the completed works, should be loosened unnecessarily during excavation. Excavation works, along with all construction activities, must be undertaken in as safe a manner as possible to minimise the dangers to road users and the contractors' personnel. Excavated materials need assessing as suitable or unsuitable. Suitable materials should be used when possible in the works.

c) Drainage and Channel Excavation

During construction, ditches are required to be maintained to ensure proper drainage at all times. Any necessary ditches and channels should be constructed and maintained to ensure there is no damage to the roadway section.

d) Mounting

The road takes shape as diggers, excavation plant machinery and bulldozers mount dirt and soil over the area where the future pathway will run. The surface is then leveled and smoothed by graders. Culverts and drains, consisting of large concrete pipes, are laid to prevent the road from flooding by leading away groundwater, sewage or storm water.

e) Fine Grading

Fine grading requires construction workers to prepare the surface by leveling it according to plans provided by structural engineers. Fine grading requires manual labour and digging as well as grading plant machinery, also called graders. To make the grading last, it is stabilized with limestone or concrete.

f) Aggregate Base

After another grading of the surface, the aggregate base course is laid. Aggregate base is made of crushed stone or gravel, and it is placed evenly on the road surface. If the road is in a town or city, a curb for the pavement and the gutter will be constructed straight after the gravel is placed on the surface. The road is then fine graded again.

g) Asphalt Paving

Once the gravel has been distributed evenly, the asphalt can be poured. Asphalt is a mixture of a petroleum byproduct, an aggregate base material and a sticky, glue like substance called bitumen. Depending on the expected traffic on the road, up to four layers of asphalt can be placed on top of each other. The asphalt usually is produced and mixed in large plants after the engineer's specifications. The hot asphalt is filled into trucks that transport the material to the construction site where it will be poured immediately. Before the last layer of asphalt is poured, the sidewalks and gutters have to be finished. The construction work is concluded by placing the appropriate road signs at the places specified by planners and the application of road markings.

1.12.3 Road Construction Equipment

Road construction requires the use of various equipment and machinery. The typical equipment to be used in the construction of the proposed road include among others as shown below including estimated quantities.

Box 1-3. Road Construction Equipment

Equipment Type
<ul style="list-style-type: none"> • Graders • Mechanical Spreaders • Trucks • Multi Tyer Rollers • Asphalt Paver • Dozers • Ordinary rollers • Vibrator rollers • Excavators • Water Tankers • Pulvi Mixer • Concrete Mixer • Hot Mix Plant • Batching Plant

1.12.4 Road Construction Materials

Highway construction can be characterized by large right-of-way having length of considerable amount. Due to this, highway construction constitutes materials that are needed in large quantum. Depending upon the type of highway pavement, flexible or rigid the material required for highway construction is decided. Items of major importance which are used in normal highway construction are:

Box 1-4. Construction Materials

<ul style="list-style-type: none"> • Bituminous Materials • Soil • Aggregates • Portland cement concrete • Admixtures • Pavement marking materials
--

- Structural steel
- Stone
- Sand
- Boulders
- Course Aggregate
- Earth

1.12.5 Activities during operation

- a) **Use of highway:** During the operation phase of the project, the completed highway will be open for motorized and non-motorized traffic.
- b) **Maintenance:** In order to preserve the project road, i.e. an asset, a proper maintenance mechanism supported with adequate fund is highly desirable; otherwise the road asset will be deteriorated to considerable extent, resulting in heavy losses. For the purpose of the economic analysis, a minimum routine maintenance strategy in case of without project or do-nothing option in the HDM-4 Model, has been considered once in a year for covering the items like vegetation clearance, potholes repair, drainage, edge repair, shoulder repair, removal of litter, debris, and other obstructions, whereas under “with project” option, the following expenditures on routine and periodic maintenance have been considered in the economic analysis.
- c) **Routine Maintenance:** Routine maintenance includes patch repairs, crack sealing, edge repair, cleaning of road side drains/cross drainage structures, repairing of shoulders, painting of road signs and km stones, turfing, road markings, removal of litter, debris, replacement of damaged signs and maintenance of culverts, etc. and also operation of maintenance cost of toll plaza equipment.
- d) **Periodic Maintenance:** To have the long-term benefits of the substantial capital investments in the Project Road, offer quality road to the users, and also to protect the asset, an appropriate periodic maintenance has been proposed. Periodic maintenance costs will be incurred once in every 6 years, during the appraisal period of 29 years, assuming the Project Road operation and maintenance operation comes in to force after proposed interventions in the year 2020. The maintenance will include: -

Box 1-5. Maintenance Aspects

- Pavement maintenance
- Routine maintenance
- Structure maintenance
- Environmental maintenance
- Traffic services maintenance
- Emergency works
- Property Management
- Network and assets management

1.13 Indicative schedule for pre-construction and construction (to the extent known).

The table below shows an indicative (to the extent known) for pre-construction and construction project schedule.

Table 1-26. Indicative schedule

Activity	Responsible Party	Timeline
Feasibility Study Development	Transactional Advisor	Completed
Preparation of RFP Stage ESIA	KeNHA	Completed
Preparation RFP Stage RAP	KeNHA	Completed
Approval of RFP Stage ESIA and RAP documents by the World Bank	World Bank	28 th February 2018
Disclosure and further consultation of RFP Stage ESIA and RAP documents	KeNHA and World Bank	28 th February 2018
Approval of ESIA and RAP documents by NEMA	NEMA	TBD
Development of Bidding Documents	KeNHA/Transactional Advisor	Completed
Issue and Review of Bids	KeNHA/Transactional Advisor	Completed
Procuring Concessionaire	KeNHA	TBD
Preparation of Detailed Design including comprehensive ESIA	Concessionaire	TBD
Approval and clearance of comprehensive ESIA	World Bank and NEMA	TBD
Preparation of Environmental and Social Management Programs	Concessionaire	Prior to construction
Recruitment of independent Advisor	KeNHA	Prior to construction
Recruitment of independent Advisor	KeNHA	Prior to construction
Road Construction 3 years	Concessionaire	TBD
Routine Maintenance -Yearly	Concessionaire	TBD
Periodic Maintenance -5 years	Concessionaire	TBD

1.14 Expected lifespan of the upgraded road

The private concessionaire will manage the Nairobi-Mau Summit highway road for a period of 30 years after which it will be handed over to the KeNHA. Prior to handing over an evaluation will be undertaken to determine the remaining lifespan of the project.

2 CHAPTER 2. REVIEW OF RELEVANT INSTITUTIONS

This section describes the roles and responsibilities of the key institutions and players and their relationship with respect to environmental and social roles in this project as relates to risks assessment, management. These institutions include Kenya National Highways Authority (KeNHA), Public Private Partnership (PPP) Unit at the National Treasury, the Transaction Advisor (TA), the future Concessionaire, Ministry of Transport, Infrastructure, National Environmental Management Agency (NEMA), Ministry of Lands Housing and Urban Development, Kenya Wildlife Service (KWS), Kenya Forest Service (KFS), National Museums of Kenya (NMK).

2.1 Kenya National Highways Authority

The Kenya National Highways Authority (KeNHA) is a statutory body established by the Kenya Roads Act, 2007. KeNHA is responsible for the management, development, rehabilitation and maintenance of National trunk roads comprising classes A, B, and C roads. KeNHA is the client for the Nairobi-Mau Summit Highway Project. KeNHA is a fully independent and autonomous organization and has no relationship with MoTI in terms of reporting or accountability.

Environmental and Social Responsibility

The detailed roles and responsibilities of KeNHA with respect to environmental and social roles and responsibilities are discussed further in chapter 8.3 including a capacity assessment of KeNHA. In brief, KeNHA's role will include among others; -

- Ensure that concessionaire, EPC and O&M contractors and their subcontractors are in compliance with the requirements of the Performance Standards, ESAP, and requirements under the national law
- Establish and maintain, throughout the duration of the concession, adequate institutional E&S capacity and competency for monitoring and oversight of E&S issues the concession /PPP
- Incorporate a grievance mechanism (GM) at the level of the government to ensure transparency and accessibility for raising complaints and concerns for Affected Communities and with a clear interface and division of responsibilities with the concessionaire's GM
- Provide for regular reporting to the WB on the E&S performance of the concession / PPP.

KeNHA will engage an Independent E&S Consultant to:-

- Review compliance with the E&S obligations of the concessionaire under the WB guarantee
- Report the outcomes of the review and present all areas of compliance and non-compliance and, where applicable, advise on corrective measures to be undertaken by the relevant party, define a timeline for their completion and report when completed
- Review, the E&S impact studies, the ESMS and related plans/procedures prepared by the concessionaire or contractors before starting of operations
- Semiannually during the first 2 years (i.e. during the time of construction activities) and annually for the time the guarantee is effective, review compliance of the concessionaire,

contractors, and subcontractors with requirements of the Performance Standards and the ESAP

- Specifically review the implementation of the E&S mitigation programs and plans/procedures, and undertake independent verification field monitoring as needed
- Review and analyze the functioning of the Grievance Mechanism at KeNHA and concessionaire level.

2.2 Ministry of Transport, Infrastructure, Housing and Urban Development

The Ministry of Transport and Infrastructure has the overall responsibility for the provision of an efficient road network in Kenya. The Ministry provides the regulatory framework, coordination,

oversight, supervision, liaison with other state agencies and any services necessary for the smooth

functioning of the roads sub-sector.

Environmental and Social Responsibility

- In this project, MOTI does not have any direct responsibility with respect to environmental and social risk assessment, management and monitoring. The Ministry of Transport and Infrastructure will be responsible for requesting funds from the National Treasury for compensation of the Project Affected Households (PAHs) who are going to be physically and economically displaced as a result of the Project.

2.3 National Treasury

Ministry of Finance (MoF) is spearheading the development of PPP in Kenya and is responsible for developing the legal, institutional, and regulatory framework for PPP programs. MoF is also responsible for the issuing of standardized PPP provisions and PPP Manual/Guidelines for effective management of PPP Projects.

Environmental and Social Responsibility

- In this project, MOF does not have any direct responsibility with respect to environmental and social risk assessment, management and monitoring. The only role will be to make available financial resources for the compensations of Project Affected Households (PAHs) who are going to be physically and economically displaced as a result of the project.

2.3.1 Public Private Partnership Unit

The PPP unit is under the National Treasury established specifically to facilitate the conceptualisation of PPP type project.

The key role of the Public Private Partnership (PPP) Unit is the coordination of policy implementation across the participating Ministries and Departments of Government. The PPPU manages donor relations in respect of the Policy, serve as the Secretariat to the (PPP) and provide a range of advisory and oversight functions that will be detailed more comprehensively in the detailed organigram currently being prepared by the PPPU. In light of the start-up status of the Policy, it is to be expected that these roles and responsibilities will be subject to some

fluidity and evolve over time in response to operational effectiveness and efficiency considerations and other lessons learned.

Environmental and Social Responsibility

- The PPP Unit's environmental and social safeguards advisor will provide oversight, review and support to KeNHA of all the environmental and social management risk documents prepared by the Private Concessionaire as stipulated in the Environmental and Social Action Plan (ESAP) including clearance of the documents prior to construction commencement. During construction and operation, the PPP Unit will provide supervisory and monitoring role to ascertain compliance with the ESAP.

2.3.2 Transactional Advisor

The Transactional Advisor (TA) was hired by the PPP Unit to prepare feasibility studies for the Nairobi-Mau Summit Highway Project.

Environmental and Social Responsibility

- The role of the transaction advisor ceases upon financial closure. The TA role includes preparation of the feasibility study documents for the project.

2.4 Future Private Concessionaire

The private concessionaire is going to be an institution comprising of a consortium as described in the RFP documents. The consortium referred as Project will include a conglomerate of different institutions with the following specialization among others: -

- Financial Specialization
- Engineering and Design Specialization
- Environmental and Social Specialization
- Project Management Specialization
- Procurement Specialization
- Construction Supervision Specialization
- Contract Management Specialization

Environmental and Social Responsibility

- Develop detailed design for the project and ensure that environment and social aspects related to minimizing adverse impacts are integrated in the final detailed design
- Update this bidding stage ESIA to final ESIA document based on the detailed design
- Developing specific management programs to cover environmental and social issues identified in this ESIA and as outlined in ESAP
- Incorporating mitigation measures, as needed, into the Project design and operation;
- Establishing and maintaining an Environmental and Social Management System that meets the requirements of the Performance Standards, including: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review.

The relationship between KeNHA and the Private Concessionaire is purely contractual as stipulated in the bidding documents.

2.4.1 Contractors and Sub-contractors

The private concessionaire will engage contractors and sub-contractors as the case may be to undertake the construction of the highway. All the specific action in the ESAP that the private concessionaire is expected to develop at different stages of the project will be passed on to the contractors and sub-contractors.

Environmental and Social Responsibility

- Developing specific management programs to cover environmental and social issues identified in this ESIA and as outlined in the ESAP
- Incorporating mitigation measures, as needed, into the Project design and operation;
- Establishing and maintaining an Environmental and Social Management System that meets the requirements of the Performance Standards, including: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review.

2.5 National Environmental Management Agency

The role of National Environment Management Authority (NEMA) Kenya is stipulated in the Environmental Management and Coordination Act (EMCA), 1999 including ensuring environmental protection and enforcing the requirements of the EMCA.

Environmental and Social Responsibility

- The principal role of NEMA in this project will be to review this bidding stage Environmental and Social Impact Assessment (ESIA) report and issue a license (EIA) for the project.
- NEMA will also further review the final detailed ESIA prepared by private concessionaire at the detailed design stage and issue EIA licence.
- During the implementation of the project (construction and operation phase), NEMA will supervision and monitoring to ensure that the mitigation measures as specified in the ESIA are being followed and adhered to.
- NEMA will issue improvement orders to contractors in the event that non-compliance to the ESAP is observed.
- NEMA will review Environmental Audit reports submitted by private concessionaire during project implementation as required by the EIA/EA regulations (2003).

2.6 National Land Commission

National Land Commission (NLC) is an independent government commission whose establishment was provided for by the Constitution of Kenya, 2010 to, amongst other things, manage public land on behalf of the national and county governments, initiate investigations into present or historical land injustices and recommend appropriate redress, and monitor and have oversight responsibilities over land use planning throughout the country. It was officially established under the National Land Commission Act, 2012.

Environmental and Social Responsibility

- The National Land Commission will undertake compensation of all the Project Affected Households (PAHs) identified by the Resettlement Action Plan prepared for this project in accordance with NLC Act 2012. The National Land Commission (NLC) will be engaged in the project on matters related to land acquisition as a result of physical displacement and will facilitate the compulsory acquisition of all land to be acquired in accordance with the Land Act 2012.

2.7 National Museums of Kenya

NMK is a multi-disciplinary institution whose role include being a repository for things that are of scientific, cultural and human value; Research and document natural and cultural heritage; promoting sustainable utilization of Kenya's heritage for development and information dissemination.

The project route is within the vicinity of known archeological and cultural sites including the Kariandusi Pre-historic sites, Hyrax Hill Pre-historic site and Mai Mahiu Catholic Church (Travellers Church). Chapter 4 describes in detail these archeological and cultural sites.

Environmental and Social Responsibility

- NMK will review the Chance Finds Procedure and Cultural Heritage Plan prepared by the private concessionaire to determine the extent to which they have mitigation measures for protecting archeological and cultural sites and provide approval for these plans.
- During the construction phase, NMK will be involved in the project by providing guidance when Chance Finds are encountered.

2.8 Kenya Wildlife Service

Kenya Wildlife Service is a state corporation that was established by an Act of Parliament (Cap 376), now repealed by Wildlife Conservation and Management Act (WCMA 2013), with the following mandate of among others: Conserve and manage national parks, wildlife conservation areas, and sanctuaries under its jurisdiction.

The project area of influence is known to have wildlife resources along the project routing as described in chapter 4.

Environmental and Social Responsibility

- KWS will review the designs of wildlife crossings prepared by the private concessionaire
- Coordinate in undertaking monitoring of wildlife populations in the project corridor

2.9 Kenya Forest Service

Kenya Forest Service is a corporate body established under the Forest Conservation and Management Act no 34 of 2016 (henceforth referred to as the Act). The Act gives the Service mandate as “to provide for the development and sustainable management, including conservation and rational utilization of all forest resources for the socio-economic development of the country and for connected purposes’.

There are a number of forest ecosystems located within the project area of influence as described in detail in chapter 4.

Environmental and Social Responsibility

- a) Conserve, protect and manage all public forests in accordance with the provisions of the Act;
- Review biodiversity management plans prepared by private concessionaire to conserve the forest ecosystems within the vicinity of the road alignment and would be directly or indirectly affected by the project.
- Undertake monitoring of forest ecosystems in the project corridor to determine any impacts

2.10 Third Party Independent Monitoring Advisor

Third party independent monitoring advisory firm of experts (2) will be engaged in the project with the first expert firm responsible for supervision and monitoring of construction works and the other during operation of the highway.

Environmental and Social Responsibility

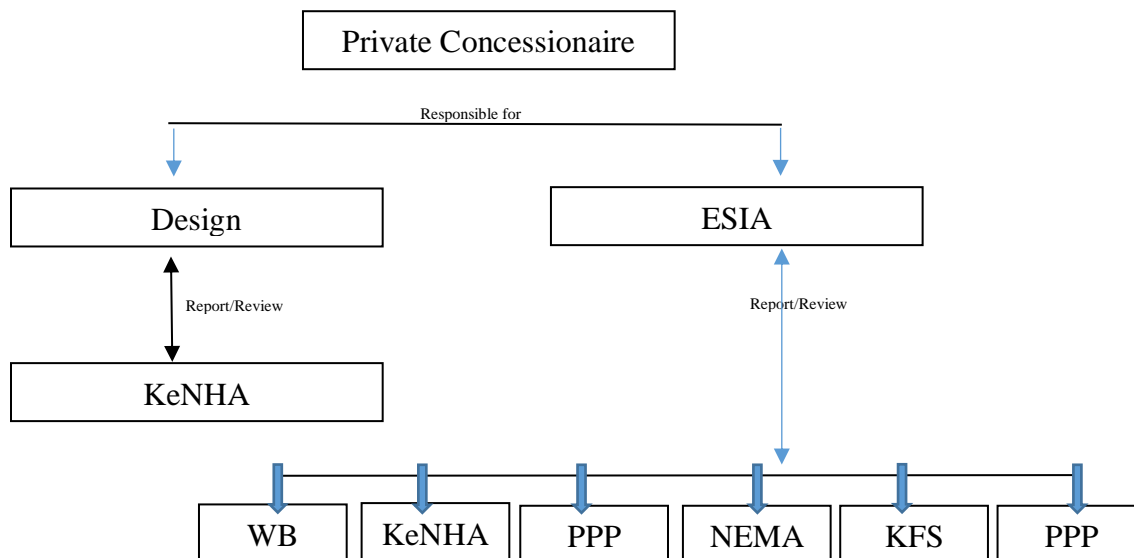
- The independent experts will be responsible for supervision and ensuring compliance in engineering and works related as well as environmental and social risks.

2.11 World Bank

World Bank will provide guarantee for this project through the International Development Association (IDA). Other arms of the World Bank Group such as International Finance Corporation (IFC) and the Multi-lateral Investment Guarantee (MIGA) may also be involved.

World Bank will provide written confirmation on Project’s Environmental and Social Management Systems (ESMS), Environmental and Social Management Programs, Environmental and Social Management and Social Impact Assessment (ESIA) in conformance to World Bank requirements through detailed review of reports. **Figure 2-1** below is a summary of all the key stakeholders in this project including environmental and social assessment, risks management and monitoring roles during project design, construction and operation.

Figure 2-1. summary of all the key stakeholders in this project and E&S roles in project



3 CHAPTER 3. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This chapter sets out the standards to which the legal, policy and administrative framework within which the Project will be developed. It identifies the applicable lender requirements and national standards. For convenience and to demonstrate a systematic approach to identifying legal constraints, it has been structured around the broad topic areas set out in the World Bank safeguards policies as these comprehensively address the environmental and social risks that may be faced by the project. The ESIA will conform to the Kenyan legislative and regulatory framework and in line with OP. 4.03 (Performance Standards for private sector activities) and Environmental, Health and Safety (EHS) Guidelines (2007). For the majority of disciplines, where there is a difference between national Kenyan standards and World Bank safeguard policies, the Bank policies will prevail.

3.1 Context

Kenya has undergone regulatory reforms over the past two decades, culminating in the enactment of a new constitution in 2010, which replaced that of 1969. This has, in turn, driven new policies and strategies relating to environmental management and conservation (including Environmental Impact Assessments).

The new constitution establishes the structure of the Kenyan government, the Bill of Rights, and provides the basic and comprehensive principles for environmental protection and management in the country. Under Chapter 5 (Part 1) of the constitution (Land and Environment), it requires that land be used and managed in “a manner that is equitable, efficient, productive and sustainable, and in accordance with the following principles: (a) equitable access to land; (b) security of land rights; (c) sustainable and productive management of land resources; (d) transparent and cost effective administration of land; (e) sound conservation and protection of ecologically sensitive areas; (f) elimination of gender discrimination in law, customs and practices related to land and property in land; and (g) encouragement of communities to settle land disputes through recognised local community initiatives consistent with this constitution”. Furthermore, Part 2 of Chapter 5 is dedicated to environment and natural resource utilisation, management and conservation, with reference to the establishment of EIA, environmental audit and monitoring of the environment.

The constitution also stipulates that all minerals and mineral oils shall be vested in the national government in trust for the people of Kenya. Devolution of powers from the central government to the newly established 47 Counties is also specified by the constitution. County governments are in charge of planning and development, amongst other services, and can enact legislation with possible implications for planned and current projects. County governments also hold all unregistered community lands in trust on behalf of the communities who use it. Other reforms include the establishment of key administrative and legislative organisations that regulate water and sanitation sector and development in Kenya.

3.2 National Policies and Legislation

Table 3-1: Summary of National Policies

Policy	Description
The National Environment Policy, 2013	<p>The goal of the policy is to ensure a better quality of life for present and future generations through sustainable management and use of the environment and natural resources.</p> <p>The objectives of the Policy are <i>inter alia</i> to:</p> <ul style="list-style-type: none"> • Provide a framework for an integrated approach to planning and sustainable management of Kenya’s environment and natural resources; • Strengthen the legal and institutional framework for good governance, effective coordination and management of the environment and natural resources; and • Ensure sustainable management of the environment and natural resources, such as unique terrestrial and aquatic ecosystems, for national economic growth and improved livelihoods. <p>Some of the guiding principles in the implementation of the policy include:</p> <ul style="list-style-type: none"> • Environmental Right: Every person in Kenya has a right to a clean and healthy environment and a duty to safeguard and enhance the environment; • Right to Development: The right to development will be exercised taking into consideration sustainability, resource efficiency and economic, social and environmental needs; • Sustainable Resource Use: Environmental resources will be utilized in a manner that does not compromise the quality and value of the resource or decrease the carrying capacity of supporting ecosystems; and • Public Participation: A coordinated and participatory approach to environmental protection and management will be enhanced to ensure that the relevant government agencies, county governments, private sector, civil society and communities are involved in planning, implementation and decision making processes.
The National Environment Action Plan Framework 2009 - 2013	The NEAP framework recognizes that the high population growth rate and expansion of economic activities have caused pressure on water resources. This is expected to increase unless urgent measures are taken to boost supply and rationalise demand. Water resources are under pressure caused by soil erosion and

	<p>siltation, water catchments destruction, low level compliance to water quality regulations, inefficient water use strategies, invasive alien species, uncontrolled sand harvesting and over-abstraction of water resources. The framework proposes such interventions as:</p> <ul style="list-style-type: none"> • Implementation of soil and water conservation measures; Provision of incentives for conservation of water catchments • Enforcement of EMCA, 1999 and other subsidiary regulations • Enforcement of the Water Act 2002 and other related legislations; • Promotion of integrated water resource management; • Enforcement of EMCA, 1999 and other subsidiary regulations • Enforcement of the Water Act 2002 and other related legislations;
The National Land Policy (Sessional Paper No. 3 of 2009)	The overall object of the national land policy is to secure land rights and provide for sustainable growth, investment, and the reduction of poverty in line with the governments overall development objectives.
The Kenya National Biodiversity Strategy and Action Plan, 2000	The overall objective of the NBSAP is to address the national and international undertakings elaborated in Article 6 of the Convention on Biological Diversity' (CBD). It is a national framework of action for the implementation of the Convention to ensure that the present rate of biodiversity loss is reversed, and that present levels of biological resources are maintained at sustainable levels for posterity.
Economic Recovery For Wealth And Employment Creation Strategy 2006	<p>The overall goal of the strategy is to ensure clear improvement in the social and economic wellbeing of all Kenyans; thereby giving Kenyans a better deal in their lives, and in their struggle to build a modern and prosperous nation. The key areas covered in the strategy are:</p> <ul style="list-style-type: none"> • Expanding and improving infrastructure; • Reforms in trade and industry; • Reforms in forestry; • Affordable shelter and housing; • Developing arid and semi-arid lands, and • Safeguarding environment and natural resources.
Gender Policy 2011	<p>The overall goal of this Policy Framework is to mainstream gender concerns in the national development process in order to improve the social, legal/civic, economic and cultural conditions of women, men, girls and boys in Kenya</p> <p>The policy provides direction for setting priorities. An important priority is to ensure that all ministerial strategies and their performance frameworks integrate gender equality objectives and indicators</p>

	<p>and identify actions for tackling inequality. In addition, each program will develop integrated gender equality strategies at the initiative level in priority areas. Within selected interventions, the policy will also scale-up specific initiatives to advance gender equality</p> <p>Relevance This policy will be referred to during Project implementation especially during hiring of staff to be involved in the project, procuring of suppliers and sub consultants and sub-contractors to the project.</p>
HIV/AIDS Policy 2009	<p>The proposed project is to be implemented in the rural area, these areas have high freelance cases of HIV and Aids. This policy shall provide a framework to both the project proponent and contractor to address issues related to HIV and Aids. In summary, the policy provides a mechanism for:</p> <ul style="list-style-type: none"> • Setting Minimum Internal Requirements (MIR) for managing HIV and AIDS • Establishing and promoting programmes to ensure non-discrimination and non- stigmatization of the infected; • Contributing to national efforts to minimize the spread and mitigate against the impact of HIV and AIDS; • Ensuring adequate allocation of resources to HIV and AIDS interventions; • Guiding human resource managers and employees on their rights and obligations regarding HIV and AIDS. <p>Relevance The Policy will be complied with during implementation of the Project, the Contract will in cooperate in tender document and implement HIV awareness initiatives during construction of the Project.</p>

Table 3-2: Summary of National Regulations and Standards

Legislation/Regulation/ Standard	Provisions	Relevance to the Project/ License or Permit Required/ or Activity requiring regulation
The Constitution of Kenya (2010)	<p>Provides for protection and conservation of the environment and ensuring ecologically sustainable development and use of natural resources; Mandates the State to: -Establish systems of environmental impact assessment, environmental audit and monitoring</p>	

	<p>of the environment;</p> <ul style="list-style-type: none"> - eliminate processes and activities that are likely to endanger the environment; - utilise the environment and natural resources for the benefit of the people of Kenya; and - Encourage public participation in the management, protection and conservation of the environment. <p>-Accords every person the right to a clean and healthy environment and where this is being or is likely to be, denied, violated, infringed or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter</p>	
Environmental Management and Coordination Act 1999	Provides for protection and conservation of the environment, environmental impact assessment, and environmental auditing and monitoring.	<p>An EIA study should be carried out for this project and EIA License to be obtained from NEMA before commencement of development.</p> <p>EIA licenses for associated infrastructures will have to be obtained by the concessionaire once the locations and detailed designs for the same are determined.</p>
Environmental (Impact Assessment and Audit) Regulations, 2003	<p>-Provides for the procedure for carrying out Environmental Impact Assessment (EIA) and Environmental Audit (EA).</p> <p>-Provides for the carrying out of an environmental audit study following commencement of project operations.</p> <p>-Provides for the contents of an EIA and an EA Report.</p>	-An initial environmental audit must be carried out in the first year of operation of the road by concessionaire.
Environmental Management and Co-ordination (Water Quality) Regulations 2006	<p>-Provides for the protection of ground and surface water resources.</p> <p>-Provides the water effluent standards</p>	<p>-The project (concessionaire) will comply with the water effluent standards during construction phase and ensure that all effluent water is disposed as per the regulations.</p> <p>The concessionaire will have to ensure that plans for protection of ground and surface water is in place during construction and operation phases of the project.</p>
Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control)	-Prohibits the generation of unreasonable, unnecessary or unusual noise which annoys,	-License to emit noise/vibrations in excess of permissible levels to be obtained by concessionaire for all

Regulations 2009	<p>disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.</p> <p>-Provides for the maximum noise levels permissible in various environmental set ups such as residential areas, places of worship, commercial areas and mixed residential</p>	<p>construction sites determined to generate noise and vibration.</p> <p>Concessionaire to comply with permissible noise level standards for various areas as provided for in the regulations.</p>
Environmental Management and Co-ordination (Waste Management) Regulations 2006	<p>-Provides for standards for handling, transportation and disposal of various types of wastes including hazardous wastes.</p> <p>-Requirements to ensure waste minimization or cleaner production, waste segregation, recycling or composting.</p> <p>-Provides for licensing of vehicle transporting waste.</p> <p>-Provides for the licensing of waste disposal facilities.</p>	<p>-Disposal of generated waste including soil, vegetation, boulders; and</p> <p>-Generation of hazardous wastes such as used oil and oily parts from construction machinery to be undertaken by concessionaire in accordance with the waste management regulations including use of NEMA licensed vendors to dispose different types of wastes generated.</p>
Environmental Management and Coordination (Air Quality) Regulations, 2014	<p>-Provides for ambient air quality tolerance limits.</p> <p>-Prohibits air pollution in a manner that exceed specified levels.</p> <p>-Provides for installation of air pollution control systems where pollutants emitted exceed specified limits.</p> <p>-Provides for the control of fugitive emissions within property boundary.</p> <p>-Provides for the control of vehicular emissions.</p> <p>-Provides for prevention of dispersion of visible particulate matter or dust from any material being transported.</p> <p>-Provides for acquisition of an emission license.</p>	<p>-Exhaust emissions from construction machinery and stacks (batching plant, hot mix, diesel generators etc.) used by concessionaire during construction phase must adhere to the air quality regulations.</p>
The EMCA (Controlled Substances) Regulation, 2007	The EMCA (Controlled Substances) Regulation is aimed at controlling the production, consumption and, exports and imports of controlled substances. Controlled substances are grouped into three lists as indicated below:	Products containing controlled substances include air conditioners, air coolers, refrigerants, portable fire extinguishers, heat pump equipment, dehumidifiers, insulation boards, panels and pipe covers, pre-polymers, etc.

	<ul style="list-style-type: none"> • Group 1 list consists of halogenated fluorochemicals with ozone depleting substances. • Group 2 list consist of hydrobromofluorocarbons with ozone depleting substances. • Group 3 list consist of bromochloromethane with ozone depleting substances. 	<p>The project contractors will need to ensure that the requirements of this regulation are observed in order to ensure that equipment, machinery, vehicles and chemicals containing such components are not imported into the country for use in the proposed project.</p>
<p>The Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009.</p>	<p>The Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009 applies to all wetlands in Kenya whether occurring in private or public land.</p> <p>The objectives of the regulations are to provide for the conservation and sustainable use of wetlands and their resources in Kenya and promote the integration of sustainable use of resources in wetlands into the local and national management of natural resources for socio-economic development.</p> <p>The act also aims at ensuring the conservation of water catchments and the control of floods and the sustainable use of wetlands for ecological and aesthetic purposes for the common good of all citizens. The act also makes provision for the protection of wetlands as habitats for species of fauna and flora. It also provides a framework for public participation in the management of wetlands.</p> <p>The Act requires wetland resources to be utilized in a sustainable manner compatible with the continued presence of wetlands and their hydrological, ecological, social and economic functions and services. The Act requires special measures to be undertaken to preserve and maintain knowledge innovations and practices of</p>	<p>The contractor will need to employ measures for the preservation and conservation of these wetlands and river systems.</p>

	<p>indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity in wetlands.</p> <p>The regulation also calls for sustainable use of wetlands through integration into the national and local land use plans to ensure sustainable use of wetlands in the country.</p>	
The Wildlife and Conservation Act (2013)	<p>The Wildlife and Conservation Act deals with the conservation and management of wildlife in Kenya.</p> <p>The Act provides that wildlife should be conserved so as to yield optimum returns in terms of cultural, aesthetic, scientific and economic benefits. The Act requires that full account be taken of the inter-relationship between wildlife conservation and land use.</p> <p>The Act controls activities within the national parks, which may lead to the disturbance of wild animals. Unauthorized entry, residence, burning, damage to objects of scientific interest, introduction of plants and animals and damage to structure are prohibited under this law.</p>	<p>The proposed road traverses' important wildlife areas especially in Gilgil.</p> <p>The technical designs have provided for wildlife crossing points to minimize wildlife accidents and provide free wildlife movement.</p> <p>The concessionaire will be required to develop a Wildlife Management Plan for this project to minimize wildlife risks during construction and operation.</p>
The Physical Planning Act, 1996	<p>-Provide for controls on the use and development of land and buildings in the interest of proper and orderly development of an area.</p> <p>-Requires that development permission be sought through a development application.</p>	-Concessionaire must obtain the development permit in all the 3 Counties for the construction of the road and associated infrastructures before commencing construction.
Forest Act 2005	This is law was enacted by Parliament in 2005 to provide for the establishment, development and sustainable management including conservation and rational utilization of forest resources for the socio-economic development of the country.	The project routing and alignment passes next to forest ecosystems. The concessionaire will prepare a specific biodiversity management plan to demonstrate measures that will be employed to ensure that the forest ecosystems are conserved.

	<p>Parts of the project area consist of indigenous forests.</p> <p>Section 8 of the Act requires all indigenous forests and woodlands to be managed on a sustainable basis for the purposes inter alia of conservation of water, soil and biodiversity, riparian and shoreline protection, sustainable production of wood and non-wood products. Community participation as provided for under Section 46 of the Act should be encouraged. The most appropriate would be initiation of participatory forest management in these forest reserves so that the local community and organization can have a significant input with Kenya Forest Service (KFS) office playing a coordination role.</p>	
<p>The Public Health Act (Cap 242)</p>	<p>-Provides for the prevention of the occurrence of nuisance or conditions dangerous/injurious to humans.</p> <p>-Provides that the relevant County Government shall take all lawful, necessary and reasonably practicable measures -:</p> <ul style="list-style-type: none"> - for preventing any pollution dangerous to health of any supply of water which the public within its jurisdiction has a right to use and does use for drinking or domestic purposes (whether such supply is derived from sources within or beyond its jurisdiction); and - for purifying any such supply which has become so polluted, and to take measures (including, if necessary, proceedings at law) against any person so polluting any such supply or polluting any stream so as to be a nuisance or danger to health. 	<p>-Concessionaire will have to comply with this Act especially with respect to generation of wastes during construction of the road infrastructure and ensure that activities do not lead to pollution hence impacting human health;</p> <p>-Handling and storage of waste at the sites; and</p> <p>-Protection of water sources from pollution.</p>
<p>Energy Act 2007</p>	<p>This is an Act of Parliament to amend and consolidate the law relating to energy, to provide for the establishment, powers and functions of the Energy Regulatory Commission and the Rural Electrification Authority, and for connected purposes.</p>	<p>The concessionaire will have to obtain permit/license for storage of bulk fuel (on site), including generation of energy via diesel generators for lighting and cooking.</p> <p>Road side stations will include petrol stations that need operating</p>

	<p>The provisions of this Act apply to every person or body of persons importing, exporting, generating, transmitting, distributing, supplying or using electrical energy; importing, exporting, transporting, refining, storing and selling petroleum or petroleum products; producing, transporting, distributing and supplying of any other form of energy, and to all works or apparatus for any or all of these purposes.</p> <p>The Act establishes a Commission known as the Energy Regulatory Commission, that among other roles, is expected to regulate (i) importation, exportation, generation, transmission, distribution, supply and use of electrical energy, (ii) importation, exportation, transportation, refining, storage and sale of petroleum and petroleum products; (iii) production, distribution, supply and use of renewable and other forms of energy.</p>	licenses from ERC
Occupational Safety and Health Act (OSHA), 2007	<p>-Provides for the safety, health and welfare of workers and all persons lawfully present at work places.</p> <p>-Provides for the registration of workplaces.</p> <p>-Outlines safety requirements in use of machinery to prevent accidents and injuries.</p>	<p>Concessionaire will have to comply with requirements of this Act including obtaining OSHA work place registration</p> <p>-Ensuring safety measures are required in use of tools and machinery on site; and</p> <p>-Ensuring protection of the workers and general public with any form of interaction with the construction sites is necessary.</p>
The Land Act 2012	<p>-Mandates the National Land Commission and other public officers to use the following guiding principles and values:</p> <ul style="list-style-type: none"> -Equitable access to land; security of land rights; - Security of land rights; -Sustainable and productive management of land resources; - Conservation and protection of ecologically sensitive areas <p>-Provides for the conversion of</p>	<p>-KeNHA to ensure that all land required for the project is acquired in accordance with the Land Act 2012 including land for associated facilities not yet identified and which will require land.</p>

	<p>private land to public land through compulsory acquisition, transfer, surrender or reversion of leasehold interest to Government;</p> <p>-Provides that just compensation shall be paid promptly in full to all persons whose interests in the land have been determined; and</p> <p>-Provides for the creation of a public rights of way (ROW) or wayleave by the National Land Commission.</p>	
National Land Commission Act 2012	<p>The National Land Commission of Kenya is an independent government commission whose establishment was provided for by the Constitution of Kenya to, amongst other duties, manage public land on behalf of the national and county governments, initiate investigations into present or historical land injustices, recommend appropriate redress, monitor and have oversight responsibilities over land use planning throughout the country. It was officially established under The National Land Commission Act, 2012.</p> <p>The mandate of the National Land Commission is drawn from the National Land Policy of 2009, Constitution of Kenya 2010, National Land Commission Act, 2012, the Land Act 2012 and the Land Registration Act of 2012.</p> <p>Under the National Land Commission Act, the Commission shall among others duties monitor the registration of all rights and interests in land and ensure that public land and land under the management of designated state agencies are sustainably managed for their intended purpose and for future generations. Also, the commission is required to manage and administer all unregistered trust land and unregistered community land on behalf of the county government and develop and</p>	<p>The KeNHA will have to acquire all land on behalf of the concessionaire through the National Land Commission.</p> <p>Any additional land required by concessionaire (e.g. associated facilities land not yet identified) will also be acquired through NLC.</p>

	<p>encourage alternative dispute resolution mechanisms in land dispute handling and management.</p> <p>The Commission is also required in consultation and cooperation with the national and county governments, to establish county land management boards for the purposes of managing public land.</p>	
County Government Act	<p>This is an Act of parliament to give effect to Chapter Eleven of the Kenyan Constitution; to provide for County government's powers, functions and responsibilities to deliver services and for connected purposes. Section 113 of the Act makes public participation in County planning processes compulsory.</p>	<p>Concessionaire and KeNHA will have to engage with affected County Governments throughout the project pre-construction, construction and operation phases.</p>
The Valuers Act cap 532, 1985	<p>The revised edition 1985 of the Valuers Act Cap 532 makes provisions for the relevant charges and conducts of valuers in relation to valuation of assets.</p> <p>The Act also provides the relevant regulations and guidelines in the undertaking of the valuation works.</p> <p>The Act requires that adequate valuation is carried out to help meet the actual compensation measures and the market rates and reduce any acts of malice in the exercise.</p>	<p>In all aspects of land acquisition by KeNHA or concessionaire, a competent valuer will have to be deployed to site to carry out the professional valuation of assets for compensation.</p>
The Employment Act, 2007	<p>The Employment Act, 2007 defines the fundamental rights of employees including the basic conditions of employment of workers.</p> <p>It also regulates employment of children. The contractor on site will have to employ casual labourers probably from the communities where the road traverses during construction.</p> <p>The basic conditions of employees should be observed to avoid unnecessary conflicts during the construction works.</p>	<p>The concessionaire will adhere to this Act with respect to labor and recruitment and ensure all statutory fee for employment are remitted.</p> <p>There will be no child or forced labor in this project</p>

<p>The Work Injury Compensation Benefit Act 2007</p>	<p>The Work Injury Compensation Benefit Act 2007 provides guideline for compensating employees on work-related injuries and diseases contacted in the course of employment. The Act defines an employee as any worker on contract of service with employer.</p> <p>The Act also requires provision of compulsory insurance for all employees.</p>	<p>The concessionaire will be required to provide all its workers with insurance so that they can be compensated in case they get injured while working</p>
<p>Public Roads and Roads of Access Act Cap 399</p>	<p>The Public Roads and Roads of Access Act Cap.399 Act states that a public road is any road which the public has a right to use immediately before the commencement of this Act, or all proclaimed or reserved roads and thoroughfares being or existing on any land sold or leased or otherwise held under the East Africa Land Regulations, 1897, the Crown Lands Ordinance,1902, or the Government Lands Act at any time before the commencement of this Act and all roads and thoroughfares hereafter reserved for public use.</p>	<p>The construction of the proposed road will need to take note of the provisions of this Act</p>
<p>The Traffic Act Cap 403 of 2013</p>	<p>The Traffic Act reserves the use of the road corridor for road facilities only. Any vegetation grown to protect the road edges should not cause problems during maintenance. Encroachment along the road corridor will have to be checked especially during the operational phase of the project. The Act also spells out conditions for use of roads by motorists, among others.</p>	<p>This provision will be complied by in this project</p>
<p>The Kenya Roads Act, 2007</p>	<p>This is an Act of Parliament that provided for the establishment of Kenya Road Agencies i.e. Kenya National Roads Authority (KeNHA), the Kenya Urban Roads Authority (KURA) and the Kenya Rural Roads Authority (KeRRA), and provided powers and functions of the authorities. KeNHA is mandated to manage, develop, rehabilitate and maintain all national roads. Other function vested to this authority relevant to the proposed project are: controlling national roads and road</p>	<p>This provision will be complied by in this project</p>

	<p>reserves and access to roadside developments; implementing road policies in relation to national roads; ensuring adherence to the rules and guidelines on axle load control prescribed under the Traffic Act (Cap. 403) and under any regulations under this Act; ensuring that the quality of road works is in accordance with such standards; in collaboration with the Ministry responsible for Transport and the Police Department, overseeing the management of traffic and road safety on national roads; collecting and collating all such data related to the use of national roads as may be necessary for efficient forward planning under this Act; monitoring and evaluating the use of national roads; planning the development and maintenance of national roads and liaising and coordinating with other road authorities in planning and on operations in respect of roads.</p>	
<p>HIV/AIDS Act, 2006</p>	<p>Section 3 of The Act indicated the purpose of the legislation including public awareness and rights to people living with HIV/AIDS. Public awareness shall be achieved through education, public campaigns even at workplaces.</p> <p>This Act's provisions then gives the guidelines unto which the project shall follow in educating workers and staff and providing of incentives to combat HIV/AIDS.</p>	<p>This provision will be complied by in this project</p>
<p>Urban Areas and Cities Act No 13 of 2011</p>	<p>This is an Act of Parliament to give effect to Article 184 of the Constitution, to provide for the classification, governance and management of urban areas and cities and to provide for the criteria of establishing urban areas. The Act also provide for the principle of governance and participation of residents of towns and cities. Under the Act a town is an urban area with a population of at least ten thousand residents. Also, under the Act the management of a city and municipality is vested in the county governments. The County</p>	<p>This provision will be complied by in this project</p>

	<p>Governments may impose such fees, levies and charges for delivery of services by the municipality or the city</p>	
<p>Building Code 2000</p>	<p>This by-law recognizes the county governments as the leading planning agencies. It compels potential developers to submit development applications for the approval. The county governments are hence empowered to approve or disapprove any plans if they do or don't comply with the law, respectively. Any developer who intends to erect a building must give the respective local authority a notice of inspection before the erection of the structure. On completion of the structure, a notice of completion shall be issued by the local authority to facilitate final inspection and approval. No person therefore shall occupy a building whose certificate of completion has not been issued by the county government.</p> <p>Section 214 of the by law requires that any public building where the floor is more than 20 feet above the ground level should be provided with firefighting equipment that may include one or more of the following; hydrants, hose reels and fire appliances, external conations portable fire appliances, water storage tanks, dry risers, sprinkler, drencher and water spray spring protector system.</p> <p>Section 194 requires that where sewer exists, the occupants of the nearby premises shall apply to the local authority for a permit to connect to the sewer and all the waste water must be discharged to the sewers. Finally, section 196 provides that the county government may refuse to admit to sewer any trade waste or any other effluent unless it has been treated in an approved manner. In this regard, the county government may cause the occupier of the premise to construct an approved manhole</p>	<p>This provision will be complied by in this project</p>

	connected to the pipe conveying such effluent. In the development of the project, the proponent will have to comply with the provisions of this Act.	
The Kenya Roads Board Act, 1999	<p>The Act was assented in January 2000. Establishing a board to oversee the road network in Kenya and thereby coordinate its development, rehabilitation and maintenance and to be the principal adviser to the Government on all matters related to Road Development.</p> <p>The Standard Specifications for Road and Bridge construction has guidelines on environmental protection and mitigation. Standard Specification Clauses 116,117,125,135,137 specifically address protection of the environment, with regard to water, health, safety and accidents, water supply, maintenance of the engineers' staff houses, offices, laboratories, and attendance upon the engineer and his staff. The provisions of these standards and codes must not be contravened during project implementation. These provisions are largely supportive of EMCA 1999 and forms part of the legal basis for environmental mitigation, avoidance, prevention, compensation, restoration and enhancement.</p>	This provision will be complied by in this project
The National Gender and Equality Act, 2011	National Gender Equality Commission is a constitutional Commission established by an Act of Parliament in August 2011, as a successor commission to the Kenya National Human Rights and Equality Commission pursuant to Article 59 of the Constitution. NGECE derives its mandate from Articles 27, 43, and Chapter Fifteen of the Constitution; and section 8 of	This provision will be complied by in this project

	<p>NGEC Act (Cap. 15) of 2011, with the objectives of promoting gender equality and freedom from discrimination.</p> <p>Gender mainstreaming in road projects ensures that the concerns of women and men form an integral dimension of the project design, implementation, operation</p>	
The Sexual Offences Act, 2006 and its amendment 2012	<p>Observing a standard work ethic is recommended to ensure persons from both genders are not subjected to sexual offences. Ample working environment should prevail in all work places in the project, to be enhanced through implementation of a Sexual Misconduct Policy.</p>	This provision will be complied by in this project
Matrimonial Property Act (No. 48 of 2013)	<p>Matrimonial property is property owned or obtained by either or both married spouses before or during their marriage. It is sometimes called 'matrimonial assets.' Matrimonial property includes the matrimonial home; the home that the couple lived in during their marriage. It also includes many other things, not just physical property like land or houses but also things like the contents of the home, furniture and appliances, vehicles that a couple owns while married, and sometimes other things as well. It may include work pensions that either spouse may have, and also certain debts that the parties have.</p> <p>The law that deals with matrimonial property in Kenya is called the <i>Matrimonial Property Act</i>. This act only applies to married couples, or couples who are in a Registered Domestic Partnership. This act does not apply to common law couples.</p>	This provision will be complied by in this project
Persons with Disability Act, Chapter 133	<p>This act protects the rights of people with disabilities ensuring they are not marginalized and that they enjoy all the necessities of life without discrimination. The act guarantees that (1) No person shall deny a person with a disability access to opportunities for suitable employment. (2) A qualified employee with a disability shall be subject to the same terms and</p>	

	<p>conditions of employment and the same compensation, privileges, benefits, fringe benefits, incentives or allowances as qualified able-bodied employees. (3) An employee with a disability shall be entitled to exemption from tax on all income accruing from his employment.</p> <p>A person with disability is entitled to exemptions which apply with respect to exemptions and deductions as described in Schedule 42 subsection (2) of the act, among other provisions within this act that should be complied with all parties involved.</p>	
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3.3 World Bank Operational Policies

3.3.1 World Bank Operational Policy 4.03

The aim of this policy is to facilitate Bank financing¹⁰ for private sector led economic development projects by applying environmental and social policy standards that are better suited to the private sector, while enhancing greater policy coherence and cooperation across the World Bank Group.

The eight IFC Performance Standards have been adopted by the Bank as the World Bank Performance Standards for Projects Supported by the Private Sector (“WB Performance Standards”) for application to Bank support for projects (or components thereof) that are designed, owned, constructed and/or operated by a Private Entity (as defined below), in lieu of the World Bank’s safeguard policies (“WB Safeguard Policies”).¹¹

The eight World Bank Performance Standards are: Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts Performance Standard 2: Labor and Working Conditions Performance Standard 3: Resource Efficiency and Pollution Prevention

¹⁰ In this OP, unless the context requires otherwise, the term: (a) “Bank” means IBRD and IDA (whether acting in its own capacity or as administrator of trust funds funded by other donors); (b) “WB Group Entity” means IFC or MIGA (or both); and (c) “financing” means any loan, credit, or grant made, or any guarantee issued, by the Bank from its resources or from trust funds funded by other donors and administered by the Bank, or a combination of these.

¹¹ See, Proposed Adoption and Application of World Bank Performance Standards for Private Sector Projects Supported by IBRD/IDA; June 26, 2012; R2012-0130; IDA/R2012-0161. The IFC Performance Standards which comprise the WB Performance Standards can be found at [www.worldbank.org/safeguards]. IFC’s “Policy on Environmental and Social Sustainability” and IFC’s “Access to Information Policy” are not Bank policies and are therefore not included in the WB Performance Standards. While the Guidance Notes and Interpretation accompanying the IFC Performance Standards are similarly not Bank policies, and therefore not included in the WB Performance Standards, they may be consulted for good practice guidance. For purposes of this OP, the World Bank Safeguard Policies comprise the following: OP/BP 4.00, Piloting the Use of Borrower Systems to Address Environmental and Social Safeguard Issues in Bank-supported Project, OP/BP 4.01, Environmental Assessment, OP/BP 4.04, Natural Habitats, OP 4.09, Pest Management, OP/BP 4.10, Indigenous People, OP/BP 4.11, Physical Cultural Resources, OP/BP 4.12, Involuntary Resettlement, OP/BP 4.36, Forests, OP/BP 4.37, Safety of Dams, OP/BP 7.50, Projects on International Waterways, and OP/BP 7.60, Projects in Disputed Areas

Performance Standard 4: Community Health, Safety, and Security Performance Standard 5: Land Acquisition and Involuntary Resettlement Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources Performance Standard 7: Indigenous Peoples Performance Standard 8: Cultural Heritage.

This OP sets forth the circumstances under which the WB Performance Standards may be applied, the roles and responsibilities of the Private Entity implementing the project, and of the Bank in supporting environmental and social sustainability aspects of the project.

A Private Sector Activity, as long as it meets the requirements set forth in paragraph 4, may take a number of forms, including: (a) an activity involving a public private partnership (“PPP”), especially in an infrastructure sector, comprising a contractual arrangement between a public entity or authority and a Private Entity, whereby risks from construction, and/or operations, and/or financing are fully or partially transferred to the Private Entity; (b) an activity that involves medium- or long-term management contracts, affermage/leases, privatizations, concessions, or build-own-transfer, build-own-operate-transfer, build-own-operate, and other similar arrangements; (c) an activity involving a financial intermediary, provided the subprojects financed by the intermediary and supported by the Bank are implemented by Private Entities; and (d) in exceptional cases, an activity implemented by a state-owned entity, provided it meets the criteria of a Private Entity described above.

Table 3-3. World Bank Performance Standards

Performance Standards	Objectives
<p>Social and Environmental Assessment and Management System Performance Standard 1 underscores the importance of managing social and environmental performance throughout the life of a project (any business activity that is subject to assessment and management).</p>	<p>Impact identification and assessment.</p> <p>To identify and assess social and environmental impacts, both adverse and beneficial, in the project’s area of influence</p> <p>To avoid, or where avoidance is not possible, minimise, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment Stakeholder engagement.</p> <p>To ensure that affected communities are appropriately engaged on issues that could potentially affect them</p> <p>Effective management. To promote improved social and environment performance of companies through the effective use of management systems</p>
<p>Labour and Working Conditions Performance Standard 2 recognises that the pursuit of economic growth through employment creation and income generation should be balanced with protection for basic rights of workers.</p>	<p>To establish, maintain and improve the worker management relationship.</p> <p>To promote fair treatment, nondiscrimination and equal opportunity of workers, and compliance with national labor and employment laws.</p> <p>To protect the workforce by addressing child labour and forced labor.</p> <p>To promote safe and healthy working conditions, and to</p>

	protect and promote the health of workers.
Pollution Prevention and Abatement Performance Standard 3 recognises that increased industrial activity and urbanisation often generate increased levels of pollution to air, water, and land that may threaten people and the environment at the local, regional, and global level.	<p>To avoid or minimise adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities</p> <p>To promote the reduction of emissions that contribute to climate change</p>
Community Health, Safety and Security Performance Standard 4 recognises that project activities, equipment, and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development.	<p>To avoid or minimise risks to and impacts on the health and safety of the local community during the project life cycle from both routine and non-routine circumstances</p> <p>To ensure that the safeguarding of personnel and property is carried out in a legitimate manner that avoids or minimises risks to the community's safety and security</p>
Land Acquisition and Involuntary Resettlement Performance Standard 5 outlines that involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or means of livelihood) as a result of project-related land acquisition	<p>To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities</p> <p>To promote the reduction of emissions that contribute to climate change</p>
Biodiversity Conservation and Sustainable Natural Resource Management Performance Standard 6 recognises that protecting and conserving biodiversity—the variety of life in all its forms, including genetic, species and ecosystem diversity—and its ability to change and evolve, is fundamental to sustainable development	<p>To protect and conserve biodiversity</p> <p>To promote the sustainable management and use of natural resources through the adoption of practices that integrate conservation needs and development priorities</p>
Indigenous Peoples Performance Standard 7 recognises that Indigenous Peoples, as social groups with identities that are distinct from dominant groups in national societies, are often among the most marginalised and vulnerable segments of the population.	<p>To ensure that the development process fosters full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples</p> <p>To avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not feasible, to minimise, mitigate, or compensate for such impacts, and to provide opportunities for development benefits, in a culturally appropriate manner</p> <p>To establish and maintain an ongoing relationship with the Indigenous Peoples affected by a project throughout the life of the project</p> <p>To foster good faith negotiation with and informed participation of Indigenous Peoples when projects are to be located on traditional or customary lands under use by the Indigenous Peoples</p> <p>To respect and preserve the culture, knowledge and practices of Indigenous Peoples</p>
Cultural Heritage Performance Standard 8 recognises the importance of cultural heritage for current and future generations	To protect cultural heritage from the adverse impacts of project activities and support its preservation

3.4 World Bank Group Environment, Health and Safety (EHS) Guidelines

The EHS Guidelines are technical reference documents that address World Bank Group expectations regarding the industrial pollution management performance of its projects. They are designed to assist managers and decision makers with relevant industry background and technical information. This information supports actions aimed at avoiding, minimising, and controlling EHS impacts during the construction, operation, and decommissioning phase of a project or facility.

The EHS Guidelines serve as a technical reference source to support the implementation of the Performance Standards. When host country (Kenya) regulations differ from the levels and measures presented in the EHS Guidelines, projects will be expected to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, a full and detailed justification for any proposed alternatives is required. General EHS Guidelines also exist which contain information on cross-cutting environmental, health, and safety issues potentially applicable to all industry sectors are listed in Box 3-1.

- Environmental, Health, and Safety General Guidelines (2007)
- Environmental, Health, and Safety Guidelines for Toll Roads (2007)
- Environmental, Health, and Safety Guidelines for Construction Materials Extraction (2007)

Box. 3-1 General EHS Guidelines

1. Environmental

- 1.1 Air Emissions and Ambient Air Quality
- 1.2 Energy Conservation
- 1.3 Wastewater and Ambient Water Quality
- 1.4 Water Conservation
- 1.5 Hazardous Materials Management
- 1.6 Waste Management
- 1.7 Noise
- 1.8 Contaminated Land

2. Occupational Health and Safety

- 2.1 General Facility Design and Operation
- 2.2 Communication and Training
- 2.3 Physical Hazards
- 2.4 Chemical Hazards
- 2.5 Biological Hazards
- 2.6 Radiological Hazards
- 2.7 Personal Protective Equipment (PPE)
- 2.8 Special Hazard Environments
- 2.9 Monitoring

3. Community Health and Safety

- 3.1 Water Quality and Availability
- 3.2 Structural Safety of Project Infrastructure
- 3.3 Life and Fire Safety (L&FS)
- 3.4 Traffic Safety
- 3.5 Transport of Hazardous Materials
- 3.6 Disease Prevention
- 3.7 Emergency Preparedness and Response

4. Construction and Decommissioning

- 4.1 Environment
- 4.2 Occupational Health and Safety
- 4.3 Community Health and Safety

3.5 International agreements and treaties signed by Kenya

Kenya is a signatory to international agreement and treaties which are relevant to this project and are mentioned below.

Convention on International Trade Against Endangered Species (CITES)

The Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

United Nations Convention on Biological Diversity (UNCBD)

The purpose of this convention is to ensure the conservation and sustainable use of biodiversity. Kenya signed the convention on 5th June 1992 and ratified the same on 26th July 1992. The National Environment Management Authority (NEMA) is the National Focal Point to this Convention. The provisions of this Convention have been integrated in many laws of Kenya.

The Ramsar Convention for the conservation and sustainable utilization of wetlands

The Ramsar Convention (formally known as the Convention on Wetlands of International Importance, especially as Waterfowl Habitat) is an international treaty for the conservation and sustainable utilization of wetlands, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value.

Vienna Convention on the Protection of the Ozone Layer

This was an Intergovernmental negotiation for an international agreement to phase out ozone depleting substances concluded in March 1985 which saw the adoption of the Vienna Convention for the Protection of the Ozone Layer. This Convention encourages intergovernmental cooperation on research, systematic observation of the ozone layer, monitoring of CFC production, and the exchange of information.

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

The primary purpose of the convention is to establish methods to minimize global warming and in particular the emission of the greenhouse gases. The UNFCCC was adopted on 9th May 1992 and came into force on 21st March 1994. The Convention has been ratified by 189 states. Kenya ratified the Convention on 30th August 1994. NEMA is the focal point for the Convention.

Convention on the Rights of the Child

The Convention on the Rights of the Child (CRC), 1989 is the most comprehensive compilation of international legal standards for the protection of the human rights of children. The CRC is also the most widely ratified international human rights treaty, ratified by all countries in the world, with the exception of two.

The Convention acknowledges children as individuals with rights and responsibilities according to their age and development (rather than the property of their parents or as victims), as well as members of a family and community. Underlying the Convention are four main principles: non-discrimination, the best interests of the child, the right to life, survival and development and the right to participation.

Convention on the Elimination of all forms of Discrimination against Women

The Convention on the Elimination of all forms of Discrimination against Women (CEDAW) places explicit obligations on states to protect women and girls from sexual exploitation and abuse. Universal Declaration of Human Rights (Article 7), the UN Charter (Articles 1, 13, 55, and 76) and the International Covenant on Civil and Political Rights (Article 24) reaffirm the freedoms and rights of all children, including internally displaced children.

International Labour Organization

The International Labour Organization (ILO) is built on the constitutional principle that universal and lasting peace can be established only if it is based upon social justice. The ILO has generated such hallmarks of industrial society as the eight-hour working day, maternity protection, child-labour laws, and a range of policies which promote workplace safety and peaceful industrial relations.

The key ILO Conventions applicable to the proposed road project include:

- To promote and realize standards, and fundamental principles and rights at work.
- To create greater opportunities for women and men to secure decent employment.
- To enhance the coverage and effectiveness of social protection for all.
- To strengthen tripartism and social dialogue.

The key ILO Conventions applicable to the proposed road project include:

1. Equal Remuneration Convention (1951) (No. 100) - Calls for equal pay and benefits for men and women for work of equal value.
2. Discrimination (Employment and Occupation) Convention (1958) (No. 111) - Calls for a national policy to eliminate discrimination in access to employment, training, and

working conditions, on grounds of race, colour, sex, religion, political opinion, national extraction or social origin, and to promote equality of opportunity and treatment.

3. Minimum Age Convention (1973) (No. 138) - Aims at the abolition of child labour, stipulating that the minimum age for admission to employment shall not be less than the age of completion of compulsory schooling.
4. Worst Forms of Child Labour Convention (1999) (No. 182) - Calls for immediate and effective measures to secure the prohibition and elimination of the worst forms of child labour which include slavery and similar practices, forced recruitment for use in armed conflict, use in prostitution and pornography, any illicit activity, as well as work which is likely to harm the health, safety, and morals of children.

3.6 Differences between the Performance Standards and national laws and regulations

The table below highlights the Performance Standards (PS), relevant environmental and social national laws in Kenya, inherent gaps and recommendations for bridging the gaps.

Table 3-4. Performance Standards, national laws gap analysis

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p><u>Social and Environmental Assessment and Management System Performance Standard 1</u> underscores the importance of managing social and environmental performance throughout the life of a project (any business activity that is subject to assessment and management).</p> <ul style="list-style-type: none"> • Provides for identification and evaluation of environmental and social risks and impacts of a project; • Provides for the adoption of a mitigation hierarchy to anticipate and avoid, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, affected communities, and the environment. • Provides for improvement in environmental and social performance through the effective use of management systems; • Provides for mechanisms to ensure that grievances from affected communities and external communications from other stakeholders are responded to and managed appropriately; • Provides for mechanisms for adequate engagement with affected communities throughout the project cycle on issues that could potentially affect them; 	<p><u>Environmental Management and Coordination Act 1999;</u></p> <p>Provides for protection and conservation of the environment, environmental impact assessment, and environmental auditing and monitoring.</p> <p><u>Environmental Management and Coordination (Amendment) Act 2015</u> (<i>legal Notice No 5 of 2015</i>) and provides for a full ESIA study for high risk projects.</p> <p><u>Environmental Impact Assessment Guidelines and administrative procedures, 2002.</u> The guidelines provide the steps in implementation of an EIA, Monitoring and Environmental Audit</p> <p>Provides for screening of the proposed development activity and preparation of a Project Report</p> <p>Provides for carrying out of an EIA Study where a Project will have significant environmental impacts and the Project Report does not disclose adequate mitigation measures.</p>	<p>No significant gaps between Performance Standard 1 and the various national laws.</p>	<p>Apply World Bank PS standards with respect to requirement for ESMS and policy establishment which is not a requirement in Kenya's statutory regulations</p>

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<ul style="list-style-type: none"> Provides for measures to ensure that relevant environmental and social information is disclosed and disseminated. <p>Requirements <i>Environmental and Social Assessment and Management System</i> The client, in coordination with other responsible government agencies and third parties as appropriate will conduct a process of environmental and social assessment, and establish and maintain an ESMS appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts.</p> <p>Policy The client will establish an overarching policy defining the environmental and social objectives and principles that guide the project to achieve sound environmental and social performance.</p> <p>Identification of Risks and Impacts The client will establish and maintain a process for identifying the environmental and social risks and impacts of the project. The type, scale, and location of the project guide the scope and level of effort devoted to the risks and impacts identification process.</p> <p>Management Programs Consistent with the client’s policy and the objectives and principles described therein, the client will establish management programs that, in sum, will describe mitigation and performance improvement measures and actions that address the identified</p>	<p><i>Environmental and Social Assessment and Management System</i> The Environmental Management and Coordination Act provides for ESIA but does not explicitly provide for establishment and maintenance of ESMS.</p> <p>Policy The Environmental Management and Coordination Act does not require establishment of overarching policy defining the environmental and social objectives and principles that guide the project to achieve sound environmental and social performance.</p> <p>Identification of Risks and Impacts The Environmental Management and Coordination Act provides for ESIA studies for projects in order to identify the environmental and social risks and impacts.</p> <p>Management Programs The Environmental Management and Coordination Act provides for ESIA studies including specifically preparation of mitigation and management programs and plans (ESMP).</p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>environmental and social risks and impacts of the project.</p> <p>Organizational Capacity and Competency The client, in collaboration with appropriate and relevant third parties, will establish, maintain, and strengthen as necessary an organizational structure that defines roles, responsibilities, and authority to implement the ESMS. Specific personnel, including management representative(s), with clear lines of responsibility and authority should be designated.</p> <p>Emergency Preparedness and Response Where the project involves specifically identified physical elements, aspects and facilities that are likely to generate impacts, the ESMS will establish and maintain an emergency preparedness and response system so that the client, in collaboration with appropriate and relevant third parties, will be prepared to respond to accidental and emergency situations associated with the project in a manner appropriate to prevent and mitigate any harm to people and/or the environment.</p> <p>Monitoring and Review The client will establish procedures to monitor and measure the effectiveness of the management program, as well as compliance with any related legal and/or contractual obligations and regulatory requirements.</p> <p>Stakeholder Engagement and Consultation Stakeholder engagement is the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a</p>	<p>Organizational Capacity and Competency The Environmental Management and Coordination Act provides for ESIA studies including specifically outlining clear roles and responsibilities and authority to implement ESMP.</p> <p>Emergency Preparedness and Response The Environmental Management and Coordination Act provides for ESIA studies including as part of ESMP preparation of emergency preparedness and response system/plans if necessary.</p> <p>Monitoring and Review The Environmental Management and Coordination Act provides for ESIA studies including as part of ESMP clear procedures for monitor and measure the effectiveness of the management program, as well as compliance with any related legal and/or contractual obligations and regulatory requirements.</p> <p>Stakeholder Engagement and Consultation The Environmental Management and Coordination Act provides for ESIA</p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>project's environmental and social impacts.</p> <p><i>Grievance Mechanism for Affected Communities</i> Where there are affected communities, the client will establish a grievance mechanism to receive and facilitate resolution of affected communities and grievances about the clients's environmental and social performance.</p>	<p>studies including stakeholder engagement with vulnerable and marginalized groups.</p> <p><i>Grievance Mechanism for Affected Communities</i> The Environmental Management and Coordination Act provides for ESIA studies establishment of a roust grievance redress mechanism.</p>		
<p><u>Labour and Working Conditions Performance Standard 2</u> recognises that the pursuit of economic growth through employment creation and income generation should be balanced with protection for basic rights of workers.</p> <ul style="list-style-type: none"> • Provides for measures to promote the fair treatment, non-discrimination, and equal opportunity of workers; • Provides for measures to establish, maintain, and improve the worker-management relationship; • Provides for measures to promote compliance with national employment and labor laws; • Provides for measures to protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties and workers' in an organisations supply chain • Provides for mechanisms to promote safe and healthy working conditions, and the health of workers; and 	<p><u>Occupational Safety and Health Act (OSHA), 2007;</u></p> <ul style="list-style-type: none"> • Provides for the safety, health and welfare of workers and all persons lawfully present at work places. • Provides for the registration of workplaces. • provides for maintenance of cleanliness of workplaces, adequate lighting and ventilation, provision of sanitary conveniences, • Outlines safety requirements in use of machinery to prevent accidents and injuries. <p><u>The Factories and Other Places of Work (Noise Prevention and Control) Rules, 2005</u></p> <p>Rules provide for the maximum noise exposure levels for workers in places of work and for the provision of protective equipment for those exposed to high noise levels.</p>	<p>No significant gaps between Performance Standard 2 and the various national laws.</p> <p>The only significant gaps worth noting is requirments related to workers engaged by third parties and requirements for ESMS.</p>	<p>Apply either of the two due to insignificant differences.</p> <p>Specifically, however, require that with respect to contracted workers the KeNHA will take commercially reasonable efforts to ascertain that the third parties who engage these workers are reputable and legitimate enterprises and have an appropriate ESMS that will allow them to operate in a manner consistent with the requirements of this Performance Standard.</p>

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<ul style="list-style-type: none"> Provides for measures to avoid the use of forced labor. <p><u>Requirments</u> <i>Human Resources Policies and Procedures</i> The client will adopt and implement human resources policies and procedures appropriate to its size and workforce that set out its approach to managing workers consistent with the requirements of this Performance Standard and national law.</p> <p><i>Working Conditions and Terms of Employment</i> Where the client is a party to a collective bargaining agreement with a workers’ organization, such agreement will be respected. Where such agreements do not exist, or do not address working conditions and terms of employment, the client will provide reasonable working conditions and terms of</p>	<p>Provide that an occupier shall also institute noise reduction measures at the source of noise in the workplace.</p> <p><i>Human Resources Policies and Procedures</i> Provides for development of a noise prevention program where noise in a workplace exceeds the continuous equivalent of eighty five dB(A)</p> <p><u>Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009</u></p> <ul style="list-style-type: none"> Prohibits the generation of unreasonable, unnecessary or unusual noise which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment. Provides for the maximum noise levels permissible in various environmental set ups such as residential areas, places of worship, commercial areas and mixed residential <p><i>Working Conditions and Terms of Employment</i> Kenya’s labour laws require that workers are all require that human resources policies and procedures exist in all workplaces and provide for collective</p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>employment. The client will identify migrant workers and ensure that they are engaged on substantially equivalent terms and conditions to non-migrant workers carrying out similar work.</p> <p>Workers' Organisation In countries where national law recognizes worker's rights to form and join workers' organization of their choosing without interference and to bargain collectively the client will comply with then national laws.</p> <p>Non-Discrimination and Equal Opportunity The client will not make employment decisions on the basis of personal characteristics unrelated to inherent job requirements. The client will take measures to prevent and address harassment, intimidation, and/or exploitation, especially in regard to women. The principles of non-discrimination apply to migrant workers.</p> <p>Retrenchment Prior to implementing any collective dismissals, the client will carry out an analysis of alternatives to retrenchment. If the analysis does not identify viable alternatives to retrenchment, a retrenchment plan will be developed and implemented to reduce the adverse impacts of retrenchment on workers.</p> <p>Grievance Mechanism The client will provide a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns and inform the workers of the grievance mechanism at the time of recruitment and make it easily accessible to them.</p>	<p>bargaining agrments.</p> <p>Workers' Organisation Further labor laws in Kenya provide for workers to form unions of choice and allow for collective bargaining agreements.</p> <p>Non-Discrimination and Equal Opportunity The constitutuon of Kenya do not allow discrimination of any form and further the labor laws also provide for equal opportunity and non-discrimination of any form for workers with respect to employment incuding any form of intimidation or harassment.</p> <p>Retrenchment Kenya's labour laws provide for framework and steps for redundancy.</p> <p>Grievance Mechanism Kenya labour laws fully provide for grievance redress mechanism establishment in all workplaces.</p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p><i>Protecting the Work Force</i> Child Labour The client will not employ children in any manner that is economically exploitative or is likely to be hazardous or interfere with the child's education or to be harmful to the child's health or physical, mental, spiritual, moral or social development.</p> <p>Forced Labor The client will not employ forced labor, which consists of any work or service not voluntarily performed that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labor, such as indentured labor, bonded labor, or similar labor-contracting arrangements. The client will not employ trafficked persons.</p> <p>Occupational Health and Safety The client to provide a safe and healthy work environment taking into account inherent risks in its particular sector and specific classes of hazards in the client's work areas</p> <p><i>Workers Engaged by Third Parties</i> With respect to contracted workers the client will take commercially reasonable efforts to ascertain that the third parties who engage these workers are reputable and legitimate enterprises and have an appropriate ESMS that will allow them to operate in a manner consistent with the requirements of this Performance Standard. The client will establish policies and procedures for managing and monitoring the performance of such third party employers in relation to the requirements of this Performance Standard and ensure that contracted workers have access to a</p>	<p>Child Labour Kenya labour laws prohibit employment of children (under 18) and makes it a criminal offence.</p> <p>Forced Labor Further, any form of forced labour is prohibited by the labour laws including trafficking.</p> <p>Occupational Health and Safety The Occupational Safety and Health Act has clear provisions and requirements for ensuring health and safety of workers and stipulate the requirements of the employer with respect to the same.</p> <p><i>Workers Engaged by Third Parties</i> Kenya's labor laws are silent on engagement of third party workers and have no specific requirements for establishment of procedures and policies etc.</p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>grievance mechanism.</p> <p>Supply Chain Where there is a high risk of child labor or forced labor in the primary supply chain, the client will identify those risks. Additionally, where there is a high risk of significant safety issues related to supply chain workers, the client will introduce procedures and mitigation measures to ensure that primary suppliers within the supply chain are taking steps to prevent or to correct life-threatening situations.</p>	<p>Supply Chain Kenya labour laws prohibit employment of children (under 18) and makes it a criminal offence.</p>		
<p><u>Pollution Prevention and Abatement Performance Standard 3</u> recognises that increased industrial activity and urbanisation often generate increased levels of pollution to air, water, and land that may threaten people and the environment at the local, regional, and global level.</p> <ul style="list-style-type: none"> • Provides for measures to avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities. • Provides for measures to promote more sustainable use of resources, including energy and water. • Provides for measures to reduce project-related GHG emissions. 	<p><u>Environmental Management and Co-ordination (Water Quality) Regulations 2006</u></p> <ul style="list-style-type: none"> • Provides for the protection of ground and surface water resources. • Provides the water quality standards for sources of domestic water. • Provides that an EIA shall be carried out and license obtained to abstract water or carry out activities that may have adverse impacts on the quantity or quality of water in lakes, rivers, streams, springs and wells • Provides the water quality standards for effluent discharged into the aquatic environment. 	<p>No significant gaps between Performance Standard 3 and the various national laws.</p>	<p>Apply either of the two due to insignificant differences</p>

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
	<p><u>Environmental Management and Coordination (Waste Management) Regulations 2006</u></p> <ul style="list-style-type: none"> • Provides for standards for handling, transportation and disposal of various types of wastes including hazardous wastes. • Requirements to ensure waste minimization or cleaner production, waste segregation, recycling or composting. • Provides for licensing of vehicle transporting waste. • Provides for the licensing of waste disposal facilities. <p><u>Environmental Management and Coordination (Controlled Substances) Regulations 2007 (Legal Notice No 73 of 2007)</u></p> <ul style="list-style-type: none"> • Provides for measures for storage, handling packaging and disposal of products with ozone-depleting substances including air conditioning and refrigeration equipment <p><u>Environmental Management and Coordination (Air Quality) Regulations, 2014</u></p> <ul style="list-style-type: none"> • Provides for ambient air quality tolerance limits. 		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
	<ul style="list-style-type: none"> • Prohibits air pollution in a manner that exceed specified levels. • Prohibits air pollution in controlled areas including residential areas, hospitals, National Parks, reserves and sanctuaries, conservation areas and central business districts • Provides for air pollution monitoring of quarries • Provides for measures to prevent air pollution from stockpiles or handling of construction materials • Provides for installation of air pollution control systems where pollutants emitted exceed specified limits. • Provides for the control of fugitive emissions within property boundary. • Provides for the control of vehicular emissions. • Provides for prevention of dispersion of visible particulate matter or dust from any material being transported. 		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
	<ul style="list-style-type: none"> Provides for acquisition of an emission license. 		
<p><u>Community Health, Safety and Security Performance Standard 4</u> recognises that project activities, equipment, and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development.</p> <ul style="list-style-type: none"> Provides for mechanisms to anticipate and avoid adverse impacts on the health and safety of the affected community during the project life from both routine and non-routine circumstances; and Provides for measures to ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the affected communities. 	<p><u>The Public Health Act (Cap 242)</u></p> <ul style="list-style-type: none"> Provides for the prevention of the occurrence of nuisance or conditions dangerous/injurious to humans. Provides that the relevant local authority shall take all lawful, necessary and reasonably practicable measures. <p><u>Environmental Management and Coordination Act 1999;</u> Provides for protection and conservation of the environment, environmental impact assessment, and environmental auditing and monitoring.</p> <p><u>Environmental Management and Coordination (Amendment) Act 2015</u> (<i>legal Notice No 5 of 2015</i>) and provides for a full ESIA study for high risk projects.</p> <p><u>Environmental Impact Assessment Guidelines and administrative procedures, 2002.</u> The guidelines provide the steps in implementation of an EIA, Monitoring and Environmental Audit</p> <p>Provides for screening of the proposed development activity and preparation of a</p>	No significant gaps between Performance Standard 4 and the various national laws.	Apply either of the two due to insignificant differences

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
	<p>Project Report</p> <p>Provides for carrying out of an EIA Study where a Project will have significant environmental impacts and the Project Report does not disclose adequate mitigation measures</p> <p><u>Environmental Management and Co-ordination (Water Quality) Regulations 2006</u></p> <ul style="list-style-type: none"> • Provides for the protection of ground and surface water resources. • Provides the water quality standards for sources of domestic water. • Provides that an EIA shall be carried out and license obtained to abstract water or carry out activities that may have adverse impacts on the quantity or quality of water in lakes, rivers, streams, springs and wells • Provides the water quality standards for effluent discharged into the aquatic environment. <p><u>Environmental Management and Co-ordination (Waste Management) Regulations 2006</u></p> <ul style="list-style-type: none"> • Provides for standards for handling, transportation and 		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
	<p>disposal of various types of wastes including hazardous wastes.</p> <ul style="list-style-type: none"> • Requirements to ensure waste minimization or cleaner production, waste segregation, recycling or composting. • Provides for licensing of vehicle transporting waste. • Provides for the licensing of waste disposal facilities. <p><u>Environmental Management and Coordination (Controlled Substances) Regulations 2007 (Legal Notice No 73 of 2007)</u></p> <ul style="list-style-type: none"> • Provides for measures for storage, handling packaging and disposal of products with ozone-depleting substances including air conditioning and refrigeration equipment <p><u>Environmental Management and Coordination (Air Quality) Regulations, 2014</u></p> <ul style="list-style-type: none"> • Provides for ambient air quality tolerance limits. • Prohibits air pollution in a manner that exceed specified levels. 		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>Requirements</p>	<ul style="list-style-type: none"> • Prohibits air pollution in controlled areas including residential areas, hospitals, National Parks, reserves and sanctuaries, conservation areas and central business districts • Provides for air pollution monitoring of quarries • Provides for measures to prevent air pollution from stockpiles or handling of construction materials • Provides for installation of air pollution control systems where pollutants emitted exceed specified limits. • Provides for the control of fugitive emissions within property boundary. • Provides for the control of vehicular emissions. • Provides for prevention of dispersion of visible particulate matter or dust from any material being transported. • Provides for acquisition of an emission license. <p><i>Community Health and Safety</i></p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p><i>Community Health and Safety</i> The client will evaluate the risks and impacts to the health and safety of the Affected Communities during the project life-cycle and will establish preventive and control measures consistent with good international industry practice (GIIP),¹ such as in the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines) or other internationally recognized sources. The client will identify risks and impacts and propose mitigation measures that are commensurate with their nature and magnitude. These measures will favor the avoidance of risks and impacts over minimization.</p> <p><i>Infrastructure and Equipment Design and Safety</i> The client will design, construct, operate, and decommission the structural elements or components of the project in accordance with GIIP, taking into consideration safety risks to third parties or Affected Communities.</p> <p><i>Hazardous Materials Management and Safety</i> The client will avoid or minimize the potential for community exposure to hazardous materials and substances that may be released by the project.</p> <p><i>Ecosystem Services</i> The project's direct impacts on priority ecosystem services may result in adverse health and safety risks and impacts on affected communities</p>	<p><u>Environmental Management and Coordination Act 1999:</u> Provides for undertaking of ESIA for all projects and assess project risks on communities with respect to health and safety.</p> <p><i>Infrastructure and Equipment Design and Safety</i> Kenya has building codes and regulations governing design, construct, operate, and decommission.</p> <p><i>Hazardous Materials Management and Safety.</i> Environmental Management and Co-ordination (Waste Management) Regulations 2006 provide for management of hazardous wastes and materials including protection of communities from associated risks.</p> <p><i>Ecosystem Services</i> <u>Environmental Management and Coordination Act 1999:</u> Provides for protection and conservation of the environment, environmental impact assessment, and environmental auditing and monitoring.</p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p><i>Community Exposure to Disease</i> The client will avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases, and communicable diseases that could result from project activities, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups.</p> <p><i>Emergency Preparedness and Response</i> In addition to the emergency preparedness and response requirements described in Performance Standard 1, the client will also assist and collaborate with the Affected Communities, local government agencies, and other relevant parties, in their preparations to respond effectively to emergency situations, especially when their participation and collaboration are necessary to respond to such emergency situations.</p> <p><i>Security Personnel</i> When the client retains direct or contracted workers to provide security to safeguard its personnel and property, it will assess risks posed by its security arrangements to those within and outside the project site. In making such arrangements, the client will be guided by the principles of proportionality and good international practice in relation to hiring, rules of conduct, training, equipping, and monitoring of such</p>	<p><i>Community Exposure to Disease</i> <u>The Public Health Act (Cap 242)</u></p> <ul style="list-style-type: none"> • Provides for the prevention of the occurrence of nuisance or conditions dangerous/injurious to humans. • Provides that the relevant local authority shall take all lawful, necessary and reasonably practicable measures. <p><i>Emergency Preparedness and Response</i> <u>Environmental Management and Coordination Act 1999;</u> Provides for development of emergency preparedness and response plans for minimizing risks to communities and ensure participation of communities in response.</p> <p><i>Security Personnel</i> The Private Security Regulation Act 2016 provides for conduct of contracted security personell including hiring, training, use of force and association with communities.</p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>workers, and by applicable law. The client will provide a grievance mechanism for Affected Communities to express concerns about the security arrangements and acts of security personnel. The client will consider and, where appropriate, investigate all allegations of unlawful or abusive acts of security personnel, take action (or urge appropriate parties to take action) to prevent recurrence, and report unlawful and abusive acts to public authorities.</p>			

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p><u>Land Acquisition and Involuntary Resettlement Performance Standard 5</u> outlines that involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or means of livelihood) as a result of project-related land acquisition.</p> <ul style="list-style-type: none"> • Provides for measures to ensure the avoidance, and when avoidance is not possible, minimization of displacement by exploring alternative project designs; • Provides for measures to ensures the avoidance of forced eviction; • Provides for measures to ensure the anticipation, avoidance or minimization of adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected; • Provides for measures to ensures the improvement or restoration of the 	<p><u>The National Land Commission Act 2012</u></p> <ul style="list-style-type: none"> • Provides for the management and administration of land in accordance with the principles of the land policy set out in Article 60 of the Constitution and the national land policy • Gives power to the National Land Commission (NLC) to manage public land on behalf of the national and county governments, and to monitor and have oversight responsibilities over land use planning throughout the country • Mandates the NLC to investigate and provide recommendations on historical land injustices including development-induced displacement for which no adequate compensation or other form of remedy was provided, including conversion of non-public land into public land <p><u>The Land Act 2012</u></p> <ul style="list-style-type: none"> • Mandates the National Land 	<p>No significant gaps between Performance Standard 5 and the various national laws. Nevertheless, the national laws do not expressly provide for compensation for land and assets at replacement cost. They also do not provide for livelihood restoration.</p>	<p>Apply the World Bank’s performance standard due clearer definition of compensation measures and livelihood restoration strategies</p>

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>livelihoods and standards of living of displaced persons; and</p> <ul style="list-style-type: none"> Provides measures to ensure the improvement of living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites. 	<p>Commission and other public officers to use the following guiding principles and values: equitable access to land; security of land rights; sustainable and productive management of land resources; conservation and protection of ecologically sensitive areas</p> <ul style="list-style-type: none"> Provides for methods of acquisition of title to land including compulsory acquisition where land is required for public purposes or in the public interest as related to and necessary for fulfilment of the stated public purpose Provides for the conversion of private land to public land through compulsory acquisition, transfer, surrender or reversion of leasehold interest to Government; Provides that just compensation shall be paid promptly in full to all persons whose interests in the land have been determined; and <p>Provides for the creation of a public rights of way (ROW) or wayleave by the National Land Commission.</p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p><u>Requirements</u> <i>Project Design</i> The client will consider feasible alternative project designs to avoid or minimize physical and/or economic displacement, while balancing environmental, social, and financial costs and benefits, paying particular attention to impacts on the poor and vulnerable.</p> <p><i>Compensation and Benefits for Displaced Persons</i> When displacement cannot be avoided, the client will offer displaced communities and persons compensation for loss of assets at full replacement cost and other assistance¹¹ to help them improve or restore their standards of living or livelihoods, as provided in this Performance Standard.</p> <p><i>Community Engagement</i> The client will engage with Affected Communities, including host communities, through the process of stakeholder engagement described in Performance Standard 1. Decision-making processes related to resettlement and livelihood restoration should include options and alternatives, where applicable.</p> <p><i>Grievance Mechanism</i> The client will establish a grievance mechanism consistent with Performance Standard 1 as early as possible in the project development phase.</p> <p><i>Resettlement and Livelihood Restoration Planning and Implementation</i> Where involuntary resettlement is unavoidable, either</p>	<p><i>Project Design</i> <u>Environmental Management and Coordination Act 1999;</u> Provides for consideration of alternatives including those related to avoiding or minimize physical and/or economic displacement during project design.</p> <p><i>Compensation and Benefits for Displaced Persons</i> <u>The Land Act 2012 and National Land Commission Act 2012</u> provides for compensation of Project Affected Persons at existing market rates for loss of assets.</p> <p><i>Community Engagement</i> <u>The Land Act 2012 and National Land Commission Act 2012</u> provides for consultations and engagement of affected communities during the RAP development process.</p> <p><i>Grievance Mechanism</i> <u>The Land Act 2012 and National Land Commission Act 2012</u> provides for establishment of grievance redress mechanism as part of the RAP development process.</p> <p><i>Resettlement and Livelihood Restoration Planning and Implementation</i> <u>The Land Act 2012 and National Land Commission Act 2012</u> provides for</p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>as a result of a negotiated settlement or expropriation, a census will be carried out to collect appropriate socio-economic baseline data to identify the persons who will be displaced by the project, determine who will be eligible for compensation and assistance, and discourage ineligible persons, such as opportunistic settlers, from claiming benefits.</p>	<p>designing of livelihood restoration planning and implementation.</p>		
<p><u>Biodiversity Conservation and Sustainable Natural Resource Management Performance Standard 6</u> recognises that protecting and conserving biodiversity— the variety of life in all its forms, including genetic, species and ecosystem diversity— and its ability to change and evolve, is fundamental to sustainable development.</p> <ul style="list-style-type: none"> • Provides for measures to ensure the protection and conservation of biodiversity; • Provides for measures to ensure the maintenance of benefits from ecosystem services; and • Provides for measures to promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities. 	<p><u>The Wildlife Conservation and Management Act, 2013</u></p> <ul style="list-style-type: none"> • Prohibits pollution of wildlife habitats and ecosystems <p><u>The Forest Conservation and Management Act, 2016</u></p> <ul style="list-style-type: none"> • Prohibits the destruction of protected tree species or family of trees • Provides for the sustainable management of indigenous forests and woodlands <p><u>The Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009</u> applies to all wetlands in Kenya whether occurring in private or public land.</p> <p>The objectives of the regulations is to provide for the conservation and sustainable use of wetlands and their resources in Kenya and promote the integration of sustainable use of resources in wetlands into the local and national management of natural resources for socio-economic development.</p>	<p>No significant gaps between Performance Standard 6 and the various national laws. However, the specific requirement for “net gain” principle for critical habitats and endangered species affected by project.</p>	<p>Apply World Bank Policies when encountering critical habitats in order to apply the specific requirement for “net gain” principle for critical habitats and endangered species affected by project.</p>

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>Requirements <i>Protection and Conservation of Biodiversity</i> For protection and conservation of the biodiversity.</p>	<p>The act also aims at ensuring the conservation of water catchments and the control of floods and the sustainable use of wetlands for ecological and aesthetic purposes for the common good of all citizens. The act also makes provision for the protection of wetlands as habitats for species of fauna and flora. It also provides a framework for public participation in the management of wetlands.</p> <p>The Act requires wetland resources to be utilized in a sustainable manner compatible with the continued presence of wetlands and their hydrological, ecological, social and economic functions and services.</p> <p>The Act requires special measures to be undertaken to preserve and maintain knowledge innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity in wetlands.</p> <p>The regulation also calls for sustainable use of wetlands through integration into the national and local land use plans to ensure sustainable use of wetlands in the country.</p> <p><i>Protection and Conservation of Biodiversity</i></p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>the mitigation hierarchy⁵ includes biodiversity offsets.</p>	<p><u>The Wildlife Conservation and Management Act, 2013</u></p> <ul style="list-style-type: none"> Prohibits pollution of wildlife habitats and ecosystems <p><u>The Forest Conservation and Management Act, 2016</u></p> <ul style="list-style-type: none"> Prohibits the destruction of protected tree species or family of trees Provides for the sustainable management of indigenous forests and woodlands <p><u>The Environmental Management and Co-ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009</u> applies to all wetlands in Kenya whether occurring in private or public land.</p>		
<p><u>Indigenous Peoples Performance Standard 7</u> recognises that Indigenous Peoples, as social groups with identities that are distinct from dominant groups in national societies, are often among the most marginalised and vulnerable segments of the population.</p> <ul style="list-style-type: none"> Provides for measures to ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples; Provides for measures to ensure the anticipation and avoidance of adverse impacts of projects on communities of 	<p>While the term “Indigenous Peoples” is not used in Kenya, the legal framework recognizes particular concerns and rights of minorities and marginalized groups. The Constitution defines a marginalized community as:</p> <p>“A community that, because of its <i>relatively small population</i> or for any other reason, has been unable to fully participate in the integrated social and economic life of Kenya as a whole;</p> <p>A <i>traditional community</i> that, out of a need or desire to preserve its unique culture and identity from assimilation,</p>	<p>No significant gaps between Performance Standard 7 and the various national laws.</p>	<p>Apply either of the two due to insignificant differences</p>

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts;</p> <ul style="list-style-type: none"> • Provides for measures to promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner; • Provides for measures to establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project’s life-cycle; and • Provides for measures to respect and preserve the culture, knowledge, and practices of Indigenous Peoples. 	<p>has remained outside the integrated social and economic life of Kenya as a whole;</p> <p>An <i>indigenous community</i> that has retained and maintained a traditional lifestyle and livelihood based on a hunter or gatherer economy; or</p> <p><i>Pastoral persons and communities</i>, whether they are (i) nomadic; or (ii) a settled community that, because of its relative geographic isolation, has experienced only marginal participation in the integrated social and economic life of Kenya as a whole” (Article 260; emphasis added).</p> <p>The Constitution of Kenya adopted in 2010 requires the State to address the needs of vulnerable groups, including “minority or marginalized” and “particular ethnic, religious or cultural communities” (Article 21.3). Specific provisions include: affirmative action programs and policies for minorities and marginalized groups (Articles 27.6 and 56); rights of “cultural or linguistic” communities to maintain their culture and language (7, 44.2 and 56); protection of community land, including land that is “lawfully held, managed or used by specific communities as community forests, grazing areas or shrines,” and “ancestral lands and lands traditionally occupied by hunter-gatherer communities” (63); promotion of representation in Parliament of “...(d) ethnic and other minorities; and (e)</p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>Requirements</p> <p><i>Avoidance of Adverse Impacts</i> The client will identify, through an environmental and social risks and impacts assessment process, all communities of Indigenous Peoples within the project area of influence who may be affected by the project, as well as the nature and degree of the expected direct and indirect economic, social, cultural (including cultural heritage), and environmental impacts on them. Adverse impacts on Affected Communities of Indigenous Peoples should be avoided where possible. Where alternatives have been explored and adverse impacts are unavoidable, the client will minimize, restore, and/or compensate for these impacts in a culturally appropriate manner commensurate with the nature and scale of such impacts and the vulnerability of the Affected Communities of Indigenous Peoples.</p> <p><i>Participation and Consent</i> The client will undertake an engagement process with the Affected Communities of Indigenous Peoples as required in Performance Standard 1. This engagement process includes stakeholder analysis and engagement planning, disclosure of information, consultation, and participation, in a culturally appropriate manner.</p> <p><i>Mitigation and Development Benefits</i></p>	<p>marginalized communities” (100); and an equalization fund to provide basic services to marginalized areas (204).</p> <p><i>Avoidance of Adverse Impacts</i> The Constitution of Kenya adopted in 2010 requires the State to address the needs of vulnerable groups, including “minority or marginalized” and “particular ethnic, religious or cultural communities” (Article 21.3).</p> <p><u>Environmental Management and Coordination Act 1999;</u> Requires undertaking of ESIA studies and identification of risks and impacts including on communities.</p> <p><i>Participation and Consent</i> The Constitution of Kenya adopted in 2010 requires the State to address the needs of vulnerable groups, including “minority or marginalized” and “particular ethnic, religious or cultural communities” (Article 21.3).</p> <p><u>Environmental Management and Coordination Act 1999;</u> Requires undertaking of ESIA studies and identification of risks and impacts including on communities.</p>		

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p>The client and the Affected Communities of Indigenous Peoples will identify mitigation measures in alignment with the mitigation hierarchy described in Performance Standard 1 as well as opportunities for culturally appropriate and sustainable development benefits. The client will ensure the timely and equitable delivery of agreed measures to the Affected Communities of Indigenous Peoples.</p>	<p><i>Mitigation and Development Benefits</i> The Constitution of Kenya adopted in 2010 requires the State to address the needs of vulnerable groups, including “minority or marginalized” and “particular ethnic, religious or cultural communities” (Article 21.3).</p> <p><u>Environmental Management and Coordination Act 1999;</u> Requires undertaking of ESIA studies and identification of risks and impacts including on communities.</p>		
<p><u>Cultural Heritage Performance Standard 8</u> recognizes the importance of cultural heritage for current and future generations.</p> <ul style="list-style-type: none"> • Provides for measures to protect cultural heritage from the adverse impacts of project activities and support its preservation; • Provides for measures to promote the equitable sharing of benefits from the use of cultural heritage; and • Provide for measures to address impacts on physical cultural resources in projects proposed for Bank financing, as an integral part of the environmental assessment (EA) process. 	<p><u>Environmental Management and Coordination Act 1999;</u></p> <ul style="list-style-type: none"> • Provides for protection and conservation of the environment, environmental impact assessment, and environmental auditing and monitoring. <p><u>Environmental Management and Coordination (Amendment) Act 2015</u> (<i>legal Notice No 5 of 2015</i>) and provides for a full ESIA study for high risk projects.</p> <p><u>Environmental Impact Assessment Guidelines and administrative procedures, 2002.</u> The guidelines provide the steps in implementation of an EIA, Monitoring and Environmental Audit</p> <ul style="list-style-type: none"> • Provides for screening of the proposed development activity and preparation of a Project Report 	<p>No significant gaps between Performance Standard 8 and the various national laws.</p>	<p>Apply either of the two due to insignificant differences</p>

Performance Standards and Requirements	National Laws and Requirements	Gaps	Recommended Action
<p><u>Requirements</u> <i>Protection of Cultural Heritage in Project Design and Execution</i> In addition to complying with applicable law on the protection of cultural heritage, including law implementing the host country's obligation under the convention concerning the protection of the World Cultural and Natural Heritage, the client will identify and protect cultural heritage by ensuring that internationally recognised practices for the protection of field based study and documentation of cultural heritage are implemented.</p> <p><i>Consultation</i> Where a project may affect cultural heritage, the client will consult with Affected Communities within the host country who use, or have used within living memory, the cultural heritage for long-standing cultural purposes.</p> <p><i>Community Access</i> Where the client's project site contains cultural heritage or prevents access to previously accessible cultural heritage sites being used by or that have been used by affected communities within living memory for long standing cultural purposes, the client will based on consultations allow for continued access to the cultural site or provide alternative access route subject to overriding health, safety and security considerations.</p>	<ul style="list-style-type: none"> Provides for carrying out of an EIA Study where a Project will have significant environmental impacts <p><i>Protection of Cultural Heritage in Project Design and Execution</i> Environmental Management and Coordination (Amendment) Act 2015 and National Museums of Kenya Act provides for protection of cultural resources with respect to risk identification of cultural heritage resources. The EMCA and NMK Act also provides for the development of Chance Finds Procedures for managing cultural impacts related to chance finds.</p> <p><i>Consultation</i> The Environmental Management and Coordination Act provides for ESIA studies including stakeholder engagement.</p> <p><i>Community Access</i> The Environmental Management and Coordination Act provides for ESIA studies including assessment or risks associated with restricted use of resources.</p>		

4 CHAPTER 4. PROJECT BASELINE DESCRIPTION

This chapter describes the project environmental baseline with respect to the bio-physical environment where the Nairobi-Mau Summit Highway Project traverses. The project highway traverses the Counties of Kiambu, Nyandarua and Nakuru Counties. The baseline description is presented by County i.e. Kiambu, Nyandarua and Nakuru Counties respectively.

4.1 Kiambu County

The road expansion begins at Rironi Town in Kiambu County and extends until Naivasha Town before entering into Nakuru County. Kiambu County also encompasses road section (1) which is the corridor from B3 intersection with A104 at Kamandura in Rironi area to the Maai Mahiu town.

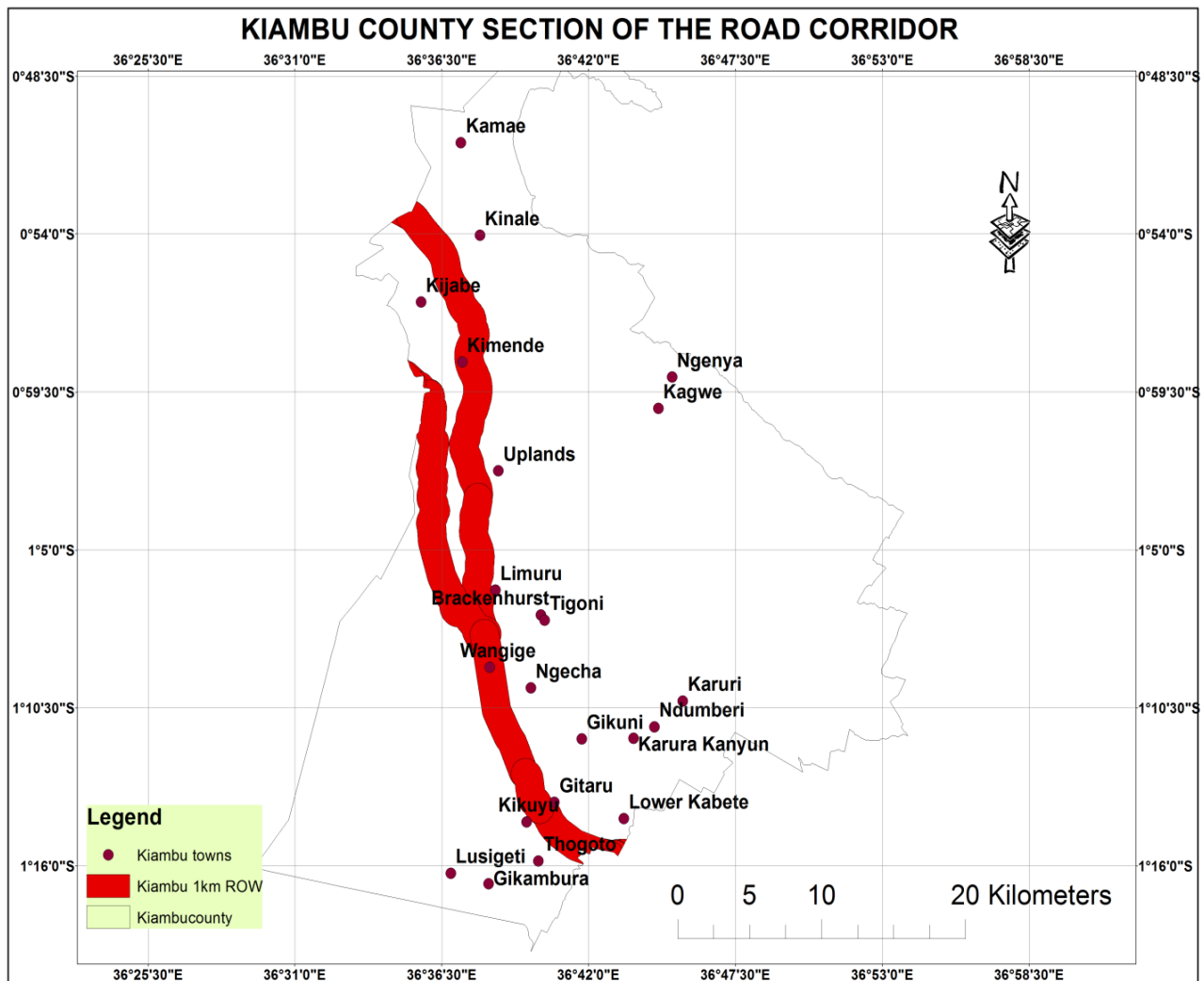


Figure 4-1. County Map of Kiambu and road section

4.1.1 Topography and Terrain

Kiambu County is divided into four broad topographical zones viz, Upper Highland, Lower Highland, Upper Midland and Lower Midland Zone. The Upper Highland Zone is found in Lari Constituency and it is an extension of the Aberdare ranges that lies at an altitude of 1,800-2,550 metres above sea level. It is dominated by highly dissected ranges and it is very wet, steep and important as a water catchment area. The lower highland zone is mostly found in Limuru and some parts of Gatundu North, Gatundu South, Githunguri and Kabete constituencies. The area is characterized by hills, plateaus, and high-elevation plains. The area lies between 1,500-1,800 metres above sea level and is generally a tea and dairy zone though some activities like maize, horticultural crops and sheep farming are also practiced. There are also large plantations of pineapples owned by Del Monte in parts of Thika sub county. The upper midland zone lies between 1,300-1,500 metres above sea level and it covers mostly parts of Juja and other constituencies with the exception of Lari. The landscape comprises of volcanic middle level uplands.

The lower midland zone partly covers Thika Town (Gatanyaga), Limuru and Kikuyu constituencies. The area lies between 1,200-1,360 metres above sea level. The soils in the midland zone are dissected and are easily eroded. Other physical features include steep slopes and valleys, which are unsuitable for cultivation. The proposed route is within the lower midland zone covering Limuru and Kikuyu and hence lie between 1,200-1,360 metres above sea level.

The road passes mostly through plain terrain with occasional passes of rolling and hilly terrains. After the beginning of Project Road at Rironi Town, the road mostly passes through plain terrain, coupled with a mild hilly terrain for about 9.5 km after Kimende Town (Great Rift Valley). The terrain map of the project area is found in **annex VII** of this report.

4.1.2 Soils and Geology

The county is covered by three broad categories of soils which are: high level upland soils, plateau soils and volcanic footbridges soils. These soils are of varying fertility levels with soils from high-level uplands, which are from volcanic rocks, being very fertile. Their fertility is conducive for livestock keeping and growth of various cash crops and food crops such as tea, coffee, horticultural products, pyrethrum, vegetables, maize, beans, peas and potatoes. These soils are found in the highlands, mostly in Gatundu South, Gatundu North, Githunguri, Kiambu, Kiambaa, Lari, Kikuyu, Kabete and Limuru Constituencies. Low fertility soils are mainly found in the middle zone and the eastern part of the county which form part of the semi-arid areas. The soils are sandy or clay and can support drought resistant crops such as soya beans and sunflower as well as ranching. These soils are mostly found in parts of Juja, Thika Town, Ruiru, Kabete, Limuru, Gatundu North and Gatundu South Constituencies.

Most parts of the county are covered by soils from volcanic footbridges. These are well drained with moderate fertility. They are red to dark brown friable clays, which are suited for cash crops like coffee, tea and pyrethrum. However, parts of Thika Town, Ruiru, Juja and Lari constituencies are covered by shallow soils, which are poorly drained, and these areas are

characterized by low rainfall, which severely limits agricultural development, although they are suitable for ranching and growth of drought resistant crops.



Figure 4-2. Rocks and Soils in Mutarakwa Road Corridor

4.1.3 Climate and Meteorology

The county experiences bi-modal type of rainfall. The long rains fall between Mid-March to May followed by a cold season usually with drizzles and frost during June to August and the short rains between Mid-October to November. The annual rainfall varies with altitude, with higher areas receiving as high as 2,000 mm and lower areas of Thika Town constituency receiving as low as 600 mm. The average rainfall received by the county is 1,200 mm.

The annual average rainfall varies from 845mm in Ruiru, at 1,555m, to 1,373mm at Kereita forest, at 2,438m. Limuru area has a mean maximum temperature of about 20°C and a mean minimum temperature of about 10°C. The mean temperature in the county is 26°C with temperatures ranging from 7°C in the upper highlands areas of Limuru and some parts of Gatundu North, Gatundu South, Githunguri and Kabete constituencies, to 34°C in the lower midland zone found partly in Thika Town constituency (Gatuanyaga), Kikuyu, Limuru and Kabete constituencies (Ndeiya and Karai). July and August are the months during which the lowest temperatures are experienced, whereas January to March are the hottest months. The county's average relative humidity ranges from 54 percent in the dry months and 300 percent in the wet months of March up to August.

4.1.4 Agro Climatic Zone

The county falls under agro-climatic zones (ACZ) I – IV which have mean annual rainfall (r) to mean annual potential evaporation (E_o) ratios (r/E_o) of $> 0.8 - 0.5$. These zones range from humid to semi-arid with very high to medium potential for plant growth. Rainfall ranges from 800 mm in agro-climatic zone IV to 2,700 mm in agro-climatic zone I, while potential evaporation ranges from 1,200 mm in ACZ I to 2,200 mm in ACZ IV. Mean annual temperatures range from 10 °C in ACZ I to 18 °C in ACZ IV ([Sombroek et al., 1982](#)).

4.1.5 Hydrology

Water in the county is from two principal sources- surface and sub-surface. About 90 percent of the county's water resource comprises of both surface water resources and ground water potential. The county is divided into several sub-catchments areas. The first one is Nairobi River Sub-catchment which occupies the southern part of the county with the major rivers being

Nairobi, Gitaru, Gitahuru, Karura, Ruirwaka, and Gatharaini. The second one is Kamiti and Ruiru Rivers Sub-catchment which is located to the north of the Nairobi river sub-catchment. It has eight permanent rivers which include Riara, Kiu, Kamiti, Makuyu, Ruiru, Bathi, Gatamaiyu and Komothai. The third one is the Aberdare plateau that contributes to the availability of two sub-catchments areas comprising of Thiririka and Ndarugu Rivers.

The main streams found in the two areas include Mugutha, Theta, Thiririka, Ruabora, Ndarugu and Komu. They flow from Nairobi, Kamiti, Ruiru, Thiririka, and Ndarugu sub-catchments to form Athi River sub-catchment. The fourth is the Chania River and its tributaries comprising of Thika and Kariminu Rivers which rise from the slopes of Mt. Kinangop in the Aberdares range. Last one is Ewaso Kedong sub catchment which runs in the North-South direction and occupies the western part of the county. It has several streams that normally form swamps. In the project area, the major surface water body (river) crossed directly by the highway as shown in table 4-1 below. There are several seasonal streams as shown in **annex VI** (drainage features and land use).

Table 4-1. Major Surface Water Bodies in Kiambu County

Name	Class	County
River Gatamaiyu	Permanent	Kiambu

4.1.6 Biological Environment

Critical Habitat Screening (CHS) survey was carried out as in Kiambu County as part of biodiversity baseline survey at the landscape scale, using ecologically and/or administratively coherent Discrete Management Units¹² (DMUs), which are a means for determining the presence or absence of Critical Habitat-qualifying features under PS6 criteria 1 to 3. A preliminary review of the region’s ecology was thus carried out during the identification of DMUs. This highlighted any potential Critical Habitat-qualifying features which might be present, and informs delineation of DMUs at an appropriate scale.

Critical Habitat designation is an assessment of biodiversity importance of an area, based on the biodiversity values and not the potential impacts associated with a Project. The presence of Critical Habitat does not necessarily imply an impact from the Project, and does not necessarily mean that any specific mitigation will be required. In this study, the area assessed for Critical Habitat was not just the direct Project footprint, but consideration of a broader landscape was made. This precautionary approach ensures all Project risks are taken into consideration, and demonstrates transparency to relevant stakeholders.

¹² DMUs are defined by the IFC as ‘areas with a definable boundary within which the character of biological communities and/or management issues have more in common with each other than they do with those in adjacent areas’.



Figure 4-3. Secondary indigenous forest patch on the road alignment in Kinale Forest

Terrestrial DMU

In Kiambu County, the highway passes through landscape that are not complex and does not contain numerous protected areas and internationally recognised areas; with diverse habitat types and topography. In particular, the area is home to a variety of large, wide-ranging species who depend on ecological connectivity within the landscape. The road is adjacent to, and its 15-km buffer intersects with, a number of Protected Areas (PA), Internationally Recognised Areas (IRAs) and areas of natural habitat.

Box 4-1. Delineated DMU

1. The block of forest and scrub formed by the Kikuyu Escarpment Forest (intersected by the road) and the Aberdares Forest Reserves/NP. This is an ecological unit within which wildlife (including wide-ranging species such as African Elephant) moves and disperses.

The DMU aligns with the boundaries for Key Biodiversity Areas (KBA) where present, where KBA's are not present the DMU aligns with nationally designated Forest Reserves.

Although the DMU includes the whole of the Aberdares National Park, encompassing the full range of large mammals such as African Elephant and Cape Buffalo, endemic species (mainly plants) confined to the high-altitude moorlands are not included in the Critical Habitat screening. This is because these species have no ecological link to the area of influence of the road project.

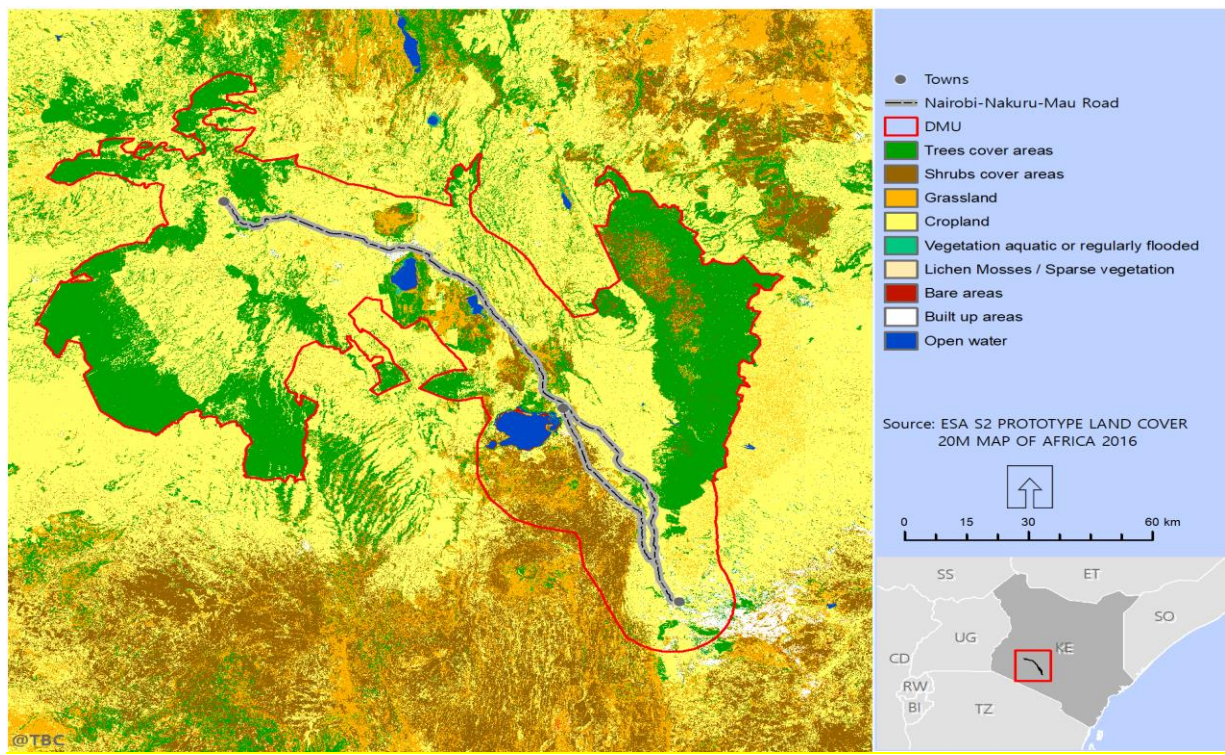


Figure 4-4: Vegetation cover in the terrestrial DMU (source CH Report)

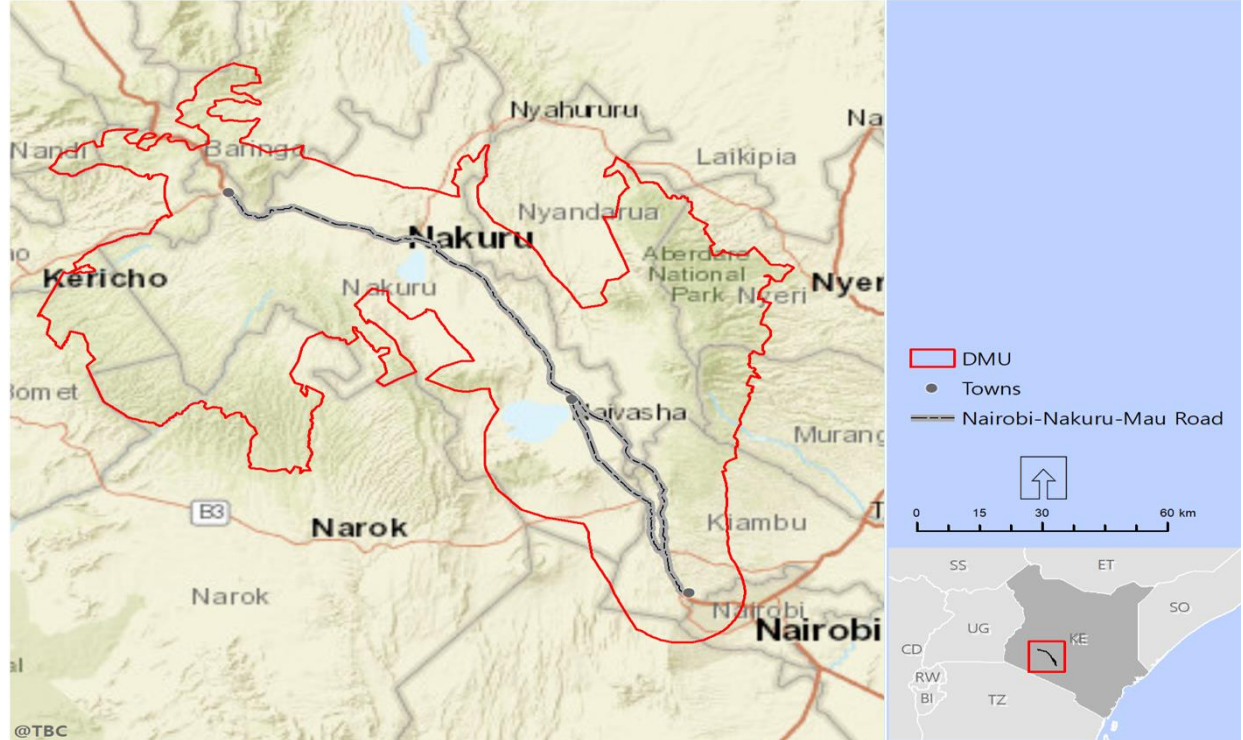


Figure 4-5. The DMU in relation to the road alignment and major towns (Source; CH Report)

Tier 1 Critical Habitat

Tier 1 Critical Habitat-qualifying species are the most sensitive biodiversity features in the Project landscape. Tier 1 Critical Habitat is of extreme global importance for the long-term survival of these species. Criterion 1 species meet the thresholds for Tier 1 because they are highly threatened (Criterion 1a or 1b). The PS6 thresholds for Tier 1 Criterion 1 Critical Habitat are:

Table 4-2: Tier 1 Criterion 1 Critical Habitat-qualifying features

Tier	PS6 Criterion	Threshold/definition (IFC 2012b)
Tier 1	Criterion 1: CR or EN species	1a Habitat required to sustain ≥ 10% of the global population of a CR or EN species/subspecies where there are known, regular occurrences of the species and where that habitat could be considered a discrete management unit for that species
		1b Habitat with known, regular occurrences of CR or EN species where that habitat is one of 10 or fewer discrete management units for that species

Qualifying features

In the project routing, there are **two** Critical Habitat-qualifying species under Criterion 1, Tier 1 in the road corridor in Kiambu County, see Table 4-3 below. See Appendix X Critical and Natural Habitat Report for species accounts.

Table 4-3: Tier 1 Criterion 1 Critical Habitat-qualifying features

Taxa	Species	IUCN	PS6 criterion
Bird	<i>Macronyx sharpei</i>	EN	1a
Amphibian	<i>Phrynobatrachus irangi</i>	EN	1a

Implications of Criterion 1, Tier 1 for the Project

Mitigation of impacts on highly threatened (Criterion 1) Tier 1 Critical Habitat features will be the highest concern. There is significant onus on the Project to ensure that impacts on these species are avoided and minimised as far as feasibly possible, including via review of project design to optimise avoidance and minimisation, and consideration of timing and intensity of operational activities if appropriate.

This means that a robust Project-specific ESIA baseline is vital, followed by iterative and thorough application of the mitigation hierarchy to ensure that impacts are avoided and minimised, and the significance of any residual impacts is reduced as far as possible to minimise the requirement for offsetting.

Criterion 1 Tier 2

Species may qualify as Criterion 1, Tier 2 because they are globally threatened and listed on the World Conservation Union (IUCN) global Red List, or because they are nationally threatened and listed on the Kenyan Red List. The PS6 thresholds for Tier 2 Criterion 1 Critical Habitat are:-

Table 4-4. Criteria 1 Tier 2 Species

Tier	PS6 Criterion	Threshold/definition (IFC 2012b)	
Tier 2	Criterion 1: CR or EN species	1c	Habitat that supports the regular occurrence of a single individual of a CR species and/or habitat containing regionally- important concentrations of a Red-listed EN species where that habitat could be considered a discrete management unit for that species/ subspecies
		1d	Habitat of significant importance to CR or EN species that are wide-ranging and/or whose population distribution is not well understood and where the loss of such a habitat could potentially impact the long-term survivability of the species.
		1e	As appropriate, habitat containing nationally/regionally important concentrations of an EN, CR or equivalent national/regional listing.

Qualifying features

There are **eight** Critical Habitat-qualifying species under Criterion 1, Tier 2 as shown in Table 4-5 below. See Appendix X Critical and Natural Habitat Report for species accounts.

Table 4-5: Tier 2 Criterion 1 Critical Habitat-qualifying features

Taxa	Species	IUCN	PS6 criterion
Bird	<i>Gyps africanus</i>	CR	1c
	<i>Gyps rueppelli</i>	CR	1c
	<i>Aquila nipalensis</i>	EN	1d (and 3b)
	<i>Neophron percnopterus</i>	EN	1d
	<i>Ardeola idae</i>	EN	1c
	<i>Balearica regulorum</i>	EN	1c
Insect (dragonfly)	<i>Notogomphus maathaia</i>	EN	1d
	<i>Platycypha amboniensis</i>	CR	1c

Implications of Criterion 1, Tier 2 for the Project

Tier 2 species for which Critical Habitat has been identified will be of high concern because these species are at high global risk of extinction. The Project must ensure activities do not contribute to a further decline of their conservation status. As for Tier 1 features, the Project must ensure that impacts on these species are avoided and minimised through iterative and thorough application of the mitigation hierarchy, to ensure that the significance of any residual impacts is reduced as far as possible to minimise the requirement for offsetting.

Criterion 2: Endemic and/or restricted-range species (Tier 1 and Tier 2)

The PS6 thresholds for Tier 1 and Tier 2 endemic/restricted range species are:

Table 4-6. Endemic and restricted species Tier 1 Tier 2 Species

PS6 Criterion	Tier	Threshold/definition (IFC 2012b)
Criterion 2: Endemic/Restricted range species	2a	Tier 1 Habitat known to sustain $\geq 95\%$ of the global population of an endemic or restricted range species where that habitat could be considered a discrete management unit for that species (e.g. a single-site endemic)
	2b	Tier 2 Habitat known to sustain ≥ 1 percent but < 95 percent of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species, where data are available and/or based on expert judgement

Qualifying features

There are **Twenty-One** Critical Habitat-qualifying species under Criterion 2 (Table 4-7) Zero Tier 1, and **Twenty-One** Tier 2 found along the project highway. See Appendix X Critical and Natural Habitat Report for species accounts.

Table 4-7: Tier 2 Criterion 2 Critical Habitat-qualifying features

Taxa	Species	IUCN	PS6 criterion
Mammal	<i>Sylvisorex granti</i>	LC	2b
	<i>Dendromus insignis</i>	LC	2b
	<i>Crocidura montis</i>	LC	2b
	<i>Surdisorex norae</i>	LC	2b
Bird	<i>Cisticola aberdare</i>	VU	2b
	<i>Zosterops kikuyuensis</i>	LC	2b
	<i>Pternistis jacksoni</i>	LC	2b
Amphibian (frog)	<i>Ptychadena mahnerti</i>	LC	2b
	<i>Cacosternum kinangopensis</i>	LC	2b
	<i>Phrynobatrachus keniensis</i>	LC	2b
	<i>Hyperolius montanus</i>	LC	2b
	<i>Mertensophryne nairobiensis</i>	DD	2b
	<i>Mertensophryne mocquardi</i>	DD	2b
	<i>Cacosternum plimptoni</i>	LC	2b
<i>Amietia wittei</i>	LC	2b	
Reptile (chameleon)	<i>Trioceros jacksonii</i>	LC	2b

Insect	<i>Onitis parvulus</i>	DD	2b
	<i>Copris morphaeus</i>	DD	2b
	<i>Onitis meyeri</i>	DD	2b
Mollusc	<i>Bulinus permembranaceus</i>	VU	2b
	<i>Potamonautes jeanneli</i>	LC	2b

Implications of Criterion 2 for the Project

Where species have very small ranges, this means that a large proportion of the global population might potentially be impacted by the Project. For species yet Not Evaluated on the global Red List, the exact species status requires clarification, but there is sufficient evidence to categorise them as Critical Habitat-qualifying (see individual species accounts. See Appendix X Critical and Natural Habitat Report). The primary implications for the Project of restricted range/endemic Critical Habitat-qualifying features in the landscape are the same as those for Criterion 1 species, focusing on freshwater river habitat, gallery forest habitat and hill slope forest.

Criterion 3: Migratory species and/or congregatory species

Table 4-8. The PS6 thresholds for Tier 1 and Tier 2 migratory/congregatory species

PS6 Criterion	Tier	Threshold/definition (IFC 2012b)	
Criterion 3: Migratory/Congregatory species	3a	Tier 1	Habitat known to sustain, on a cyclical or otherwise regular basis, ≥ 95 percent of the global population of a migratory or congregatory species at any point of the species lifecycle where that habitat could be considered a discrete management unit for that species
	3b	Tier 2	Habitat known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent but < 95 percent of the global population of a migratory or congregatory species at any point of the species lifecycle and where that habitat could be considered a discrete management unit for that species, where data are available and/or based on expert judgement.
	3c	Tier 2	For birds, habitat that meets BirdLife International's Criterion A4 for congregations and/or Ramsar Criteria 5 or 6 for Identifying Wetlands of International Importance.
	3d	Tier 2	For species with large but clumped distributions, a provisional threshold is set at ≥ 5 percent of the global population for both terrestrial and marine species.
	3e	Tier 2	Source sites that contribute ≥ 1 percent of the global population of recruits.

Qualifying features

There are **Ten** Critical Habitat-qualifying species under Criterion 3: **Zero** Tier 1, and **Ten** Tier 2. See Appendix X Critical and Natural Habitat Report for species accounts.

Table 4-9: Tier 2 Criterion 3 Critical Habitat-qualifying features

Taxa	Species	IUCN	PS6 criterion
Bird	<i>Aquila nipalensis</i>	EN	3b (and 1d)

	<i>Phoenicopterus roseus</i>	LC	3c
	<i>Phoeniconaias minor</i>	NT	3c
	<i>Mycteria ibis</i>	LC	3c
	<i>Platalea alba</i>	LC	3c
	<i>Pelecanus onocrotalus</i>	LC	3c
	<i>Larus cirrocephalus</i>	LC	3c
	<i>Fulica cristata</i>	LC	3c
	<i>Recurvirostra avosetta</i>	LC	3c

Implications of Criterion 3 for the Project

The presence of migratory/congregatory species qualifying for Criteria 3 means that an important population of these species uses the DMU at some point of their cycle life and they might potentially be impacted by the Project. For the freshwater fish *Barbus loveridgii*, the exact species status requires clarification, but there is sufficient evidence to categorise them as Critical Habitat-qualifying (see individual species accounts in Appendix X Critical and Natural Habitat Report).

The primary implications for the Project of migratory/congregatory Critical Habitat-qualifying features in the landscape will be in some freshwater rivers (for the freshwater fish) and close lakes (for birds –for lakes qualifying as Important Bird Areas).

Criterion 4: Highly threatened and/or unique ecosystems

Application of Criterion 4 is currently hampered because there is as yet no global list of threatened ecosystems. IUCN has developed criteria for assessing ecosystem threat status and an IUCN Red List of Ecosystems is being compiled, but this will not be available for some years.

To assess the DMU against this criterion, WWF’s global mapping and assessment of ecoregions was used. There is terrestrial and no freshwater ecoregion intersecting the DMU:

1. East African Moorlands: Relatively stable
2. East African Montane Forests: Relatively stable
3. East African Acacia Savannas: Vulnerable

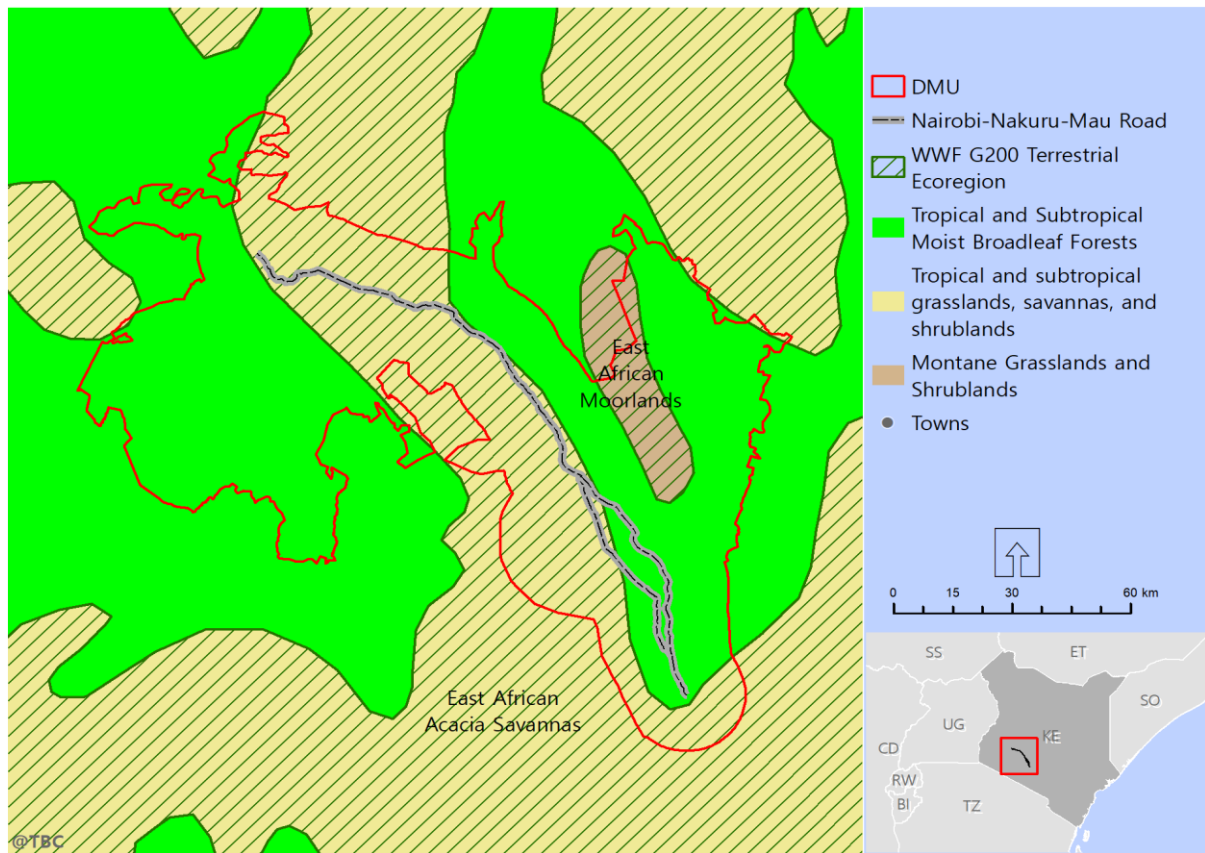


Figure 4-6. Terrestrial ecoregions (WWF classification) intersecting with the DMU (Source; CH Report)

Criterion 5: Areas associated with key evolutionary processes

This criterion is defined by the physical features of a landscape that might be associated with particular evolutionary processes, and/or subpopulations of species that are phylogenetically or morpho-genetically distinct and may be of special conservation concern given their distinct evolutionary history (IFC 2012b, paragraph GN95).

Aberdare Mountains and Kikuyu Forest Escarpment are showing high levels of endemism for amphibian (especially frogs) and insect (especially butterflies) species. However, nothing indicates that those areas should be considered as places with distinct evolutionary history. They are thus unlikely to qualify under Criterion 5.

Figure 4-7. Roadside pond at Kamirithu, near Limuru Flyover



Protected areas and internationally recognised areas

PS6 paragraph 20 addresses project activity in Legally Protected Areas¹³ (LPAs) and Internationally Recognized Areas¹⁴ (IRAs). Where a Project is within an LPA or IRA, the client should meet the requirements of paragraphs 13 to 19 of PS6 (paragraphs 13-15 relate to Natural Habitat, and paragraphs 16-19 to Critical Habitat) (IFC 2012a). In addition, the client should:

- Demonstrate that the proposed development in the LPA/IRA is legally permitted;
- Act in a manner consistent with any government recognized management plans for such areas;
- Consult Protected Area sponsors and managers, Affected Communities, Indigenous Peoples and other stakeholders on the proposed project, as appropriate; and
- Implement additional programs, as appropriate, to promote and enhance the conservation aims and effective management of the area’.

Qualifying features

There are **two** LPAs/IRAs within the DMU (see figure 4-5), some with overlapping designations:

- Kikuyu Escarpment Forest;

¹³ PS6 footnote 16 defines an LPA as: ‘A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values’.

¹⁴ PS6 footnote 17 defines IRAs as: ‘UNESCO Natural World Heritage Sites, UNESCO Man and the Biosphere Reserves, Key Biodiversity Areas, and wetlands designated under the Convention on Wetlands of International Importance (the Ramsar Convention)’.

PS6 guidance notes states that “legally protected areas with an IUCN Management Category of Ia, Ib and II, UNESCO Natural World Heritage Sites and Ramsar sites will be treated as critical habitat.” There are no PAs qualifying as Critical Habitat under this provision.

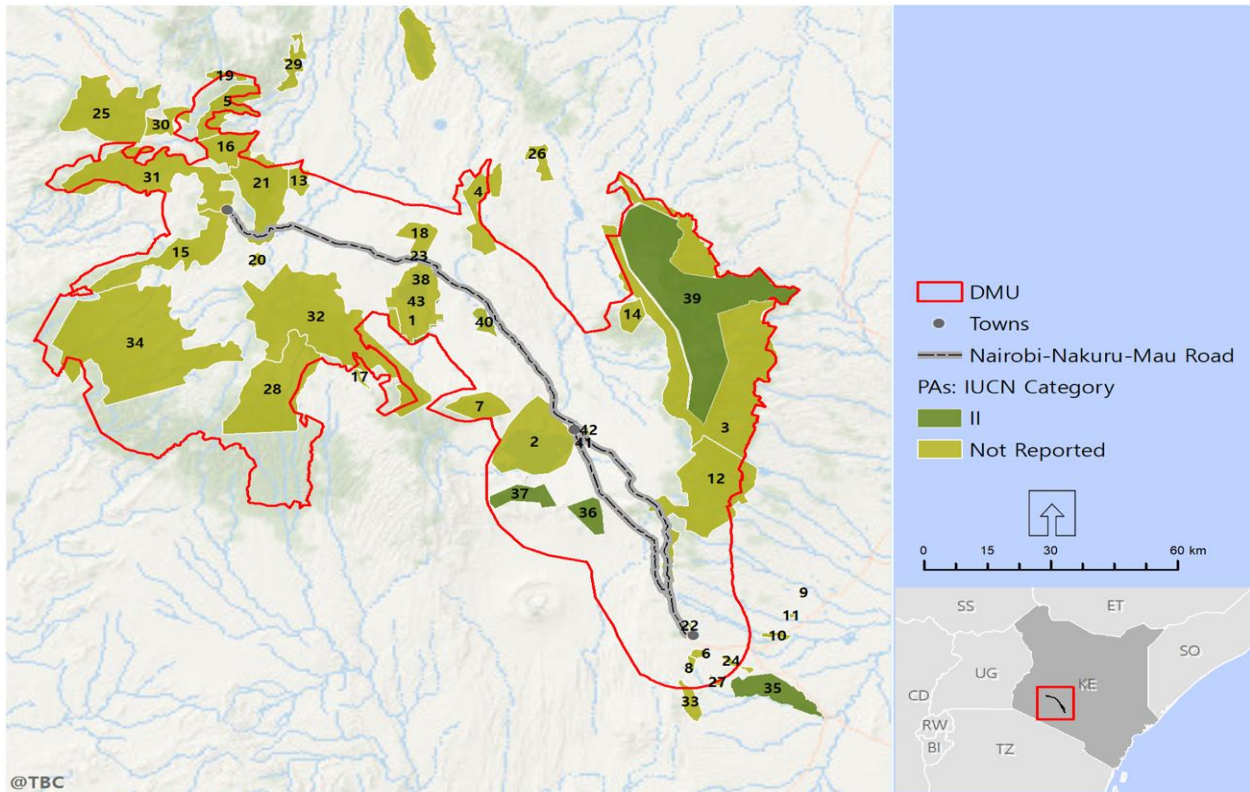


Figure 4-8. Protected Areas within the DMU. (Mismatch between boundaries is owing to registration errors in the World Database of Protected Areas; the DMU is based on more accurate and recent land cover mapping).

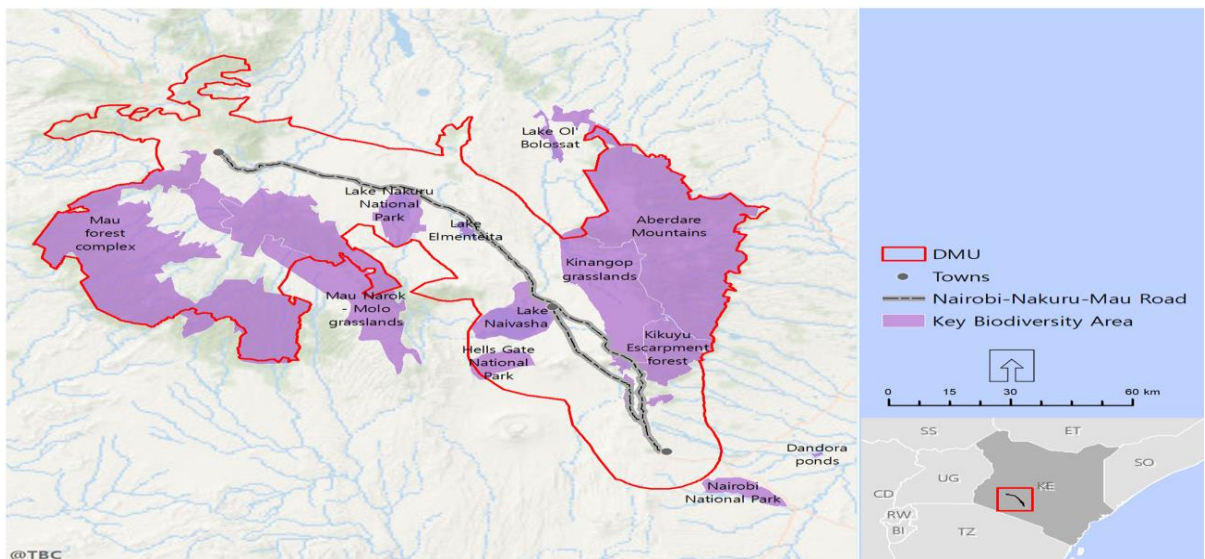


Figure 4-9: Key Biodiversity areas in the DMU

Table 4-10. The PAs qualifying as Critical Habitat

Kikuyu Escarpment forest	IBA criteria: A1, A2 and A3	37,000	<p>The Kikuyu Escarpment forest lies 30 km north-north-west of Nairobi, and covers the eastern slopes of the escarpment from about 2,700 m in the north-west (bordering grassland at the edge of the Kinangop Plateau) to around 2,050 m in the east, where it borders agricultural land.</p> <p>This forest has a rich avifauna, characteristic of the central Kenyan highlands but with a composition different to that of the nearby Aberdare mountains. The African Elephant is present in good numbers at times.</p> <p>IBA monitoring assessment summary (2015):</p> <ul style="list-style-type: none"> • Threat score: high; • Condition score: near favorable; • Action score: high.
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4.1.7 Land Use

Although the project road passes mostly through rural/ open country land use, it also connects various major towns between Nairobi, Nakuru through to Mau Summit. The settlements along the project road are mainly in linear settlement pattern. There are several urban settlements/centers along the road, Rironi, Limuru, Uplands among others. Annex VI shows the drainage and land use map and different land uses along project area in Kiambu County.

4.2 Nakuru County

Nakuru county covers an area of 7,495.1 Km² and is located between Longitude 35° 28` and 35° 36` East and Latitude 0°13 and 1° 10` south. It lies in the central part of the Great Rift Valley and borders several counties namely; Kericho and Bomet to the west, Baringo and Laikipia to the north, Nyandarua to the east, Narok to the south-west and Kajiado and Kiambu to the south.

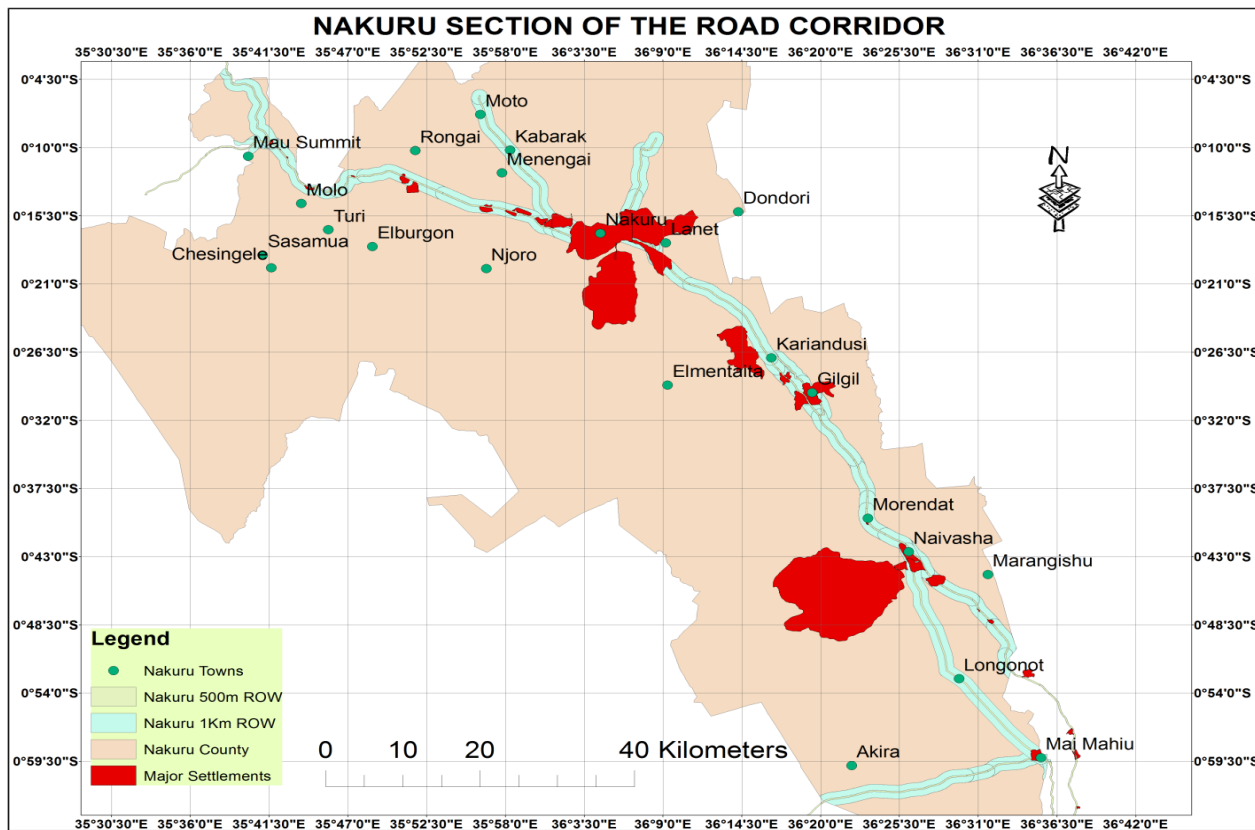


Figure 4-10. County Map of Nakuru and road section

4.2.1 Topography and Terrain

The main topographic features in Nakuru County are the Mau Escarpment covering the Western part of the county, the Rift Valley floor, Ol Doinyo Eburru Volcano, Akira plains, Menengai Crater, elaborate drainage and relief system and the various inland lakes on the floor of the Rift Valley where nearly all the permanent rivers and streams in the county drain into. These rivers include river Njoro, Makalia which drain into Lake Nakuru, Malewa which drains into Lake Naivasha and Molo River which drains into Lake Baringo among others. The most predominant is the Hells gate gorges in Naivasha which are an important tourist sites. The land topography in Naivasha and Gilgil Sub-Counties is characterised by mountain ranges and savannah vegetation cover that support various species of wildlife.

Table 4-11. Topography

Type of Geography	Units	2014
Altitude: Highest point :	metres a.s.l	2,500
Altitude: Lowest point :	metres a.s.l	1,520
Latitudes :	degrees N/S	0 0 13' N and 10 10'
Longitudes :	degrees E/W	350 28' W and 350 36' E

Source: Department of Agriculture, County Government Nakuru

4.2.2 Soils and Geology

The Nakuru area lies within the inner graben of the central Kenya rift valley and has experienced continual outpourings of trachyte magma during the last 6.2 Ma. The volcanic rocks of intermediate composition are usually overlain and not exposed while basaltic rocks are rare. There volcanic rocks were extruded at various times and hence there is an old surface and this intercalation of sedimentary rocks with volcanic rocks is very common. Volcanic rocks older than 6.2 Ma must underlie the area, contributing to the total volcanic and sedimentary rift fill. According to Sombroek et al., (1982) the geology of the county is composed of volcanic rocks, ranging in age from tertiary quaternary to recent, basically consisting of pyroclastic rocks of recent volcanoes. The rocks are predominantly agglomerates, sediments, welded tuffs, and phonolites on mountains, ciders, pumice, sanidine minerals, basaltic tuffs and black ashes on hills, plateaus, uplands, plains and valleys and alluvium and lacustrine and fluvial sediments derived directly from them.

The county is highly faulted with some being buried. As a result, areas of Nakuru town and its environs often undergo subsidence along the parallel fault zones during and after heavy rainfall. During the rainy season, when most of the subsidence occurs, the overlying unconsolidated volcanoclastic sediments become oversaturated with water. The water reduces the shear strength of the sediments and also introduces extra loading through saturation leading to subterranean erosion along faults. The unconsolidated sediments then collapse into the subsurface water channels which closely follow the fault zones, leading to formation of sinkholes. The frequent incidences of ground subsidence in, the study area caused has to destruction of physical infrastructure, several fatalities and destruction of settlements (Ngecu and Nyambok, 2000).

The distribution of soil types within Nakuru County is complex which is attributed to the influence of climatic conditions, volcanic activities and underlying rock type. Three main soil classification comprises of (i) Latosolic soils which are well-drained red volcanic soils

encountered in the upper Subukia valley and imperfectly drained loam with dark brown subsoil encountered in Njoro, Nakuru Central Elementaita and Mai Mahiu in Naivasha areas. The fertility in these soil types varies from moderate to high and support crops such as wheat, maize, pyrethrum, sunflower, finger millet potatoes, pigeon peas, vegetables and beans and peas. (ii) Planosolic soils which comprises of poorly drained dark brown clay soils with highly developed textured top soils as well as well drained humic lawns with dark brown sub soils. These soils are classified as fertile. Areas covered under these soils range from Olenguruoni in Kuresoi, Molo, Rongai and parts of Njoro. The main agriculture activities in these areas include sheep rearing, dairy farming, wheat, barley, potatoes, pyrethrum and vegetables farming, and (iii) Alluvial and Lacustrine deposits these are shallow soils resulting from volcanic ash sediments as well as other sources. They occupy the Rift Valley bed in Lake Nakuru, Lake Naivasha, and Lake Elementaita, Solai and the Menengai Crater as well as the adjacent areas to these features. Their fertility ranges from low to moderate.

4.2.3 Climate and Meteorology

Nakuru County has a mean annual precipitation of 600 to 800 mm in the rifts and about 1300 mm annual precipitation in the plateau. Modern climate in tropical East Africa is mainly controlled by the Intertropical Convergence Zone (ITCZ) and the African-Asian summer monsoon, both being very sensitive to the El Nino/ Southern Oscillation (ENSO) (Marwan et al., 2007). The average monthly temperature ranges from 15.9°C to 17.8°C. The rain seasons are from April to May and October to November. The annual potential evaporation is estimated at about 1700 mm.

4.2.4 Agro Climatic Zone

The County has several Agro-Ecological Zones (AEZ), which cover different regions of the County: AEZ TA (covering Molo, Olenguruone and Njoro), AEZ UH1 (Molo, Mau Narok, Bahati Forest, Olenguruone), AEZ UH2 (Molo South, Mau Summit, Keringet, Olenguruone), AEZ UH3 (Mau Narok, Olenguruone), AEZ LH2 (Kabazi, Ndundori, Mau Narok), AEZ LH3 (Njoro, Ngata, Menengai, Naivasha, Subukia), AEZ LH4 (Rongai, Naivasha, Upper Gilgil), AEZ LH5 (Gilgil, Naivasha, Karati), AEZ UM3 (Mbogoini, Bahati), AEZ UM4 (Weseges, Lower Solai, Kampi Ya Moto), AEZ UM5 and UM6 (Lake Naivasha, Mbaruk, Longonot), AEZ LM5 and LM6 (Mbogoini).

Altitudes in these AEZs range between 2980-3050 m.a.s.l (in TA) and 1480-1550 m.a.s.l (in LM5 and LM6). Annual rainfall varies between 1200-1900 mm/ year in TA and UH1 and 100-1200 mm/year in LH5, and 550-700 mm/year in UM5 and UM6. The short rains fall between October and December, while the long rains fall between March and May.

4.2.5 Hydrology

Nakuru County has an elaborate basin, drainage and relief system comprising of rivers and lake. The county's basin is a closed drainage system which has its boundaries as the Bahati high lands to the east, Mau escarpment to the west, Eburru crater to the south and the Menengai crater to the north. There is a ground water divide, beyond Lake Elementaita and also at the Menengai crater. The divide separates the Nakuru basin and the Lake Naivasha basin. A large number of the rivers and streams systems in the county are permanent and drain into the either Lake Nakuru, Lake Baringo or Lake Naivasha. River Njoro and Makalia drain into Lake Nakuru, Malewa,

Turasha and Gilgil drain into Lake Naivasha and Molo River drain into Lake Baringo.

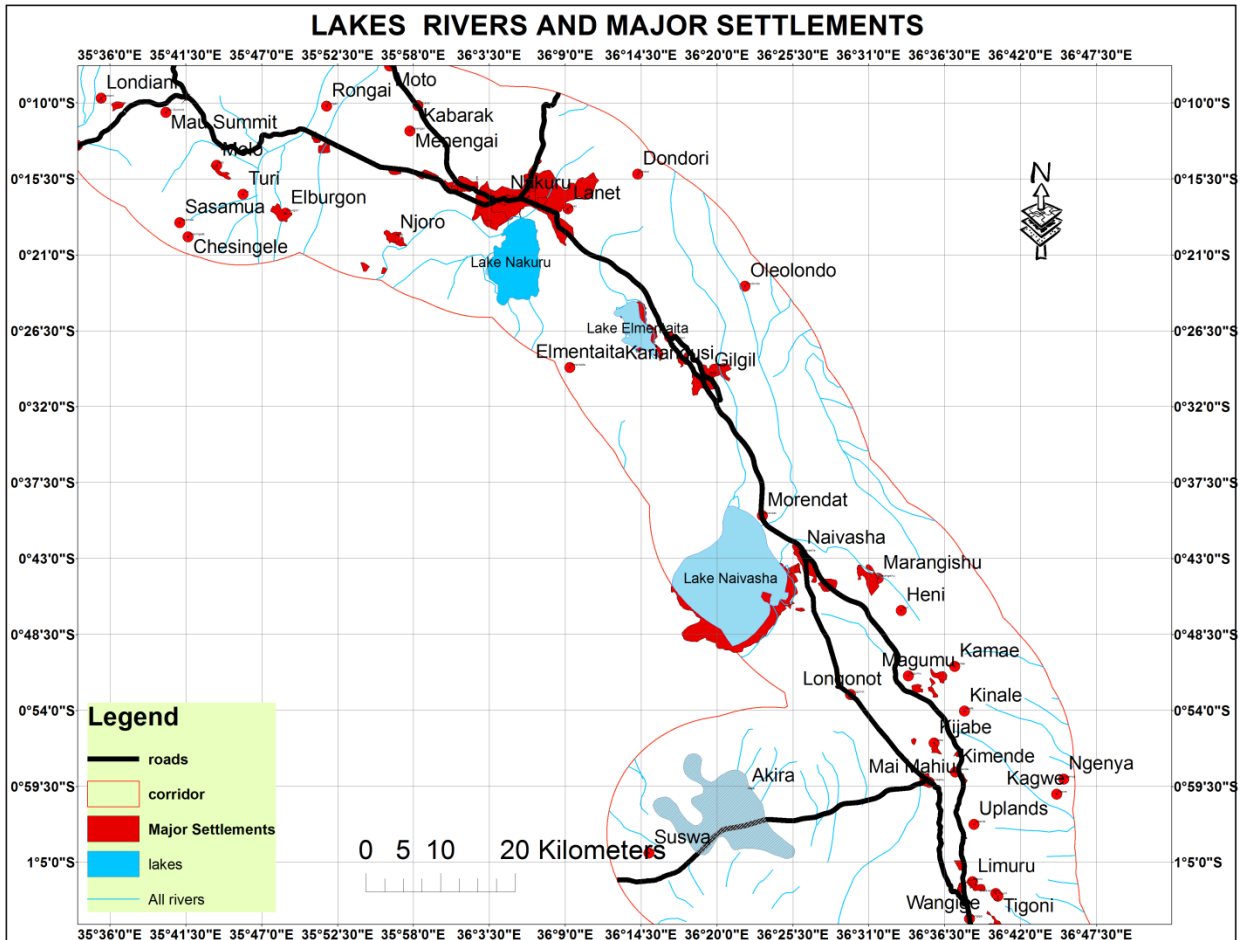


Figure 4-11. Lakes along project route

a) Lake Nakuru

The Nakuru basin occupies a total catchment area of 1,800 km² and the Lake Nakuru as its lowest point. Lake Nakuru is a very shallow alkaline lake located in Kenya’s rift valley, with a surface area of 44 km² and an average depth of 2.5 meters. The Lake is fed by one permanent river –Ngosur and four seasonal rivers Njoro, Nderit, Makalia and Lamudhiak. Treated waste water from Nakuru town is also discharged into this Lake. The lake has very little recharge through fault systems compared to other lakes within the rift owing to its high elevation. There is no outflow from the Lake and in the long run, all rainfall is lost by evapo-transpiration in the catchment area. Some of the rivers (Njoro, Ngosur, and Naishi) become influent, disappearing along the fault lines to recharge deep aquifers (Odada *et al*, 2006).

b) Lake Naivasha

The Lake Naivasha Basin is bordered by the Nyandarua Mountains (previously known as the Aberdare Range and Kinangop Plateau) to the east, the Mau Escarpment to the west, Mount Longonot to the south, and the Eburru Hills to the north. It is considered to be one of the remains of a once-larger lake that existed thousands of years ago and which covered the area between

Mount Longonot and Menengai Crater. The other lakes, separated from Lake Naivasha by the Eburru Hills, are Lakes Nakuru and Elementaita, both of which have remained highly alkaline.

The surface inflow to Lake Naivasha enters through three distinct river systems, the Malewa, Gilgil and Karati Rivers. According to Clarke *et al.* (1990) and Ojiambo *et al.* (2001), the lake has no surface outlet and it is thought that water from the lake seeps into the underlying volcanic rocks and probably moves both southwards, towards Mount Longonot, and northwards towards Gilgil and Lake Elementaita. Gaudet and Melack 1981 stated that the freshness of the lake water, with a pH range of 7.3–9.2 in some areas, has been attributed to four factors namely: dilution from incoming permanent discharges from the Malewa River, and other seasonal rivers; sodium salts extraction by *Cyperus papyrus* and other aquatic plants, underground seepage (inlet to the north, outlet to the south); and subterranean seepage of rainwater from the Nyandarua Mountains.



Figure 4-12. Birdlife in Lake Naivasha

c) Lake Elementaita

Elementaita is a shallow small saline lake, in the Great Rift Valley, about 120 km northwest of Nairobi, Kenya. It is fed by inflows from the rivers Mbaruk, Chamuka and Mbereroni which is the main water source. The lake level fluctuates and in some cases the lake and its feeder rivers have been known to dry up. This brings an effect to the water quality of the lake. Salt harvesting and game viewing are some of the major anthropogenic activities taking place in the area.

Over 400 bird species have been recorded in the Lake Nakuru/Lake Elementaita basin. Elementaita attracts visiting flamingoes, both the Greater and Lesser varieties, which feed on the lake's crustacean and insect larvae and on its suspended blue-green algae, respectively. Tilapia were introduced to the lake from Lake Magadi in 1962 and since that time the flamingo population has dwindled considerably. The tilapia attracts many fish-eating birds that also feed upon the flamingo eggs and chicks. Over a million birds that formerly bred at Elementaita are now said to have sought refuge at Lake Natron in Tanzania. The lake's shores are grazed by zebra, gazelle, eland and families of warthog.

The lake is normally very shallow (less than 1 m deep) and bordered by trona-encrusted mudflats during the dry seasons. During the late Pleistocene and early Holocene, Lake Elementaita was at times united with an expanded Lake Nakuru, forming a much larger dilute lake. Remnants of the former joined lake are preserved as sediments at various locations around the lake basins, including former shorelines.

Table 4-12. Lakes along the highway (15km buffer) in Nakuru County

Name
Lake Nakuru
Lake Elementaita
Lake Naivasha

Table 4-13. Rivers that highway crosses in Nakuru County

Name	Class	County
River Molo	Permanent	Nakuru
River Njoro	Permanent	Nakuru
River Gilgil	Permanent	Nakuru
River Malewa	Permanent	Nakuru
River Mereroni	permanent	Nakuru
River Kariandusi	Permanent	Nakuru

4.2.6 Biological Environment

Critical Habitat Screening (CHS) survey was carried out as part of biodiversity baseline survey at the landscape scale, using ecologically and/or administratively coherent Discrete Management Units (DMUs), which are a means for determining the presence or absence of Critical Habitat-qualifying features under PS6 criteria 1 to 3.

4.2.6.1.1 Terrestrial DMU

The road passes through a very complex landscape containing numerous protected areas and internationally recognised areas; with diverse habitat types and topography. In particular, the area is home to a variety of large, wide-ranging species who depend on ecological connectivity within the landscape. The road is adjacent to, and its 15-km buffer intersects with, a number of PAs, IRAs and areas of natural habitat.

The delineated DMU therefore includes the 15-km buffer, individual PAs/IRAs that overlap the buffer and:-

Box 4-2. Delineated DMU

1. The Kinangop Grasslands IBA – intersected by the road, and forming an ecological unit within which grassland-specialist wildlife moves and disperses.
2. Natural habitat surrounding Longonot NP (adjacent to the road) and Hell’s Gate National Park (intersected by the buffer) and forming a dispersal area for wildlife.
3. The Mau Forest complex, components of which are intersected by the road, and which forms an ecologically connected network of forests within which wildlife moves and disperses (including wide-ranging species such as African Elephant).

The DMU aligns with the boundaries for Key Biodiversity Areas (KBAs) where present, where KBA’s are not present the DMU aligns with nationally designated Forest Reserves. In the South-West section, the DMU encompasses an important area of natural habitat that is not currently protected. See Figure 4-2 on vegetation cover in the terrestrial DMU and Figure 4-3 above.

4.2.6.1.2 Tier 1 Critical Habitat

Tier 1 Critical Habitat-qualifying species are the most sensitive biodiversity features in the Project landscape. Tier 1 Critical Habitat is of extreme global importance for the long-term survival of these species. Criterion 1 species meet the thresholds for Tier 1 because they are highly threatened (Criterion 1a or 1b). The PS6 thresholds for Tier 1 Criterion 1 Critical Habitat are:

Table 4-14: Tier 1 Criterion 1 Critical Habitat-qualifying features

Tier	PS6 Criterion	Threshold/definition (IFC 2012b)
Tier 1	Criterion 1: CR or EN species	1a Habitat required to sustain $\geq 10\%$ of the global population of a CR or EN species/subspecies where there are known, regular occurrences of the species and where that habitat could be considered a discrete management unit for that species
		1b Habitat with known, regular occurrences of CR or EN species where that habitat is one of 10 or fewer discrete management units for that species

Qualifying features

In the project routing, there are **four** Critical Habitat-qualifying species under Criterion 1, Tier 1 see Table 4-15 below. See Appendix X Critical Habitat Screening Report for species accounts.

Table 4-15: Tier 1 Criterion 1 Critical Habitat-qualifying features

Taxa	Species	IUCN	PS6 criterion
Bird	<i>Macronyx sharpei</i>	EN	1a
Freshwater fish	<i>Aplocheilichthys sp. nov. 'Baringo'</i>	CR	1a
Amphibian	<i>Phrynobatrachus irangi</i>	EN	1a
Plant	<i>Ethulia scheffleri</i>	EN	1a

4.2.6.1.3 Implications of Criterion 1, Tier 1 for the Project

Mitigation of impacts on highly threatened (Criterion 1) Tier 1 Critical Habitat features will be the highest concern. There is significant onus on the Project to ensure that impacts on these species are avoided and minimised as far as feasibly possible, including via review of project design to optimise avoidance and minimisation, and consideration of timing and intensity of operational activities if appropriate. This means that a robust Project-specific ESIA baseline is vital, followed by iterative and thorough application of the mitigation hierarchy to ensure that impacts are avoided and minimised, and the significance of any residual impacts is reduced as far as possible to minimise the requirement for offsetting.

4.2.6.1.4 Criterion 1 Tier 2

Species may qualify as Criterion 1, Tier 2 because they are globally threatened and listed on the IUCN global Red List, or because they are nationally threatened and listed on the Kenyan Red List. The PS6 thresholds for Tier 2 Criterion 1 Critical Habitat are:-

Table 4-16: Tier 2 Criterion 1 Critical Habitat-qualifying features

Tier	PS6 Criterion	Threshold/definition (IFC 2012b)	
Tier 2	Criterion 1: CR or EN species	1c	Habitat that supports the regular occurrence of a single individual of a CR species and/or habitat containing regionally- important concentrations of a Red-listed EN species where that habitat could be considered a discrete management unit for that species/ subspecies
		1d	Habitat of significant importance to CR or EN species that are wide-ranging and/or whose population distribution is not well understood and where the loss of such a habitat could potentially impact the long-term survivability of the species.
		1e	As appropriate, habitat containing nationally/regionally important concentrations of an EN, CR or equivalent national/regional listing.

Qualifying features

There are **thirteen** Critical Habitat-qualifying species under Criterion 1, Tier 2 as shown in Table 4-17 below. See Appendix X Critical Habitat Screening Report for species accounts.

Table 4-18: Tier 2 Criterion 1 Critical Habitat-qualifying features

Taxa	Species	IUCN	PS6 criterion
Mammal	<i>Giraffa camelopardalis camelopardalis</i>	VU but assessed as EN at subspecies level	1c
	<i>Diceros bicornis</i>	CR	1c
	<i>Redunca fulvorufula</i>	EN	1c
Bird	<i>Gyps africanus</i>	CR	1c
	<i>Gyps rueppelli</i>	CR	1c
	<i>Aquila nipalensis</i>	EN	1d (and 3b)
	<i>Neophron percnopterus</i>	EN	1d
	<i>Ardeola idae</i>	EN	1c
	<i>Balearica regulorum</i>	EN	1c
Freshwater fish	<i>Labeo victorianus</i>	CR	1c
Insect (dragonfly)	<i>Notogomphus maathaiaie</i>	EN	1d
	<i>Platycypha amboniensis</i>	CR	1c
Plant	<i>Lagarosiphon hydrilloides</i>	EN	1d

4.2.6.1.5 Implications of Criterion 1, Tier 2 for the Project

Tier 2 species for which Critical Habitat has been identified will be of high concern because these species are at high global risk of extinction. The Project must ensure activities do not contribute to a further decline of their conservation status. As for Tier 1 features, the Project

must ensure that impacts on these species are avoided and minimised through iterative and thorough application of the mitigation hierarchy, to ensure that the significance of any residual impacts is reduced as far as possible to minimise the requirement for offsetting.

4.2.6.1.6 Criterion 2: Endemic and/or restricted-range species (Tier 1 and Tier 2)

Table 4-18: PS6 thresholds for Tier 1 and Tier 2 endemic/restricted range species

PS6 Criterion	Tier	Threshold/definition (IFC 2012b)
Criterion 2: Endemic/Restricted range species	2a Tier 1	Habitat known to sustain $\geq 95\%$ of the global population of an endemic or restricted range species where that habitat could be considered a discrete management unit for that species (e.g. a single-site endemic)
	2b Tier 2	Habitat known to sustain ≥ 1 percent but < 95 percent of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species, where data are available and/or based on expert judgement

Qualifying features

There are **Twenty-One** Critical Habitat-qualifying species under Criterion 2 (Table 4-19) Zero Tier 1, and **Twenty-One** Tier 2 found along the project highway. See Annex X Critical Habitat Screening Report for species accounts.

Table 4-19: Tier 2 Criterion 2 Critical Habitat-qualifying features

Taxa	Species	IUCN	PS6 criterion
Mammal	<i>Sylvisorex granti</i>	LC	2b
	<i>Dendromus insignis</i>	LC	2b
	<i>Crocidura montis</i>	LC	2b
	<i>Surdisorex norae</i>	LC	2b
Bird	<i>Cisticola aberdare</i>	VU	2b
	<i>Zosterops kikuyuensis</i>	LC	2b
	<i>Pternistis jacksoni</i>	LC	2b
Amphibian (frog)	<i>Ptychadena mahnerti</i>	LC	2b
	<i>Cacosternum kinangopensis</i>	LC	2b
	<i>Phrynobatrachus keniensis</i>	LC	2b
	<i>Hyperolius montanus</i>	LC	2b
	<i>Mertensophryne nairobiensis</i>	DD	2b
	<i>Mertensophryne mocquardi</i>	DD	2b

	<i>Cacosternum plimptoni</i>	LC	2b
	<i>Amietia wittei</i>	LC	2b
Reptile (chameleon)	<i>Trioceros jacksonii</i>	LC	2b
Insect	<i>Onitis parvulus</i>	DD	2b
	<i>Copris morphaeus</i>	DD	2b
	<i>Onitis meyeri</i>	DD	2b
Mollusc	<i>Bulinus permembranaceus</i>	VU	2b
	<i>Potamonautes jeanneli</i>	LC	2b

4.2.6.1.7 Implications of Criterion 2 for the Project

Where species have very small ranges, this means that a large proportion of the global population might potentially be impacted by the Project. For species yet Not Evaluated on the global Red List, the exact species status requires clarification, but there is sufficient evidence to categorise them as Critical Habitat-qualifying (see individual species accounts in Annex X Critical Habitat Screening Report). The primary implications for the Project of restricted range/endemic Critical Habitat-qualifying features in the landscape are the same as those for Criterion 1 species, focusing on freshwater river habitat, gallery forest habitat and hill slope forest.

4.2.6.1.8 Criterion 3: Migratory species and/or congregatory species

Table 4-20, The PS6 thresholds for Tier 1 and Tier 2 migratory/congregatory species

PS6 Criterion	Tier	Threshold/definition (IFC 2012b)
Criterion 3: Migratory/Congregatory species	3a Tier 1	Habitat known to sustain, on a cyclical or otherwise regular basis, ≥ 95 percent of the global population of a migratory or congregatory species at any point of the species lifecycle where that habitat could be considered a discrete management unit for that species
	3b Tier 2	Habitat known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent but < 95 percent of the global population of a migratory or congregatory species at any point of the species lifecycle and where that habitat could be considered a discrete management unit for that species, where data are available and/or based on expert judgement.
	3c Tier 2	For birds, habitat that meets BirdLife International's Criterion A4 for congregations and/or Ramsar Criteria 5 or 6 for Identifying Wetlands of International Importance.
	3d Tier 2	For species with large but clumped distributions, a provisional threshold is set at ≥ 5 percent of the global population for both terrestrial and marine species.
	3e Tier 2	Source sites that contribute ≥ 1 percent of the global population of recruits.

Qualifying features

There are **Ten** Critical Habitat-qualifying species under Criterion 3: **Zero** Tier 1, and **Ten** Tier 2. See Appendix X Critical Habitat Screening Report for species accounts.

Table 4-21: Tier 2 Criterion 3 Critical Habitat-qualifying features

Taxa	Species	IUCN	PS6 criterion
Bird	<i>Aquila nipalensis</i>	EN	3b (and 1d)
	<i>Phoenicopterus roseus</i>	LC	3c
	<i>Phoeniconaias minor</i>	NT	3c
	<i>Mycteria ibis</i>	LC	3c
	<i>Platalea alba</i>	LC	3c
	<i>Pelecanus onocrotalus</i>	LC	3c
	<i>Larus cirrocephalus</i>	LC	3c
	<i>Fulica cristata</i>	LC	3c
	<i>Recurvirostra avosetta</i>	LC	3c
Freshwater fish	<i>Barbus loveridgii</i>	DD	3b

4.2.6.1.9 Implications of Criterion 3 for the Project

The presence of migratory/congregatory species qualifying for Criteria 3 means that an important population of these species uses the DMU at some point of their cycle life and they might potentially be impacted by the Project. For the freshwater fish *Barbus loveridgii*, the exact species status requires clarification, but there is sufficient evidence to categorise them as Critical Habitat-qualifying (see individual species accounts in Appendix X Critical Habitat Screening Report).

The primary implications for the Project of migratory/congregatory Critical Habitat-qualifying features in the landscape will be in some freshwater rivers (for the freshwater fish) and close lakes (for birds –for lakes qualifying as Important Bird Areas **Error! Reference source not found.** **Error! Reference source not found.** **Error! Reference source not found.** **Error! Reference source not found.** **Error! Reference source not found.** **Error! Reference source not found.** **Error! Reference source not found.**).

4.2.6.1.10 Criterion 4: Highly threatened and/or unique ecosystems

Application of Criterion 4 is currently hampered because there is as yet no global list of threatened ecosystems. IUCN has developed criteria for assessing ecosystem threat status and an IUCN Red List of Ecosystems is being compiled, but this will not be available for some years.

To assess the DMU against this criterion, WWF’s global mapping and assessment of ecoregions was used. There are three terrestrial and one freshwater ecoregion intersecting the DMU. Refer to Figure 4.4. Terrestrial ecoregions (WWF classification) intersecting with the DMU.

1. East African Montane Forests: Relatively stable
2. East African Acacia Savannas: Vulnerable
3. Rift Valley Lakes: Critical or Endangered
4. The Rift Valley Lakes ecoregion (in the DMU Lakes Naivasha, Elementaita and Nakuru) qualifies as Critical Habitat under criterion 4.

4.2.6.1.11 Criterion 5: Areas associated with key evolutionary processes

This criterion is defined by the physical features of a landscape that might be associated with particular evolutionary processes, and/or subpopulations of species that are phylogenetically or morpho-genetically distinct and may be of special conservation concern given their distinct evolutionary history (IFC 2012b, paragraph GN95).

Although the road project is located close to a World Heritage Site and several Key Biodiversity Areas, this section of the Great Rift Valley and Kenyan highlands located within the DMU have relatively low level of endemism in comparison to what can be found in Ethiopia or in the Albertine Rift and do not indicate the presence on evolutionary hotspot. It is thus unlikely that the project qualifies under Criterion 5.

Kenya Lake System in the Great Rift is qualifying under Criterion (ix)¹⁵ of the World Heritage Site. Those lakes illustrate ongoing ecological and biological processes which provide insights into the evolution and the development of soda lake ecosystems and the related communities of plants and animals (e.g. the production of huge biomass quantities of green algae that provides critical support to birds visiting the lakes). However, even if those lakes are important for some congregatory and migratory species, many of them can be found in the region (Ethiopia, Tanzania, Kenya). Therefore, they are not considered to qualify under Criterion 5.

4.2.6.1.12 Protected areas and internationally recognised areas

PS6 paragraph 20 addresses project activity in Legally Protected Areas¹⁶ (LPAs) and Internationally Recognised Areas¹⁷ (IRAs). Where a Project is within an LPA or IRA, the client should meet the requirements of paragraphs 13 to 19 of PS6 (paragraphs 13-15 relate to Natural Habitat, and paragraphs 16-19 to Critical Habitat) (IFC 2012a). In addition, the client should:

- Demonstrate that the proposed development in the LPA/IRA is legally permitted;
- Act in a manner consistent with any government recognized management plans for such areas;
- Consult Protected Area sponsors and managers, Affected Communities, Indigenous Peoples and other stakeholders on the proposed project, as appropriate; and

¹⁵ Criterion (ix) of World Heritage Site: “to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals”

¹⁶ PS6 footnote 16 defines an LPA as: ‘A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values’.

¹⁷ PS6 footnote 17 defines IRAs as: ‘UNESCO Natural World Heritage Sites, UNESCO Man and the Biosphere Reserves, Key Biodiversity Areas, and wetlands designated under the Convention on Wetlands of International Importance (the Ramsar Convention)’.

- Implement additional programs, as appropriate, to promote and enhance the conservation aims and effective management of the area’.

Table 4-22. Protected Areas in Nakuru County

NAME	DESIGNATION	DESIGNATION TYPE	IUCN CATEGORY	County
Lake Nakuru	Ramsar Site, Wetland of International Importance	International	Not Reported	Nakuru
Lake Naivasha	Ramsar Site, Wetland of International Importance	International	Not Reported	Nakuru
Bahati	Forest Reserve	National	Not Reported	Nyandarua/Nakuru
Eburu	Forest Reserve	National	Not Reported	Eburu
Kilombe Hill	Forest Reserve	National	Not Reported	Baringo/Nakuru
Menengai	Forest Reserve	National	Not Reported	Nakuru
Molo	Forest Reserve	National	Not Reported	Nakuru
Nakuru	Forest Reserve	National	Not Reported	Nakuru
Timboroa	Forest Reserve	National	Not Reported	Nakuru
Eastern Mau	Forest Reserve	National	Not Reported	Nakuru
Hell's Gate	National Park	National	II	Nakuru
Mt. Longonot	National Park	National	II	Nakuru
Lake Nakuru	National Park	National	II	Nakuru
Lake Elementaita	National Sanctuary	National	Not Reported	Nakuru
Naivasha Wildlife Sanctuary (West Part)	National Sanctuary	National	Not Reported	Nakuru
Naivasha Wildlife Sanctuary (East Part)	National Sanctuary	National	Not Reported	Nakuru
Lake Elementaita	National Sanctuary	National	Not Reported	Nakuru
Naivasha Wildlife Sanctuary (West Part)	National Sanctuary	National	Not Reported	Nakuru

Qualifying features

There are **eleven** LPAs/IRAs within the DMU (see figure 4.2 and 4.3), some with overlapping designations:

- The World Heritage Site ‘Kenya Lake System in the Great Rift Valley’ including **Lake Nakuru National Park** and **Lake Elementaita**;
- The Wetlands of International Importance (Ramsar Sites) **Lake Nakuru**, **Lake Elementaita** and **Lake Naivasha**;
- Mau forest complex (including 5 Forest Reserves and 1 National Reserve);
- Mau Narok-Molo Grasslands (IBA);
- Lake Naivasha;
- **Hells Gate National Park**;
- Soysambu Conservancy;
- Kigio Conservancy;
- Oserengoni Conservancy (formerly Oserian);
- Kedong Ranch.

PS6 states that “legally protected areas with an IUCN Management Category of Ia, Ib and II, UNESCO Natural World Heritage Sites and Ramsar sites will be treated as critical habitat.” The PAs qualifying as Critical Habitat under this provision are listed in **bold** above. Refer to Figure 4.2. Protected Areas within the DMU. (Mismatch between boundaries is owing to

registration errors in the World Database of Protected Areas; the DMU is based on more accurate and recent land cover mapping) and Figure 4.3, Key Biodiversity areas in the DMU.

Table 4-23. The PAs qualifying as Critical Habitat under this provision are listed in bold above.

Site	Status and designation	Area (ha)	Short description
Kenya Lake System in the Great Rift Valley	World Heritage Site (based on criteria (vii), (ix) and (x))	32,034	The Kenya Lake System in the Great Rift Valley comprises three inter-linked relatively shallow lakes (Lake Bogoria, Lake Nakuru and Lake Elementaita). It is home to 13 globally threatened bird species and some of the highest bird diversities in the world. For example, it is the most important foraging site for the Lesser Flamingo and a major nesting and breeding ground for Great White Pelicans (both qualifying under CH Criteria 3). It is also inhabited by CH-qualifying mammals such as the Black Rhinoceros, the Rothschild's Giraffe and the Cheetah and is valuable for the study of ecological processes of major importance.
Kinangop grasslands	IBA criteria: A1 and A2	72,000	<p>These montane grasslands lie on the Kinangop Plateau, a wide stretch of land bounded by the forests of the Aberdare mountains and Kikuyu Escarpment to the east and south, and by a steep scarp dropping to the Rift Valley floor on the west. Originally, the entire plateau was covered with almost treeless, tussocky grassland, including many tussock bogs in the swampy valleys. Since the 1960s the area has been settled by the Kikuyu people, whose livelihood revolves around small-scale farming.</p> <p>This is probably the world stronghold of the Sharpe's Longclaw. The Aberdare Cisticola is thought to occur in the higher parts of the plateau, close to the Aberdare mountains, but its status is uncertain. The fauna and flora of these grasslands have been little studied. Very few large wild mammals survive on the Kinangop, but many smaller species that are confined to highland grassland can be expected. The frogs <i>Hyperolius montanus</i> and <i>Phrynobatrachus kinangopensis</i> are recorded only in Kinangop and a few other sites in the Kenyan highlands.</p> <p>IBA monitoring assessment summary (2009):</p> <ul style="list-style-type: none"> • Threat score: high; • Condition score: very unfavorable; • Action score: negligible.
Lake Nakuru National Park	Nationally Protected IBA criteria: A1 ¹⁸ , A2 ¹⁹ and A4 ²⁰	18,800	<p>This area comprises a very shallow, strongly alkaline lake (3,300 ha), with surrounding woodland and grassland.</p> <p>The lake is internationally famous for its populations of Lesser Flamingos (numbers can reach 1.5 million at times) being a very important feeding site for this species. At times, it is a major feeding ground for the Great White Pelicans. Globally threatened species such as the Madagascar Squacco Heron can also be found in the park. It is also a sanctuary for the Black Rhinoceros, the Rothschild's Giraffe, the leopard and the Cheetah.</p> <p>IBA monitoring assessment summary (2010):</p> <ul style="list-style-type: none"> • Threat score: high; • Condition score: near favorable; • Action score: high.
Lake Elementaita	IBA criteria: A1, A2 and A4	7,200	<p>Elementaita is a shallow alkaline lake (1,800 ha), 20km south-east of Nakuru Town. The surrounding landscape is characterized by rocky faults, volcanic outcrops and cones.</p> <p>The lake consistently holds internationally important populations of Lesser Flamingos and of Pied Avocets and is a breeding site for the Great White Pelicans. The Rothschild's Giraffe is also found in the area.</p>

¹⁸ A1: **Globally threatened species:** The site is known or thought regularly to hold significant numbers of a globally threatened species.

¹⁹ A2: **Restricted-range species:** The site is known or thought to hold a significant component of a group of species whose breeding distributions define an Endemic Bird Area or Secondary Area.

²⁰ A4: **Congregations:** The site is known or thought to hold congregations of $\geq 1\%$ of the global population of one or more species on a regular or predictable basis.

Site	Status and designation	Area (ha)	Short description
			<p>IBA monitoring assessment summary (2009):</p> <ul style="list-style-type: none"> • Threat score: very high; • Condition score: very unfavorable; • Action score: negligible.
Mau forest complex	Complex of five Forest Reserves and one Natural Reserve IBA criterion: A3 ²¹	270,000	<p>The Mau Forest Complex is the largest indigenous montane forest in East Africa and encompasses five main Forest Reserves: Eastern, Western and South-western Mau, Trans-Mara and Ol Pusimoru. A sixth large block, the Maasai Mau is as yet ungazetted.</p> <p>It serves as a critical water catchment area for the country and is the source from which numerous rivers flow, many of them draining into bodies of water like Lake Victoria, which receives 60% of its water from Mau.</p> <p>The Mau generally has a rich highland bird community, characteristic of the Central Kenya highlands, including a number of regional endemic, restricted-range and regionally threatened species. Notable mammals are inhabiting these forests, such as the African Elephant.</p> <p>IBA monitoring assessment summary (2009):</p> <ul style="list-style-type: none"> • Threat score: high; • Condition score: very unfavorable; • Action score: low.
Mau Narok-Molo Grasslands	IBA criteria: A1 and A2	72,000	<p>The Mau Narok-Molo Grasslands is an open plateau of montane grassland along the crest of the Mau Escarpment, which forms the western wall of the central Rift Valley, and is bounded on one side by the Mau Forest Complex.</p> <p>It is inhabited by endangered species such as <i>Macronyx sharpei</i> and restricted-range species such as <i>Cisticola aberdare</i> and <i>Hyperolius montanus</i>.</p> <p>IBA monitoring assessment summary (2009):</p> <ul style="list-style-type: none"> • Threat score: high; • Condition score: very unfavorable; • Action score: negligible.
Lake Navaisha	IBA criteria: A1, A2 and A4	23,600	<p>The site consists of a shallow freshwater lake (15,600 ha) and its fringing <i>Acacia</i> woodland (c. 7,000 ha).</p> <p>Depending on water levels, it can be a significant site for the African Spoonbill and the Red-knobbed Coot. The lake also supports a large population of Hippopotamus.</p> <p>IBA monitoring assessment summary (2012):</p> <ul style="list-style-type: none"> • Threat score: high; • Condition score: unfavorable; • Action score: low.
Hells Gate National Park	Nationally protected	68	<p>The Hells Gate National Park lies within the Eco-Climatic zone IV that is described as environmentally fragile and prone to land degradation. It is situated in the floor of the great Rift Valley. The general topography of the area is characterized by a wide range of features associated with volcanic activity.</p> <p>There are over 100 bird species recorded inside the park, including the only nationally protected nesting colony of the Endangered Ruppell's Vultures (19 nests per year). The White-backed Vulture, the Cheetah, the Leopard, the Spotted Hyena, the Mountain Reedbuck, the Zebra and the Thompson's Gazelle are also occurring in the Park.</p>
Aberdare National Park	Nationally protected IBA criteria: A1, A2 and A3	190,000	<p>The Aberdare or Nyandarua mountains are an isolated volcanic range that form the easternmost wall of the Gregory Rift Valley, to the east of the high Kinangop/Laikipia plateau. They are c.100 km long from north to south, with 2 main peaks above 3,900m separated by a land above 3,000m.</p> <p>The Sharpe's Longclaw is living in the southern slope grasslands (but its current</p>

²¹ A3: **Biome-restricted species:** the site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome.

Site	Status and designation	Area (ha)	Short description
			status is uncertain) and the Aberdare Cisticola occurs locally in the tussock moorland. Black Rhinoceros, African Elephants and the endemic shrew <i>Surdisorex nora</i> are also inhabiting the Park. IBA monitoring assessment summary (2009): <ul style="list-style-type: none"> • Threat score: very high; • Condition score: unfavorable; • Action score: low.
Soysambu Conservancy	Private conservation area	19,425	The Soyambu Conservancy is an open land area bordering the Elmenteita Badlands in the south and sharing a boundary with Lake Nakuru National Park that has been created to preserve the land from human development. The Rothschild's Giraffe can notably be found in the area.
Kigio Wildlife Conservancy	Private conservation area, owned and operated by local communities	1,400	The Conservancy is located between Lake Nakuru and Lake Naivasha. Originally a cattle ranch, the area is now dedicated to eco-tourism. The conservancy is enclosed by an electric fence. The Rothschild's Giraffe, the Thompson's Gazelle, the Grant's Zebra, the Spotted Hyena, the Leopard and the Caracal are inhabiting the area.
Oserengoni Wildlife Sanctuary (formerly Oserian)	Private conservation area	7,284	The Sanctuary is located close to the Hell's Gate National Park. It is totally surrounded by an electric fence, at the exception of the boundary with the park. Great White Pelicans, Spotted Hyena, Leopard and Zebra can notably be found in the area.
Kedong Ranch	Private conservation area	60,000	The ranch straddles Mount Longonot, Hell's Gate and Lake Naivasha. A part of the ranch is leased for agriculture production. The ranch is inhabited by some zebras.

a) Marula Ranch Conservancy

These three tracts of privately-owned land protect a large, connected swathe of natural habitat between Naivasha and Nakuru. The A8 crosses Marula and Soysambu and runs adjacent to Kigio. The three properties hold substantial wildlife populations and a diversity of species that are likely to cross the A8 regularly.



Figure xx. *Acacia xanthophloea* woodland in road reserve, Marula Ranch

b) Soysambu Conservancy

These three tracts of privately-owned land protect a large, connected swathe of natural habitat between Naivasha and Nakuru. The A8 crosses Marula and Soysambu and runs adjacent to

Kigio. The three properties hold substantial wildlife populations and a diversity of species that are likely to cross the A8 regularly.



Figure 4-13. Acacia woodland/scrub habitat, Soysambu Conservancy

c) Kigio Conservancy

Kigio is fully fenced and Marula and Soysambu partially fenced. Large animals from Marula and Soysambu frequently attempt to cross the A8, sometimes resulting in vehicle collisions. Again, Cape Buffalo and Plains Zebra are reported to be the most frequent species killed on the road (S. Thomsett, pers. comm.). Nubian (Rothschild's) Giraffe, a Critical Habitat-qualifying species, occur here, with population estimates ranging from 145 (Giraffe Conservation Foundation) to 180 (Kenya Wildlife Service). Giraffe do attempt to cross the road at times (KWS, pers. comm.) but often are either prevented by fencing, or deterred by the heavy traffic (S. Thomsett, pers. comm.). There appear to have been no recent incidents of giraffe being hit by vehicles on the A8. The current road (and conservancy fences designed to keep wildlife away from it) thus appears to be an effective barrier to giraffe movement. There is a set of existing underpasses in this section, used mainly by the ranches for moving vehicles and livestock. Some are gated for security reasons; those that are open appear already to be used by wildlife for crossing the road.



Figure 4-14. Plains Zebra adjacent to an existing underpass (to right of photo) on Kigio Conservancy. Zebra tracks were observed in the underpass

4.2.6.1.13 Implications of protected areas for the project

The Project DMU is overlapping twelve Key Biodiversity Areas, therefore the Project should be aware of the potential for indirect impacts on these sites and apply the mitigation hierarchy to avoid and minimise them. However, some of the KBAs are not located directly close to the Project footprint (i.e., Aberdare National Park, Mau Forest Complex and Mau Narok-Molo Grasslands). These KBAs might only be impacted indirectly, e.g. if human resettlement is necessary or if human in-migration due to the road construction and expansion is observed. Such potential impacts should be closely monitored and the Project should be aware of the potential for indirect impacts on the KBAs and apply the mitigation hierarchy to avoid and minimise them.

Several KBAs are located directly close to the Project footprint (i.e., The World Heritage Site ‘Kenya Lake System in the Great Rift Valley’ including Lake Nakuru National Park and Lake Elmenteita, Lake Navaisha, Hells Gate National Park, Kinangop grasslands, Kikuyu Escarpment forest, Soysambu Conservancy, Kigio Conservancy, Oserengoni Conservancy (formerly Oserian).

These KBAs might potentially be impacted directly or indirectly. The Project should avoid direct impacts associated with intersecting the KBAs. If this cannot be avoided, the Project should apply the mitigation hierarchy, and should ensure alignment with PS6 paragraph 20 (see [Section 10](#)) by: demonstrating legal permission for development in the protected area; aligning with any management plans for the KBAs; consulting with relevant stakeholders; and implementing additional conservation actions in the area.

4.2.7 Land Use

Land use in the county is primarily agriculture, mostly subsistence farming, some large scale establishment (horticultural and wheat), livestock (beef and dairy) rearing, and settlements. Some areas are under settlement (towns), wildlife conservancies, and others are under forest (such as Menengai, Koibatek, Eburru, Londiani, and Mau, among others).



Figure 4-15. Open dry grassland and Leleshwa scrub habitat, Marula Ranch. Cleared road reserve in the foreground.

Table 4-24. Agro-Ecological Zones for the County, 2014

Zone	Description	Sub-county	Enterprises	Area(Sq.Km)
UH1	Upper highland-Humid	Kuresoi, Molo, Njoro, Nakuru North, Gilgil, Naivasha	Sheep, Dairy Zone	433.8
UH 2-3	Upper Highland-Sub Humid	Rongai, Nakuru North, Subukia, Kuresoi, Molo, Njoro, Gilgil,	Pyrethrum, Wheat Zone	1026.1
LH2	Lower High Zones-Sub	Molo, Njoro, Nakuru North, Subukia, Gilgil	Wheat, Maize, Pyrethrum Zone	419.1
LH3	Lower High Zones	Molo, Njoro, Rongai, Nakuru, Nakuru North, Subukia, Gilgil	Wheat, Barley	850.1
LH 4-5	Lower High Zones-Transitional	Transitional Gilgil, Naivasha	Cattle, Sheep, Barley Zone, Ranching Zone	370.1
UM 3-4	Upper Midland Zones-Semi- Humid	Rongai, Nakuru, Nakuru North, Subukia, Gilgil, Naivasha	Marginal Coffee Zone, Maize, beans, tobacco,	995
UM5	UM5 Upper Midland Zones-Semi- Arid	Rongai, Nakuru, Gilgil, Naivasha	Livestock, Sorghum Zone	608.5
LM5	Lower Mid land Zones-Semi-arid	Rongai	Millet Zone, Cassava, sorghum, sesame, beef	6.4

Source: Department of Agriculture, Livestock and Fisheries, County Government of Nakuru

4.3 Nyandarua County

The county is located in the central part of Kenya. The county has an area of 3245.2km² lying between latitude 0°8' to the North and 0°50' to South and between 35° 13' East and 36°42' West. The county borders include several counties; Laikipia to the North, Nyeri to the East, Kiambu to the South, Murang'a to the South East and Nakuru to the West.

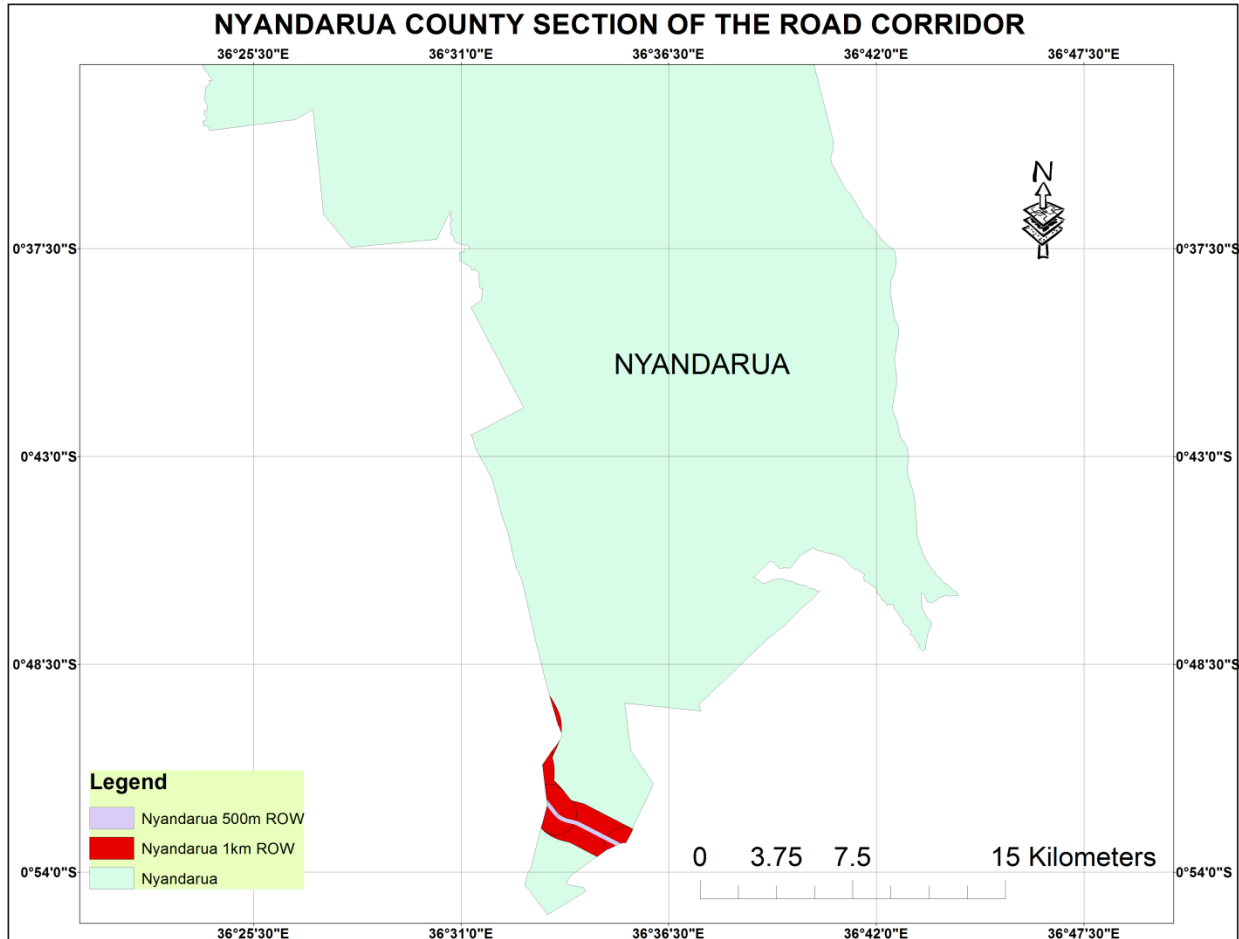


Figure 4-16. County Map of Nyandarua and road section

4.3.1 Soils and Geology

These are igneous rocks, volcanic, and alluvium. Most rock systems have lines of weaknesses occasioned by faulting which allows porosity and easy percolation. The soils in the County are of volcanic origin and vary in both fertility and distribution. The county is endowed with moderate to high fertile soils. Soils in the Kinangop and Ol'kalou plateau are poorly drained clay loams. However, Ndaragwa, northern part of Ol'joroOrok and Ol'kalou has well drained clay loams. These soils have different crop production potentials.

4.3.2 Climate and Meteorology

The county experiences moderate to low temperatures. The highest temperatures are recorded in the month of December, with a mean average of 250 C while the lowest is recorded in the month of July, with a mean average temperature of 120 C. The cold air rises during clear nights on the moor lands of the Aberdare Ranges flows down the Plateau, through the valleys west of the

plateau. The temperatures in these valleys can fall to between 1.20 C and -1.30 C which last for few hours before sunrise. The County experiences two rainy seasons: Long rains from March to May with a maximum rainfall of 1600 mm and short rains from September to December and with a maximum rainfall of 700 mm. The rainfall intensity varies according to the location. Areas near the Aberdare slopes receive sufficient rainfall with the plateau receiving scanty and erratic rainfall.

4.3.3 Agro Climatic Zone

The County is categorized into seven agro-ecological zones (AEZs):

- UH1 (North and South Kinangop), that receives relatively high rainfall
- UH2 (North Kinangop), that falls in the high rainfall zone
- UH3 (Olkolou, Kinganop)
- UH4 (Ojororok, Kipipiri)
- LH3 (Olkalou), receiving a moderate amount of Rainfall
- LH4 (Ndaragwa, Kipipiri), in dry in the ranching zone
- LH5 (Ndaragwa), that is largely dry

4.3.4 Hydrology

There are eight permanent rivers; Malewa, Ewaso Narok, Pesi, Turasha, Chania, Kiburu, Mkungi and Kitiri. Lake Ol'bollosat which is the largest water mass in the county is fed by streams and underground water seepage from the Aberdare and Dundori hills. Human activities and clearing of the catchments areas for settlement has affected its natural refilling system and its existence is threatened.

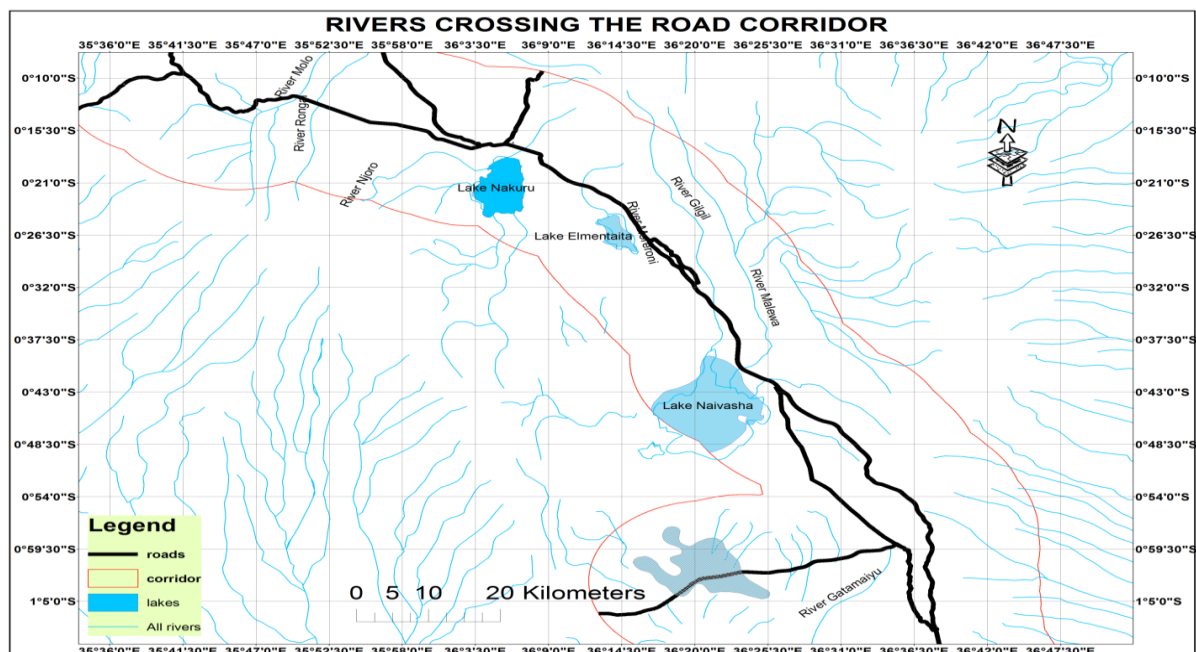


Figure 4-17. Rivers crossing road corridor

4.3.5 Biological Environment

4.3.5.1.1 Terrestrial DMU

The highway does not affect or cut into any of the DMU within the 15km buffer in Nyandarua County.

4.3.5.1.2 Tier 1 Critical Habitat

Tier 1 Critical Habitat-qualifying species are the most sensitive biodiversity features in the Project landscape. Tier 1 Critical Habitat is of extreme global importance for the long-term survival of these species. There are no Tier 1 CH qualifying species in the highway section crossing Nyandarua County.

4.3.5.1.3 Criterion 1 Tier 2

Species may qualify as Criterion 1, Tier 2 because they are globally threatened and listed on the IUCN global Red List, or because they are nationally threatened and listed on the Kenyan Red List. There are no Tier 2 CH qualifying species in the highway section crossing Nyandarua County.

4.3.5.1.4 Criterion 2: Endemic and/or restricted-range species (Tier 1 and Tier 2)

There are no Tier 1 and 2 endemic/restricted range species in the highway section crossing Nyandarua County.

4.3.5.1.5 Criterion 3: Migratory species and/or congregatory species

There are no Tier 1 and 2 migratory/congregatory species in the highway section crossing Nyandarua County.

4.3.5.1.6 Criterion 4: Highly threatened and/or unique ecosystems

Application of Criterion 4 is currently hampered because there is as yet no global list of threatened ecosystems. IUCN has developed criteria for assessing ecosystem threat status and an IUCN Red List of Ecosystems is being compiled, but this will not be available for some years. There are no Highly threatened and/or unique ecosystems in the highway section crossing Nyandarua County.

4.3.5.1.7 Criterion 5: Areas associated with key evolutionary processes

This criterion is defined by the physical features of a landscape that might be associated with particular evolutionary processes, and/or subpopulations of species that are phylogenetically or morpho-genetically distinct and may be of special conservation concern given their distinct evolutionary history (IFC 2012b, paragraph GN95). There are no key evolutionary processes in the highway section crossing Nyandarua County.

4.3.5.1.8 Protected areas and internationally recognised areas

There are no Legally Protected Areas²² (LPAs) and Internationally Recognised Areas²³ (IRAs).in the highway section crossing Nyandarua County.

²² PS6 footnote 16 defines an LPA as: 'A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values'.

4.3.6 Land Use

Land use in the road section crossing into Nyandarua County is primarily agriculture, mostly subsistence farming.

4.4 SOCIO-ECONOMIC ENVIRONMENT

4.4.1 Kiambu County

4.4.1.1 Population and Demography

According to the 2013 Population Projections, Kiambu County had 1,760,692 people with 878,710 and 881,982 being males and females respectively. The county's population is projected to be 1,921,392 in 2015, and 2,032,466 in 2017. This is influenced by the county's high population growth rate, which is at 2.81 per cent and the influx of people working in the city who prefer to stay in Kiambu and its environs. In terms of gender, the sex ratio of male to female is approximately 1:1.02.

The 2009 Population and Housing Census indicate that the county had an urban population of 936,411 in 2009 and in 2012 was projected to be 1,018,773. Urban population is expected to reach 1,108,380 in 2015 and 1,172,453 by the end of 2017. The county urban population distribution per urban centres shows that Ruiru and Kikuyu towns have the highest number of people living in urban areas, followed by Thika and Karuri towns respectively.

Kabete Constituency has the highest population density which currently is 2,534 persons/Km² followed by Kiambaa Constituency which has 2,153 persons/Km². The least densely populated constituency is Lari with 307 persons/Km², mainly due to the fact that a considerable part of the constituency is covered by forests. Ruiru Constituency had the highest population with a total of 219,752 people while Gatundu North Constituency had the lowest population of 109,460 people.

Human Development Index (HDI)

One of the main objectives under the Kenya's economic blue print, Vision 2030, is to provide a high quality of life for all Kenyans. Various human development indices will be applied to measure the broad level of social economic wellbeing. These indices use three basic dimensions namely education, health and income.

The HDI emphasizes that people and their capabilities should be the ultimate criteria for assessing the development of a country and not economic growth alone since two countries/regions with the same level of GNI per capita can end up with such different human development outcomes.

The Constitution of Kenya, 2010 in Article 27 recognizes that measures should be put in place to encourage affirmative action programmes and policies to address past inequalities. Economic and social rights to all are also recognized in Article 43. These include the right to health care services, adequate housing, and sanitation, adequate food of acceptable quality, clean and safe water and appropriate social security to vulnerable groups in the society.

²³ PS6 footnote 17 defines IRAs as: 'UNESCO Natural World Heritage Sites, UNESCO Man and the Biosphere Reserves, Key Biodiversity Areas, and wetlands designated under the Convention on Wetlands of International Importance (the Ramsar Convention)'.

The HDI for the country in 2009 was 0.561 while that of the Kiambu County was 0.56. This means that the county was almost the same as that of national score. However, it is still low because in an ideal situation the index should be as close as possible to 1.

Youth Development Index (YDI)

The 6th Kenya Human Development Report of 2009, Introduced a new measure for youth development in Kenya, the Youth Development Index (YDI). The index was at 0.5817 nationally but also depicted variations across the regions. The index is a composite of education, income and survivorship (health) dimensions. Therefore, it is critical to look at youth as a resource and a potential wealth for a nation.

However, a large group of youths are potentially at risk of engaging in harmful anti-social behaviors, including risky sexual behavior, substance use, and crime. The constitution requires measures to be undertaken to ensure the youth access relevant education and training, have opportunities to participate in political, social, economic activities and access to employment as well as protection from harmful cultural practices.

Human Poverty Index

The Human Poverty Index is a composite measure of poverty that combines several basic factors affecting the quality of life. The major component included in the HPI survey includes; Longevity of life, knowledge acquisition, economic status and social inclusion. According to the 2009 Kenya Human Development report, Kiambu County's HPI is 27.2 per cent compared to the National average of 29.1 per cent.

4.4.1.2 Ethnic Composition

Majority of the people living in Kiambu County are Kikuyus - the most populous tribe in Kenya. The county has one of the wealthiest people, among them other ethnicities who primarily work in the civil service, carry out business, and are farmers or in informal employment. There is a considerable percentage of Asians and Caucasian population who are in business or working for various foreign missions. Most Kikuyus living here are predominantly farmers growing tea and coffee as cash crops alongside food crops such as maize, beans, assorted vegetables and sweet potatoes. Other communities living in the county include Luo, Luhya, Maasai, Kamba, Meru, Kalenjin and other ethnic groups from all over Kenya.

4.4.1.3 Settlement Patterns

Along the highway, there are a number of settlements which are within close proximity to the highway as shown in the box 4-3 below. Annex V is a map showing the major settlements along the highway by road section.

Box 4-3. Major settlement areas along the alignment

1. Rironi
2. Uplands
3. Lari
4. Limuru at Km 2.800
5. Ngarariga at Km 5.900

6. Uplands at Km 9.100
7. Kimende Township at Km 17.550
8. Rwa Ng'ang'a at Km 51.800
9. Kijabe
10. Kinungi

The Project Road passes through the rural areas with a few pockets of settlements at Rironi (Km 0.000), Limuru (Km 2.800), Ngarariga (Km 6.000), and Uplands (Km 9.000) after which the alignment passes very closely along the Great rift valley from Km 12.500 to Km 17.000.

After passing through Great Rift Valley, the alignment transits through rolling and plain terrains, crossing Kimende township at Km 17.400 (Photograph 3); from Km 21.200 (Magina village) to Km 29.300 the alignment passes through Kikuyu Escarpment Forest Zone on both sides after which it passes along the open fields with minor settlements along the corridor, from Km 29.500 to Km 38.000 the alignment descends the hill section gradually along the foot hills, and then till Km 51.000 the alignment passes through open fields with very minor settlements along the corridor.



Photograph 4-18: Kimende Township at Km 17.400



Photograph 4-19: Kikuyu Escarpment Forest

4.4.1.4 Education

Pre-School Education

The county has a total population of 87,594 children falling within the age group of 3 to 5 (pre-school). This consists of 44,177 males and 43,417 females. The total number of ECD teachers is 1,843 and the teacher to pupil ratio is 1:40. However, most of the teachers are paid by parents and this is likely to compromise quality since not all are qualified to handle the young ones during the formative stages. We are optimistic that the court case filed by KNUT will soon be over so that we can bring qualified teachers on board. Total enrolment for ECD in the county is 73,730. Public ECD centres have an enrolment of 29,655 comprising of 15,563 males and 14,092 females. Private ECD centres have a total enrolment of 44,075 children comprising of 22,134 males and 21,941 females. There is therefore need for more investments in public ECD centres to ensure children from poor background get access to early education without much strain.

Primary Education

There are 1,225 primary schools in Kiambu County out of which 576 are public and 349 are private. The total number of primary school teachers is 21,090 and the teacher to pupil ratio is 1:38. The total enrolment rate stands at 295,409 pupils comprising of 115,375 males and 113,910 females. The gross enrolment rate stands at 109.6 percent, while the net enrolment rate is 99.7 percent. This could be attributed to the introduction of Free Primary Education programme. Infrastructure in schools has also improved through devolved funds e.g. Constituency Development Fund (CDF) and Local Authority Transfer Fund (LATF). However, the county still needs to invest in the provision of additional education facilities because of the increasing number of school going population.

Literacy

The percentage of people within the county who can read stands at 95.6 percent while 3.8 percent of the total population cannot read. Also, 95.2 percent of the total population can write while 4.2 percent cannot write. About 95.4 percent of the total population within the county can read and write while 4.6 percent cannot read and write. Those who can read and write stand at 95.4 per cent. The high literacy rates are as a result of continued investment in the education sector and there is need for more investment to ensure the literacy levels gets to 100 percent.

Secondary Education

There are 303 secondary schools consisting of 227 public and 76 private schools. The total enrolment rate is 89,065 out of which 44,777 are males and 44,288 are females. The gross enrolment rate is 69.3 percent and the net enrolment rate is 61.8 percent. The number of teachers in the county stands at 3,479 and the teacher/pupil ratio is 1:25. The completion rate is 92.5 percent and therefore there is need for great investment in the education sector to ensure the rate reaches 100 percent.

Tertiary Education

The County has one public University, Jomo Kenyatta University of Agriculture and Technology located in Juja Constituency and two satellite campuses namely University of Nairobi, Kikuyu campus in Kikuyu sub county and Kenyatta University, Ruiru campus in Ruiru Sub County. There are six private universities which include Grets University, Mount Kenya University, St. Paul's University, Kiriri Women's Science and Technology University and Presbyterian University of East Africa, Zetech University in Ruiru and a number of tertiary colleges. The county also has two Teacher Training Colleges namely Kilimambogo Teachers in Thika Sub County and Thogoto Teachers in Kikuyu sub county. These institutions have gone a long way in ensuring secondary school graduates get access to higher education therefore ensuring the availability of necessary skills required in the job market.

The table below shows the learning institutions along the project corridor within a distance of 1Km from ROW. **Annex 4** shows learning institutions within a distance of 500m ROW and 15km ROW.

Table 4-25. Educational facilities within 1km distance from ROW

Magina secondary school	Within 1Km	Kiambu	36.625928 -0.964212
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4.4.1.5 Health

There are a total of 364 health facilities spread across the county. Under the public facilities, the county has one level-five hospital namely Thika District Hospital, three level-4 in Gatundu South, Kiambaa and Kikuyu Constituencies, four level-three in Gatundu North, Juja, Kiambaa and Limuru Constituencies. There are 20 level-two (Health Centres) and 54 level-ones also known as dispensaries which are well distributed within the county. The rest of the facilities are private with 17 Mission Hospitals, five nursing homes, 36 dispensaries and 169 private clinics. The doctor/population ratio in the county is 1:17,000 and the nurse/population ratio stands at 1:1,300.

The average distance to the health facility is seven Km and the facilities are well accessed since the road network is good. The most prevalent diseases in the county are Flu which accounts for 35.3 per cent of the total hospital visits, Malaria accounts for 18.6 percent of the total hospital visits, Respiratory Tract Infections (RTI) at 9.7 percent, and Ear Nose and Throat Infections account for 3.1 percent of hospital visits. Generally, the county does not have serious health problems and this is indicated by low infant mortality rate, which stand at 48/1,000 and under five mortality rates, which stands at 58/1,000. Due to high rate of delivery at health institutions which stands at 80.4 per cent, children's health is fair and data available for stunted growth is negligible.

Acceptance of family planning methods currently stands at 85 per cent in the county. This partially explains the lower population growth rate in the county as most of the women in the reproductive age group understand the importance of and practice family planning. However, more efforts need to be put in place to ensure that the remaining women of reproductive age accept and start using various methods of family planning methods.

4.4.1.6 Poverty, Income and Employment

The major factors which contribute to poverty are: rising unemployment, high cost of agricultural inputs, population pressure, poor yields, low agricultural producer prices, landlessness, poor infrastructure, lack of credit, rise in HIV and AIDS, and insecurity. The poverty level in the county is estimated at 21.75 percent. The most affected areas by poverty are in the eastern part of the county for instance Thika East, which is semi-arid and with low rainfall. Pockets of poverty are also found in informal settlements of Thika, Ruiru and Juja sub counties.

Inadequate access to credit facilities for the community reduces economic empowerment hence increasing economic dependence. This increases the poverty cycles among families. Besides, security must also be improved so that investment can take place in the county in order to absorb the ever rising unemployment levels and boost economic growth and development of the county in general.

Wage Earners

The county has 902,848 persons who are wage earners representing 51.6 per cent of the total household's income in the county. These people are either skilled or unskilled and most of them are employed in coffee plantations, tea farms, industries, quarry sites and other agricultural farms. In order to ensure the county's economy remains vibrant there is need for expansion of the job market to ensure great percentage of the population becomes wage earners.

Self Employed

Due to dwindling availability of formal jobs in the county, most of the people have reverted to self-employment which contributes to 31 per cent of households 'income in the county. In rural areas, 157,473 persons are self-employed whereby they engage in agricultural activities for their livelihoods. On the other hand, 384,935 of the persons in urban centres are self-employed, having set up businesses and small scale industries.

Labour Force

The labor force in the county was 961,261 people in 2009, which comprised of 475,149 males and 486,112 females translating to 59.2 percent of the population. It was projected to rise to 1,036,128 in 2012, 1,116,826 in 2015 and 1,174,087 people at the end of 2017. With the steady growth of the labor force, there will be a major challenge of creating employment opportunities in the county.

Unemployment Levels

The county's labor force comprises of 59.2 percent of the total population. Due to high rate of population growth estimated at 2.81 per cent, the labor force is growing rapidly, while existing resources remain the same. Unemployment rate is high with 17 percent of the population unemployed. There is need to revive the collapsed industries such as dairy and establish new ones to provide job opportunities to the growing labor force majority of whom are employed.

4.4.1.7 Livelihoods

Agriculture is the predominant economic activity in the county and contributes 17.4 per cent of the county's population income. It is the leading sub sector in terms of employment, food security, income earnings and overall contribution to the socio-economic well-being of the people. Majority of the people in the county depend on the sub sector for their livelihood, with 304,449 directly or indirectly employed in the sector. Coffee and tea are the main cash crops in the county. The main food crops grown in the county are maize, beans, pineapples and irish potatoes. These are mainly grown in small scale in the upper highlands of Limuru, Kikuyu, Gatundu North and South Constituencies.



Figure 4-20. Mixed Farming in Mutarakwa area.

According to 2009 Population and Housing Census, the numbers of livestock in the county were as follows: 230,294 cattle, 120,056 Sheep, and 89,817 goats. In addition, there were 2,600,837 poultry, 46,493 pigs, 13,662 donkeys and 127 camels. In the year 2010, the county produced

267.5 million Kgs of milk valued at Kshs. 5.0 billion; and 36.2 million Kgs of beef valued at Kshs. 6.5 billion. Production of mutton was at 106,686 Kgs valued at Kshs. 42.7 million. Growth in this sub-sector has been encouraged by a ready urban market in Thika, Ruiru, Kiambu and Nairobi and the availability of local food processing factories such as Farmers' Choice Ltd, Kenchic Co. Ltd, Brookside Dairies, Githunguri Dairies, Ndumberi Dairies, Limuru Milk and Palmside Dairies, among others. There are no ranches within the county.

4.4.1.8 Energy

The main source of cooking energy in the county is firewood which accounts for about 47.3 percent, while paraffin is the major source of lighting fuel. This poses a great challenge to the realization of 10 percent forest cover within the county. Connection to the national grid is good with 98 percent of all trading centres connected and only 4 percent of public institutions currently not connected. However, connection to individual homes is low and there is need for up-scaling of the rural electrification programme. Kiambu County is endowed with a number of big rivers which can be exploited for power generation. The presence of fourteen falls and a number of other small falls like Thika falls presents a big opportunity for hydropower generation, as the country gears towards adoption of green energy.

4.4.1.9 Water and Sanitation

After coming into Law of the Water Act 2002, Athi Water Services Board (AWSB), a parastatal in the Ministry of Water and Irrigation which licensed nine (9) Water Service Providers (WSPs) Companies namely: Limuru Water and Sewerage Company, Kikuyu Water and Sewerage Company, Kiambu Water and Sewerage Company, Karuri Water and Sewerage Company, Githunguri Water and Sewerage Company, Ruiru- Juja Water and Sewerage Company Limited, Gatundu South Water and Sanitation Company, Karimenu Water and Sanitation Company and Thika Water and Sewerage Company Limited. The Water Companies mainly cover the areas which had Water Schemes operated by Government or Municipalities and they had mainly concentrated in extending and improving water and sanitation services in their areas of operation.

Therefore, areas outside the jurisdiction of these companies either have no water infrastructure or are served by community water projects. Most of these water projects are either not operational or are poorly managed and thus limiting their water coverage. To mitigate this issue, there is a proposal to extend the service area of each WSP so as to ensure there is no area left out. Once any new project is constructed, it will be handed over to respective WSPs for operation and maintenance. The well managed Community Water Projects will sign third party agreements with respective water companies, to enable the WSPs monitor their service delivery.

4.4.1.10 Solid Waste

Garbage disposal around the urban centres within the county of Kiambu cover a small percentage of waste/garbage collection as only 2.6 percent of the total population has facilities for waste disposal, about 0.7 percent of the total population uses private firms, 29.1 percent use garbage pits, 29.6 percent use farm gardens, 12.1 use public garbage heap and 25.9 percent opt to burn the waste/ garbage. This has a negative effect on the environment and hence proper mechanisms for waste disposal need to be put in place to ensure the county remains clean.

There is a proposal to construct a county landfill which will handle all solid waste from sub-counties which should be accompanied by modern incinerators to burn hazardous waste as well as waste that cannot be decomposed. With this kind of think the County can use solid waste to generate revenue through generation of electricity, biogas, compost manure etc. The County will formulate policies to increase efficient of collection of solid waste to incorporate stakeholder participation and private players.

4.4.1.11 Tourism and Recreation

The county does not have national parks or game reserves apart from tourist attraction sites which are unexploited. These sites include Kinare Forest in Lari Constituency, Chania Falls and Fourteen Falls in Juja Constituency, Paradise Lost and Mugumo Gardens in Kiambaa Constituency, Mau Mau Caves, Gatamaiyu Fish Camp and historical sites in Gatundu and Githunguri Constituencies.

The county has 682 unclassified hotels and 694 bars and restaurants which are well distributed within the county. Availability of such facilities in this county is affected by its close proximity to Nairobi where tourist facilities of all classes exist in abundance.

4.4.1.12 Industry

The county is well endowed with industries mostly located in Thika and Ruiru Constituencies. Thika Town constituency has several industries namely Bidco Oil Industries, Thika Motor Vehicle dealers, Thika Pharmaceutical Manufacturers Limited, Devki Steel Mills, Broadway Bakeries, Kenblest Industry, Kel Chemicals, Thika Rubber Industries Limited, Macadamia Nuts, Campwell Industry and Kenya Tanning Extracts Limited. In Ruiru constituency, the major industries include Clay Works as well as Spinners and Spinners. The Bata Shoe Factory which is the country's major producer of leather products is located in Limuru constituency. These industries act as a major source of employment and market outlet for agricultural and non-agricultural products both for domestic use and export. The agro processing includes Farmers' Choice Ltd, Kenchic Co. Ltd, Brookside Dairies, Githunguri Dairies, Ndumberi Dairies, Limuru Milk and Palmside Dairies, among others.

4.4.1.13 General Infrastructure

The county has a total of 2,033.8 km of roads under bitumen standards, 1,480.2 km under gravel surface and 430.1 km under earth surface. There is a great need in improving the condition of the roads since during the rainy season, most of the roads become impassable. However, the terrain poses a great challenge for road maintenance. There has been a lot of improvement in the roads subsector with the example of Thika-Nairobi highway.

It also has 131 km of railway line and four railway stations in Ruiru, Thika, Kikuyu and Limuru towns. The rail is not fully utilized in the county and only passenger trains operate in the morning and evenings between the City of Nairobi and the four stations. However, there is a great potential in the sector and hence efforts need to be put in place to ensure the infrastructure is improved which will encourage introduction of modern efficient trains.

4.4.1.14 Posts and Telecommunications

Kiambu County is well covered by mobile network which is estimated at 98 percent even though landline coverage is very poor with only 214 connections in the entire county. This might be

attributed to the fact that landlines are becoming obsolete and have a high maintenance cost. There are 19 post offices and 14 sub-post offices which are fairly distributed within the county. Distances to the nearest post office vary from one part of the county to another. Most of the residents (70.4 percent) are within the range of 5 Km and above while 22.5 percent of the population are in the range of 1.1-4.9 Km and only 7.2 percent of the residents are within the range of 0-1 Km. Currently there are 149 cyber cafes and eight private courier services operating within the county which are mostly located in the urban centres of Thika, Ruiru, Karuri, Kiambu, Limuru and Kikuyu.

The county has a total of 2,517 trading centres with 6,634 registered retail traders and 750 registered wholesale traders. There are also a number of urban centres with the largest being Thika Town which is one of the largest industrial towns in the country. Other urban centres include Kiambu in Kiambu Sub county, Karuri in Kiambaa sub county, Kikuyu in Kikuyu sub county, Limuru in Limuru Sub County Gatundu in Gatundu South sub county and Ruiru in Ruiru Sub County.

4.4.1.15 Financial Institutions

There are a total of 17 commercial banks with branches well distributed within the county. In addition, there are eight microfinance institutions, one building society, four village banks and 12 insurance companies. The institutions are well distributed within the county and hence they are easily accessible. This is an indication of vibrant economic activities that are able to sustain the financial sector making it one of the fastest growing sectors in the county over the last five years.

4.4.2 Nakuru County

4.4.2.1 Population and Demography

Nakuru County has a diverse background comprising of urban and rural set-ups as well as a rich multi-ethnic, economic and cultural diversity. The county covers an area of 7,495.1 Km² and lies within the Great Rift Valley bordering eight other counties. The county headquarter is Nakuru Municipality, one of the fastest growing towns in the East Africa region. Nakuru County is divided into 11 administrative Sub-Counties with a total of 31 divisions and 55 electoral wards. The county has five towns and one municipality.

The county population projection in 2015 is estimated at 1.925296 million (KNBS, 2009), with male and female accounting for approximately 50.2% and 49.8% of the total population respectively with a population density of 234 per square kilometer with a county population growth rate of 3.05% per annum the population is projected to increase further to 2,046,395 by 2017 assuming constant mortality and fertility rates.

The county population growth rate is estimated at 3.05 percent as per 2009 National Population and Housing Census. The high population growth rate has created a predominantly youthful population with about 51.87 percent of the population being less than 20 years of age and about 71.63 percent of the population less than 30 years of age. The implication of a large youthful population is that it will exert pressure on the existing resources. The county should promote facilities and services to meet the economic and social needs of the youth. In this regard the county government needs to initiate deliberate programmes aimed at youth empowerment for instance Small and Medium Enterprise Parks as well as training youths in technical and

professional programmes. The observable decline in population of higher age group indicates a lower life expectancy. Developing a strong and affordable healthcare system and other socio-economic factors that improve the quality of life like environment will partly enhance living standards as envisaged in the Kenya Vision 2030.

The county population is predominantly youthful with about 51.87% aged below 20 years and about 71.63% of the total population aged below 30 years. About 62% of the total population dwells in the rural areas. The rate of unemployment is at 24%.

Table 4-26. Projected Populations and Population Density per Constituency

	2009		2012 (Projection)		2015 (Projection)		2017 (Projection)	
	Population	Density	Population	Density	Population	Density	Population	Density
Nakuru Town West	152,257	607	166,846	665	182,832	728	194,332	774
Nakuru Town East	157,167	2,115	172,226	2318	188,728	2,540	200,599	2,700
Molo	124,438	260	136,361	285	149,427	312	158,826	332
Njoro	184,859	259	202,572	284	221,981	311	235,944	331
Kuresoi North	124,050	222	135,936	243	148,961	266	158,331	283
Kuresoi South	115,435	202	126,496	221	138,616	242	147,335	257
Rongai	130,132	124	142,601	136	156,264	149	166,093	158
Bahati	144,266	384	158,089	421	173,237	461	184,133	490
Subukia	94,478	242	103,531	265	113,451	290	120,586	309
Naivasha	224,141	133	245,617	146	269,152	160	286,081	170
Gilgil	152,102	113	166,676	124	182,646	135	194,135	144
Total	1,603,325	4,660	1,756,951	5107	1,925,295	5,596	2,046,395	5,948

Table 4-27. Population Projections by Sub-Counties

Sub-County	2009 Census			2012 Projections			2015 Projections			2017 Projections		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Nakuru	15656 5	15285 9	309424	17156 7	16750 5	339072	18800 6	18355 5	371561	199831	195101	394932
Rongai	71914	70213	142127	78805	76941	155745	86355	84313	170668	91787	89616	181403
Molo	62254	62184	124438	68219	68142	136361	74756	74671	149427	79458	79368	158826
Njoro	88364	89816	178180	96831	98422	195253	10610 9	10785 2	213961	112783	114636	227419
Kuresoi	12133 6	11814 9	239485	13296 2	12947 0	262432	14570 2	14187 5	287577	154867	150799	305665
Subukia	39160	40713	79873	42912	44614	87526	47024	48889	95913	49982	51964	101945
Nakuru North	74907	78648	153555	82084	86184	168268	89949	94442	184391	95607	100382	195989
Naivasha	12372 5	12233 1	246056	13558 0	13405 2	269632	14857 1	14689 7	295468	157916	156136	314052
Gilgil	66357	63830	130187	72715	69946	142661	79682	76648	156330	84694	81469	166163
Total	80458 2	79874 3	160332 5	88167 4	87527 6	175695 0	96615 4	95914 2	192529 6	102692 4	101947 1	204639 5

Source: Nakuru County Integrated Development Plan

Human Development Index (HDI)

The HDI measures human development based on the basic factors of a long and healthy life, the acquisition of knowledge, and a reasonable standard of living. These factors are measured using the following indicators; GDP per capita measured in purchasing power parity (PPP) in US dollar, life expectancy at birth, adult literacy rate and combined enrolment ratio at primary, secondary and tertiary level.

The average life expectancy for Nakuru County is 52.9 years for the males and 58.2 for the females. The adult literacy rate is 76.8 per cent. The county GDI index is 0.4321 less than the 0.4447 national indexes. The HDI on the other hand is 0.5558 compared to the national one which is 0.561 where zero is the poorest score and 1 is the best score. The Kenya's vision 2030 blue print has a target to increase the current National HDI to 0.750 by the year 2030.

Youth Development Index (YDI)

The Kenya Human Development report for 2009 has identified YDI as a critical monitoring system and a vehicle for youth development. The wellbeing and economic productivity of the youthful populations is important Human development indicator as they constitute 29 per cent of the total population in the county. The main factor evaluated in measuring YDI include the acquisition of wealth; access to education and training; access to labor markets; good personal and reproductive health; longevity of life; access to social services, opportunities and conditions (availability, knowledge, attitudes, access, utilization) The youth development index for the region is 0.5952 higher than the national level at 0.5817.

Human Poverty Index

The Human Poverty Index is a composite measure of poverty that combines several basic factors affecting the quality of life. The major component included in the HPI survey includes; Longevity of life, knowledge acquisition, economic status and social inclusion. According to the 2009 Kenya Human Development report, Nakuru County's HPI is 24.6 per cent compared to the National average of 29.1 per cent.

4.4.2.2 Ethnic Composition

Nakuru County is a multi-cultural county with individuals originating from all the Kenya chief tribes. According to the 2009 census, Nakuru County is said to have a population of 1, 603,325 individuals with majority being male (50.2%) and female are said to be 49.8% of the population. The leading tribes are the Kalenjin and the Kikuyu making around 70% of the entire population. Other tribes for example Kamba, Meru, Luhya, Luo, Kisii among others are present mostly in urban area. Majority of these people migrated here for business and employment. The government is the main employer in the county.

4.4.2.3 Settlement Patterns

Box. 4-4 Major settlement areas along the alignment

1. Naivasha at Km 57.000
2. Gilgil at Km 85.500
3. Lanet at Km 114.500
4. Nakuru town from Km 117.000 to 127.500
5. Salgaa at Km 151.000
6. Molo at Km 166.400
7. Mau summit at Km 174.900

From Km 51.000 to Km 52.500 commercial establishments of Rwa Ng'ang'a are observed on both sides of the project road then the Project road passes through the outskirts of Naivasha town from Km 53.800 to Km 58.800 till Naivasha interchange with residential and commercial

establishments situated laterally on left of the corridor and Karati River at Km 59.650.

The alignment passes through open agricultural Delemere fields and existing railway line along the project corridor on left hand side till Km 69.300 after which the railway line deviates away. From Km 73.500 to Km 77.200 road passes along Kigio Wildlife Conservation on right of the corridor; existing toll plaza and weigh bridge is observed at Km 75.200, and at Km 80.000 the railway line crosses the project road through an overpass after which the road passes through the box cut section of hard rock for 500mts.

From Km 84.000 to Km 86.000 the alignment passes through thick built up areas of Gilgil town, and then passing through built up areas of Kikopey at Km 89.600; the project passes along the World Heritage site “Lake Elementaita Wetland” on LHS of corridor from Km 91.000 to Km 99.500.

From Km 99.500 to Km 113.200 alignment passes through open lands with fever settlements. The outskirts and industrial areas of Nakuru Town start from Km 113.200 and the roadway section widens to four lane divided carriageway from Km 114.100 just before the intersection with Elementaita Road.

From Km 114.100, the project corridor passes through outskirts of Nakuru town with several commercial establishments like Tuskys super market at Km 121.000, Naivasha super market at (Km 122.400) and several residential areas, hotels, lodges, resorts and other commercial establishments on RHS. A single lane service road/cycle track of 3.5m wide is provided on RHS from Km 116.700 to Km 122.000. On the left of the corridor thick built up residential colonies including Club country (Km 119.000) is observed which is separated by the existing railway line and a railway station at Km 123.600. From Km 123.600 to Km 127.850 the alignment passes through thickly built up sections of Nakuru town with several commercial establishments, industrial setups, educational institutes, government offices, vehicle showrooms, banks and hotels. Raised footpath cum covered drains is provided in this section. This section of the highway has 4 existing roundabouts.

1. Gatehouse roundabout at Km 124.100
2. Nakumat/Westside Mall Roundabout at Km 125.500
3. Total station Roundabout at Km 126.400
4. Eveready Industries Roundabout at Km 127.850

Important establishments along this section of road are Jomo Kenyatta Institute of Science and Technology at Km 125.100 on LHS, Railway Godown at Km 125.200 on RHS, Westside Mall/Nakumat at second roundabout (Km 125.500), County Assembly of Nakuru at Km 125.700 on RHS, KCB Bank at Km 125.900, and Eveready industries at fourth roundabout (Km 127.850).



Photograph 4-21: First Roundabout – Gate House Roundabout

Till Km 130.000 the alignment passes with 4 lane divided carriageway configuration and then transits to 2 lane with paved shoulders + climbing lane on RHS till Km 136.200 for the facilitation of heavy vehicles on the steep gradient; stone pitched trapezoidal drain is also observed in this stretch. Construction batch plant is also observed on right of the project road at Km 135.200. From Km 136.200 to Km 143.100 the alignment is generally straight without any geometrical deficiencies and passes along the rolling terrain and through some settlements of Sobeia Village (Km140.600) fewer industrial establishments were observed in this stretch like Ganglong International Company at Km 138.300 and Nakuru Teachers’ Training College at km 150.000.

From Km 143.100 to Km 146.000 there are huge pine plantations on the RHS of the project corridor, after which then it passes through the open areas till km 150.800, from Km 150.800 to Km 152.200 it has thickly built up section on both sides of the road with Salgaa junction Km 151.750.

4.4.2.4 Education

There are 898 primary schools and 334 secondary schools in Nakuru County, serving 358,556 pupils and 25,475 students respectively. The county's Teacher to Pupil Ratio is 1: 49 for public primary schools and 1:36 for public secondary schools. Some of the top high schools in Nakuru County include Moi High School Kabarak, Molo Academy, Nakuru High School, Bahati Girls Secondary School, Naivasha Girls Secondary School and Rongai Secondary School.

Universities and other institutions of higher learning in the county include Egerton University, Mt Kenya University Campus, Kabarak University, Kenya Industrial Training Institute (KITI) and Kenya Institute of Management (KIM). The literacy level in the county is at 79.7%.

Table 4-28. ECDE Centres, Enrolment and Teachers by Category, 2014

Category	Centers	Enrollment	Teachers
Public	771	70,714	5,333
Private	694	40,598	2,022
Total	1,465	111,312	7,355

Source: Ministry of Education Science and Technology.

Table 4-29. Primary Schools by Category and Sub-County, 2013 - 2014

Sub-County	2013			2014		
	Public	Private	Total	Public	Private	Total
Kuresoi	167	48	215	172	63	235
Molo	47	15	62	50	22	72
Njoro	87	28	115	91	38	129
Rongai	73	41	114	82	45	127
Nakuru	62	78	140	62	73	135
Nakuru North	42	56	98	43	58	101
Subukia	40	12	52	42	16	58
Gilgil	62	29	91	68	29	97
Naivasha	68	52	120	71	52	123
Total	648	359	1,007	681	396	1,077

Source: Ministry of Education, Nakuru County

Table 4-30. Secondary Schools by Category Enrolment and Teachers, 2013 - 2014

Category	Centers	Enrollment	Teachers
Public	294	93,237	4,402
Private	101	16,788	1,110
Total	395	110,025	5,512

Source: Ministry of Education Science and Technology

Table 4-31. Institutions of Higher Learning

Category	2013			2014		
	Public	Private	Total	Public	Private	Total
Universities	1	1	2	1	1	2
Universities Campuses	6	7	13	6	7	13
Teacher Training Colleges	-	4	4	-	4	4
National Polytechnics	1	-	1	1	-	1
Institutes of Technology	2	13	15	2	13	15
Technical Training Institutes	2	-	2	2	-	2
Total	12	21	33	12	21	33

Source: Department of Education, Nakuru County

Pre-School Education

The county has a total population of 87,594 children falling within the age group of 3 to 5 (pre-school). This consists of 44,177 males and 43,417 females. The total number of ECD teachers is 1,843 and the teacher to pupil ratio is 1:40. However, most of the teachers are paid by parents and this is likely to compromise quality since not all are qualified to handle the young ones during the formative stages. We are optimistic that the court case filed by KNUT will soon be over so that we can bring qualified teachers on board. Total enrolment for ECD in the county is 73,730. Public ECD centres have an enrolment of 29,655 comprising of 15,563 males and 14,092 females. Private ECD centres have a total enrolment of 44,075 children comprising of 22,134 males and 21,941 females. There is therefore need for more investments in public ECD centres to ensure children from poor background get access to early education without much strain.

Primary Education

There are 1,225 primary schools in Kiambu County out of which 576 are public and 349 are private. The total number of primary school teachers is 21,090 and the teacher to pupil ratio is 1:38. The total enrolment rate stands at 295,409 pupils comprising of 115,375 males and 113,910 females. The gross enrolment rate stands at 109.6 percent, while the net enrolment rate is 99.7 percent. This could be attributed to the introduction of Free Primary Education programme. Infrastructure in schools has also improved through devolved funds e.g. Constituency Development Fund (CDF) and Local Authority Transfer Fund (LATF). However, the county still needs to invest in the provision of additional education facilities because of the increasing number of school going population.

Literacy

The percentage of people within the county who can read stands at 95.6 percent while 3.8 percent of the total population cannot read. Also, 95.2 percent of the total population can write while 4.2 percent cannot write. About 95.4 percent of the total population within the county can read and write while 4.6 percent cannot read and write. Those who can read and write stand at 95.4 per cent. The high literacy rates are as a result of continued investment in the education sector and there is need for more investment to ensure the literacy levels gets to 100 percent.

Secondary Education

There are 303 secondary schools consisting of 227 public and 76 private schools. The total enrolment rate is 89,065 out of which 44,777 are males and 44,288 are females. The gross enrolment rate is 69.3 percent and the net enrolment rate is 61.8 percent. The number of teachers in the county stands at 3,479 and the teacher/pupil ratio is 1:25. The completion rate is 92.5 percent and therefore there is need for great investment in the education sector to ensure the rate reaches 100 percent.

Tertiary Education

The County has one public University, Jomo Kenyatta University of Agriculture and Technology located in Juja Constituency and two satellite campuses namely University of Nairobi, Kikuyu campus in Kikuyu sub county and Kenyatta University, Ruiru campus in Ruiru Sub County. There are six private universities which include Gretsia University, Mount Kenya University, St. Paul's University, Kiriri Women's Science and Technology University and Presbyterian University of East Africa, Zetech University in Ruiru and a number of tertiary colleges. The county also has two Teacher Training Colleges namely Kilimambogo Teachers in Thika Sub County and Thogoto Teachers in Kikuyu sub county. These institutions have gone a long way in ensuring secondary school graduates get access to higher education therefore ensuring the availability of necessary skills required in the job market.

The table 4-32 below shows the primary and secondary schools along the project corridor within a distance of 1km from the right of way. Annex 4 shows schools in the project highway within a 15km buffer.

Table 4-32. Educational facilities within 1km distance from ROW

Name	With 1K m Buffer	Country	Coordinate
Kapsorok primary school	Within 1Km	Nakuru	35.775153 -0.215505
Mau summit secondary school	0.9 KM	Nakuru	35.680020 -0.165654

Nakuru Day secondary	Within 1Km	Nakuru	36.025606 -0.273373
Afraha High school	Within 1Km	Nakuru	36.070943 -0.297917
Nakuru High school	Within 1Km	Nakuru	36.091579 -0.277750
Nakuru Girls High school	Within 1Km	Nakuru	36.096582 -0.280251
Menengai High school	Within 1Km	Nakuru	36.096269 -0.276968
Ngala School for the Deaf	Within 1Km	Nakuru	36.075633 -0.294165
Shiners Girls secondary school	Within 1Km	Nakuru	36.130350 -0.293852
Hillcrest secondary school	Within 1Km	Nakuru	36.127692 -0.302451
Mustard Seed school	Within 1Km	Nakuru	36.025606 -0.273373
Greensteds International school	Within 1Km	Nakuru	36.173967 -0.343879
Wellspring secondary school	Within 1Km	Nakuru	36.304037 -0.494429
Teresia's academy	Within 1Km	Nakuru	36.329050 -0.493022
Gilgil Boys High school	Within 1Km	Nakuru	36.329363 -0.509593
Kirobon High school	Within 1Km	Nakuru	35.944081 -0.253434
Manera primary	Within 1Km	Nakuru	36.425039 -0.709231
D N Handa secondary school	Within 1Km	Nakuru	36.437859 -0.713609
Nyamathi Primary school	Within 1Km	Nakuru	36.509928 -0.790525
Tabain Primary	1Km	Nakuru	35.714810 -0.185214

4.4.2.5 Health

There are about 440 health facilities inclusive of 22 level 4 and 5 hospitals. GoK hospitals are 16 and contribute to 36% of the total health facilities in the county. In terms of health, the major disease burden is upper respiratory infection, malaria, disease of skin and diarrhoea and HIV and AIDS. Deliveries by skilled attendants is at 69.5% and deliveries at health facilities stands at 69.7% against annual target of 70%, according to the Kenya Demographic and health surveys 2014.

Nakuru is rated 7th among the high burden counties and 10th among high incidence counties (Kenya HIV prevention revolution roadmap). The HIV prevalence among women in the county is higher (5.8%) than that of men (3.5%), indicating that women are more vulnerable to HIV infection than men in the County. According to Kenya indicator Aids Survey (KAIS) 2016, the prevalence for the County stands at 5.3% with a total number of 66,295 PLHIV with 58,397 being adults and 7,898 being Children. By the end of 2015, a total of 41, 217 people were living with HIV in the County, with 15% being young people aged 15-24 years and 9% being children under the age of 15 years. Approximately 202 children and 1,204 adults died of AIDS-related conditions in 2015. (Kenya HIV estimate 2015). There are geographic variations within the county with some sub-counties having a higher burden and more severely affected than others. This is defined by the hotspots which lie in the sub-counties.

4.4.2.6 Poverty, Income and Employment

Majority of wage earners are in the private sector mainly in the flower, tea and coffee farms, construction, academic institutions, public transport, wholesale and retail trade, hotels and restaurants and *jua kali* sectors. Estimates from the 2009 Population and Housing Census indicate that on average, 14 per cent of the county population (12 per cent urban and 16 per cent

rural) are self-employed. 33.5% of people in Nakuru county live below the poverty line. The economic growth and development of the county is mainly driven by agriculture. Trade and tourism are the other major contributors to the county economy. There are various economic activities in the county ranging from— land sale, manufacturing, horticulture, agro-business and strong service industry.

Table 4-33. Labour Statistics

Employed labour force in Agriculture	26.0%
HHS Owning livestock	32.4%
Employed labour force in informal sector	40.5%
Unemployed people in active labour force	10%
Economically inactive people in total labour force	21.5%

Source: Economic Atlas

Labour Force

The working-age population in 2012 (15-64 years) in the county was 968,745 accounting for 55.1 per cent of the total population of whom 484,378 are male while 484,366 are female. The primary working-age population comprises the employed and the unemployed. It is expected to increase from 968,745 persons in 2012 to 1,128,338 persons in 2017. Given a labour force population which is more than half of the total population, measures will need to be put in place to provide adequate employment opportunities.

Unemployment Levels

Based on the forgoing information, of the total labour force of 968,745 in the year 2012, the employed are 740,608 while the unemployed are 228,137 representing 24 per cent of the total labour force. The female accounts for 46 per cent of the unemployed population. In order to enhance the growth of the economy in the county, there is need to enhance measures aimed at creating employment activities both in the formal and informal sectors to absorb the unemployed. The strategies should focus more on the women and youth population. There is therefore need to boost youth and women enterprise development funds that have contributed to the empowerment of these groups. Further, community based projects like development of cottage industries that make use of local resources should be promoted.

4.4.2.7 Livelihoods

According to the most recent census, Nakuru County population stands at 1.6 million, with a population growth rate of 3.05% per annum, the population is projected to increase to 2,046,395 by 2017 assuming constant mortality and fertility. The population is largely youthful with over 70% being below 30 years. The County is cosmopolitan comprising populace of diverse ethnicity and nationality. The settlement patterns are influenced by availability of natural resources, soil fertility and rainfall, pasture, infrastructure, economic opportunities, proximity to urban set-ups and security. Although a large population is in the rural areas, the urban centres have the highest population density due to rural-urban migration as a result of well-developed infrastructures, employment opportunities and security as in the case of Molo Town. The rural population is estimated at 62%.

The poverty level in the County is relatively high (41%), especially in the urban areas (55%). High unemployment and low agricultural productivity are some of the likely reasons leading to high poverty. Despite the high literacy (those who can read and write) levels in the County (80% among youth), skill mismatch and lack of innovation, coupled with increased rural to urban migration, hinder economic development of urban areas. Unemployment stood at 24% in 2012. Only 34% of the population has access to electricity for lighting, while over 80% use firewood for cooking.

The food poverty rates in the County stands at 36%. Female-headed households are the most affected most likely due to lack of agricultural production inputs. In many cases this is associated with cultural practices that marginalize women in terms of asset ownership. The main livelihood activities in the County are livestock keeping, crop farming, small businesses (retailing) with minimal mining, tourism and industry. The main livestock types in the County are dairy cattle, local poultry and wool sheep. Agriculture is the backbone of the county's economy with food crops, horticulture and cash crops, dairy and beef as common products.

The major on-going mining activity in Nakuru County is that of Diatomite at Kariandusi located along the Nairobi-Nakuru highway about 2Km east of Lake Elementaita. Other activities related to mining include the harvesting of sand for construction, quarrying and the harnessing of underground hot water for geothermal power generation.

4.4.2.8 Energy

The 2009 Population and Housing Census indicate that 139,430 in Nakuru County households were using electricity for lighting, which translate to 34 per cent of the households. However, 85.7 per cent of these connections are in the urban areas. It is also worth to note that lantern and tin lamp are a common source of lighting in the rural areas.

Only 5% of residents in Nakuru County use Liquefied Petroleum Gas (LPG), and 8% use paraffin. 46% use firewood and 40% use charcoal. Firewood is the most common cooking fuel by gender at 44% in male headed households and 50% in female headed households.

Nakuru County occupies a strategic geographical location at the floor of the Rift Valley which has seismic activities and therefore promotes the production of geothermal power at Olkaria, Menengai Crater and Ol Doinyo Eburru geothermal projects. Exploiting the full potentials of geothermal energy shall hugely improve the realization of affordable energy and reduce overreliance on hydro-power which is susceptible to climate change.

4.4.2.9 Water and Sanitation

The distance to the nearest water point in Nakuru County is from zero to six kilometers. It is worth noting that 35% percent of the county population take between 1-4 minutes to fetch drinking water. Estimates from Kenya Population and Housing Census 2009 indicate that about 150,608 households (36.8 per cent) in the county have access to piped water. About 63 per cent have access to potable water. 80 per cent of household are harvesting rainwater.

Improved sources of water comprise protected spring, protected well, borehole, piped into dwelling, piped and rain water collection while unimproved sources include pond, dam, lake, stream/river, unprotected spring, unprotected well, jabia, water vendor and others.

The 2009 Population and Housing Census indicated that 85 per cent of the residents had access to private improved sanitation. In rural areas, open defecation was estimated to be still practiced by 0.03 per cent of the population. Lack of affordable housing in the major towns in the county has led to mushrooming of informal settlements (slums) in these urban areas resulting in poor spring protection project in parts Mau forest, Olenguruoni, Kuresoi South Sub County, sanitation and poor management of both solid and liquid waste. There will be need therefore, for enhanced measures to ensure proper physical planning and management of waste disposal in the county.

Environmental degradation in Nakuru County is mainly as a result of inappropriate farming methods, effects of climate change, poor solid waste and liquid waste disposal, soil erosion, inadequate sanitary facilities, massive felling of trees for firewood, timber and clearing land for agricultural use. In addition, poor physical planning in urban areas, quarrying activities, pollution and toxic from agro-chemicals contributes to environmental degradation.

4.4.2.10 Tourism and Recreation

The county has several tourist attractions such as Menengai Crater, Hell's Gate National Park, Lake Nakuru, Lake Nakuru National Park, Lake Naivasha and Lake Elementaita. Tourism is a major economic activity in Nakuru County, this is attributed to the numerous tourist attractions that include Lake Nakuru National Park, Lake Naivasha, Hell's Gate and the Menengai Crater. Lake Nakuru National Park, situated just 4km from Nakuru town, is one of Kenya's most popular tourist destinations. The park's ecosystem, which comprises Lake Nakuru and surrounding grasslands, supports over 50 species of mammals including white rhino and about 450 species of birds including the lesser flamingos. Other tourist destinations include Lake Naivasha with over 350 species of birds'; Hell's Gate National Park, which, is ideal for rock climbing'; biking and wildlife, including cheetahs, leopards and lions. The 2,490 meters-high Menengai Crater 10km north of Nakuru town is also a tourist attraction.

Nakuru County has substantial number of tourist hotels and camping sites offering high class services. They include: Crayfish, Fish Eagle, Marina, Hippo Point, Simba Lodge, Sopa Lodge, Naivasha Country Club Enashipai Resort and Spa, and Great Rift Valley Lodge among others. Many of these hotels are found in Naivasha Sub-County especially near Lake Naivasha.

4.4.2.11 Industry

Some of the industries that are found in the county forming the economic basis include: textile industries, animal feeds, agricultural implements, printing, dairy products, engineering works & body builders, saw mills, contractors, bitumen products and quarrying, posho mills, canners, edible oils and soap manufacturers and pyrethrum processing plants. A large proportion of the County population is employed in, wholesale and retail trade, hotels and restaurants, manufacturing sector and informal sector including the Jua kali sector. The Jua-Kali sector has employed over 23,169 artisans. In the market Centre's, there are a lot of trading activities such as retail shops, groceries and wholesale traders forming the bulk of business activities contributing significantly to income for many households. A lot of emphasis should be laid on the promotion

of Medium and Small Scale businesses (MSEs), the informal sector, Jua-Kali- retail and wholesale trade and the transport sector. These sectors create a lot of employment to the citizens especially for women and youth. The industrialization sub sector through the Economic Stimulus Programme has constructed and equipped Constituency Industrial Development Centres in four constituencies in the county, namely Kuresoi South, Nakuru town, Rongai and Subukia Constituencies. These centres will give the community an opportunity to channel their creativity, innovation and entrepreneurial competencies in economic activities like jua-kali. The pyrethrum processing plant which is a significant agro-based industry in the county have not been operating at full capacity due year of inefficiencies and declining raw materials.

4.4.2.12 General Infrastructure/Public Utilities

Roads: Nakuru has approximately 911.9 Km of roads with bitumen surface, 1,110.8Km are of gravel surface and 2,326.6Km of earth surface. The Nairobi – Uganda highway runs across the county thus promoting cross-border interconnections within the three East African countries.

Railway: The county has a railway line length of 192 Km connecting major urban areas of the county namely; Naivasha, Gilgil, Nakuru, Njoro, Molo and Rongai. It has ten railway stations serving as drop/ collecting points for agricultural and industrial good as well as providing public transport from Nakuru to the Mombasa via Nairobi and Nakuru to Uganda via Eldoret, Kisumu, Busia and Malaba.

Communication: Estimates from the 2009 Population and Housing Census indicate that approximately 75 per cent of households in the county own a mobile phone. Mobile network coverage in the county is at 91 per cent.

Financial Services: Nakuru County is served by a network of major financial institutions. There are a least ten major banks which include Kenya Commercial Bank, Standard Chartered bank, Equity bank, National Bank, Commercial Bank of Africa, Family Bank, Co-Operative Bank, Barclays Bank, Post Bank and Trans-National Bank.

4.4.2.13 Archeological Sites along project corridor

Along the project corridor there are known archeological sites that are within the vicinity of the road alignment. These sites all located in Nakuru County include: -

a) Kariandusi Archeological Pre-Historic Site

Kariandusi lies on the eastern side of the Rift Valley, about 120-km north North West of Nairobi; and about 2 km to the East Side of Lake Elementaita. It is situated at 0°, 28s, and 36° 17E. The site rests on the Nakuru-Elementaita basin which occupies the width of the Rift valley, flanked by Menengai crater on the north and the volcanic pile of Mount Eburru, on the south. This living site of the hand-axe man was discovered in 1928. A rise in the Lake level drove pre-historic men from their lake-side home and buried all the tools and weapons which they left behind in a hurry. The Acheulian stage of the great hand-axe culture, to which this site belongs, is found over a very widespread area from England, France, and Southwest Europe generally to Cape Town.

The Kariandusi archaeological site is amongst the first discoveries of Lower Paleolithic sites in East Africa. There is enough geological evidence to show that in the past, large lakes, sometimes reaching levels hundreds of meters higher than the Present Lake Nakuru and Elementaita,

occupied this basin. Dating back between 700,000 to 1 million years old, Kariandusi is possibly the first Acheulian site to have been found in Situ in East Africa. Dr. Leakey, a renowned paleontologist, believed that this was a factory site of the Acheulian period. He made this conclusion after numerous collections of specimens were found lying in the Kariandusi riverbed.

b) Hyrax Hill Pre-Historic Site

Hyrax hill lies in the middle of Kenya's Rift valley, about 4 km from Nakuru town. The site is close to the Nairobi-Nakuru highway. It is about 150 km away from Nairobi. From Lake Nakuru, the hill is about 4.5 km with its base about 100m above the Lake. Hyrax Hill is a prehistoric site near Nakuru in the Rift Valley province of Kenya. It is a rocky spur roughly half a kilometer in length, with an elevation of 1,900 meters above sea level at its summit. The site was first discovered in 1926 by Louis Leakey during excavations at the nearby Nakuru Burial Site, and Mary Leakey conducted the first major excavations between 1937 and 1938. There are two distinct areas of occupation at Hyrax Hill: one which was occupied during the Neolithic and late Iron Age, and one which was occupied by the Sirikwa earlier in the Iron Age.

c) Italian Catholic Church

Mai Mahiu Catholic Church, also known as the 'Travelers Church', was built by Italian prisoners of war in 1942. The building went up despite great challenges, such as their dedication to worship. It is the smallest church in the country.



Photo 4-22: Bushlands at the Italian Catholic Church near Maai Mahiu Town

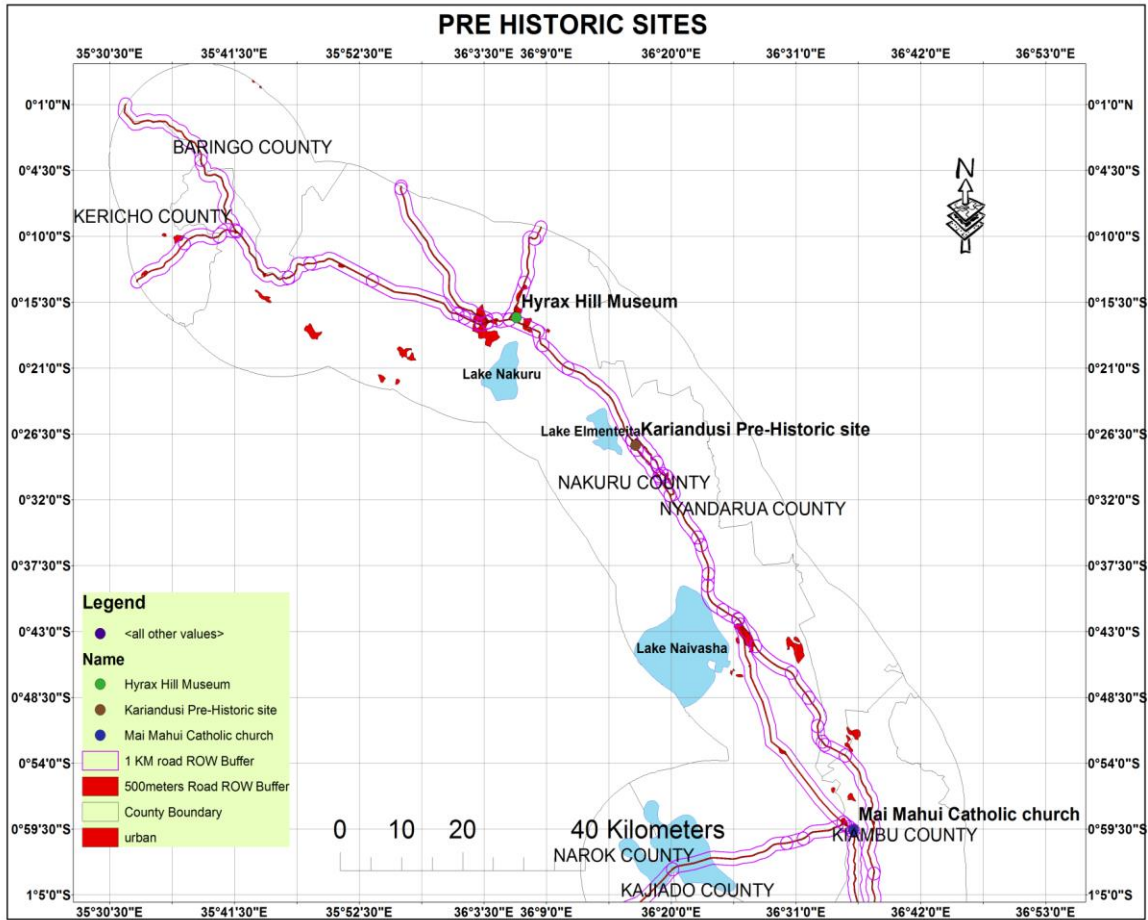


Figure 4-23. Map of Archeological Sites

4.4.2.14 Social Conflict

Natural resources have been at the center of most conflicts in Africa in general and Kenya to be specific. These resources related conflicts have often been experienced in formerly Coast province with Rift Valley remaining the epicenter of resource related conflicts. In Rift Valley, conflicts over resources have been experienced between the Agikuyu versus the Kalenjin in Uasin Gishu, and Bomet Counties and Agikuyu versus the Maasai in Nakuru County.

Resource related conflicts among the agro-pastoral communities have often revolved around ownership, management and use. Nakuru County experienced sporadic agro-pastoral conflicts pitting the Maasai against the Agikuyu since 1995 becoming full blown in the year 2005. Contemporary societies in attempt to resolve agro-pastoral conflicts have tended to emphasize utilization of legal mechanisms ignoring various social institutions and local capacities.

Land ownership, water access and livestock theft were the sources of the agro-pastoral conflicts. Land ownership and use is the main source of the agro-pastoral conflicts that affected Nakuru County in the year 2005. The Agikuyu, on one hand, claim ownership through buying and subsequent acquisition of title deeds and government settlement program in the post independent period. The Agikuyu further argued that they bought the land when the white settlers left the country after Kenya gained independence in 1963. The Maasai claim was based on the pre-colonial or historical ownership of the disputed land. The Maasai argued that they acquired the land before colonialist came and evicted them. In addition, this emphatic identification of land as the source of conflicts could be attributed to the different economic systems of the two communities in dispute and the need for the same resource for different uses. While the Agikuyu require the land for farming, the Maasai require it for grazing. These economic systems are incompatible in the sense that the Maasai would want to graze their animals in their “historical heritage” while the Agikuyu would want to farm in the land that constitutionally belong to them through “purchase”.

The proposed highway expansion passes through Nakuru County and in certain settled areas where the Maasai community exist. While the historical land issues in this country pitting the Agikuyu and Maasai is acknowledged, it is noted that the expansion will not lead to any displacement and acquisition of land and therefore does not exacerbate this historical land issue of concern. The project expansion is aligned to the existing ROW that is already owned by KeNHA. The Resettlement Action Plan (RAP) report prepared for this project has however noted and identified that there are encroachers on the ROW who will be compensated as part of economic displacement.

There are seasonal grazing and water areas in Eburu where Maasai come from as far as Narok in search for water and pasture and these areas are likely to be inaccessible when the highway is complete as a result of construction of medians and barriers for safety. The project design has factored the establishment of livestock crossing points which will be informed by a detailed study on the same to ensure that livestock barrier effect is minimized.

4.4.3 Nyandarua County

4.4.3.1 Population and Demography

Population in the county stood at 596,268 as at the last national population census of 2009. This comprised of 292,155 males and 304,113 females. The 2013 projected populations for the county were 656,348 persons. The population which grows at 2.4 % annually comprises of 321,593 male and 334,755 female.

The population was expected to grow to 688,618 and 722,498 persons in 2015 and 2017 respectively with 43% of the population being below 15 years while over 69% of the population is below 30 years. There is no significant difference between the male and female population as there are 104 females for every 100 males.

Human Development Index (HDI)

One of the main objectives under the Kenya's economic blue print, Vision 2030, is to provide a high quality of life for all Kenyans. Various human development indices will be applied to measure the broad level of social economic well-being. These indices use three basic dimensions namely education, health and income.

The HDI emphasizes that people and their capabilities should be the ultimate criteria for assessing the development of a country and county and not economic growth alone since two countries/regions with the same level of GNI per capita can end up with such different human development outcomes. For instance, the HDI for the country in 2009 was 0.561 while that of the Nyandarua County was 0.6342. This means that the county was doing relatively well compared to the national score. However, it is still low because in an ideal situation the index should be as close as possible to 1.

Youth Development Index (YDI)

The 6th Kenya Human Development Report of 2009, introduced a new measure for youth development in Kenya, the Youth Development Index (YDI). The index is a composite of education, income and survivorship (health) dimensions. The index was at 0.5817 nationally but also depicted variations across the regions. For instance, in Nyandarua County the index (YDI) was 0.6517. This means that the county has a relatively developed youth compared to the whole country score but is still low.

4.4.3.2 Ethnic Composition

Nyandarua County is home to 596,268 people (male - 49% and female - 51%), according to the 2009 National Census. The Kikuyu people are the dominant community in Nyandarua, making at least 90% of the county's population. Other communities such as Luo, Luhya, Kamba and Kisii are also residents especially in the urban centres. These groups of people reside in the county where they primarily engage in various businesses and employment. The government is the main employer in the county.

4.4.3.3 Settlement Patterns

There are no settlements along the section of the highway passing through Nyandarua County other than a market centre called Soko Mjinga.

4.4.3.4 Education

The county has 846 Early Childhood Development (ECD) Centres of which 436 are private, 508 primary schools of which 171 are private and 337 are public, 185 secondary schools where public are 139, 14 Youth Polytechnics and 1 Science and Technology Institute. The county has two branches of universities namely: Greta University and Maasai Mara University.

Pre-School Education

The county has 864 ECD centres with a total enrolment of 26,964 pupils. This enrolment is 54.3% of the target population aged between 3-5 years. This means there are many children who have not been enrolled in ECD. There are 1,828 ECD teachers indicating a teacher pupil ratio of 1:17. The average years of attendance are two years.

There is need for increased funding to expand the ECD facilities, increase the number of ECD teachers and there is also need to sensitize the parents about the need to take their children to the ECD facilities at the appropriate age.

Primary Education

The county has 508 primary schools with a total enrolment of 155,732 pupils. This enrolment is 95.3% of the county population aged 6-13 years. The number of primary school teachers is 3,573 with the teacher pupil ratio of 1:40. About three per cent of the children travel for less than one kilometre to school while 93% travel between 1.1-4.9 Km. Four per cent of the children travel for more than five kilometers to school.

Literacy

The county literacy rate is 86.3%. This is the county population that can read. However, the proportion of the population that can write is 85.2% while the proportion that can read and write is 83.8%. This implies that about 13.7% of the population cannot read and will be the target for adult education basic literacy programmes.

Secondary Education

The total number of secondary schools in the county is 185 schools with a total enrolment of 49,769. This enrolment is 50.3% of population aged 4-17 years. There are 1063 teachers in the county giving a teacher/student ratio of 1:28. The dropout rate in secondary school stands at 5.8%.

Students travelling less than one kilometre to a secondary school account for 12% of the total student population, while those travelling 1.1 to 4.9 km account for 54%. However, those travelling for five kilometers and above are 34%. The transition from primary school to secondary school is 21% meaning that 79% either join tertiary institutions or they drop out of school after completing primary school.

Tertiary Education

The county has 14 youth polytechnics and one Institute of Science and Technology (Nyandarua institute). There is one university branch of Maasai Mara University in both Kinangop and Kipipiri. This shortage in tertiary institutions has greatly affected the transition rates from secondary school to institutions of higher learning. There lacks an institution offering agro-based

courses which would be more relevant to the economy of the county that largely depend on agriculture.

4.4.3.5 Health

There are two level four public health facilities in the county, one mission hospital, three nursing homes, seven level three health facilities, 32 level two facilities and 50 private clinics. The doctor population ratio is 1:155,188 and nurse population ratio is 1:2,150. The average distance to the nearest health center is 3.2 km. In the county, 21 % of the households travel up to one kilometre to access health service 78% travel between 1.1 km and 4.9 km while those who travel above five kilometre account for 1 % of the population. Of major concern is that only 15% of the total population in Nyandarua County use mosquito bed nets. This needs to be improved through creating public awareness to the residents.

The most prevalent disease in the county is upper respiratory infections which account for 23.1 % of all reported cases. Other diseases are: lower respiratory infections which account for 5.9 % of reported cases, malaria at 14.5 % diarrhea is at 1.4 % and stomach aches at 3.8 %. The average morbidity rate for the county is 21.2 %. The male morbidity rate is 19.2 % and female morbidity rate is 23.4 %. Most of these diseases are bacterial infections that can be prevented through proper clothing, appropriate beddings, water treatment and hand wash.

4.4.3.6 Poverty, Income and Employment

Labour Force

The total eligible labor force for the county is 334,054 with 159,832 males and 174,222 females. This labor force is engaged as wage earners, self-employed, in school or is unemployed. The majority are in the agriculture sector as they are either unskilled or semi-skilled. The improvement of the county education structures will equip this labor force with the necessary skills needed in the job market or venture into private businesses and be job creators. The ICT sector can be considered to provide such openings as it's under exploited.

There is need for skills upgrading for the existing labor force with the incoming of county structures to meet the enhanced demand for skilled workers to drive the county economy. With the expansion of youth polytechnics, technical institutes and middle level colleges the number of skilled workers will be increased.

Unemployment Levels

The employment level in the county is at 16.9 %. The rest of the labor force is not economically engaged either because they are at school, are incapable to work or cannot find any work. This unemployment level of 83.1 % indicates the extent to which the resources of the county including human capital remain under exploited. The level of unemployment may also be attributed to job-skills mismatch where the available jobs are not filled with the qualified personnel for that post.

4.4.3.7 Livelihoods

The economic potential of Nyandarua County mainly lies in agriculture earning activity in the County, employing about 69% of the people and contributing about 73% to the household incomes. The major agricultural activities in the County are crop production and livestock

keeping. A survey by the Agricultural Sector Development Support Program (ASDSP) in 2013 revealed that about 63%, 88% and 47% of all the adult men, adult female and youth interviewed were employed in crop and/or livestock production respectively. In 2012, the total value for crops in the County was KES 17 billion and KES 7 billion for the livestock sector. Irish potato and cabbage had the highest contributions to crop income, about 72% (KES 12,205.9 million) and 17% (KES 2,981.1 million) respectively, whereas cow milk and beef contributed the most to livestock income, about 88% (KES 6,260 million) and 6% (KES 422.6 million) respectively (GoK, 2015).

4.4.3.8 Energy

Main source of cooking energy is firewood while electricity covers 10.5 % of the county and is mainly found in urban centres of Mairo-inya, Ol'kalou, Njambini and Engineer and several trading centres located in different parts of the county. The total number of households using electricity for cooking is 0.2 %, while 77.8 % of household use firewood as the main source of cooking fuel. The proportion of households using charcoal is 19.3 %, paraffin is 1.4%, and biomass residue is 0.3%. Households using firewood for lighting are 0.3%; paraffin 82.7 %, electricity 10.5 %, and solar 6.0 %.

4.4.3.9 Water and Sanitation

The county is categorized as a water scarce area. The situation has been aggravated by the degradation of water catchments leading to reduced ground water recharge. As a result, boreholes have medium to low yields. The main source of water in the county is rainwater which ends up in dam sand rivers. The major rivers within the county originate from the Aberdare forest and drains into Ewaso-Nyiro and Narok in Rift valley and Tana catchment areas.

The county has one lake, 222 dams, 280 boreholes 6244 shallow wells and 96 springs. Main source of water for domestic use is dams and shallow wells. This water issued for domestic, agricultural and small industrial use. Most of the water used is untreated which poses great health risk. There are two water companies in the county registered by the Rift Valley Water Services Board (RVWSB). These are: the Nyandarua Water and Sanitation Company and the Ol'kalou Water and Sanitation Company. Most of the areas in the county are not covered under these schemes thus remains unserved. The water supply system is unreliable and there will be need to expand water schemes to increase the number of households with access to piped water. The average distance to the nearest water point is 1.5km. 35,321 households have access to piped water while 21,154 have access to portable water. Most of the households depend on water from shallow wells, roof catchments and rivers.

The main form of disposal for human waste is pit latrines. 92 % of the households have latrines out of which 81 % have pit latrines and three % have flush toilets. There is no sewerage system in the county. On the other hand, the most common mode of disposal for solid garbage is by garbage pit at 32.8 % of the households. 28 % of households dispose by burning while 25 % dispose in their farm gardens. The local authority collects garbage for only two % of the households.

On waste disposal, 92 % of the population have access to latrines with 81 % utilizing pit latrines, eight % VIP latrines and three % flush toilets. There are no sewerage systems in the county.

Garbage collection by the town and County Councils within the county cover a small %age as only two % of the waste is collected by the local authorities.

There are no private firms engaging in waste disposal. This has a negative effect on the environment and hence proper mechanisms for waste disposal need to be put in place to ensure the county remains clean. There is need to develop sewerage systems for the major urban centres of Ol'kalou, Mairo-inya, Engineer and Njambini.

4.4.3.10 Tourism and Recreation

There are a few tourist attraction sites in the county. The main tourist attraction sites include: Lake Ol'bollosat that is ideal for bird and hippos watching, boating and water surfing activities and sport fishing. At the Aberdare ranges there is mountain climbing and nature trails. Evidence of the pre-colonial and colonial-times settlements can be located in the County. There exist white mischief valley homes at the foot of the Aberdare forest where the colonialists lived and Mau-Mau caves at Geta and Kimathi. Some Community Based Organisations have endeavored to preserve these relics. There is tourism potential in the visit of caves used by the Mau Mau in the Aberdare forest. The county has been a training ground for some of the best athletes in the world. There is great potential for tourism in the county as it borders the Aberdare National Park to the east. Main Wildlife found in the county are elephants, hippos and different bird species.

4.4.3.11 Industry

The country has an undeveloped industrial sector. The jua kali artisans operate in un-coordinated manner in production and marketing. There are 1023 jua kali artisans and five associations. Great potential in development of industries exist in agro processing. Thread milling which done at small scale in Kinangop could be expanded and replicated in other areas as the raw material (wool) is readily available in the county.

The Midlands factory in Njambini deals with potato processing and has contracted market in Nairobi. There is room to expand this factory and establish more to boost potato farming in the county and offer cold storage facilities for green peas and carrots.

The pyrethrum processing industries in the county that have since collapsed should be revived. Milk processing and dairy product making should be expanded to enhance value addition. There is also potential for processing of hides and skins. Cut flower farming is also practiced in the county with flower farms in Ol'joroOrok, Ol'kalou, and Kipipiri.

4.4.3.12 Archeological Sites along project corridor

The project highway does not pass next to any archeological and cultural sites along the highway.

4.4.3.13 General Infrastructure/Public Utilities

Road, Rail Network and Airstrip

The provision of a well maintained and efficient road network is key to the development of the county. However, the county has adequate road network though most of them have never been opened due to inadequate funds while the existing ones are in poor condition. The county has a

total of 3,400 Km of road of which 224 Km is bitumen, 525 Km is gravel surface and 2,651 Km is earth surface.

The earth roads are impassable during the rainy season while in many cases the gravel roads are cut off. This is a frequent phenomenon noting that the county has three heavy rainy seasons in any given year and the poor alignment soils (black cotton soils). Road C69 Njabini Ndudori road was completed in 2010 and is the only all-weather road that cuts across the county.

The other is Gilgil-Ol'kalou road which is in bad state of repair though the contractor is trying to fix it. Roads linking Muranga and Nyeri needs to be opened up to enable smooth and cheap movements of goods from the county. The road linking Naivasha and engineer once fixed will facilitate movement of goods from Nyandarua to Nakuru County. The county has 60 kilometers of railway line running from Nyahururu to Gilgil in Nakuru County that is currently not in use. There is one air strip in Nyandarua west district which is in good condition and is operational.

Posts and Telecommunications

The telephone connections (landlines) stands at 1 % of the population and are mainly found in major towns of Ol'kalou, Engineer and Njambini. The county enjoys high mobile network coverage of 90 % provided by all mobile phone service providers. The areas which have no reliable mobile connections are the interior parts of Mirangi-ini and Kipipiri.

The county is serviced by nine (9) post offices situated in Mirangi-ini, Miharati, Ol'kalou, Njambini, Ndaragwa, Engineer, Kasuku, and Kaheho and two sub-post offices in Mairo- inya and Ol'joroOrok. The county has no fibre optic cable connections but it is anticipated to be connected in the next fiscal year. However, some people are currently using E-mail as way of communication.

5 CHAPTER 5. ENVIRONMENTAL AND SOCIAL RISKS AND IMPACTS

5.1 Impacts and Risks Associated with Design

5.1.1 Barrier Effect on Wildlife Movement

The proposed expansion of the highway traverse areas where wildlife is known to exist as described in the baseline chapter 4 and further and in detail in **section 5.2.1** below. Wildlife cross the existing highway along various points in search of pasture and the expansion of the highway which will include erection of medians and barriers for safety purposes will block the movement of the wildlife from one side of the highway to the other and hence adversely affect them.

This risk has been anticipated at the feasibility design stage and wildlife crossing points (underpasses and overpasses) have been identified by design team. Kenya Wildlife Service (KWS) has also further undertaken a study to determine efficacy of these proposed crossing points. A total of 11 crossing points have been proposed by KWS points which have been further reinforced and confirmed by a complimentary study conducted by The Biodiversity Consultancy firm as adequate and necessary with additional design improvements as shown in table below. Table 5-1 below shows the wildlife crossing points aimed at facilitating movement of wildlife from one side of the highway to the other.

Table 5-1. Proposed Wildlife Crossings

Wildlife crossing ID	Location	GPS coordinates x/y	KWS notes and proposed structure	The Biodiversity Consultancy (TBC) Firm Comments
W1	Kinale Forest	37M 0232284/ 9901146	Proposed improved underpass for wildlife movement to and from both sides of the forest. Recommend one underpass wildlife crossing in the forest. Redesign the culvert into an underpass to allow animal crossing. Underpass dimensions 30M wide by 7M high	This underpass will also be important for smaller wildlife, including CH-qualifying species if present. Redesign of culverts elsewhere in this stretch may also assist small animals to cross at additional points. The largest animals expected to cross the road in this stretch are Leopards. While a wide underpass will encourage use, the height could be reduced if necessary.
W2	KWSTI	37M 0216713/ 9918832	Proposed underpass for wildlife to move between KWSTI Institute and game farm. Due to limited space, it can also serve as an access road for KWSTI. Underpass dimensions 30M wide by 7M high	The two sections of the KWSTI sanctuary are aligned (on opposite sides of the road) for only a short stretch in between the Kinangop and Naivasha road junctions. This is the best place for a crossing, but may be challenging to design if an interchange also needs to be built here. Other options would involve acquiring land for a crossing on one or other side of the road.

				A discussion between KWS and road engineers is recommended to outline and prioritize the different options. The crossing size is appropriate as it is high enough for giraffe, however preliminary findings from the Standard Gauge Railway in Tsavo West NP are that giraffe may be wary of using even a much narrower underpass.
W3	Marula	37M 0209089/ 9930886	Currently is a cattle crossing situated past Mordent/Moi north road junction. Currently has a gate that is locked/opened by Marulla. The area has wildlife on both sides of the road. It is proposed to be redesigned as an underpass for wildlife and livestock. Proposed underpass dimensions 30M wide by 7M high	The road would need to be fenced securely to prevent human access and allow the underpass to remain open, as well as to channel wildlife to the crossing point.
W4	Marula	37M 0208294/ 9932840	The area is utilized by wildlife on either side of the road. The area is proposed as the 2nd wildlife crossing in Marula as an overpass. Overpass design should be 100m wide with natural vegetation and grills on both sides to prevent animals from falling over.	Including overpasses in the road design, as well as underpasses, is crucial to provide options for giraffe to cross (see W2 above). Overpasses must be wide enough that animals near the centre can cross without having a direct sightline of nearby traffic on the road. 100 m is a reasonable length – the overpass should not be narrower than this.
W5	Marula	37M 0207582/ 9935092	Currently serves as an access road to Kigio Conservancy. It is recommended that the crossing to be re-designed into an underpass for wildlife crossing as well as an access road to Kigio conservancy. To be re-designed as an underpass with Height: 7M Width: 30M	The crossing size is appropriate as it is wide enough to encourage use and high enough for giraffe.
W6	Marula	37M 0205649/ 9937553	This is the 4th proposed site after Gilgil river and past the toll station. It is recommended for a wildlife underpass and can also be used by Marula livestock. Proposed underpass design Height: 7M Width: 30M	The crossing size is appropriate as it is wide enough to encourage use and high enough for giraffe.

W7	Marula	37M 0204826/ 9939110	This is the 5th proposed wildlife crossing at Marulla past the Gilgil river bridge and the weigh-bridge. The area has wildlife on both sides of the ranch and is less disturbed and is recommended for a wildlife underpass. Proposed underpass design Height: 7M Width: 30M	The crossing size is appropriate as it is wide enough to encourage use and high enough for giraffe.
W8	Marula	37M 0203112/ 9941156	This is the 6th proposed wildlife crossing after the railway crossing. Proposed to be designed as an underpass. Proposed underpass design Height: 7M Width: 30M	The crossing size is appropriate as it is wide enough to encourage use and high enough for giraffe.
W9	Soysambu	37M 0192902/ 9957127	Proposed overpass for wildlife in Soysambu conservancy. It connects the main conservancy and Kasambara block and has wildlife on both sides. Overpass dimensions: to be 100m in length to allow animals to adapt and use without panic and for natural vegetation growth.	Including overpasses in the road design, as well as underpasses, is crucial to provide options for giraffe to cross (see W2 above). Overpasses must be wide enough that animals near the centre can cross without having a direct sightline of nearby traffic on the road. 100 m is a reasonable length – the overpass should not be narrower than this.
W10	Soysambu	37M 0193605/ 9956102	The site connects the main conservancy and Kasambara block and has wildlife on both sides. The site is proposed for an underpass Underpass dimensions 30M wide by 7M high to accommodate all species including the giraffes.	The crossing size is appropriate as it is wide enough to encourage use and high enough for giraffe.
W11	Koibatek Forest	36M 0806416/ 9975524	The proposed Mau summit underpass along Koibatek forest Underpass dimensions 30M wide by 7M high	The crossing should be large enough to accommodate African Elephant should elephant movements through this forest patch be restored in future. The size proposed is appropriate.

Source –KWS Study Report

Risk Significance

The risk significance related to barrier effect on wildlife movement on both sides of the highway is considered low in significance if the design of the highway takes consideration of the proposed crossing points and includes them in the final project design. In actual fact, the establishment of

these crossing points will reduce wildlife mortality which is common on the highway and along the points where as shown in table above. These crossing points have been adopted in the feasibility study report and will be a condition for adoption by private concessionaire during the detailed design.

5.1.2 Barrier Effect of Livestock Movement

Along the highway in certain areas, the local communities especially the Maasai rear livestock which graze on both sides of the road. Especially in Eburru area near Gilgil, the presence Maasai communities has been observed and they use the current ROW to graze livestock. The proposed highway expansion including installation of median and barriers for safety reasons, will block livestock from grazing on either side of the highway which is likely to lead to conflict between the Maasai and the project. This area is sometimes home to seasonal temporary camps belonging to nomadic Maasai pastoralists who come to the Eburru area in Gilgil and Nessuiet area near Molo in search of pasture and water and set up temporary camps. In the Nessuiet area, the camps are located on KeNHA’s and Kenya Railways Corporation’s ROW and in a vast parcel of land belonging to a private ranch. These are nomadic Maasai pastoralists from Narok County and usually use these areas during the dry seasons as they move around in their search of pasture and water.

The feasibility study has anticipated this risk and identified crossing points for livestock along the corridor and provided for underpasses specifically to serve as livestock crossing points. The proposed crossing points are the same that will be used by wildlife as shown in table 5-1 above.

Risk Significance

The risk significance related to barrier effect on livestock movement on both sides of the highway is considered low to moderate in significance if the design of the highway takes consideration of the proposed crossing points and includes them in the final project design. In actual fact, the establishment of these crossing points will reduce livestock mortality which is common on the highway and along the points as shown in table above. These crossing points have been adopted in the feasibility study report and will be a condition for adoption by private concessionaire during the detailed design, when the Concessionaire will be required to consult with the Maasai to ensure that the proposed crossing sites are acceptable to them.

5.1.3 Water Quality Risks

The poor design of the road and culverts in the highway sections crossing rivers and are likely to adversely impact on the water bodies, wetlands and aquatic species through pollution, sedimentation effects or hydrological disruptions. The highway crosses 7 permanent rivers in Kiambu and Nakuru Counties as shown in tables 5-2 below.

Table 5-2. Rivers crossed by highway

Name	Class	County
River Molo	Permanent	Nakuru
River Njoro	Permanent	Nakuru
River Gilgil	Permanent	Nakuru
River Malewa	Permanent	Nakuru

River Mereroni	permanent	Nakuru
River Kariandusi	Permanent	Nakuru
River Gaitamayu	Permanent	Kiambu

In some of these rivers especially Molo River, there is a highly threatened fish species. *Aplocheilichthys* sp. nov. 'Baringo' inhabits the Lake Baringo catchment, whose headwaters (for the River Molo) arise on the western rim of the Rift Valley, around the end of the Project road alignment near Mau Summit. The species is Critically Endangered, and qualifies for Tier 1 Critical Habitat.

It is unlikely that *Aplocheilichthys* sp. nov. is found in these upper reaches of the catchment, as its morphology suggests it is better adapted to the slower-flowing waters at lower altitude (J. Gathua, pers. comm.). However, given the interconnected nature of aquatic ecosystems, pollution, sedimentation or hydrological disruption to the upper catchment can be expected to have impacts downstream.

The detailed design by private concessionaire must consider the risks associated with pollution of these water bodies and risks on aquatic species and ensure that the design of culverts and of storm-water runoff for the road, avoid and minimise the risk of pollution, sedimentation or hydrological disruption to these rivers and streams.

Risk Significance

The risk significance related to water quality risks is considered high and long term in nature and irreversible especially with respect to the impacts on the highly threatened fish species. *Aplocheilichthys* sp. nov.

5.2 Construction Impact Drivers

5.2.1 Critical Habitat Risks and Impacts

Approach to assess project impacts on CH-qualifying features

Based on expert knowledge and literature review, an initial assessment of the likelihood of a project impact (direct or indirect impact) on Critical Habitats (CH) and species was undertaken as part of the ESIA study. Species were categorised into one of three mitigation classes: -

- Class A: Significant project impacts are possible; application of the mitigation hierarchy is likely to be required;
- Class B: Significant project impacts are unlikely but further information required to confirm this: impacts are possible if, for example, the species is found to occur on the road alignment and/or is susceptible to indirect impacts such as pollution or sedimentation of water bodies;
- Class C: No likelihood of a project impacts; no further work is required.

Table 5-3 below shows the main findings with respect to species and associated classes along the highway.

Table 5-3. Species and classes along highway

	A	B	C	Total
Plants	1	1		2
Crustacea			1	1
Molluscs	1			1
Insects	3	1	4	8
Fish	1		1	2
Amphibia	7	2	2	11
Reptiles	2			2
Mammals	2	2	3	7
Birds		1	17	18
Total	17	7	28	52

Note: three species qualify for Tier 1 Critical Habitat:

- The fish *Aplocheilichthys* sp. nov. 'Baringo' (category A)
- The bird *Macronyx sharpei* (Sharpe's Longclaw) (category B)
- The frog *Phrynobatrachus irangi* (category C)

Seventeen CH-qualifying species have been identified as likely to be impacted by the project (i.e., Class A: 5 mammals, 1 birds, 2 freshwater fish, 2 amphibians, 3 insects, 1 mollusc and 2 plants), because the road may disrupt their habitat and acts as a barrier or because road expansion may lead to pollution and/or hydrological changes of feeder streams in catchment. The application of the mitigation hierarchy will be required for these 16 species.

For **seven** CH-qualifying species, significant project impacts appear unlikely but further investigation of species status and potential impacts will be required (i.e., Class B).

Regarding the **twenty-eight** remaining CH-qualifying species, no project impacts are likely, so no further investigation is required (i.e., Class C). Justifications for Classes B and C are detailed in annex X Critical and Natural Habitat Screening and Recommendation for Biodiversity Management.

Two species, the frog *Mertensophryne nairobiensis* and the fish *Barbus loveridgii* have been classed as data deficient as there is not sufficient information available to assess whether or not they qualify Critical Habitat.

A number of other species do not qualify for CH but are important ecological components of Natural Habitat and thus also priorities for the project in terms of impact mitigation.

The 18 CH-qualifying species can be divided into several broad groups in regard to the mitigation measures that may be required.

a) A highly threatened fish species

Aplocheilichthys sp. nov. 'Baringo' inhabits the Lake Baringo catchment, whose headwaters (for the River Molo) arise on the western rim of the Rift Valley, around the end of the Project road alignment near Mau Summit. (Figure 5-1.). The species is Critically Endangered, and qualifies for Tier 1 Critical Habitat.

It is unlikely that *Aplocheilichthys* sp. nov. is found in these upper reaches of the catchment, as its morphology suggests it is better adapted to the slower-flowing waters at lower altitude (J. Gathua, pers. comm.). However, given the interconnected nature of aquatic ecosystems, pollution, sedimentation or hydrological disruption to the upper catchment can be expected to have impacts downstream.

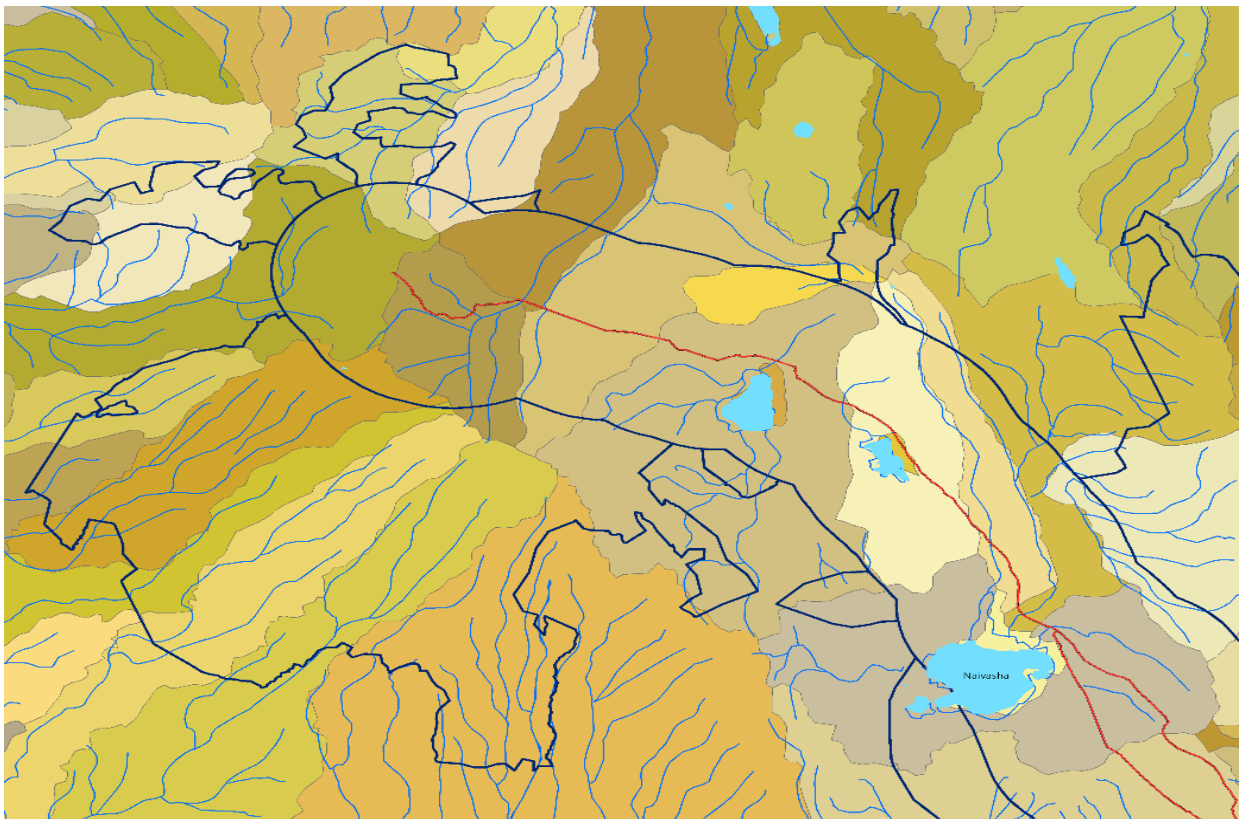


Figure 5-1. North-west section of road alignment in relation to Rift Valley catchments

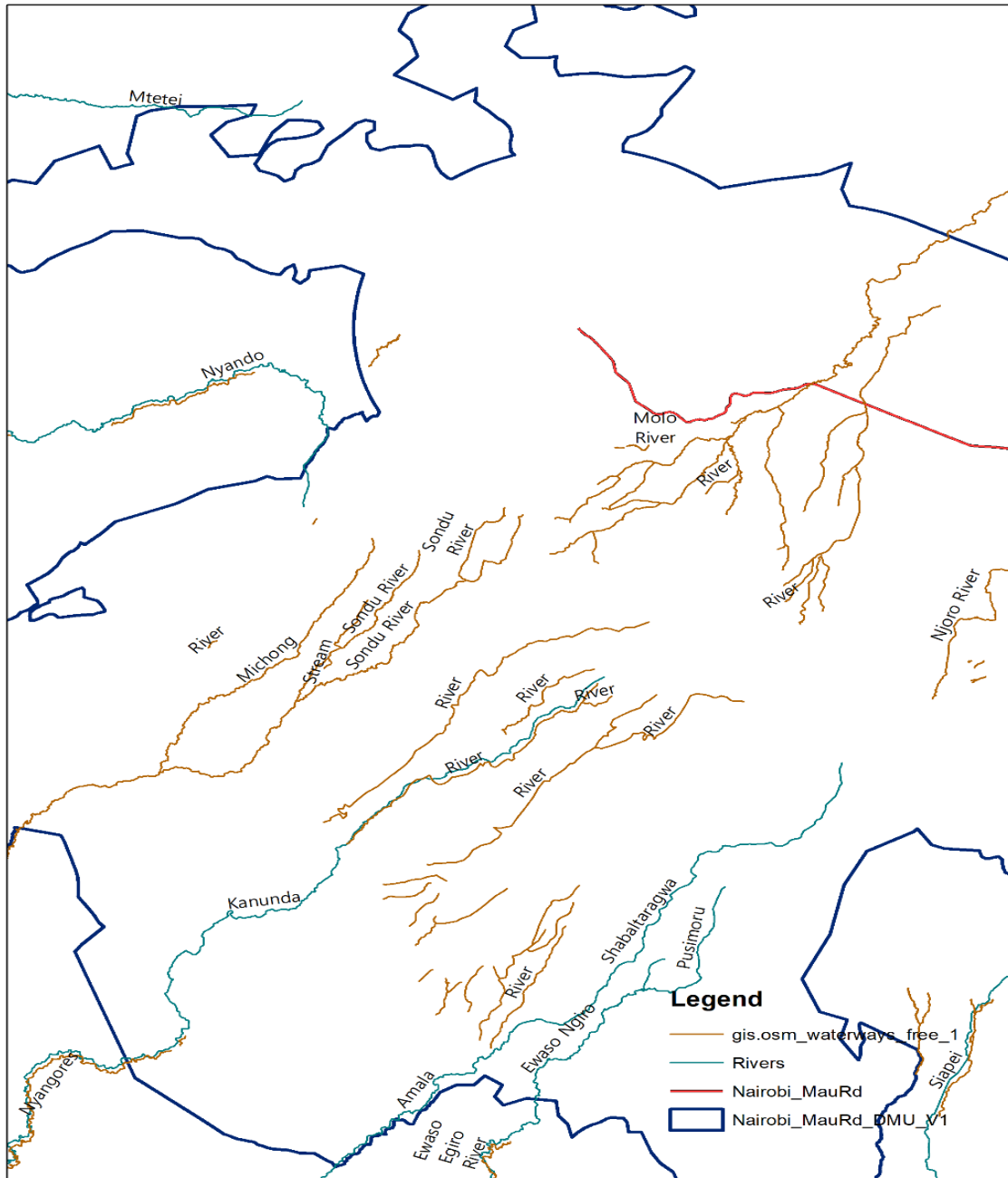


Figure 5-2. Headwaters in the Lake Baringo catchment intersected by the road alignment

Wetland-dependent species

These include the plant *Lagarosiphon hydrilloides*, the mollusc *Bulinus permembranaceus*, the dragonfly *Notogomphus maathaiae*, and a large suite of range-restricted (but as yet not severely threatened) amphibians: *Cacosternum kinangopensis*, *Hyperolius cystocandicans*, *Hyperolius montanus*, *Mertensophryne lonnbergi*, *Phrynobatrachus keniensis*, *Phrynobatrachus kinangopensis* and *Ptychadena mahnerti*.

These species all depend on wetlands, though may have different habitat requirements (e.g. small streams vs. seasonal pools) and seasonalities. All are potentially sensitive to water pollution and hydrological disruption. They may also inhabit small wetlands that are in or close to the road alignment. For amphibians in particular, which often show seasonal movements to and from breeding sites, the increased barrier effect of the road is a potentially significant impact.

Small terrestrial forest animals

These include the butterflies *Neptis katama* and *Neptis kikuyuensis*, the chameleon *Trioceros jacksonii* and the shrew *Sylvisorex granti*. All occur in the Kinale Forest area. The primary concern with these species is potential loss or degradation of habitat under the project footprint. For the chameleon and the shrew, barrier effects of the road could also be a significant impact.

A narrowly endemic snake species

Bitis worthingtoni occurs in dry grassland and scrub in the high central Rift Valley. Mortality from road crossings is a potentially serious impact to this species. Fences designed to keep impala and zebra off the road will not prevent snakes from attempting to cross.

A threatened giraffe species

Nubian (Rothschild's) Giraffe, recently recognised as a separate species, has a fragmented global range and a small population. This species is found along the road alignment in the central Rift Valley between Marula and Soysambu. The key potential impact on giraffe is the barrier effect of the road, and mortality from attempted road crossings.

While there are records of giraffe crossing the road, reports suggest that the existing road is already a major barrier that they are reluctant to cross. Fences put up to keep wildlife and livestock away from the road are likely also disrupting giraffe movements.

5.2.2 Potential project impacts on Natural Habitat

Large areas of the DMU are Natural Habitat, with a variety of habitat types. The A8 road alignment itself (including the road reserve that will be used for widening the highway) runs predominantly through Modified Habitat. However, there are some sections where the footprint of the upgraded road may cause loss of relatively small areas of Natural.

By contrast, the A8 South loop runs predominantly through natural habitat, through (degraded) natural forest along the escarpment and through open dry grassland and scrub (interspersed with agriculture) on the Rift Valley floor. As the strengthened road will maintain the same alignment, no loss of Natural Habitat is expected if construction activities are well managed.

Sources of building material for the road are not yet determined. These (or their access routes) may be in Natural Habitat, and losses of Natural Habitat are possible if extraction and access are not well managed.

Natural Habitat comprises not only vegetation but the animal populations it supports. In addition to CH-qualifying animal species, there are other wildlife species that may potentially be impacted by the upgraded road through an increased barrier effect and greater risk of collision with vehicles. Such impacts would amount to a degradation of Natural Habitat quality.

5.2.3 Potential Natural Habitat Risks and Impact loss

The A8 road alignment borders or directly intersects some areas of natural habitat. These have not been comprehensively assessed, but include:

- Small patches of indigenous forest and scrub in Kinale Forest, where the route passes mainly through plantations of exotic trees and some cleared sections under the ‘shamba’ system. These patches, and the regenerating understory of indigenous shrubs and trees under the plantations, are likely important in maintaining connectivity between indigenous forest on the escarpment and in the Kikuyu Escarpment Forest to the north-east. Small patches of degraded and fragmented highland grassland between Kinale Forest and the Thika-Mangu flyover.
- *Leleshwa* and *Acacia* scrub within the Kenya Wildlife Service sanctuary in Naivasha. The road alignment does not appear to encroach on the sanctuary, but this has not been definitively determined and may depend on the design chosen for the interchange with the Kinangop and Naivasha roads.
- Mature *Acacia xanthophloea* woodland in the stretch bordering Delamere Farm and Marula Ranch beyond Naivasha. This woodland appears to lie within the road reserve.
- Open dry grassland and *Leleshwa* and *Acacia* scrub habitats where the road passes through or adjacent to Marula Ranch and Kigio and Soysambu Conservancies, between Naivasha and Nakuru.
- A small section of indigenous forest where the road crosses the Koibatek Forest from Sachangwan to Kibunja trading center. Most of this section is plantation forest with some cleared sections under the ‘shamba’ system (KWS 2017).
- A number of seasonal or permanent wetlands, including:
 - Large roadside ponds at Kamiriithu before the Limuru flyover. These ponds are not vegetated and one appears to have been ‘reclaimed’ through piling a large amount of earth on top.
 - Manguo Pond to the north-east of the road just beyond the Limuru Flyover. This is a large seasonally variable wetland, a portion of which now appears to have been drained through channel-cutting (these drainage lines take water through culverts under the existing road). The upgraded road appears likely to cut into the edge and one corner of the wetland, dry at the time of observation (January 2018) but which may be seasonally flooded.
 - A number of seasonal ponds in gravel pits immediately adjacent to and north-east of the road, surrounded by rough grassland, between Kinale Forest and the Thika-Mangu flyover. These ponds appear to be in the footprint of the expanded road.
- These sites may all be seasonally important for CH-qualifying amphibians.

5.2.4 Mitigating barrier effects for wildlife

Roads frequently pose a barrier to wildlife movements. This fragmentation of habitats is a key biodiversity impact, often compounded by mortality of animals attempting to cross in the path of traffic.

The A8 and A8 South roads are busy highways that already pose a significant barrier to animal movements. Vehicle collisions with animals are also frequent along some sections of the road,

resulting in both animal and human fatalities. Once upgraded, the A8, as a four- and eventually a six-lane highway with more and faster-moving traffic, will be a formidable obstacle for animals to cross.

Reported collisions are mainly with Cape Buffalo, Plains Zebra and other large mammals. However, the barrier effect applies equally to smaller animals, including CH-qualifying species, which should not be overlooked when assessing potential impacts and planning mitigation.

Currently, information on the movements of wildlife and on road-kill is mainly anecdotal: where data do exist they have not been compiled and analysed. The road sections of main concern are those where Natural Habitat is present. These are:-

- Kinale Forest
- Kenya Wildlife Service Training Institute Sanctuary
- Marula Ranch, Kigio Conservancy and Soysambu Conservancy
- Koibatek Forest

Kenya Wildlife Service in 2017 compiled information on the large wildlife species in each of these road sections when developing recommendations for wildlife crossings (see chapter 5). This is summarised below, together with information from discussions with KWS, KWS Training Institute and Soysambu Conservancy (see chapter 7 on stakeholder consultation).

a) Kinale Forest

This forms part of the Kikuyu Escarpment Forest, which is ecologically connected with the Aberdares Forest. However, Kinale (which is largely plantation forest) and the indigenous forest on the escarpment itself are now separated from the main forest block by the Aberdares wildlife fence. This means that larger animals, including African Elephant and Cape Buffalo, no longer move out of the main forest block, and do not cross the road.

A range of wildlife species is still present in Kinale Forest (Table 5-5) and may regularly cross the road. Several smaller, CH-qualifying species may also occur here but their presence requires confirmation.

Table 5-5. Larger wildlife species reported to occur in Kinale Forest, along the road alignment (KWS 2017).

Common Name	Scientific name
Greater Galago	<i>Otolemur crassicaudatus</i>
Civet	<i>Civettictus civetti</i>
Duikers	<i>Cephalophus</i> sp.
White-tailed Mongoose	<i>Ichneumia albicauda</i>
Porcupine	<i>Erethizon dorsatum</i>
Serval	<i>Leptailurus serval</i>
Spotted Hyena	<i>Crocuta crocuta</i>
Warthog	<i>Phacochoerus africanus</i>
*Black and White Colobus	<i>Colobus guereza</i>
*Leopard	<i>Panthera pardus</i>
*Sykes Monkey	<i>Cercopithecus albogularis</i>

*** indicates that species are not resident but only occasionally present.**

b) Koibatek Forest

Koibatek Forest is part of the large Mau Forest complex. This complex forms an ecological unit, but is increasingly fragmented and disconnected.

A range of larger wildlife species occurs in Koibatek Forest and may regularly cross the road. While African Elephants have been recorded here in the past, KWS report that this species is no longer regularly present and does not cross the road. However, recent elephant movements from Laikipia to Koibatek have been reported (KWS, pers. comm.). Forest restoration to improve connectivity, along with the potential recovery of elephant populations, could result in elephants again moving through this forest in future. Several smaller, CH-qualifying species may also occur here but their presence requires confirmation (see chapter 4).

Table 5-6. Larger wildlife species reported to occur in Koibatek Forest, along the road alignment (KWS 2017).

Common name
<ul style="list-style-type: none">• African Elephant• African Hare• Black and White Colobus• Blue Monkey• Cape Buffalo• De Brazza Monkey• Genet sp.• Giant Forest Hog• Honey Badger• Hyena• Leopard• Mongoose sp.• Olive Baboon• Porcupine• Tree Hyrax

c) Kenya Wildlife Service Training Institute Sanctuary

The Kenya Wildlife Service Training Institute (KWSTI) Sanctuary, a gazetted Protected Area, lies astride the A8 highway at the edge of Naivasha town. The main block of around 200 ha (500 acres) surrounds the institute buildings south-west of the A8. The ‘game farm’, covering a further c. 600 ha (1500 acres) lies on the other side of the road. A third section, the ‘annex’, lies across the A8 South from the main sanctuary, abutting Lake Naivasha (Figure 5-3).



Figure 5-3. Kenya Wildlife Service Training Institute Sanctuary (Google Earth image) showing the three main sections of the Protected Area, and the main wildlife crossing zones on the A8 South and A8 (in red, left and right respectively).

KWSTI staff and students conduct regular counts of wildlife. A suite of large mammal species occurs here. The animals show seasonal movements, dispersing in the wet season to the ‘game farm’ area, which has no permanent water sources, and retreating in the dry season towards the lake. Wildebeest and Waterbuck are concentrated in the lakeside ‘annex’. Wildebeest may cross the A8 South, but not usually the A8. Most vehicle collisions are with Cape Buffalo and Plains Zebra (a large python was recently also killed) (C. Musyoki, pers. comm.). Giraffe are also known to cross the A8. The giraffe at KWSTI are Maasai Giraffe, now recognised as a separate species from Nubian (formerly Rothschild’s) Giraffe, which occurs a short distance away at Kigio and Soysambu Conservancies. Maasai Giraffe are not as severely threatened as Nubian Giraffe, and are not a Critical Habitat-qualifying species.

Development of Naivasha town along the A8 road reserve has now closed off a preferred route for wildlife crossing from the sanctuary north of the Naivasha town junction. Because of the alignment of the ‘main’ and ‘annex’ sections, only a short stretch of overlap is now available for animals to cross, between the Kinangop and Naivasha road junctions.

The main KWSTI sanctuary is fenced, but to control human not animal movements. There are a number of places where animals can move in or out of this part of the sanctuary.

d) Marula Ranch, Kigio Conservancy and Soysambu Conservancy

These three tracts of privately-owned land protect a large, connected swathe of Natural Habitat between Naivasha and Nakuru. The A8 crosses Marula and Soysambu and runs adjacent to Kigio. The three properties hold substantial wildlife populations and a diversity of species that are likely to cross the A8 regularly.

Kigio is fully fenced and Marula and Soysambu partially fenced. Large animals from Marula and Soysambu frequently attempt to cross the A8, sometimes resulting in vehicle collisions. Again, Cape Buffalo and Plains Zebra are reported to be the most frequent species killed on the road (S. Thomsett, pers. comm.).

Nubian (Rothschild’s) Giraffe, a Critical Habitat-qualifying species, occur here, with population estimates ranging from 145 (Giraffe Conservation Foundation) to 180 (Kenya Wildlife Service). Giraffe do attempt to cross the road at times (KWS, pers. comm.) but often are either prevented by fencing, or deterred by the heavy traffic (S. Thomsett, pers. comm.). There appear to have been no recent incidents of giraffe being hit by vehicles on the A8. The current road (and conservancy fences designed to keep wildlife away from it) thus appears to be an effective barrier to giraffe movement.

There is a set of existing underpasses in this section, used mainly by the ranches for moving vehicles and livestock. Some are gated for security reasons; those that are open appear already to be used by wildlife for crossing the road.



Figure 5-4. Plains Zebra adjacent to an existing underpass (to right of photo) on Kigio Conservancy. Zebra tracks were observed in the underpass.

Table 5-7. Population estimates (rounded figures) for the most numerous large mammals potentially crossing the road in Marula and Soysambu, and in KWSTI Sanctuary (summarised from KWS 2017). A further 3,500 head of wildlife occur in Kigio.

Table 5-7. Wildlife Population estimates

English name	Marula and Soysambu	KWSTI
Plains Zebra	8235	265
Impala	7230	470
Thomsons Gazelle	3690	110
Cape Buffalo	1970	30
Warthog	1385	15

Eland	1240	60
Waterbuck	710	90
Baboon	630	
Grants gazelle	320	
Dikdik	275	15
Vervet Monkey	250	
African Hare	240	
Black-backed Jackal	195	5
Nubian (Rothschild's) Giraffe	180	
Wildebeest	110	30
Topi	100	
Reedbuck	90	
Kongoni	80	
Bat-eared Fox	70	
Sykes Monkey	70	
Spring hare	60	
Oryx	40	
Hyena	30	
Oribi	30	
Maasai Giraffe	0	20

Box 5-1 shows other wildlife species known to occur in Marula and Soysambu, and potentially crossing the road.

Box. 5-1. Wildlife in Marula and Soysambu

<p>Common name</p> <ul style="list-style-type: none"> • Aardvark • Bushbuck • Bushpig • Duiker spp. • Leopard • Lion • Mongoose spp. • Ostrich • Porcupine • Python • Serval cat • Side-striped Jackal • Small-spotted Genet • Spotted Hyena • Steenbok • Striped Hyena • Tortoise spp.

Induced access Risks and Impacts

New or upgraded roads frequently facilitate unsustainable use of natural resources through making human access easier. In the Marula-Kigio-Soysambu area, bushmeat poaching is largely carried out near the existing A8 highway (KWS, pers. comm) as this allows poachers to make a speedy getaway.

As the A8 is already a very busy road, it is not obvious that upgrading the highway will induce greater human pressure on the biodiversity around it. The reverse could be the case through improved fencing to channel wildlife movements to specific safe crossing points – see below – which would also reduce human access from the road. There is however a risk that specific crossing points, if regularly used by animals, become a focus for the attention of poachers (or of predators).

Marula Ranch has for some years collected data on (a) wildlife killed in road collisions, (b) human-wildlife conflict, including bush meat poaching. These data are not currently compiled or accessible (KWS, pers. comm.). There appear to be no other scientific data available on wildlife movements for these conservancies, leaving open the questions of which animals are moving where and when (and why).

5.2.5 Induced Access and In-Migration Risks to KBA

New or upgraded roads frequently facilitate unsustainable use of natural resources through making human access easier. In the Marula-Kigio-Soysambu area, bush meat poaching is largely carried out near the existing A8 highway (KWS, pers. comm) as this allows poachers to make a speedy getaway.

As the A8 is already a very busy road, it is not obvious that upgrading the highway will induce greater human pressure on the biodiversity around it. The reverse could be the case through improved fencing to channel wildlife movements to specific safe crossing points which would also reduce human access from the road. There is however a risk that specific crossing points, if regularly used by animals, become a focus for the attention of poachers (or of predators).

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- Light and other disturbance, including disturbance from the presence of humans;
- Mortality and injury to animals from vehicle collisions and from machinery;
- Habitat fragmentation and edge effects;
- Induced access and in-migration (and resulting pressures on biodiversity and natural resources); hunting, bush meat and wildlife trade.

5.2.6 Invasive Species Risks and Impacts

PS6 notes that “intentional or accidental introduction of alien, or non-native, species of flora and fauna into areas where they are not normally found can be a significant threat to biodiversity,

since some alien species can become invasive, spreading rapidly and out-competing native species.” PS6 requires that developers do not intentionally introduce new invasive alien species (not currently established in the country or region of the project), and avoid the potential for accidental or unintended introductions including the transportation of substrates and vectors (such as soil, ballast, and plant materials) that may harbour alien species.

Where alien species are already established in the region of the proposed project, developers must exercise diligence in not spreading them into areas in which they have not already been established. As practicable, developers should also take measures to eradicate such species from the natural habitats over which they have management control.

No systematic audit of invasive alien species along the road alignment has been undertaken. However, a number of invasive alien plants were noted during field surveys. Around KWSTI, Naivasha, for example, invasives observed included *Opuntia exaltata* (planted as a hedging species, but spreading into its surroundings), *Datura stramonium* and *Solanum mauritianum*. *Opuntia* spreads vegetatively (its fruits in East Africa are usually sterile), while *Datura* and *Solanum* have many-seeded fruits that aid their spread.

Road-building activity can promote the spread of invasive in a number of ways, e.g. by providing them a foothold in disturbed ground where they tend to flourish, by bringing in seeds or propagules with building materials, or by moving them to new sites through earth-moving operations.

5.2.7 Air pollution from Construction Activities

Construction of the highway will entail the use of motorized machinery and vehicles which will lead to air pollution. Pollutants from road traffic during construction of the highway are numerous but the principal pollutants will include:

1. CO – Carbon monoxide;
2. HC – unburned hydrocarbons generated through combustion processes and fugitive fuel evaporation, including benzene, a known carcinogen;
3. CO₂ - Carbon dioxide.
4. NO_x– Nitrogen oxides including NO₂ - nitrogen dioxide and NO – nitric oxide²⁴;
5. PM₁₀ – fine particulate matter including soot/black carbon and particles from abrasion of brakes, wheel rubber and the road surface;
6. Sulphur dioxide (SO₂): SO₂ is of concern because of its impacts on health and vegetation²⁵;

The above pollutants are of concern due to the adverse effects on human health and natural ecosystems they may have in the local environment around highway and the risks and impacts are described in detail below. Carbon dioxide is important because it is a greenhouse gas and increasing emissions can contribute to climate change. Other pollutants such as metals, volatile organic compounds and polycyclic aromatic hydrocarbons may arise from some activities,

²⁴ NO_x includes NO₂ plus nitrous oxide NO and nitrogen oxide (N₂O) which convert to NO₂ over time in the atmosphere.

²⁵In urban areas SO₂ can also be of concern because of corrosion of materials (building materials, monuments etc.), however this is not judged likely to be an issue given the rural nature of the Project location.

primarily combustion of fuel. EHS guidance²⁶, suggests that these pollutants are only likely to be significant where coal or heavy fuel oil are in use. As these fuels will not be used for the Project, significant impacts on air quality from these pollutants are therefore considered unlikely.

Carbon monoxide will also arise from combustion but maintaining plant and equipment in good working order and operating plant and equipment according to manufacturer specifications will maintain emissions of carbon monoxide at concentrations that will not result in significant impacts to air quality.

Nitrogen Oxides

The combustion of fuel from industrial and power plants are main contributors of Nitrogen oxides emissions. NOX contributes to acidification and eutrophication of waters and soils, and can lead to the formation of particulate matter and ground-level ozone. Of the chemical species that comprise NOX, it is NO₂ that causes adverse effects on health as high concentrations can cause airway inflammation and reduced lung function. NO₂ and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as NOX. All combustion processes produce NOX emissions, predominantly in the form of NO, which then undergoes conversion in the atmosphere to NO₂, mainly as a result of its reaction with ozone (O₃).

It is NO₂ that has been most strongly associated with adverse effects upon human health. Nitrogen dioxide can irritate the lungs and lower resistance to respiratory infections such as influenza. Continued or frequent exposure to concentrations, that are typically much higher than those normally found in the ambient air, may cause increased incidence of acute respiratory illness in children.

The main products of the combustion of motor fuels are carbon dioxide and water, but inefficiencies and high temperatures inherent in engine operation encourage the production of many other pollutants of varying effects. NOX is the one of major pollutants of significance to roadside air quality in vehicle emissions.

Sulfur Dioxides

Sulfur dioxide (SO₂) and sulfur trioxide (SO₃) are the types of sulfur oxides that are commonly present in the atmosphere. SO₂ is mainly discharged to atmosphere via exhaust gases of reciprocating engines and flue gases formed from combustion of fossil fuels like oil and coal. SO₂ in the atmosphere goes into photochemical or catalytic reaction and is partially converted to SO₃ or H₂SO₄. The emission rate of SO₂ is directly linked to the sulfur content of fuel. Diesel engines produce more SO₂ than do gasoline engines. In conjunction with NOX, SO₂ is involved in the formation of acids in the atmosphere.

The main goal of almost all the major national and international standards and guidelines produced over the last two decades has been to protect human health. Early research appeared to indicate a threshold or-no effects level below which health impacts were negligible for even the most vulnerable groups, such as asthmatics and smokers. Standards were then set below this level to provide a margin of safety.

²⁶ WB PS (2008) Environmental, Health, and Safety Guidelines for Thermal Power Plants

Particular Matter

In terms of potential to harm human health, PM is one of the most important pollutants as it penetrates into sensitive regions of the respiratory system, and can cause or aggravate cardiovascular and lung diseases. PM is emitted from many sources and can comprise a complex mixture of both primary and secondary PM.

Particulate matter or dust: this is considered in three fractions: very fine particles less than 2.5 microns in diameter (PM_{2.5}); particles between 2.5 and 10 microns in diameter (PM₁₀), and total suspended particles (TSP). PM_{2.5} and PM₁₀ are of concern because of their potential impact on health as the size means these particles are small enough to be inhaled into the lungs. Larger particles are removed in the upper respiratory tract. TSP is of concern because of loss of visibility at very high levels, impact on amenity caused by soiling of surfaces, and damage to plants caused by a reduction in the effectiveness of photosynthesis and blockage of leaf pores.

Primary PM is the fraction of PM that is emitted directly into the atmosphere, whereas secondary PM forms in the atmosphere following the release of precursor gases (mainly SO₂, NO_x, NH₃ and some volatile organic compounds (VOCs)).

Airborne particulate matter, which includes dust, dirt, soot, smoke, and liquid droplets emitted into the air, is small enough to be suspended in the atmosphere. Airborne particulates may be a complex mixture of organic and inorganic substances. They can be characterized by their physical attributes, which influence their transport and deposition, and their chemical composition, which influences their effect on health. The physical attributes of airborne particulates include mass concentration and size distribution.

Ambient levels of mass concentration are measured in micrograms per cubic metre (µg/m³); size attributes are usually measured in aerodynamic diameter. Particulate matter (PM) exceeding 2.5 microns (µm) in aerodynamic diameter is generally defined as coarse particles, while particles smaller than 2.5 microns (PM_{2.5}) are called fine particles. Particles interact with various substances in the air to form organic or inorganic chemical compounds.

The most common combinations of fine particles are those with sulfates. The smaller particles contain the secondarily formed aerosols, combustion particles, and recondensed organic and metal vapors. The carbonaceous component of fine particles—products of incomplete combustion—contains both elemental carbon (graphite and soot) and non-volatile organic carbon (hydrocarbons emitted in combustion ex-airborne).

Particulate Matter exhaust, and secondary organic compounds formed by photochemistry). These species may be the most abundant fine particles after sulfates. Additionally, atmospheric reactions of nitrogen oxides produce nitric acid vapor (HNO₃) that may accumulate as nitrate particles in both fine and coarse forms. The most common combination of coarse particles consists of oxides of silicon, aluminum, calcium, and iron.

Construction Dust

Dust is defined as all particulate matter up to 75 µm in diameter and comprising both suspended and deposited dust, whereas PM₁₀ is a mass fraction of airborne particles of diameter 10 µm or

less. Samples taken from construction sites showed that about 35% of particulate matter was in the PM10 fraction (Watson and Chow, 2000). The health impacts associated with dust include eye, nose and throat irritation in addition to the nuisance caused by deposition on cars, windows and property. Dust and PM10 emissions arise from a number of sources, so both construction activities and emissions from vehicles associated with the construction site need to be considered.

Table 5-8. presents Kenyan and IFC/WB and WHO reference standards and guidelines for NOx PM, Sox.

Parameter	WHO Air Quality Guidelines	NEMA Air Quality Regulations	Averaging period
Sulphur Dioxide, SO ₂	20 µg/m ³	80 µg/m ³	24hr
Nitrogen Oxides, NO _x as NO ₂	200 µg/m ³ (1hr)	80 µg/m ³ (24hr)	
Suspended Particulate Matter	200 µg/m ³	-	24hr
PM10	100 µg/m ³	50 µg/m ³	24hr
PM2.5	25 µg/m ³	75 µg/m ³	24hr
Ozone	100 µg/m ³	120 µg/m ³	8hr

Construction Air Emission Risks and Impacts

The main sources of air emissions from construction works on the Project and hence risks will be:

1. Dust emitted from excavation, earth moving, loading, handling and transportation of excavated material. Dust deposition from road traffic is not likely to be a more significant issue than exhaust emissions, as many of the roads used by construction vehicles will be paved specifically the existing road which will be used. Traffic may need to pass through settlements especially access roads for material sites, camp sites etc. with the potential to affect people living near the road and nearby vegetation. Receptors up to 200 m from the roadside may be affected, with major impacts for people living within 50 m of roads which are heavily trafficked, moderate impacts for receptors up to 100 away, and minor impacts for receptors up to 200 m away. As the details of access roads to be used for construction have yet to be determined, it is not possible to specify where these effects will occur at this time, but in the absence of mitigation, construction traffic is predicted to have an overall moderate or major adverse impact due to soiling caused by dust deposition and locally elevated levels of PM10 and PM2.5 where the roads to be used during construction pass through towns and villages.
2. Emissions of combustion gases from construction machinery and the vehicles. Construction vehicles are generally fueled with diesel, and thus, SO₂, PM, NO_x, VOC and CO emissions are expected to occur along the route of the highway and access road construction. In addition to these mobile source emissions, there will be also stationary emissions from the activities in the camp sites, and at the concrete and asphalt plants. These emissions will be mostly due to heating and power generations in diesel generators. For heating, it is most likely that fuel-oil will be used at the camps. Thus, SO₂, PM, NO_x, VOC and CO emissions are expected to occur at camp sites. At the asphalt plants and concrete sites²⁷, there will be VOC, SO₂ and PM emissions. Construction machinery and vehicles use mainly diesel engines that can lead to emissions

²⁷ Site for associate facilities have not been identified and will be determined by private concessionaire.

of nitrogen oxides and particulates. Most site equipment (bulldozers, diggers, etc.) can be considered as similar to medium or heavy duty trucks. Vehicles are used for the transport of materials and equipment on and off site as well as carriage of personnel to and from site using minibuses and cars. Offsite transport will include spoil, concrete, road aggregates, asphalt, and prefabricated concrete tunnel segments. Since the project construction phase duration will be 3 years long, consisting of different construction activities, air quality impact generated from these activities will not be static. Although the general terms of the construction of phases are similar, their application locations will follow each other. For these reasons the concessionaire will be required to undertake and calculate air quality for the whole project route including the construction camp area locations and all the associated facility locations. Machines and equipment likely to be used during the construction phase are shown below. The quantities of motorized equipment (trucks, excavators) etc. remains unknown and will be determined by the private concessionaire.

3. Workers accommodation camps and associated facilities are also significant sources of air emissions. The locations of the camp sites, construction facilities, concrete and asphalt plants and crushing units are not known at this point in time and will only be determined by the private concessionaire after which associated risks and mitigation measures will be determined prior to construction works.
4. In addition, quantities of material to be loaded and unloaded, number and type of construction equipment and machinery all which are contributors to air emissions are also unknown and will be determined at a later stage by the private concessionaire.
5. The construction of the proposed highway has the potential to cause emissions of dust Total Suspended Particles (TSP) from land clearing, earthworks, movement of vehicles over unpaved surfaces and roads, handling of friable materials, laying of ballast, and construction of structures such as interchanges, bridges etc. These sources have the potential to increase ambient concentrations of particulate matter, resulting in nuisance at nearby settlements and to affect crops and natural vegetation through dust deposition. Experience from construction sites around the world suggests that dust deposition levels can be sufficient to adversely affect people and vegetation at distances up to a few hundred metres from construction activity. Typically, critical impacts can occur up to 20 m from construction sites, major impacts up to 50 m, moderate impacts up to 100 m, and minor impacts up to 200 m. In view of the fact that there are a number of settlements currently within distances of the construction corridor around the current alignment that could be affected by nuisance levels of dust deposition e.g. Nakuru Town, the concessionaire will be required to undertake a baseline survey and air quality modelling in order to develop Air Quality Management Plan.

Annex IV and V shows the sensitive receptors, mainly settlements, towns and schools along the road corridor which are likely to be affected as a result of the emissions from construction equipment. Table 5-9 shows the learning institutions within a distance of 1 km from the ROW which are considered sensitive receptors. Annex IV show all the learning institutions within the 15km buffer zone. These receptors include settlements where human population reside close to

the road and critical habitats where flora and fauna exist.

Table 5-9. Schools within 1km distance on ROW

Name	With 1K m Buffer	Country	Coordinate
Kapsorok primary school	Within 1Km	Nakuru	35.775153 -0.215505
Mau summit secondary school	0.9 KM	Nakuru	35.680020 -0.165654
Nakuru Day Secondary	Within 1Km	Nakuru	36.025606 -0.273373
Afraha High School	Within 1Km	Nakuru	36.070943 -0.297917
Nakuru High School	Within 1Km	Nakuru	36.091579 -0.277750
Nakuru Girls High School	Within 1Km	Nakuru	36.096582 -0.280251
Menengai	Within 1Km	Nakuru	36.096269 -0.276968
Ngala School for the Deaf	Within 1Km	Nakuru	36.075633 -0.294165
Shiners Girls secondary School	Within 1Km	Nakuru	36.130350 -0.293852
Hillcrest Secondary School	Within 1Km	Nakuru	36.127692 -0.302451
Mustard Seed School	Within 1Km	Nakuru	36.025606 -0.273373
Greensteds international School	Within 1Km	Nakuru	36.173967 -0.343879
Wellspring Secondary school	Within 1Km	Nakuru	36.304037 -0.494429
Teresia's academy	Within 1Km	Nakuru	36.329050 -0.493022
Gilgil Boys High school	Within 1Km	Nakuru	36.329363 -0.509593
Kirobon High school	Within 1Km	Nakuru	35.944081 -0.253434
Manera primary	Within 1Km	Nakuru	36.425039 -0.709231
D N Handa secondary school	Within 1Km	Nakuru	36.437859 -0.713609
Nyamathi Primary School	Within 1Km	Nakuru	36.509928 -0.790525
Magina secondary School	Within 1Km	Kiambu	36.625928 -0.964212
Tabain Primary	1Km	Nakuru	35.714810 -0.185214

Risk Significance

This risk is considered moderate in significance, short term in nature (with respect to construction), more intense in areas with sensitive receptors, cumulative in scope and highly likely to occur but mitigatable using construction best practices.

5.2.8 Noise Emission Risks and Impacts

There will be risks and impact of traffic noise and vibration resulting from the construction and of the proposed Project on people and property. Potential sources of noise and vibration during construction will include clearing and grubbing of the highway corridor, earthmoving, erection of bridges, construction traffic and blasting in quarries.

Definition of Noise and Vibration

Noise: The simplest definition of noise is 'unwanted sound' which can be produced by many sources such as; construction equipment, vibrating loudspeakers, operating machine tools, friction between road surfaces and vehicles. There are two important characteristics of sound or noise: frequency and loudness. Sound/Noise is a mechanical wave that results from the vibration of particles of the medium through which the sound/noise wave is moving. Either mechanical waves such as sound or electromagnetic waves

such as infrared have a value of frequency. The number of repeated event occurrences per unit time can be stated as a definition of frequency.

Vibration: Vibration is a mechanical phenomenon whereby oscillations occur about an equilibrium point. Vibration is usually an undesirable situation. For example, the vibrational motions of engines, trucks, construction equipment and tools in an operation are typically unwanted.

A certain level of noise is an inevitable side effect of aggregates production required for road building, for example. The exposure of the aggregates by mechanical stripping of soil and rock, extraction by digging or blasting, loading of the aggregate onto trucks or conveyors, and processing, all generate noise. Most of these activities take place in the open, increasing the potential for noise to be heard beyond site boundaries. The most significant source of vibration is blasting with explosives, as ground vibration from other sources (such as mobile plant and heavy fixed equipment) is generally not felt outside the site (Walker, A. 2004. "Environmental Noise". ISBN 0-538003-4-2.).

Blasting prior to excavation is rarely needed at sand, gravel or clay operations but is common at hard rock quarries, where it is used to reduce the rock mass to fragments that can be easily excavated using standard machinery. During blasting, energy is lost' in the form of noise and ground vibration. In general, the level of vibration increases with the amount of explosive used, and decreases with the distance between the blast and receptor. Noise can seriously affect people and animals in noise sensitive locations and interfere with their ability to relax, sleep, or communicate, causing stress and annoyance, with consequences for psychological wellbeing.

dBa: Environmental noise levels such as noise generated by industry, construction and road traffic are commonly expressed in dBA or A-weighted decibels, Decibels are units of sound measured on a logarithmic scale. This means that a step of 10 dB represents a ten-fold increase in intensity or sound energy. The A Weighting scale is a standard weighting of the audible frequencies designed to reflect the response of the human ear to noise. To the typical human ear an increase of 10 dBA actually sounds slightly more than twice as loud.

LAeqT: Time varying noise sources are often described in terms of statistical noise descriptors. LAeq (the equivalent continuous A-weighted sound pressure level) is a value that, simply expressed represents the average sound level over a period of time. The period of time (T) may be daytime hours (say 12 hours from 0600 to 1800), night time hours (12 hours from 1800 to 0600), all day (24 hours), or any other relevant period.

LA90T: this is an alternative statistical descriptor calculated as the sound level exceeded for 90% of the time. For a noise environment with a fairly steady background noise level on which occasional noisy events are superimposed (such as occasional passage of trains through a rural area) it simply expressed, represents the background noise level. Other percentile values are used to present different aspects of the noise environment such as LA95T and LA10T.

LAm_{ax}: this is the maximum sound pressure level recorded during a measurement period.

"World Bank Group Health and Safety (EHS) Guidelines for Toll Roads" requires assessment at affected existing activities, developed lands, and undeveloped lands for which development is planned, designed and programmed. World Bank Group General EHS Guidelines provide guidance on acceptable noise levels based on WHO standards and these are set out in Table 5-10.

Table 5-10. World Bank Group Noise Level Guidelines

	Maximum Allowable Ambient Noise Levels, LAeq,1hr, dBA Free field	
	Daytime	Night-time
	07:00 – 22:00	22:00 – 07:00
Residential, institutional, educational	55	45
Industrial, commercial	70	70

National Environment Management Authority (NEMA) noise levels, maximum permissible noise levels for construction sites (Measurement taken within the facility) are shown below.

Table 5-11. NEMA Noise Level Guidelines

Site	Day	Night
Health facilities, educational institutions, homes for disabled	60dBA	35dBA
Residential	60dBA	35dBA
Other areas	75dBA	65dBA

Sensitive Receptors

Along the project route, sensitive receptors are located around the highway and include towns and settlements shown in box 5-2 below. Sensitive receptors also include schools, hospitals and areas with wildlife presence which are likely to be affected by construction noise.

Box 5-2. The major settlement areas along the alignment

<ul style="list-style-type: none"> • Rironi • Uplands • Lari • Limuru at Km 2.800 • Ngarariga at Km 5.900 • Uplands at Km 9.100 • Kimende Township at Km 17.550 • Rwa Ng'ang'a at Km 51.800 • Kijabe • Kinungi • Naivasha at Km 57.000 • Gilgil at Km 85.500 • Lanet at Km 114.500 • Nakuru town from Km 117.000 to 127.500 • Salgaa at Km 151.000 • Molo at Km 166.400 • Mau summit at Km 174.900

Noise and Vibration Risks and Impacts

The equipment used in construction will generate noise during construction of the highway and will adversely affect communities and fauna. Further impacts and risks associated with noise and vibration will emanate from quarry and other material sites due to blasting.

The locations of proposed material sites have not been identified and will be determined by the

private concessionaire who will then be required to develop specific plan (s) informed by further noise studies to mitigate such risks.

In areas where presence of vulnerable and marginalized groups (Maasai community) are known to exist as shown in the figure 4.9, siting of material sites will not be considered in order to avoid the risks associated with this group categorized as indigenous. So far, the preliminary material sites identified during the feasibility study (the private concessionaire is not obligated to source materials from these sites) has only one location where Maasai communities are present, Gilgil area and the private concessionaire must avoid this site as a mitigation measure.

Risk Significance

This risk is considered moderate in significance, short term in nature (with respect to construction risks), more intense in areas with sensitive receptors, localized in scope and highly likely to occur but mitigatable based on the noise environmental and social program to be developed by private concessionaire.

Noise and vibration risks associated with material sites (quarries) etc. are unknown at this point due to non-identification of sites and will be determined by the private concessionaire.

Noise and vibration risks related to sourcing of materials if located in areas where the Maasai exist are likely to be high in nature and siting of material sites in such locations will be avoided.

5.2.9 Water Quality and Supply

The potential risks and impacts of the construction of the Nairobi-Mau Summit Highway on the surface and groundwater environment in terms of water quality and quantity in the vicinity and downstream of the highway infrastructure is described below. The assessment has considered the following types of impacts and risks: -

1. Impacts and risks of the project on drainage and flood characteristics, including: flooding caused by disruption to surface water drainage regimes during construction; potential flooding, scour and erosion caused by inadequately sized or designed drainage structures; and impacts on vegetation and land use through changes to flow and drainage patterns following construction.
2. Impacts and risks on water quality, including: elevated downstream total suspended solids levels due to soil disturbance during construction; and contamination from accidental spills of fuel, lubricants, etc. during both construction and operation.
3. Impacts and risks on water supply including: stresses on local water resources, water abstractions from surface and/or ground water during construction and operation and potential indirect effects from local population expansion due to in-migration.
4. Any impacts on the quantity or quality of surface water and groundwater may have direct impacts to downstream water users, including community and / or agricultural water supply abstractions and aquatic ecology.

5. Impacts from early works such as quarries, road improvements, and construction camp water supply.

In terms of this assessment the most vulnerable surface water resources are those that the Project route crosses directly and these have been highlighted in table 5-12 below. In addition, where the route passes through the catchment areas of rivers and lakes then these water bodies may be vulnerable during construction and operational phases.

The World Bank Group EHS Guidelines recommend:

- Use of storm water management practices that slow peak runoff flow, reduce sediment load, and increase infiltration, including vegetated swales (planted with salt-resistant vegetation); filter strips; terracing; check dams; detention ponds or basins; infiltration trenches; infiltration basins; and constructed wetlands;
- Where significant oil and grease is expected, using oil /water separators in the treatment activities;
- Regular inspection and maintenance of permanent erosion and runoff control features.

Important Surface Water Bodies at the Project Site

There are several watercourses present along the project route and which have been described in detail in chapter 4. Annex 6 shows the surface water bodies along the project route.

Table 5-12 below shows the distance from the proposed Right of Way (ROW) and the surface water bodies along the project highway.

Table 5-12. Surface Water Bodies along project corridor and distances

Name
Lake Nakuru
Lake Elementaita
Lake Naivasha

There are 7 permanent rivers that the highway crosses as shown in table 5-13 below.

Table 5-13. Sections of Highway crossing rivers

Name	River Class	County
River Molo	Permanent	Nakuru
River Njoro	Permanent	Nakuru
River Gilgil	Permanent	Nakuru
River Malewa	Permanent	Nakuru
River Mereroni	permanent	Nakuru
River Kariandusi	Permanent	Nakuru
River Gatamaiyu	permanent	Kiambu

5.2.10 Impacts and Risks on Surface Water Quality and Supply

Construction activities can have significant effects on the surface water resources along the

proposed highway and good environmental management, including control of runoff, sediments, storage of fuels and good practice (such as not driving across watercourses with construction vehicles) should be followed.

The potential risks of detrimental impacts on water quality will be higher where construction activities are close to surface water bodies. Risks may further increase if works are carried out within a watercourse (e.g. for culvert or bridge construction), or from the potential destabilisation of soils and channel banks that may lead to erosion and deposition of sediment into water bodies.

There may also be risks of pollution from the uncontrolled runoff or accidental spillage of fuels and lubricants, or from the inadequate or unsafe disposal of sanitary wastewater from construction sites. Whilst the volume of hydrocarbon (primarily diesel) spillages would typically be very small (tens of litres or less), this could rise to over 100 litres in the event of a ruptured hydraulic line or fuel tank. Moreover, a road tanker accident could release up to thousands of litres into the water environment if the spillage occurred directly into a flowing watercourse.

Below are risks and impacts on water that may be encountered as a result of the project during the construction phase.

1. The construction of the project may cause temporary disturbances and negative effects on surface water resources. These negative impacts could increase without proper scheduling or programming of the works or particular activities. In other words, there are likely to be impacts of construction of the project on water quality where required mitigation activities are not implemented correctly.
2. Untreated contaminated leaking water from the excavation areas, stockpile areas and other construction areas may enter rivers or any other surface water resources near to the Project sites where there are inadequate containment measures. Such leakage of waters and surface runoff may carry sediments or harmful wastes and these may collect in rivers or any other surface water resources and therefore there will be negative impacts of leakage waters on water quality.
3. Further, during the construction activities temporary plants (batching, asphalt mixing) and other associated/ancillary facilities will be constructed and machinery will be used. Pollution may occur because of these facilities. Some concrete wastes, materials and chemicals may cause contamination, and wash water from the facilities may cause pollution of the surface water resources. In other words, construction site runoff from plant and machinery can cause pollution. Therefore, plant and machinery may have impacts on water quality.
4. During the construction activities, waste water will be generated at the workers' camp sites and plant areas. It is required of the private concessionaire to have proper wastewater collection and treatment systems as described in the relevant Kenyan legislation and also the recommendation provided in the World Bank Group General EHS Guidelines.

5. In addition, in the project sites there will be storage areas for chemicals, fuels, oils, etc., used for construction activities including refueling of plant and other vehicles. These materials must be stored according to the regulatory requirements, including the related regulation. Otherwise, there may be risk of leakage of all chemicals to the surface water resources, and so there may be impact on water quality.
6. In addition, all chemicals, fuels, oils etc. used for construction activities must be handled, transported and used according to related regulation and procedures. Otherwise there may be risk of spill of these by accidents etc. Therefore, there may be impact on water quality.
7. According to the Feasibility Report (ICT, 2016), culverts are planned to be constructed. These culverts will be made to allow water to flow safely under the project road, connection road and junctions. These culverts should be designed on suitable sized; otherwise drainage system may not work correctly. Therefore, there may be impact on water quality. According to the feasibility report, permanent culverts are planned for the project.
8. The proposed project crosses water catchment areas and in a close proximity of water protection areas. Thus, it is very crucial that the proposed Project design will include sound storm water management measures and procedures.
9. The proposed project includes construction of bridges and viaducts on various sections of the route that will cross some surface water resources. Therefore, flows and beds of small river systems near or within the project site could be physically affected, for example watercourse may have to be diverted or altered. There may therefore be direct or indirect impacts on flows and courses of small river systems near to project route during the construction phase.
10. Construction of paved roads increases the amount of impermeable surface area which increases the rate of surface water runoff. High storm water flow rates can lead to stream erosion and flooding. Storm water may be contaminated with oil and grease, metals (e.g. lead, zinc, copper, cadmium, chromium, and nickel), particulate matter and other pollutants released by vehicles on the roadway, in addition to deicing salts (e.g. sodium chloride and magnesium chloride) and their substitutes (e.g. calcium magnesium acetate and potassium acetate) from road maintenance facilities. Storm water may also contain nutrients and herbicides used for management of vegetation in the rights-of-way.

Risks Significance

As shown in the table above, the surface water lakes, are not located close to the proposed highway and therefore in terms of pollution of the water bodies and critically endangered aquatic species, the risks are likely to be moderately low, short term (with respect to construction), localized to the specific water body, and unlikely to occur especially with the development of a robust water quality management plan.

The risk significance with respect to rivers that are crossed by the highway is however higher in terms of pollution related to construction due to the proximity, long terms in nature (construction and operation), localized but mitigatable with development of and implementation of robust water quality management plan.

The siting of other project components e.g. workers' accommodation camps, material sites, construction plant sites may also cause adverse risks to the water bodies if within close proximity to such bodies in terms of pollution and indiscriminate abstraction for domestic use and construction (in case of the rivers) and for construction (in case of lakes which are salty and cannot be fit for consumption).

These sites have not been identified and will be determined by private concessionaire who will prepare management plans including consideration of siting implications and risks on the water bodies.

5.2.11 Impacts on fisheries

Pollution from the construction activities as described in 5.2.11 above is a potential significant risk to the floral and aquatic species present in the surface water bodies described in table 5-13 above. The run off from construction pollutants could adversely impact on the species (see species in chapter 4) and specifically the highly threatened fish species *Aplocheilichthys* sp. nov. 'Baringo' which inhabits the Lake Baringo catchment, whose headwaters (for the River Molo) arise on the western rim of the Rift Valley, around the end of the Project road alignment near Mau Summit. The species is Critically Endangered, and qualifies for Tier 1 Critical Habitat. The Molo River is one of the surface water bodies that the road crosses in Mau Summit (see annex X)

Risks Significance

As shown in the table above, the surface water lakes, are not located close to the proposed highway and therefore in terms of pollution of the water bodies and critically endangered aquatic species, the risks are likely to be moderately low, short term (with respect to construction), localized to the specific water body, and unlikely to occur especially with the development of a robust water quality management plan.

The risk significance with respect to rivers that are crossed by the highway is however higher in terms of pollution related to construction and impacts on aquatic flora and fauna due to the proximity, long terms in nature (construction and operation), localized but mitigatable with development of and implementation of robust water quality management plan.

The siting of other project components e.g. workers' accommodation camps, material sites, construction plant sites may also cause adverse risks to the aquatic flora and fauna in water bodies if within close proximity to such bodies in terms of pollution.

These sites have not been identified and will be determined by private concessionaire who will prepare management plans including consideration of siting implications and risks on the water bodies.

5.2.12 Impacts and Risks on Water Supply

During the construction of the road, water will be required for several purposes including for use in the workers' accommodation camps, road construction process which requires water, cleaning of the vehicles and equipment, keeping down construction dust impacts among others.

The potential impacts and risk of the project relating to surface water supply are:

- Stresses on local water resources from construction water abstractions from surface and / or ground water; and
- Potential indirect effects from water demand caused by local population expansion due to in-migration.

Overall raw water supply requirements for the construction of the highway will vary over the course of construction. The actual estimates on water supply quantities for instance for use in workers' accommodation camp is difficult to determine and will be ascertained by the private concessionaire when the labor force in terms of numbers is known.

It is important to understand that these abstractions may be distributed along the full length of the highway and so disaggregated data are more important when considering potential surface water impacts than the overall totals.

The precise location and source (i.e. ground or surface water) of each abstraction point will be determined during detailed design by the concessionaire following the hydro-morphological survey, and all abstractions will be subject to a requirement for a water use authorization under the Water Act of Kenya. Moreover, potential impacts may also relate to localised water level effects; for example, where a village or agricultural offtake is sited downstream and the project abstraction reduces levels to the point where the existing offtake needs to be re-engineered.

The main impacts will relate to the depletion of water resources for other users, either in terms of community or agricultural supplies, or the aquatic or riparian environment.

As described in chapter 4 (baseline), surface waters are used fairly extensively throughout the project routing, particularly for agriculture along the project route, and also for domestic supply in the many communities that exist along the highway route. These potential uses will all be analysed by the private concessionaire and, where necessary, any potential impacts mitigated on a site-by site basis for each abstraction. The concessionaire will be required to undertake a **comprehensive raw water requirement** during construction activities including for the camp requirements.

In-migration during construction of the highway is likely to induce in-migration into the vicinity of the highway. This may therefore place a strain on local community water supply and sanitation facilities, leading to a range of potential social and health-related issues within the host communities.

Risks Significance

The risk in terms of significance is considered **low** and in terms of duration **medium term** with respect to water needs for road construction (managing dust and cleaning of machinery and equipment) in view of typical quantities required in such projects.

Water use risks with respect to human consumption during construction is likely to be moderate in risk significance and medium term especially if workers' accommodation camps are sited in locations where there are competing water use or water scarcity hence triggering conflict with local communities. The locations of the workers' accommodation camps are not known and will be determined by the private concessionaire.

Most of the surface water lakes within close proximity of the highway (lakes Elementaita, Naivasha, Nakuru) are not fresh water lakes and cannot be sources for domestic water for human consumption.

Abstraction of water from the existing rivers (Molo, Kariandusi, Njoro, Malewa, Gaitamayu, Mereroni and Gilgil) which is used by the local communities for domestic use may trigger conflict and hence the risk is high in significance, medium term in duration and localized in scope especially if the concessionaire does not establish alternative water sources (boreholes) for use by workers.

5.2.13 Solid and Liquid Waste Risks and Impacts

Improper waste management procedures or lack of mitigation measures during construction, phase of the Project may result in adverse environmental and social impacts on: -

- Storm water quality and thus water quality in the water bodies in project areas;
- Soil quality;
- Surface water quality;
- Ground water quality; and
- Ecological receptors or human health.

The different types of wastes and sources that are likely to be generated from the construction of the highway are described below.

a) Domestic Waste

The workers' accommodation and camps will be significant sources of domestic waste generation and therefore presents risks and impacts associated with the disposal of domestic wastes.

b) Recyclable and Reusable Waste

The types of recyclable and reusable wastes to be generated on site during the construction period include among others: -

Box 5-3. Recyclable and reusable waste

1. Waste metal
2. Waste plastic
3. Waste cables
4. Waste glass
5. Waste paper (packaging material)
6. Clean air filters
7. Clean containers, drums, bins etc.

8. Crushed stone, float stone etc.

c) **Excavation Waste**

The greatest volume of excavated material will arise from the construction activities of the Project. There are a considerable number of cuttings and interchanges to be constructed along the whole of the route and these will generate very large quantities of excavated material.

d) **Waste Water**

Water will be required for the workers' accommodation and camp, construction works, dust suppression and washing of construction equipment. Waste water if discharged indiscriminately into the environment, will lead to risks and impacts on water bodies, soil, vegetation fisheries and even human health.

e) **Hazardous Waste**

The proposed project will generate hazardous wastes which may adverse impact on the local environment due to the handling, storage, transport and disposal.

f) **Waste Oil**

During the construction period, waste oil will result from the maintenance of machines, equipment and construction vehicles. Direct and indirect disposal of waste oils to the receiving environment is likely to adversely impact on the environment and human health.

g) **Medical Waste**

Medical wastes will be generated during the construction phase especially in the event that health facilities are established in workers' accommodation and camps. Medical wastes impact adversely on the environment and human health.

h) **Waste Batteries and Accumulators**

Waste batteries and accumulators if poorly disposed or discharged to the receiving environment can directly or indirectly damage human health and the environment. Waste battery and accumulators will be generated during construction period.

Waste Risks and Impacts

Surface water bodies that may be at risk as a result of indiscriminate solid and liquid waste disposal are described in chapter 5.2.13. The Lakes Nakuru, Naivasha, Elementaita, are unlikely to be affected by solid and liquid waste pollution owing to the distance between the ROW and these features as already demonstrated above in 5.2.13.

However, the rivers Molo, Malewa, Gilgil, Kariandusi, Njoro, Gaitamayu and Mereroni which the highway crosses stand a high risk of pollution from construction wastes due to their close proximity to the ROW. Pollution of these rivers may adversely affect the flora and fauna, livestock and local communities that depend on these bodies as sources of water.

Improper solid and liquid wastes may also significantly affect wildlife (see section 4 on wildlife locations), livestock and human settlements that may be poisoned by these wastes.

Without mitigation measures, it is anticipated that there will be potential major to moderate adverse impacts during construction and moderate adverse impacts during the maintenance and operations periods on these receptors. Note that some of the conditions and effects described, particularly with regard to contamination and hydrogeology, may interact with other parameters such as ecology and surface water.

Risks Significance

As shown in the table above, the surface water lakes, are not located close to the proposed highway and therefore in terms of waste pollution of the water bodies and critically endangered aquatic species, the risks are likely to be moderately low, short term (with respect to construction), localized to the specific water body, and unlikely to occur especially with the development of a waste management plan.

The risk significance with respect to rivers that are crossed by the highway is however higher in terms of waste pollution related to construction due to the proximity, long terms in nature (construction and operation), localized but mitigatable with development of and implementation of robust water quality management plan.

The siting of other project components e.g. workers' accommodation camps, material sites, construction plant sites may also cause adverse risks to the water bodies if within close proximity to such bodies in terms of pollution.

These sites have not been identified and will be determined by private concessionaire who will prepare management plans including consideration of siting implications and risks on the water bodies.

5.2.14 Landscape and Visual Risks and Impacts

The visual risk and impact assessment aims to identify the significance of the potential visual impacts of the proposed Project upon the site and surrounding area. Visual assessment is concerned with people's perception and response to changes in visual amenity.

'Landscape and visual resources' are defined as the combined components of topography, geology, forests, woodland, biodiversity, ridgelines, water courses which contribute to landscape through the visual, aesthetic or scenic quality of the environment. Landscape and visual impacts may occur when new elements are introduced into a landscape or existing elements are altered or removed leading to a change in the way stakeholders access, perceive or experience landscape resources.

Visual impacts can be positive (beneficial) or negative (adverse). A development may have no significant visual impacts but result in an adverse impact on the landscape character; conversely, a development may have significant visual impacts, but insignificant landscape impacts.

Along the proposed highway, there are landscape and visual resources including forests, biodiversity, grasslands, ridgelines, water resources among others that will be affected as a result of construction of structures and movement of equipment.

The development will include road expansions and improvements to existing carriageways, new sections of connecting carriageway (interchanges) and new junctions.

Sources of landscape and visual risks and impacts associated with the construction phase include: -

1. Road construction activities and structures including infrastructure like bridges, overpasses, road interchanges, the carriageway layout itself, viaducts etc.;
2. Clearing of vegetation;
3. Rock cuttings
4. Movement of large construction vehicles; and
5. Establishment of quarry plants
6. Establishment of asphalt and batching plants
7. Establishment of camp sites for workers

Risks Significance

The significance is moderate in nature and will be long term especially with respect to the permanent structures (bridges, overpasses, road interchanges, the carriageway layout itself, viaducts) which will become permanent features on the highway.

5.2.15 Labour and Working Condition Risks and Impacts

The principles against which this risk and impact assessment is carried out are set out in the provisions of relevant national law and international standards and in Performance Standard 2: Labour and Working Conditions which seeks to protect the fundamental rights of workers including their right to freedom of association, non-discrimination, a safe working environment and protection of vulnerable groups such as children and migrant labour.

Performance Standard 2

Labour and Working Conditions are Performance Standards designed to: -

- promote fair treatment, non-discrimination and equal opportunity of workers;
- establish, maintain, and improve the worker-management relationship;
- promote compliance with national employment and labour laws;
- protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the company's supply chain;
- promote safe and healthy working conditions, and the health of workers; and
- avoid the use of forced labour.

In the field of labour and working conditions, assessing potential Project risks requires analysing the possibility that workers involved on the Project, either directly or through contractors and suppliers, will not enjoy the benefit of the rights and entitlements provided for in law, collective bargaining agreements, contracts of employment and other applicable standards (notably PS2) related to employment, health and safety and work place conditions.

In this section the assessment of risk to workers (that is the possibility that they may be treated in a way which is in breach of the identified standards, predominantly national law and PS2) is

assessed and followed by a consideration of mitigation measures to manage the identified risks.

Types of workers required to be recruited

The construction of the highway will attract workers who are estimated to be about 500. Of these, an estimated 150 workers will be accommodated in workers' camps this is based on KeNHA's estimate which shows that 70% of the total work force are going to be unskilled and sourced from project locality and hence not requiring accommodation and will instead reside in their homes. The actual number of workers will be determined by the private concessionaire.

- a) Engineers-Skilled Experts (civil, mechanical PM)
- b) Supervisors, Inspectors Foreman and Operators –Skilled Experts
- c) Technicians (lab, inspectorate, welders, masons, steel fixers, drivers etc.)
- d) Unskilled-flagmen, diggers, trenches, cleaning, security, mixing, watering, help team,

The ratio of the unskilled to skilled workers is likely to be 70:30 with an estimated 2% being international experts.

Thirteen different risks/issues related to the employment of workers have been identified as potentially arising in association with the Project. These relate to:

Box 5-4. Employment Risks

1. Indiscriminate Human Resources Policies and Procedures;
2. Indiscriminate Working Hours and Leave;
3. Indiscriminate Wages and Benefits;
4. Poor Workers' Accommodation;
5. Workers' Organization–Trades Unions, Freedom of Association and Collective Bargaining;
6. Non-Discrimination and Equal Opportunities;
7. Migrant labour;
8. Retrenchment;
9. Grievances;
10. Child Labour;
11. Forced labour;
12. Occupational Health and Safety; and
13. Specific issues related to Workers Employed by Third Parties in the Supply Chain.

This risk assessment deals with all individuals working on the Project during both the construction and operation phases of the highway, including staff employed directly by the Project (referred in the as Project employees) and employees of contractors and sub-contractors (referred to as contractor employees). All mitigation measures must and will apply equally to both Project and contractor employees.

It also considers the potential for risks to those employed indirectly in the Project supply chain, that is in enterprises providing goods and services to the Project such as local suppliers of food and maintenance services.

In accordance with PS2, these supply chain risks are focused on child and forced labour and life threatening safety issues only.

Expatriate Project employees who work for the Project in management and other senior posts on a short term fly-in, fly-out basis are excluded from the scope of the assessment as they will be employed from their home base and under terms and conditions applying in their home countries. Foreign construction workers employed by the construction contractors are included within the scope of assessment.

The assessment does not address a specific geographical study area but covers all people employed during the construction and operation of the highway and by its contractors and suppliers.

1. Risk that Private Concessionaire's human resources policies, procedures and resources will not be sufficiently established, deployed and communicated to all workers to provide them with the necessary protection and benefits

The expected workforce for construction of the highway will lead to challenges for the Project and Concessionaire's Human Resources Departments in developing, implementing and communicating human resources policies and procedures to all directly employed and contracted workers. If Concessionaire's Human Resources Departments is not adequately equipped to respond this could have a potentially negative impact on workers who may not be aware or enjoy the full benefits of the rights those policies and procedures aim to guarantee. Problems for workers could be particularly severe for those employed by subcontractors who may not come under the direct control of the Project and its Concessionaire.

2. Risk that workers will be expected to work excessive hours and have inadequate leave

While long working hours and overtime paid at a premium will potentially have a positive impact on livelihoods of workers, such practices could have a negative impact on their enjoyment of working conditions in accordance with national law and international standards, create a risk to their health and safety and have negative impacts on their social and family lives. The construction schedule is likely to lead to the requirement for working long hours.

3. Risk that wages and benefits especially for daily workers are not in accordance with current agreement and are not kept up to date

Although wages for directly employed permanent and fixed-term workers on the Project can be determined using the wage criteria in Kenya or negotiated with union representatives, there is a risk that the Project would have a negative impact on employees if wages were not updated regularly to take into account external factors such as inflation. In addition, there would be a risk that of negative impact if unskilled daily workers were employed and did not receive a wage sufficient to meet their basic needs and provide some discretionary income. Similarly, there are risks of negative impacts and non-compliance with national and international standards arising from the use of migrant workers, who may have little knowledge of prevailing local wage levels or likely

living costs. There are also risks that some workers may not benefit from adequate overtime payments because of the potential difficulties in obtaining supervisors' sign-off for hours worked beyond the limit of the law.

4. Risk that workers' accommodation will not meet appropriate standards in design and operation

During construction, the Project will require a level of skills and a number of workers from foreign or local communities. It is not yet known whether the majority of construction workers will be foreign or local but from experience, majority of workers will be local. Foreign workers will be accommodated in workforce accommodation camps and logistical supply centres located along the railway route. There will be risks associated with the living conditions within these camps and the presence of workers from different cultures and ethnic backgrounds, has the potential to lead to tensions between workers. In very restricted circumstances, some limitations on workers' freedom of movement may be put in place where this is shown to be necessary to manage community impacts and security risks.

5. Risk that workers will not be adequately represented or provided with the opportunity to be consulted, and that they will lack freedom of association

Despite the fact that some areas for union consultation are covered in labour law, the scope of issues that can be discussed or negotiated with union representatives is not fully defined in the law. If regular consultation with workers cannot be achieved this would have a negative impact on union representatives and the workers they represent who will not receive the information needed for meaningful representation in a timely manner, as per the requirements of PS2. Some contractors, and smaller contractors in particular, can have a negative attitude towards trade union representation within their companies. There is therefore a risk related to freedom of association and the right to collective bargaining. International contractors may bring their own specific attitudes to labour representation based on their own national circumstances.

6. Risk of discrimination especially against women and workers from ethnic minorities

In a national context where gender and ethnic discrimination is prevalent, and in the absence of specific communication and training on discrimination issues by Private Concessionaire level, there is risk that Project and contractor employees during all phases of the Project, and in particular women and workers from vulnerable and marginalized groups, will not benefit from adequate protection against discrimination.

7. Risk that lower standards will be applied to the protection of migrant labour

Foreign workers are expected to be employed by the private Concessionaire and sub-contractors during construction and operation of the Project. The use of international contractors raises the risk of relatively weaker standards being applied. Language barriers could lead to difficulty in monitoring working conditions and in dealing with grievances, both by government officials and the Project. This would give rise to risks of negative impacts on contracted workers who could as a result not benefit from adequate labour and working conditions and fail to enjoy their rights as set out in national law and Project and performance standards and guidelines.

8. Risk that, when required, retrenchment will not be appropriately planned and implemented

The workforce needs over the lifetime of the construction of the highway mean that retrenchment is likely to be an issue especially after the completion of the construction. Limited employment will be available during operation phase especially during the maintenance works and manning of toll stations. At some point in the future the highway will be transferred from the special infrastructure company established for the Project to the Republic of Kenya for continuing operation. At the end of construction and that of concession period limited need for labour could introduce the risk of staff being dismissed or of unfavourable changes in employment terms. This introduces a risk that workers could lose livelihoods or be adversely affected by inadequate protection and severance payments.

9. Risk that workers will not have access to an appropriate mechanism for dealing with grievances

Even with the best policies and practices, there is always a risk that the Project may cause or contribute to negative impacts on workers' rights that are not foreseen or cannot be prevented. Workers whose rights are negatively impacted by Project activities need to have access to remedies. In this context, if a grievance procedure was not formalised and communicated this would have a negative impact on workers who would not be able to raise grievances and have them properly addressed. This would be of particular concern for contractor employees and during construction.

10. Risk that children will be employed by contractors or in the supply chain

No children under the minimum working age of 18 are according to the labor laws of Kenya to be engaged by the Project and its contractors or will be permitted to be employed in future. However, it is possible that young workers under the age of 18 could become economically involved at some stage of the Project, in particular during the construction when unskilled local workers will be employed by contractors. In the absence of effective risk assessment procedures and a monitoring mechanism for contractors there is a risk that young persons under the age of 18 could work in conditions which are inappropriate for their age and/or dangerous. Due to the prevalence of child labour in agriculture, there is also a risk that children could be engaged by suppliers in the production or supply of food to the Project. This would have a negative impact on those children and their right not to work under national law and international standards. It may also have a negative impact on their education and their enjoyment of childhood.

11. Risk that workers will be subject to conditions constituting forced labour

In major construction projects the use of international construction contractors, recruiting a large pool of migrant workers through international labour brokers can introduce the risk of practices which include extortionate presentation fees, passport retention, and intimidation. If these were to occur they would have a negative impact on those workers, who may find themselves working under conditions which amount to involuntary or

forced labour and therefore do not enjoy the rights afforded to them by international and national standards.

12. Risks to occupational health and safety

The lack of a safe and healthy work environment for workers, taking into account inherent risks in its particular sector and specific classes of hazards in the work areas, including physical, chemical, biological, and radiological hazards, and specific threats to women may be a risk during construction. Occupational health and safety risks include accidents, injury, and disease arising from, associated with, or occurring in the course of work. Risks are likely if there is lack of (i) identification of potential hazards to workers, particularly those that may be life-threatening; (ii) provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) training of workers; (iv) documentation and reporting of occupational accidents, diseases, and incidents; and (v) emergency prevention, preparedness, and response arrangements. Health and safety must be on top of the agenda in KeNHA's and the Private Concessionaire who must be fully committed to protecting the health and safety of all workers. Any difficulties in meeting the Project's health and safety standards would have a negative direct impact on workers in terms of their safety and health.

13. Risks to workers engaged by third parties

There is likely to be a negative impact on workers employed by suppliers in terms of their health and safety, working conditions and broad rights under the law. The construction of the highway will entail engagement of contractors, sub-contractors and third party entities which will form part of the supply chain. Risks associated with workers' health and safety for third party suppliers if third parties who engage these workers are not reputable and legitimate enterprises and lacking appropriate ESMS that will allow them to operate in a manner consistent with the requirements of Performance Standard 2.

Risks Significance

The risk significance is considered high in nature, long term in duration (construction and operation), likely to occur but moderate in severity. The regulations of Kenya instill adequate safeguards for workers and strict adherence to these regulations including development of robust labour and working condition plans by the private concessionaire will reduce the risk significance and severity to low.

5.2.16 In-migration Risks and Impacts

It is considered that construction of the project may affect the demographic structure of local communities. Indirectly, results of the development activities might affect population growth. It is predicted that the following demographic processes will take place:

1. **In-migration:** People from other areas will move to the area in search of new opportunities.
2. **Presence of temporary workers:** There will be a short-term influx of construction workers during the construction phase of the project. Another important factor to

consider is that in Kenya, with its high levels of unemployment, any new project will lead to an influx of people to the area. It is therefore most likely that the area will experience an influx of people looking for jobs and new opportunities.

3. **Young population:** Especially population at working age, can become much easily part of any potential population movement. In brief, the need for unskilled or semi-skilled labor force increases the possibility of employment, and thus, leads to in-migration.
4. **Increase in population:** Due to the arrival of workers from outside near to the settlements close to major and minor camp sites, total population in these settlements will increase, even temporarily.
5. **Change in population structure in favor of male ratio:** This is the potential increase in male population as a result of in-migration for seeking a job. It is assumed that male immigration will be temporary.

The Project is expected to stimulate substantial in-migration along the highway. Several features of the Project could prompt in-migration.

1. **Local labour requirements:** Construction of the highway will employ a significant number of people. There is a perception in the project area, evident from the results of stakeholder engagement during the ESIA and RAP study, that a high level of opportunity will result from this and this is likely to stimulate significant in-migration. In practice, the level of construction employment available to local workers will be focused on skilled, unskilled and lower skilled workers. In KeNHA's experience, 70% of the workers are going to be unskilled and are normally sourced from the local vicinity and in view of this, employment creation to the local communities is expected.
2. **Project demand for goods and services:** The scale of the Project will generate high expectations around opportunities associated with the supply chain. Demand from the highway for goods and services in the local study area will be high during construction, and very low during operation, this is still likely to be a strong pull factor.
3. **Perceptions of opportunity associated with construction camps:** the construction workforce will be largely housed in camps located along the route of the highway. These are likely to act as a focus for in-migration with people looking for work and other economic opportunities associated with the Project workforce. Again in practice, the level of opportunity will be relatively limited as the camps will be operated as secure sites managed by the construction contractors.
4. **Operation of construction sites:** In addition to the accommodation camps, construction works on the highway are also likely to act as a magnet for people and are likely to attract some in-migrants.

On the one hand in-migration will bring benefits in economic development and diversification, providing opportunity for members of the existing population who can harness these opportunities.

1. But against this, rapid physical expansion of towns and villages and uncontrolled squatter development along roads, and potentially the operational highway corridor, will have significant implications for the use and availability of land and other resources, for spatial planning, and for the traditional and national and county government authorities.
2. Without mitigation, the primary impact of in-migration will be an increase in population, physical expansion of towns and villages, and informal development on the outskirts and alongside roads and tracks approaching settlements. Land use intensification combined with limited land availability, is likely to increase the strain on existing physical, social and human resources as well as governance systems.
3. The potential for unplanned and uncontrolled growth could lead to issues surrounding safety, sanitation, and service delivery. In terms of impacts on infrastructure, the increased population will increase demand on water, power, sewerage and waste facilities, health and education facilities, and telecommunications. These services are already constrained and significant social, environmental and health risks will arise from a failure to adequately provide for these needs. Pressure on land could potential displace or introduce conflict with existing land owners and communities.
4. Increased demands on existing resources for crops, livestock, fish, wildlife, and forest products, and increased food prices, will have a direct and negative impact on food security in the affected settlements along the highway route.
5. Physical environmental impacts will include impacts on biodiversity through increased pressure on bush-meat (zebra and gazelle meat especially around Gilgil Town), firewood, charcoal, other non-timber forest products (forest areas), fish and other food sources and water.
6. Continued uncontrolled exploitation, spurred by in-migration, could be detrimental to biodiversity, as well as to the livelihoods of people who are dependent on natural flora and fauna for food and other resources.
7. Impacts on biodiversity will be exacerbated by increasing access into areas that have generally been less at risk from exploitation because of their poorer accessibility. These areas are likely to have retained higher biodiversity value and will experience adverse impacts from development, hunting and a general increase in human activity.
8. Socio-economic impacts of in-migration will include an increase in prices. The categories of goods and services that may experience price increases include construction materials, food, fuel and transport. Such inflationary trends can reduce the availability and affordability of basic goods and services to the existing population.

9. An influx of migrant job-seekers into an area will significantly increase local competition for employment opportunities. It is possible that some migrants will have gained skills in construction in previous large scale projects in Kenya and elsewhere, which will be an advantage in seeking work positions within the Project, and may provide some uplift of skills in the local community.
10. Where in-migrants compete directly against local people, especially for unskilled jobs, it may result in tension, and possible aggression, between job seekers within the affected areas, and Kenya more widely.
11. In-migration can also lead to negative social change and an erosion of cultural values, as migrants bring in different cultural norms and values and attitudes to traditional leadership systems.
12. Vulnerable groups specifically the Maasai in Eburu settlement area after Gilgil will be the most susceptible to the challenges posed by a changing socio-cultural environment, particularly during construction, as there will be little time and few resources available to these groups to help them cope and adapt. Some receptors – particularly youth, entrepreneurs, and people with higher levels of skills and education – will likely view the socio-cultural changes in the area as not only beneficial, but also a necessary step for economic and community development, both locally and regionally.
13. An influx of in-migrants is likely to lead to an increase in communicable and vector-borne diseases such as malaria, TB, HIV/AIDS and sexually transmitted diseases, exacerbated by increased pressure on health care facilities and the possible introduction of new diseases.
14. The Project may also contribute to the development of health inequalities through the provision of health initiatives in selected communities and due to the fact that employees / contractors and their dependants can access site-based medical services which are better equipped and staffed than public health facilities.
15. **Gender-Based Violence (GBV):** is an umbrella term for any harmful act that is perpetrated against a person's will and **that is based on socially ascribed (i.e. gender) differences between males and females**. It includes acts that inflict physical, sexual or mental harm or suffering, threats of such acts, coercion, and other deprivations of liberty. These acts can occur in public or in private. The construction of the highway is likely to exacerbate any of the various forms of GBV described below and could be perpetrated between workers themselves, between bosses and workers and between workers and the community members.

The term GBV is used to underscore systemic inequality between males and females (which exists in every society in the world) and acts as a unifying and foundational characteristic of most forms of violence perpetrated against women and girls. The 1993 United Nations Declaration on the Elimination of Violence against Women defines

violence against women as “any act of gender-based violence that results in, or is likely to result in, physical, sexual or psychological harm or suffering to women.”²⁸

The eight core types of GBV are:

1. **Rape:** non-consensual penetration (however slight) of the vagina, anus or mouth with a penis, other body part, or an object. Likely to be perpetrated between workers themselves, between bosses and workers and between workers and the community members.
2. **Sexual Assault:** any form of non-consensual sexual contact that does not result in or include penetration. Examples include: attempted rape, as well as unwanted kissing, fondling, or touching of genitalia and buttocks. Likely to be perpetrated between workers themselves, between bosses and workers and between workers and the community members.
3. **Sexual Harassment:** is unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature. Sexual harassment is not always explicit or obvious, it can include implicit and subtle acts but always involves a power and gender dynamic in which a person in power uses their position to harass another based on their gender. Sexual conduct is unwelcome whenever the person subjected to it considers it unwelcome (e.g. looking somebody up and down; kissing, howling or smacking sounds; hanging around somebody; whistling and catcalls; in some instances, giving personal gifts). Likely to be perpetrated between workers themselves, between bosses and workers.
4. **Sexual Exploitation and Abuse:** This includes taking advantage of the poverty conditions and other vulnerabilities of potential victims – who may include young girls (or boys) and even married women - to lure them into sexual activities which in the surface might seem to be consensual, but in reality, is induced with promises of money and other favors.
5. **Sexual favours:** is a form of sexual harassment and includes making promises of favorable treatment (e.g. promotion) or threats of unfavorable treatment (e.g. loss of job) dependent on sexual acts—or other forms of humiliating, degrading or exploitative behavior. Likely to be perpetrated between workers themselves, between bosses and workers and between workers and the community members.
6. **Physical Assault:** an act of physical violence that is not sexual in nature. Examples include: hitting, slapping, choking, cutting, shoving, burning, shooting or use of any weapons, acid attacks or any other act that *results* in pain, discomfort or injury. Likely to be perpetrated between workers themselves, between bosses and workers and between workers and the community members.

²⁸ It is important to note that women and girls disproportionately experience violence; overall 35 percent of women worldwide have faced physical or sexual violence (WHO, Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence, 2013). Some men and boys also face violence based on their gender and unequal power relationships.

7. **Forced Marriage:** the marriage of an individual against her or his will.-likely to happen between community members and workers especially when families force children into marriage with foreign workers in exchange for money.
 8. **Denial of Resources, Opportunities or Services:** denial of rightful access to economic resources/assets or livelihood opportunities, education, health or other social services (e.g. a widow prevented from receiving an inheritance, earnings forcibly taken by an intimate partner or family member, a woman prevented from using contraceptives, a girl prevented from attending school, etc.). Likely to be perpetrated between workers themselves, between bosses and workers.
 9. **Psychological / Emotional Abuse:** infliction of mental or emotional pain or injury. Examples include: threats of physical or sexual violence, intimidation, humiliation, forced isolation, stalking, harassment, unwanted attention, remarks, gestures or written words of a sexual and/or menacing nature, destruction of cherished things, etc. Likely to be perpetrated between workers themselves, between bosses and workers.
- **Violence Against Children (VAC):** is defined as physical, sexual, emotional and/or psychological harm, neglect or negligent treatment of minor children (i.e. under the age of 18), including exposure to such harm,²⁹ that results in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power. This includes using children for profit, labor³⁰, sexual gratification, or some other personal or financial advantage. This also includes other activities such as using computers, mobile phones, video and digital cameras or any other medium to exploit or harass children or to access child pornography.
 - **Grooming:** are behaviors that make it easier for a perpetrator to procure a child for sexual activity. For example, an offender might build a relationship of trust with the child, and then seek to sexualize that relationship (for example by encouraging romantic feelings or exposing the child to sexual concepts through pornography).

Risk Significance

The in migration risks and associated impacts is considered to be high in significance and likely to occur but short terms in nature (construction phase). The risks especially with respect to GBV, VAC is likely to be higher in areas along the highways with settlements or within close proximity to learning institutions.

5.2.17 Community Health and Safety Risks

²⁹ Exposure to GBV is also considered VAC.

³⁰ The employment of children must comply with all relevant local legislation, including labor laws in relation to child labor and World Bank's safeguard policies on child labor and minimum age. They must also be able to meet the project's Occupational Health and Safety competency standards.

This section presents the risks and impact assessment of the potential impacts of the construction, operation of the Nairobi-Mau Summit Highway Project in relation to Community Health, Safety and Security.

Performance Standard 4-Community Health, Safety and Security

The PS 4 outlines the following requirements in order to minimise impacts to community health, safety and security.

- Evaluation of the risks and impacts to the health and safety of the affected communities during the project life-cycle and will establish preventive and control measures and where applicable develop an action plan which is disclosed to stakeholders.
- Designing, constructing, operating, and decommissioning the structural elements or components of the project in accordance with Good International Industry Practice (GIIP), taking into consideration safety risks to third parties or affected communities.
- Avoiding or minimizing the potential for community exposure to hazardous materials and substances that may be released by the project.
- Avoiding or minimising the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases, and communicable diseases that could result from project activities, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups.
- Assisting and collaborate with the affected communities, local government agencies, and other relevant parties, in their preparations to respond effectively to emergency situations.
- Assessing risks posed by its security arrangements to those within and outside the project site.

The section looks at ways in which the health and safety of the local communities could be impacted during the project life cycle as a result of both routine and non-routine activities. The risks include consideration of disease transmission, access to health care and accidents and injuries.

In addition, the project needs to ensure that safeguarding of personnel and property is carried out in a legitimate manner that avoids or minimizes risks to the community's safety and security.

As such the risk and impacts associated with the highway construction has considered the following types of impacts:

- Transmission of communicable diseases in particular tuberculosis (TB) and acute respiratory infections which result from in-migration, housing pressure and the presence of an external workforce;
- Transmission of malaria which due to changes in the environment creating breeding grounds and due to in-migration;
- Impacts associated with water and sanitation in particular diarrhoeal diseases due to in-migration and decreased access to good quality water;
- HIV/AIDS and Sexually Transmitted Infections (STIs) due to changes in demographics, presence of a workforce and changes to socio-economic factors;

- Health impacts associated with hazardous materials and the handling of these materials appropriately to avoid non-routine events (such as spillages);
- Increased pressure on health care services due to in-migration, worker health care needs and changes to community safety;
- Impacts on community safety in particular road accidents; and
- Impacts to community security, particularly covering interaction between security forces and the local community.

Communicable Diseases Risks

1. The rate of spread of communicable diseases may increase within communities as a result of the construction of the highway project. This is largely due to:
 - potential for overcrowding as a result of increased pressure on existing housing infrastructure from in-migration;
 - in- migrants to the area bringing new diseases or varying disease profiles compared to the existing community;
 - improved access leading to increased opportunities for interaction with other communities and therefore transmission of disease; and
 - potential interactions between the construction workforce and local communities.
2. Construction of the Project is expected to result in localised in-migration most notable in communities located close to worker camps and the logistic supply centres (LSCs). In-migration could lead to increased pressure on housing in these communities with the potential to result in overcrowding, especially amongst the poorest in the community if families rent out rooms or new poor quality housing is constructed in which multiple people rent accommodation.
3. Overcrowding and poor housing is associated with the increased transmission of communicable diseases in particular acute respiratory infections, TB, influenza, and skin diseases notably fungal infections and scabies.
4. The lack of access to health care facilities and effective case detection in these areas could contribute to the rapid spread of these diseases and poor health outcomes due to lack of access to treatment.
5. In-migration of people into the area from other parts of Kenya and from other countries also provides an opportunity to introduce novel diseases, including pandemic influenza into the area, or increase transmission of existing diseases, such as TB. Again this risk will be higher if these individuals migrate from places with a higher prevalence of such diseases. Improvements in access could also lead to increased interaction between communities and therefore the potential for transmission of diseases or more rapid transmission.
6. The presence of the workforce has the potential to increase the transmission of existing communicable diseases (e.g. TB) and introduce new diseases into the area. The risk of transmission of diseases is greatest if aspects of the workforce are sourced from areas with a higher prevalence of communicable diseases. Again areas close to worker

accommodation and LSCs will be most affected. Furthermore, the movement of workers between sites, camps and LSCs could also provide transmission pathways and facilitate the spread of communicable diseases.

7. In addition, workers from the local community (who will remain living in their existing homes within the community), will provide potential transmission pathways between the non-local workforce and the local community. Such diseases may not only spread from the workforce to community members, but also quickly within worker accommodation given the close living arrangements that occur at camps.

Transmission of Malaria Risks

The project has the potential to impact, or be impacted by (through worker ill health) increased transmission of malaria.

During construction of the highway modifications to the environment and in-migration into the area is likely to increase the risk of transmission. Modifications to the environment during construction (for example through borrow pits and creation of equipment lay-down areas) can create small water pools (e.g. wheel ruts and footprints) offering new mosquito breeding grounds and leading to increased vector densities and human-vector interaction.

Any influx of people into the area may play an indirect role in increasing the malaria burden. This may result from an increase in pressure on medical facilities, inadequate waste management and establishment of make-shift housing (reducing natural protection from mosquitoes).

Uncontrolled development could also alter the environment and create improved vector borne diseases which may extend the breeding season of mosquitos and lead to additional cases of malaria in the current low season. The increased concentration of people due to in-migration and workers from outside the area may also increase the circulating pool of the malaria parasite and increase the risk for disease transmission. Part of the influx in population will be from the workforce. The highly non-endemic nature of the disease means that the Project is likely to significantly add to the already high disease burden of the community during the wet season.

Sexually-transmitted Infections including HIV/AIDS and High Risk Sexual Practices

As described in the baseline health section STIs and HIV/AIDS are a concern in the areas through which the highway passes especially Naivasha, Nakuru and Salgaa where the HIV/AIDS prevalence is high. The prevalence of HIV/AIDS in these towns is as a result of the fact that they are along the major transport corridor and act as rest stops for truck drivers.

Development projects can contribute to an increase in transmission and prevalence of sexually transmitted infections (STIs) and HIV/AIDS. The Project is likely to impact on transmission of HIV/AIDS throughout the duration and construction of the highway and across the affected towns/regions due to the following.

- Improving accessibility through the construction or upgrading of access road at various points along the highway, thereby providing opportunities for interaction between communities in various locations.

- Transport drivers, who typically have higher rates of HIV or STIs than the general population, may engage in casual high risk sexual activity along the transport route and at their end destination.
- In-migration resulting in the mixing of people with higher HIV or STI prevalence rates than the host community which may promote the transmission of the disease.
- Presence of a mainly male workforce with disposable incomes who may engage in high risk sexual activities with commercial sex workers in particular in larger towns near the highway and on transit routes.
- Changes in the social make up of communities such as the “urbanisation” of communities, may also influence casual sexual engagement practices. Women in these communities are likely to be unaware of the risks of unprotected sex and the potential for men away from home to indulge in casual sexual encounters.
- Commercial Sex Workers (CSWs) may come from other areas and therefore may have higher rates of HIV and while they are better able to negotiate safe sex practices they may waive this for a fee. Again this is most likely to occur in settlements close to the LSCs and worker camps.
- Existing stigma and taboos around STIs and HIV/AIDS will make it challenging for women to negotiate safe sex practices such as the use of condoms (including female condoms).

Any increase in the prevalence of HIV/AIDS in the study area is not only a risk to the health of members of the community but is also a business risk for the Project as it can affect the health of the workforce and therefore their ability to do their job. There is little access to treatment for STIs including HIV/AIDS in the PACs with treatment only available at the larger centres which can be difficult to access. A lack of access to treatment could also affect the long term health of those who contract STIs including fertility and damage to internal organs. The stigma and taboos around STIs may also affect people accessing treatment in a timely manner which may also affect health outcomes.

Water and Sanitation Risks

The construction of the highway and the presence of the worker camps and the LSCs has some potential to decrease localised water quality over the short term, either as a direct result of pollution or increased sedimentation. In addition, in-migration may put additional pressure on existing water and sanitation facilities leading to the potential for an increase in water-borne diarrhoeal diseases, including cholera outbreaks.

Hazardous Materials Risks

The use, transport and storage of hazardous chemicals is likely to occur in relation to the highway construction. All hazardous chemicals and hydrocarbons need to be procured, transported, stored and handled appropriately in line with international best practice for each

individual chemical / hydrocarbons. In this way the potential for impacts to human health will be minimised and should an incident occur this would be a non-routine event.

The Project will use explosives most likely in the quarries. The location of quarries are not yet known and will be determined by the concessionaire. Any explosive material, if handled incorrectly, could result in injuries or even fatalities.

Health Care Risks

The presence of the project, change in demographics (associated with in migration) and increase in the types and rates of diseases predicted is likely to place additional pressure on existing public health care facilities within the area. Any increase on pressure on the health care facilities is likely to lead to further difficulties in accessing care. The Government of Kenya is unlikely to have the capacity to adapt health services rapidly to Project induced population changes.

Community Health and Safety Risks

Road traffic accidents are not uncommon in numbers due to the high levels of existing traffic movements in communities in most of the project areas. Amongst vehicle users and pedestrians, there is poor road safety awareness and limited enforcement of traffic rules with certain black spots known along the road highway especially (Salgaa), where several tragic accidents have been encountered etc.

Construction related traffic will result from the movement of supplies and materials and to a lesser extent from local traffic movements from construction workers. This is the busiest and most important transport corridor in the East and Central Africa, with one of the highest accidents and fatality rates in the world. During the 3-year construction period, this road will either be fully or partially closed or diverted and with hundreds of construction vehicles and equipment passing along communities and settlement areas.

The risks and impacts associated with vehicular traffic in terms of occupational and community health and safety, traffic jams, accidents and potential economic losses because of slow down in trade and transport is considered significant. Potential impacts of increased vehicular activities on sensitive receptors identified in Table 5-9 (schools within 1 km distance from the road) is also of significance.

The predicted increases in road traffic, road improvements and poor safety awareness will increase the risk of road traffic accidents occurring which could result in injuries or fatalities to other road users or pedestrians. This is a particular risk as adherence to road safety measures is low and communities are likely to have low levels of awareness regarding traffic movements and risks. Children are generally considered to be at a higher risk due to a lack of awareness of risks associated with road traffic accidents.

Community Security Risks and Impacts

Facilities including workers' accommodation, work fronts, LSCs etc. may be patrolled by security personnel. The Private concessionaire may seek security contractors. There is the potential for negative interactions between the community and any security forces used especially if community protests occur.

The use of inappropriate force by security personnel in the event of any incident could compromise the safety and security of individuals from local communities. This in turn could have impacts on the reputation of the Project locally, nationally and internationally including eroding trust in the Project. Any excessive force that may be used by security personnel could result in a threat to the safety and security of community members and could lead to injuries or fatalities.

Risk Significance

The community health, safety and security risk significance is likely to be moderate in nature, short term in terms of duration (construction), and highly likely to occur. However, these risks are avoidable and can be minimized through the development of appropriate community health, safety and security management plans by the private concessionaire.

5.2.18 Land Acquisition and Involuntary Displacement Risks

This expansion of the Nairobi-Mau Summit Highway will lead to impacts and risks associated with on land use and land-based livelihoods during construction. Potential impacts include: -

- physical displacement;
- economic displacement;

Of particular relevance in this risk assessment is Performance Standard 5: Land Acquisition and Involuntary Resettlement. PS 5 has the following objectives: -

Box 5-5. Land Acquisition and Involuntary Resettlement

- to avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs;
- to avoid forced eviction;
- to anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by:
 - providing compensation for loss of assets at replacement cost; and
 - ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.
- to improve, or restore, the livelihoods and standards of living of displaced persons; and
- to improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.

Physical Displacement

- The proposed expansion of the highway will not acquire land for the expansion because the project routing is aligned on the existing Right of Way (ROW) and the additional land acquired for expansion (80 metres) on either side of the highway is within KeNHA's ROW and not on private or communal.
- Land will however be required for the interchanges which are outside of the ROW. A total of 4.6053 acres of land will be required for the interchanges.

- The construction of other project components including associated facilities are also likely to lead to land acquisition for instance workers' accommodation camps, construction sites, material sites (borrow pits, quarry sites). The locations of these other components of project are not yet determined and will be identified by the private concessionaire and therefore this ESIA is unable to determine the risks associated with land acquisition.

Economic Displacement

- Loss of Trees / Perennial Crops: The project will lead to the loss of trees
- Loss of structures: A total of 1621 temporary and 301 permanent structures will be lost
- Loss of Graves: 2 graves will be affected as a result of the project
- Loss of Communal Facilities: 1 water borehole will be affected as a result of the project
- Loss of and restricted access of grazing lands of the Maasai along the ROW

Table 5-14. Economically Displaced Project Affected Persons

Affected Businesses/Livelihoods	
Type of Business	Number
Mechanical/bicycle repair	140
Construction Materials Vendors	28
Video/games shops	58
Metal fabricators & bricks makers	36
Farm inputs shops	17
Cereals vendors	240
Food outlets/vendors	192
Small traders/retail/Mpesa	143
Hardware business	32
Open air hawking –candies, snacks, fruits	297
Chemists	5
Traditional herbalists	28
Cyber cafe	9
Institution (schools & churches	30
Green grocers	255
Livestock, hides & skins vendors	10
Newspaper vendor	1
Cosmetics shops	187
Tree nursery	59
property agent	3
rental business	117
Residential	16
Retail shops	183
Stores for merchandise goods	55

Affected Businesses/Livelihoods	
Type of Business	Number
Timber yard	11
Curio shops related	136
Transport- sand/taxi/hand cart	40
Gardening within the corridor	371
Grazing of livestock	242
Type of structures	
Permanent Structures	301
Temporally Structures	1621
Land for interchanges	4.6053 acres

Risk Significance

The risk significance is low to moderate in view of the fact that the highway expansion is aligned to the existing ROW and is not physically displacing communities other than in the proposed interchanges.

However, the proposed expansion is likely to restrict access to grazing land or water points for the local communities and especially Maasai and the project design has included livestock crossing points – which will be whose sites will be decided upon in consultation with the Maasais - as a mitigation including further studies on the Maasai to determine their migratory patterns and establish additional livestock crossing points.

There is also economic displacement of communities who encroached on the ROW and have been earning their livelihoods from small scale businesses. A Resettlement Action Plan has been prepared to compensate for the economic displacement of the informal traders on the ROW.

The risks significance with respect to physical and economic displacement in order to acquire land for other project components whose locations are not yet known may be high if they are located in sites with settlements.

5.2.19 Archaeology and Cultural Heritage Risks

Along the project route, 3 archeological heritage sites have been identified as shown in table 5-15 below and shown in annex XI including proximate distance from the ROW. This section assesses the impact of the proposed highway expansion on cultural heritage, including both tangible and intangible features. Tangible features include archaeological sites, historic sites and monuments, traditional sacred sites and other places of importance. Intangible cultural heritage includes traditional beliefs and practices such as religious rites of passage, ritual, crafts and other cultural traditions.

Impacts and risks addressed are:

- disturbance or damage to cultural heritage sites causing loss of cultural value or historical and scientific information about Kenya's past and potential damage to local and national cultural identity;

- disruption of access to currently used cultural heritage sites;
- changes to the setting of cultural heritage sites which could inhibit spiritual or traditional practices and cause potential damage to local and national cultural identity and values;
- threats to cultural knowledge and activities causing potential loss of cultural identity and cohesion; and
- infringement of cultural norms, causing offence to local communities and possible exacerbation of social impacts and negative sentiment towards the Project.

The Project recognises the diversity of stakeholder groups, and their right to maintain or redefine Cultural heritage forms the basis upon which the shared history, identity and culture of these different groups is built. By preserving cultural heritage, the Project aims to protect the foundations of ethnicity, religion, and culture within the Project area. The assessment includes consideration of physical impacts on cultural heritage and also addresses potential social implications of these impacts.

Table 5-15. Archeological sites within the project routing

Name
Kariandusi Pre-Historic Site
Hyrax Hill Pre-Historic Site
Mai Mahiu Catholic Church

Types of Cultural Heritage Relevant to the Assessment

Tangible Cultural Heritage The assessment considers two types of tangible cultural heritage: Archaeological Cultural Heritage (ACH); and Living Cultural Heritage (LCH). ACH refers to sites whose primary value is historical or scientific and includes the three types of site below:

- Settlement sites – those with evidence of ancient human occupation (such as a village or cave dwelling);
- Special Purpose sites – those with evidence of ancient human activity that does not include occupation (such as a former ritual site or craft workshop); and
- Burial sites – places of internment, separate from ancient settlements, which are no longer visited by living populations (such as an ancient necropolis or tomb).

LCH is any cultural site of importance in use by local living populations and includes:

- Religious sites – places of worship, cemeteries, and tombs;
- Sacred sites – places where spirits live, or where fetishes are displayed or buried; and
- Initiation sites – male and female rite of passage sites.

From a resource management perspective, tangible cultural heritage has several common characteristics. Tangible cultural heritage is generally:

1. fixed on the landscape with discrete boundaries;
2. unique, non-renewable, and sometimes irreplaceable;
3. sensitive to ground-disturbing construction impacts;
4. difficult to identify and evaluate when underground (i.e. archaeological sites);
5. possible to avoid for impact mitigation, if the location is known; and

6. potentially disruptive to construction schedules and project reputation if encountered as unexpected discoveries (chance finds) during construction or later.

The value of tangible cultural heritage sites varies depending on their importance to local or wider regional, national or international communities, and to the scientific community. Value may be indicated by protection of sites under local, national or international legislation or other recognised systems of designation. Physical dimensions of the sites are also relevant, as they will determine how difficult a site may be for the Project to avoid and / or evaluate and remove.

Intangible Cultural Heritage

The assessment considers two types of Intangible Cultural Heritage: Cultural Knowledge and Cultural Activity. Cultural Knowledge is the belief system or knowledge base that is maintained and passed down over generations, including language, cultural concepts, traditional techniques and traditional forms of social organisation:

- cultural concepts –language, religion, cosmology, cultural values, myths and stories of the group’s history, which together form the basis of a people’s understanding of their relationship with the physical and spiritual world;
- traditional techniques – traditional technologies, fishing, hunting or agricultural techniques, and knowledge of traditional craft production techniques; and
- traditional forms of social organisation – community organisation and the systems in which power and resources are shared among individuals or groups. Traditional land management systems are an example of a traditional Guinean social organisation potentially affected by the Project, as in-migration can cause a change in the distribution of land and undermine traditional sources of local authority. Cultural Activity is defined as activity which represents expressions of social or cultural identity for a particular group in which multiple members of the community take part. Cultural activities can be divided into the subcategories of ritual, cultural expression and traditional life-ways:
 - rituals – festivals, initiation ceremonies and mortuary practices;
 - cultural expression – song, dance, clothing, and the production of folk art; and
 - traditional lifestyles – means of subsistence, social and political activities, and other daily activities which form the basis of cultural identity.

From a resource management perspective, intangible cultural heritage is very different from tangible cultural heritage. Intangible cultural heritage is generally:

- without a fixed location or discrete boundaries;
- embedded in traditional residential and economic patterns;
- widely shared and resilient but also subject to loss under conditions of rapid social change; and
- sensitive to changing socio-economic situations, and to outside cultural influence.

Although the assessment distinguishes between tangible and intangible cultural heritage, it should be noted that they often overlap. Communal knowledge and belief systems (e.g. oral history and rituals) are often embodied within the tangible manifestations of a culture (e.g. a

cemetery, mosque or sacred forest), so direct impacts to physical objects or places may also have impacts on intangible cultural values.

Cultural Heritage Risks and Impacts

- **Physical Disturbance or Damage to Cultural Heritage Sites**

Cultural heritage sites are fixed and discrete. Project risks and impacts will come from direct physical disturbance or damage to the resources themselves. Disturbance can result directly from earth-moving activities, from vibration and dust produced by heavy vehicles and machinery, or damage resulting from a change in water flows. The magnitude of this kind of impact is based on the percentage of the total site physically impacted by Project activities and the severity of the disturbance or damage.

- **Disruption of Access to Cultural Heritage Sites**

Project activities may disrupt access to cultural heritage, preventing their usage and limiting their value to site users, who may include local residents and visitors. The magnitude of this type of impact is measured by the duration and severity of the disruption of access and the potential for alternative access routes. An example of a low magnitude impact would be construction activities which temporarily restrict direct access, but do not completely block users from accessing a site. An example of a high magnitude impact would arise if the existence of the highway were to act as a barrier, cutting off access to sites from the communities that use them or making access difficult or dangerous.

- **Infringement of Cultural Norms**

This type of impact includes Project activities which do not follow proper social or cultural protocol and may cause offence to local communities. These impacts will be inherently difficult to predict. Examples of impacts of this type would include undertaking community relations through improper channels or failing to conduct expected rituals. Social and cultural norms are not as clearly definable as heritage site locations and boundaries. Expectations may be unspoken and highly situational, making impacts more difficult to predict in advance. The process of identifying potential impacts through community consultation has already begun in areas where Project infrastructure is planned for development.

- **Threats to Cultural Knowledge and Activities**

Traditional practice and knowledge serve to unite a community and to give it cohesion. Traditional dance, music, oral histories and stories, and common language are examples of intangible heritage that provide this type of internal cohesion for the communities in the study area. They represent an intangible resource that, once lost, would be hard to recover. This impact encompasses Project activities that would directly threaten cultural knowledge or restrict traditional activities. Examples of impacts that endanger cultural knowledge would be religious conversion, linguistic change, abandonment of traditional dance and festival. These could be caused by in-migration or changing employment that could reduce available time and opportunity for such activities. As with the identification of and respect for traditional cultural norms and protocols, the identification of key cultural knowledge and activities is not always a straight forward task.

Impacts on Tangible Cultural Heritage Resources

The highway alignment has undergone a process of optimization whereby the alignment has been designed to avoid key environmental and social constraints wherever possible.

Cultural heritage sites have been avoided. Of the cultural heritage sites recorded in the highway study area, none is anticipated to be disturbed by ground-disturbing construction or operation activities related to the highway. There may, however, be impacts to cultural heritage sites that have yet to be identified in the highway study area. Archaeological resources will be impacted if they exist in areas where ground disturbance is to be undertaken.

Construction or operation activities may hinder users from accessing sites especially Kariandusi Pre-Historic Site and Mai Mahiu Catholic Church by cutting off access or making access difficult or dangerous. These 2 sites are very close to the existing ROW. Disruption of access is not anticipated to affect any of the known cultural heritage sites; however, access issues may become apparent as the Project is implemented.

None of the known cultural heritage sites is anticipated to be affected by changes to site setting, however, site setting issues may become apparent as the Project with the start of construction. The use, access, and significance of each site will be identified through community engagement.

Potential Impacts on Other Currently Unknown /Undiscovered Sites

The significance of the impacts on undiscovered sites is impossible to assess precisely at this stage, as it will depend on the nature of each find and the degree of impact caused by the Project.

Risk Significance

The risk significance on the archeological and cultural sites already identified is low in nature due to avoidance of these sites, short term in terms of duration (construction), and highly unlikely to occur with respect to expansion of the highway.

5.2.20 Risks and Impacts on Vulnerable and Marginalized Groups

This section presents the impacts and risks of the Nairobi-Mau-Summit Highway Project on vulnerable and marginalized groups (also referred to as indigenous peoples) existing within the project alignment during construction and operation phase.

Performance Standard 7. Indigenous Peoples

Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded. Their languages, cultures, religions, spiritual beliefs, and institutions may also come under threat. As a consequence, Indigenous Peoples may be more vulnerable to the adverse impacts associated with project development than non-

indigenous communities. This vulnerability may include loss of identity, culture, and natural resource-based livelihoods, as well as exposure to impoverishment and diseases.

Box 5-6. Objectives of Performance Standard 7

- To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples.
- To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts.
- To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner.
- To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle.
- To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present. To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.

Vulnerable and Marginalized Groups in Project Alignment

The Maasai communities (categorized as vulnerable and marginalized) have been identified to be located in a small seasonal settlement between Eburru Turn off just after Gilgil on the Nairobi-Mau Summit alignment and in the areas between Mai-Mahiu and Naivasha where they graze livestock in the ranches, conservancies and Mt. Longonot National Park. In these locations, the Maasai are known to graze their livestock on both sides of the current highway.

Construction Risks and Impacts

- During the construction phase, as a result of increased movement of construction machinery and vehicles along the project alignment, livestock related mortalities/accidents are likely to increase especially when the Maasai seek pasture land and water entailing crossing of the highway. This is likely to exacerbate tensions and could even trigger potential conflict between the Maasai and the workers.
- Competition over existing water resources between the Maasai for livestock and work force could also exacerbate tensions and even trigger potential conflict between the Maasai and the workers.
- Cultural erosion as a result of mingling between the work force and Maasai could also exacerbate tensions and even trigger potential conflict between the Maasai and the workers.
- The proposed highway expansion project will not lead to acquisition of the land or other assets (including grazing land) owned by the Maasai in view of the fact the highway is aligned along the current ROW and therefore there are no displacement related impacts on the Maasai as a result of the highway expansion.

- The establishment of other project components (see chapter 1) and associated facilities may however lead to the physical and economic displacement of the Maasai including loss of, alienation or denial of access and exploitation of their land and access to natural communal cultural resources including grazing land and water points. These sites are not yet identified and will be determined by the private concessionaire and hence the associated risks cannot be predicted. However, as a precautionary measure, there will be no siting of other project components or associated facilities in locations known to have settlements or Maasai.

Risk Significance

The risk significance to the Maasai is likely to be low in nature, short term in terms of duration (construction), and highly unlikely to occur with respect to expansion of the highway. The highway expansion is limited to the current ROW owned by KeNHA and will not lead to displacement of the Masaai. The Maasai in the project highway are only limited to the Eburu and Longonot areas. Establishment of livestock crossing points to access pasture and water along the highway reduces the risk significance.

The risk magnitude is likely to be high if the other project components whose locations are undetermined as yet are sited in areas where the Maasai reside or graze their cattle.

5.2.21 Supply Chain Impacts and Risk

The construction of the highway will entail engagement of contractors, sub-contractors and third party entities which will form part of the supply chain. Risks associated with workers' health and safety for third party suppliers if third parties who engage these workers are not reputable and legitimate enterprises and lacking appropriate ESMS that will allow them to operate in a manner consistent with the requirements of Performance Standard 2.

Materials used in construction of the highway will originate from various suppliers. Some of these materials including for instance cement are produced in regions where there is a risk of significant conversion of natural and/or critical habitats and therefore is considered as risks and require systems and verification practices to be adopted as part of the ESMS to evaluate its primary suppliers.

Risk Significance

The risk significance is considered moderate and short term in duration (construction phase only) likely to occur but mitigatable through inclusion of binding provisions in contractor contracts.

5.3 Increased Vehicular Traffic Impacts and Risks due to road presence

5.3.1 Wildlife Disorientation Impacts and Risks

When the highway is operational, the increased vehicular traffic will have adverse risks and impacts on wildlife especially in areas identified in chapter 4, where wildlife exists. These risks include: -

- Noise from heavy traffic. The birds and other wildlife that communicate by auditory

signals may be particularly confused by increased noise from the heavy traffic and could lead to higher levels of disturbance and stress;

- Pollutants, such as heavy metals, carbon dioxide, and carbon monoxide, emitted by vehicles, may all have serious cumulative effects on wildlife. Combustion of petrol containing tetraethyl lead, and wear of tyres containing lead oxide, result in lead contamination of roadsides. Many studies documented increasing levels of lead in plants with proximity to roads, and with increases in traffic volume. Plant roots take up lead from the soil, and leaves take it up from contaminated air or from particulate matter on the leaf surface. The lead then moves up the food chain, with sometimes toxic effects on animals, including reproductive impairment, renal abnormalities, and increased mortality rates.
- The impacts of other heavy metals, such as zinc, cadmium, and nickel are less known. Motor oil and tyres contain zinc and cadmium; motor oil and gasoline contain nickel. These metals, like lead, were found to increase with proximity to roads, with increasing traffic volume and decreasing soil depth. Earthworms were found to accumulate all these metals, in concentrations high enough to kill earthworm-eating animals.
- Poorly managed waste may attract and entrap small animals, while cigarette butts and filters are often mistaken for food by birds.

Risk Significance

The risk significance is considered moderate but long term in nature (throughout project life) and moderate in severity.

5.3.2 Air Pollutant Emissions Risks and Impacts

The increased vehicular traffic along the highway brings with it risks associated with increased air pollution specifically from the motorized vehicles. The quantity of pollutant emissions by vehicles depends on a variety of factors, such as type and power of engine, date of construction, type and composition of fuel, efficiency of combustion (e.g. age, wear), presence of emission control equipment (i.e. catalyser), actual speed of the vehicle, traffic flow (number of vehicles per hour or day), composition of vehicle types (e.g. abundance of trucks, average age and actual performance of engine types), traffic flow characteristics on a specific road section (average speed, free flow, or congested traffic), road characteristics (i.e. incline). Increased air pollution is likely to lead to among others: -

a) Impacts and Risks on Human Health

Significant impacts from emissions of vehicles are predicted especially in settled areas. Whilst concentrations of NO₂ close to passing settlements are likely to be sufficient to cause moderate impacts, concentrations decrease quickly with distance from the source and impacts become not significant at distances of greater than 30 m.

b) Impacts and Risks on Vegetation

There will be impacts on vegetation especially in areas of the road where there is vegetation within 20 metres. It is predicted that there will be at most minor impacts on vegetation

(including crops) in these locations.

c) Impacts and Risks on Protected Areas

The current alignment crosses the edges of the Mau Forest, Kimende Forest. It also passes along the edges of the Kigio Conservancy, Soysambu Ranch. Emissions from vehicles are predicted to cause moderate impacts within 60 m and minor impacts up to 500 m away within these designated ecological areas.

Risk Significance

The risk significance is considered moderate but long term in nature (throughout project life) and moderate in severity.

5.3.3 Noise and Vibration Risks and Impacts

Noise and vibration will have the following risks and impacts during the operation phase of the project as a result of increased vehicular traffic.

- Impacts on settlements from noise from vehicular traffic
- Impacts on wildlife from noise from highway vehicular traffic

With respect to operational noise impacts, the World Health Organization Guidelines for Community Noise provide the following generic guidance concerning nuisance effects from noise.

- To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB LAeq for a steady, continuous noise.
- To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB LAeq.
- At night, sound pressure levels at the outside façades of living spaces should not exceed 45 dB LAeq and 60 dB LMax, so that people may sleep with bedroom windows open. These values are obtained by assuming that the noise reduction from outside to inside with windows partly open is 15 dB.

Risk Significance

The risk significance is considered moderate but long term in nature (throughout project life) and moderate in severity.

5.3.4 Water Quality and Supply Risks and Impacts

1. During highway operation, potential impacts on water quality will mainly arise from occasional fuel or lubricant leaks or accidental spillages from vehicles that may occur directly into watercourses or infiltrate into groundwater or wash off into surface waters following heavy rainfall.
2. Poorly designed drainage infrastructure may also induce scour and erosion in channels and embankments, leading to increased sediment levels in downstream water bodies. Water quality impacts may also occur during maintenance of the road or from the

discharge of untreated wastewater from operational workforce facilities (toll stations, rest stops stations, shops,).

3. The poor design of the road and culverts in the highway sections crossing rivers and are likely to adversely impact on the water bodies, wetlands and aquatic species through pollution, sedimentation effects or hydrological disruptions.
4. The most significant consequences for water quality would arise in the event of the accidental spill of a fuel train directly into a water body by trucks thus entering the water environment.
5. The overall raw water supply requirements for the operation of the highway may be low and small in comparison to water resource availability along the highway route, and it should be a relatively straight forward process to use sustainable water sources that have been developed during construction. The rest stop stations will require frequent water for operation specifically for use by commuters accessing the rest stops.

Risk Significance

The risk significance is considered moderate but long term in nature (throughout project life) and moderate in severity.

5.3.5 Waste Risks and Impacts

- Waste oil will be generated due to periodical maintenance of the highway. The oil to be used for the maintenance activities will not contain PCBs or any other carcinogenic chemicals.
- The project plans to construct clinics at the rest stop stations to provide medical services to commuters and road users and thus medical waste generation is expected during operation of the Project. The locations of these rest stops including clinic etc are unknown as well as the number of persons they can accommodate.
- Waste battery and accumulators will be generated during maintenance activities in the course of the operation period. The impacts associated with this waste stream will be Negligible.

Risk Significance

The risk significance is considered moderate but long term in nature (throughout project life) and moderate in severity.

5.3.6 Landscape and visual Risks and Impacts

- The introduction of new built structures into the landscape, including viaducts, interchanges, road carriageways and associated infrastructure including lighting.
- Alteration of topography and landform
- Introduction of increased traffic levels to the study area

Risk Significance

The risk significance is considered moderate but long term in nature (throughout project life) and

moderate in severity.

5.3.7 Labour and Working Conditions Risks and Impacts

- During the operation of the highway, labour issues will not be significant in view of the fact that the estimated number of workers will be very low mainly for maintaining the road.

Risk Significance

The risk significance is considered low but long term in nature (throughout project life) and low in severity.

5.3.8 Community Health, Safety and Security Risks and Impacts

The presence of an increased vehicular traffic on highway has the potential to affect the safety of local communities close to the highway route and also the population over a wider area due to:

- Collisions between vehicles, pedestrians and livestock at crossing points.

However, the project design includes footpaths, bridges, viaducts and crossing points for livestock and hence the road will be much safer than its current status. Further the dualling of the road and increasing of the lanes drastically reduces chances for head on collision related accidents.

Risk Significance

The risk significance is considered low but long term in nature (throughout project life) and low in severity.

5.3.9 Risks and Impacts on Vulnerable and Marginalized Groups

- The establishment of rest stop stations can also lead to cultural erosion related risks and impacts including spread of sexually transmitted diseases including (HIV/AIDS).

Risk Significance

The risk significance is considered low but long term in nature (throughout project life) and low in severity. This is because, the design of the project includes livestock crossing points and the **RSS** will not be located around Eburu settlement where the Maasai exist.

6 CHAPTER 6. ANALYSIS OF PROJECT ALTERNATIVES

This chapter describes the alternative analysis undertaken for the proposed project including without project” alternative, in terms of their potential environmental and social impacts, and feasibility of mitigating these impacts.

6.1 No Project Alternative

The Project is the expansion and improvement of the existing Nairobi-Nakuru-Mau Summit road. It is part of the A8 highway and of the Northern Corridor that connects the Port of Mombasa via Nairobi to Malaba at the border with Uganda and onwards to Kampala. The Northern Corridor is the busiest and most important transport corridor in East and Central Africa, providing a gateway through Kenya from Mombasa Port via road, rail and pipeline to the landlocked countries of Uganda, Rwanda, Burundi, South Sudan and Eastern Democratic Republic of Congo.

The project road is a part of international Northern corridor which is facing considerable congestion all along its route and needs to be addressed immediately. A104 and A109 have a prominent international or port-connecting function. The segment A109 and the northern segment of the A104, between Athi River and Malaba, comprise part of the “Northern Corridor”. This is the busiest route in the country since it carries most of the export and import traffic through Mombasa port for Kenya, Uganda and other land locked countries. This is also designated as part of the Lagos-Mombasa long-distance highway (Link 8) under the Trans-Africa Highway Programme.

The southern segment of the A104 (Namanga to Athi River), together with its continuation northwards as the A2 to the Ethiopian border at Moyale, constitute part of the so called “Great North Road”, originally conceived in the colonial times as linking the “Cape to Cairo”. It has potential importance now in furthering integration of the East African Region. It links southwards to Tanzania through T2 route from Dar-es-Salaam via Arusha (formerly part of the old A104), and onwards to Zambia via T5 and T1 routes through Mbeya.

Present traffic congestion over the project road section requires immediate attention and development of the corridor is very essential in order to improve the trade relation with other East African countries.

Current infrastructures are not able to accommodate the increasing traffic, leading the extended travel times and worsening road safety (575 people were killed between 2012 and 2014 according to police statistics). The deadliest highways in the world have been revealed in an interactive map by Driving Experiences. The map is based on the World Health Organization’s global status report on world safety for 2013. The project highway is one among the top 22 dangerous highway in the world. As per the report the Nairobi-Nakuru section of A104 obtains a fear factor score of 6 out of 10. In one year 320 people were killed on the highway alone. Hence Road safety becomes one of the major objective involved in the development of the Project.

The Kenya National Highway Authority (KeNHA) has thus undertaken to improve the road safety and quality, through a PPP scheme. No project alternative means the current situation is maintained and the associated adverse effects continue being experienced.

A positive effect of the No Action alternative is the preservation of trees and other flora and fauna along the right-of-way and avoidance of further disturbance to critical habitat in the project area. Finally, without the project all impacts related to construction like camp site management, occupational and community health and safety, shifting of utilities, and dust, noise, vibration from construction equipment are avoided. Only operational impacts associated with normal operations of the existing road will be experienced.

6.2 Alternative Linear Transport Means

The movement of people, goods and services along this corridor can also be achieved through other linear transport means especially through the construction of railway lines from Nairobi-to Mau-Summit instead of the expansion of the proposed highway. This alternative would entail a totally new greenfield which would require land (ROW) and would lead to displacement of communities due to acquisition.

The railway line just like a new highway would also likely traverse close or through/along some of the environmental sensitive areas like Lake Naivasha, Lake Nakuru, Lake Elementaita, Wildlife Conservancies like Kigio Wildlife Conservancies, Soy Sambu Ranch, Nakuru National Park and some of the escarpment forest zones like Kikuyu escarpment zone and hence lead to significant adverse impacts and risks compared to the expansion of the current highway within the ROW.

This option was rejected from an environmental and social point of view (with respect to displacement and environmental and social risks) as well as economic reasons.

6.3 Construction of Parallel Greenfield Expressway

The construction of a totally new greenfield parallel to the existing highway was considered as an alternative option but was rejected on environmental and social points of view with respect to the adverse environmental and social impacts anticipated. The construction of a totally new highway due to lack of land, would likely pass close or through/along some of the environmental sensitive areas like Lake Naivasha, Lake Nakuru, Lake Elementaita, Wildlife Conservancies like Kigio Wildlife Conservancies, Soy Sambu Ranch, Nakuru National Park and some of the escarpment forest zones like Kikuyu escarpment zone, etc.

Further, this would require acquisition of new land as opposed to the current proposal where the expansion is within the ROW. The acquisition of new land for the greenfield would lead to social impacts including resettlement of a high number of Project Affected Persons.

This option was this rejected from an environmental and social point of view (with respect to displacement and environmental and social risks) as well as economic reasons.

6.4 Alternative Traffic Management

The construction of the highway will lead to increased traffic associated with construction and will disrupt traffic flows, movement of goods, services and people hence an adverse effect. The following alternatives were considered namely:

1. Re-routing the traffic from Nairobi to Mai-Mahiu-Narok-Bomet-Kericho-Kisumu highway. This option was considered economically unviable with respect to distance of travel and cutting off road users whose destinations include towns and settlements between Rironi and Mau Summit.
2. Re-routing the traffic from Nairobi to Mai-Mahiu-Narok-Bomet-Kisii-Kisumu highway. This option was considered economically unviable with respect to distance of travel and cutting off road users whose destinations include towns and settlements between Rironi and Mau Summit.
3. Creation of alternative diversions within the existing road corridor. This option was considered the best from a social and economic perspective in the sense that it allows road users interested to travel from Nairobi-Mau Summit have continuous access without restrictions and maintains the social connectivity.

6.5 Alternative Design for Congested Urban Areas (Nakuru Town)

In Nakuru town, which is the biggest urban town that the highway passes, a number of alternatives were considered in order to minimize the project footprint with respect to displacement risks and impacts since there is limited land within the ROW and further reduce the risks associated with splitting the town into 2 parts and disrupt connectivity of the people in Nakuru Town.

A total of 6 options were considered and option 6 was considered the most environmentally, socially and technically sound as described below. The rest of the options were rejected for various environmental and social risks as described below.

Box 6-1. Design Options in Nakuru Town

1. Widening of existing road through Nakuru Town
2. Bypass Option-I – Southern Bypass
3. Bypass Option-II – Northern Bypass
4. Detouring Option-I – North of Nakuru
5. Detouring option-II – South of Nakuru
6. Provision of Viaduct/Elevated Corridor

6.5.1 Widening of existing road through Nakuru Town

This option involves widening of the existing road from 2 lanes into 6 lanes within Nakuru Town. The option was not considered socially sound due to the significant displacement risks and impacts it would bring with it. Land acquisition along this section is practically not possible since it has structures like Jomo Kenyatta Institute of Technology and Science at Km 125.100 on LHS, Railway Godown at Km 125.200 on RHS, Westside Mall/Nakumat at Second roundabout (Km 125.500), County Assembly of Nakuru at Km 125.700 on RHS, KCB Bank at Km 125.900, and Eveready industries at fourth Roundabout (Km 127.850) and several commercial

establishments, Industrial setups, Educational Institutes, Government Offices, Vehicle showrooms, Banks and Hotels.

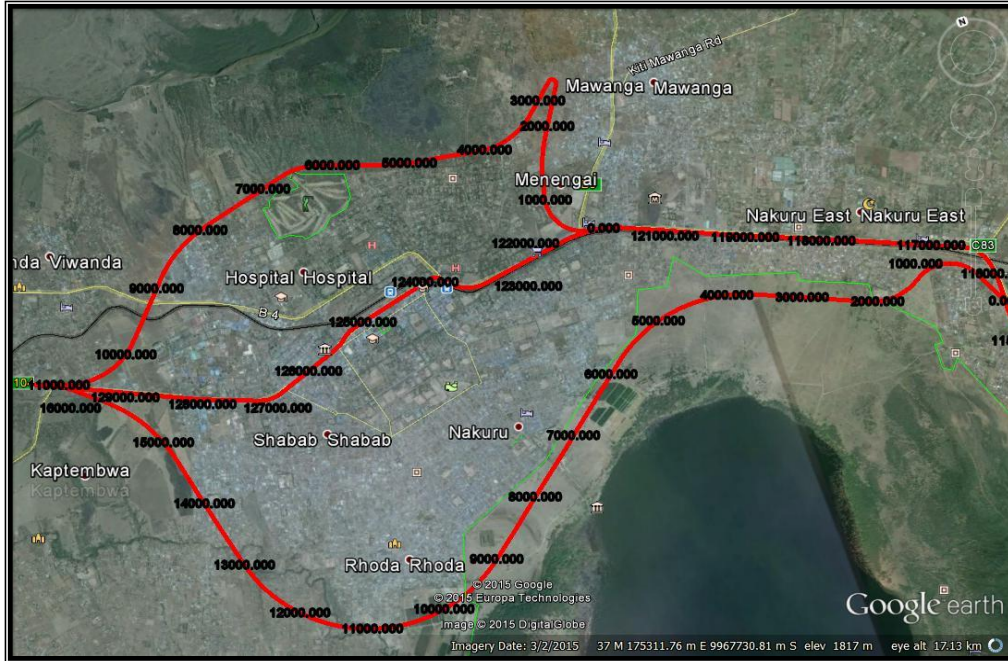
The removal of building and structures as well as land acquisition would lead to displacement and disruption of socio-economic activities including connectivity within Nakuru town and was hence rejected from a socio-economic perspective.

6.5.2 Bypass Options for Nakuru Town

The option of bypassing Nakuru Town completely was considered by evaluating the following 2 bypasses namely:

- **Southern bypass** which would have the highway transits along the Nakuru National Park and Lake Nakuru which are environmentally sensitive areas. Since this alignment passes through the environmental sensitive area, this option was considered environmentally unsound and was rejected from an environment risk point of view. A legal case is already going on in the courts against Kenya Urban Roads Authority (KURA) who has planned this alignment of the bypass. The proposed bypass takes off from existing A104 at Km 115.600 and joins back at Km 129.400 and is for the length of Km 16.480. The alignment passes along the outskirts of the Nakuru town on the edge of Nakuru National Park.
- **Northern bypass** proposal which starts near the intersection of B5 road (at Km 121.400) for which an interchange is under construction and with a direct connector along with the interchange alignment takes off towards the north of Nakuru town and passes through fewer development areas, following the foothills of the volcanic mountain and passing along the side of golf course, joins back existing A104 on northern side of Nakuru town. The proposed bypass takes off from existing A104 at Km 121.400 and joins back at Km 129.900 and is for the length of Km 11.400. Grade compensation on climbing the volcanic mountain requires special attention since it may incur high cutting sections and a hair pin curve. Alignment passes at foot hills of volcanic crater mountain and shall require environmental clearance. This option was rejected from an environmental and socio-economic (displacement) and technical point of view.

Figure 6-1. The snapshot of the both alignments



6.5.3 Detouring away from Nakuru Town

Nakuru town is highly congested and has a number of prominent structures including administrative buildings, educational institutions, industrial setups, banks, hotels, automobile showrooms and service centres and various other commercial establishments along the project highway.

- Northern Detouring option:** This detouring option from northern side of the highway/Nakuru town takes off at Km 121.700 and follows B5 road (which is planned to be widened to 4 lane divided carriageway till Km 13.100 after which it transit towards North west around the volcanic crater through greenfield new alignment till Km 34.500 and joins onto B4 road from Km 34.500 to Km 35.500 after which it joins back onto existing A104 at Km 41.730 (Corresponding Chainage on existing A104 is 137.600). Total length of the detouring option shall be 41.73 Kms v/s 15.9 Kms of existing highway. This option shall include 13.1 Kms of widening of existing B5 road, 1 km of widening of existing B4 road and 27.63 Kms of greenfield alignment.

This option was rejected in view of the additional kms that will need to be constructed as well as the additional greenfield alignment and widening of B5 and B4 roads which will lead to significant land acquisition and hence displacement impacts and therefore not socio-economically feasible.

Figure 6-2. Key map of the option is given below:



- Southern Detouring option:-**This detouring option from southern side of the highway/Nakuru town takes off at Km 111.300 through a greenfield new alignment parallel to Lake Elementaita road till Km 19.00 and follows lake Elementaita road till Km 24.000 after which it transit towards south west around the Lake Nakuru and Nakuru National Park zone through greenfield new alignment till Km 44.000 and joins onto C57 road from Km 44.000 to Km 47.500 after which through a green field alignment it bypasses Njoro town joins back onto Njoro road at Km 53.000 and further joins back onto existing A104 at Km 63.055 (Corresponding Chainage on existing A104 is 129.600) through interchange at Njoro turnoff. Total length of the detouring option shall be 63.055 Kms v/s 18.3 Kms of existing highway. This option shall include 5 Kms of widening of existing Elementaita road, 3.5 km of widening of C57, 10 km of widening of Njoro road and 44.555 Kms of greenfield alignment.

Since this alignment passes through the environmental sensitive area (Lake Nakuru and Lake Nakuru National Park), this option was considered environmentally unsound and was rejected from an environment risk point of view.

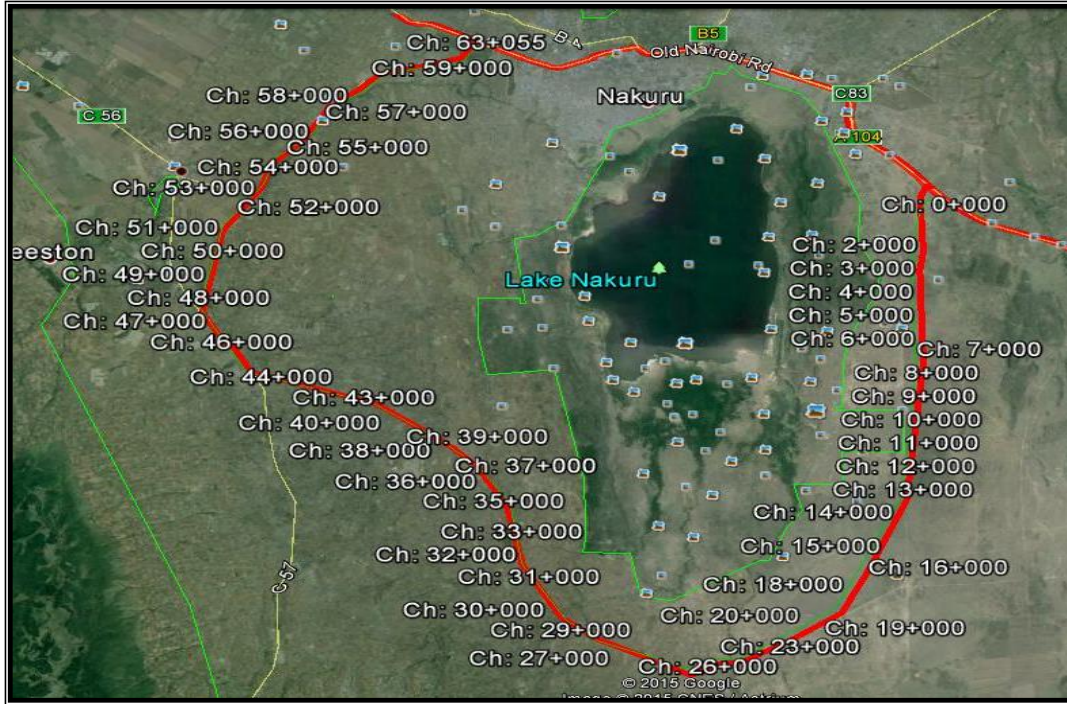


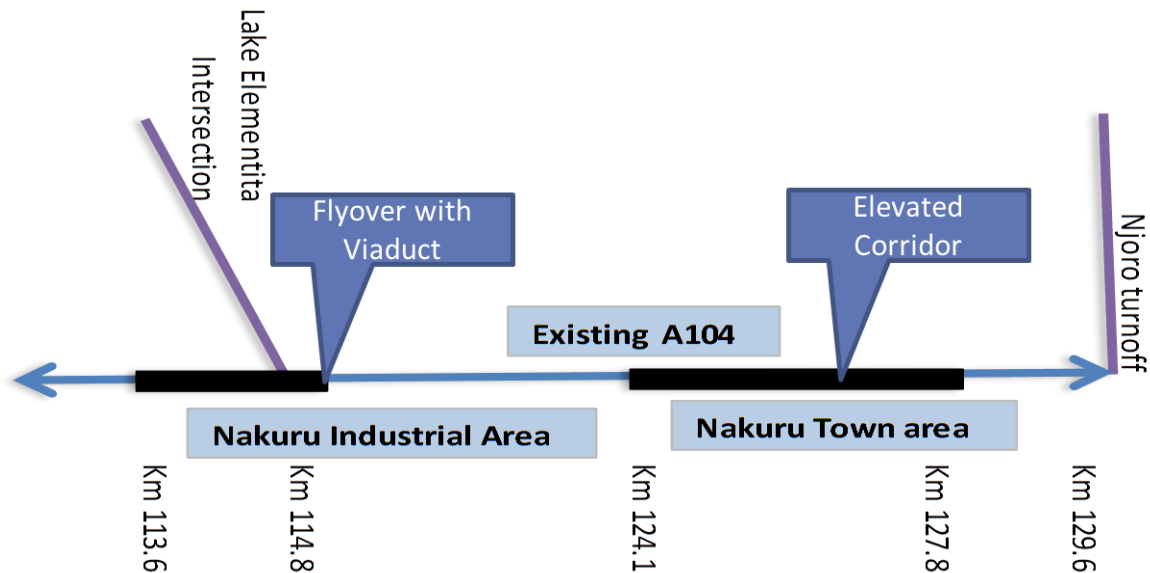
Figure 6-3. Key map of the option

6.5.4 Provision of Viaduct/Elevated Corridor

Provision of viaducts has been looked as an optional study at two locations at Nakuru town: Location 1: Km 114.400 (at Elementaita road junction with alignment 1) several commercial establishments were observed abutting the project road corridor at this section from Km113.600 to 14.800 including hotels, petrol stations etc. flyover with viaducts is proposed at these locations.

Location 2: From Km 124.100 to Km 127.800 (Nakuru Town Area) this optional study is carried out to see the scope of elevated highway with viaducts within Nakuru town which may serve as solution for decongestion of the traffic at Nakuru town.

Figure 6-4. Via Duct Option



This option is considered the best environmental and socially feasible and practical option for solving Nakuru town congestion (provision of elevated corridor as an immediate solution) in view of the fact that it does not lead to physical and economic displacement, nor does it lead to socio-economic disruption and connectivity and has minimal environmental risks (non associated with sensitive ecosystems).

6.6 Alternative Alignment Options

The following 5 alignment options were considered with option 1 and 2 considered as environmentally and socially sound as described below. Option 3, 4 and 5 were rejected owing to environmental, social and economic risks.

6.6.1 Alignment Option 1: Development of Existing A8 (Road-Nairobi –Mau Summit)

The improvement proposal starts from Rironi and follows along the existing A104 passing through Naivasha – Gilgil – Nakuru – Molo – Mau summit. As a solution for Nakuru congestion a 6-lane elevated corridor is proposed in this alignment option – Total length of this alignment option is 176 Km. This is the current proposal for which this ESIA has been prepared and is considered the most environmentally and socially sound as well as technically viable option.

6.6.2 Alignment Option 2: Development of Existing A 8 South Road (Rironi-Mai Mahiu-Mau Summit)

Development of a section of alignment through B3 and C88 till Naivasha and then following with Existing A104 from Naivasha to Mau Summit – The improvement proposal starts from Rironi and passing through Mai Mahiu along B3 (length of 19.750 Km) and then following C88 through Naivasha joins back existing A104 (length of 37.430 Km) – the length of this section of alignment is 57.180 Km. The alignment then follows existing A104 from corresponding Chainage Km 59.000 till Mau summit Km 174.940 for a length of 115.94km. As a solution for Nakuru congestion a 6-lane elevated corridor is proposed in this alignment option. Total length of this alignment option is 173.120 km (57.180+115.940). This highway section has been considered for strengthening and not expansion in view of the environmental and socio-

economic risks. The highway passes through critical ecosystems and will require acquisition of huge tracts of land due to lack of ROW.

6.6.3 Alignment Option 3

Development of a section of alignment through Old A104 from Gilgil to Lanet rest of the alignment from Rironi to Gilgil and from Lanet to Mau summit will follow existing A104 – The improvement proposal starts from Rironi and follows the existing A104 passing through Naivasha; continues till the railway overpass near Gilgil at Km 80.100 of existing A104 – length of this section of alignment is 80.100 km. The alignment then takes off towards right of existing highway onto old A104 which passes through the Gilgil city joining back existing A104 at Lake Elementaita and takes off North West through Mbaruk road and joins back Nakuru at km 116.100 – length of this section of alignment is 36.600 km. After joining back at Nakuru the alignment passes along existing A104 till Mau summit from Km 116.100 to Km 174.940 – length of this section of alignment is 58.840 km. As a solution for Nakuru congestion a 6-lane elevated corridor is proposed in this alignment option. Total length of the alignment option 3 is 175.540 Km (80.100+36.600+58.840)

6.6.4 Alignment Option 4

Development of a section of alignment through B3 – C88 till Naivasha and Old A104 from Gilgil to Lanet and sections from Naivasha to Gilgil and Lanet to Mau summit shall follow existing A104: The improvement proposal starts from Rironi and passing through Mai Mahiu along B3 (19.750 Km) and then following C88 reaches Naivasha and joins back existing A104 (37.430 Km) – length of this section of alignment is 57.180 Km. The alignment further follows existing A104 from corresponding Chainage Km 59.000 till the railway overpass near Gilgil at Km 80.100 of existing A104 – length of this section of alignment is 21.100 Km.

The alignment then takes off towards right of existing highway onto old A104 which passes through the Gilgil city joining back existing A104 at Lake Elementaita and takes off north-west through Mbaruk road and joins back Nakuru at km 116.100 – length of this section of alignment is 36.600 km. After joining back at Nakuru the alignment passes along existing A104 till Mau Summit from Km 116.100 to Km 174.940 – length of this section of alignment is 58.840 km. As a solution for Nakuru congestion a 6-lane elevated corridor is proposed in this Alignment option. Total Length of this alignment option is 173.72 Km (57.180+21.100+36.600+58.840).

This option has been rejected in view of the costs associated with acquisition of new land and overall cost implication of the project due to length increase.

6.6.5 Alignment Option 5: Greenfield alignment

The improvement proposal is a parallel expressway to the existing A104 from Rironi to Mau Summit bypassing all major urban and settlement sections like Naivasha, Gilgil, Nakuru, Salgaa and Molo. The parallel alignment crosses the existing A104 at 4 locations from west to east and vice versa to avoid the environmental sensitive areas like escarpment forest and rift valleys. The alignment also crosses the existing railway lines at 7 locations for which new ROB structures are to be proposed. Spur alignments also have to be designed and provision has to be made to connect all the major towns/settlements to attract traffic over the new parallel expressway. Total Length of the entire alignment option is 189.490 Km. This option was rejected from an environmental and social point of view (with respect to displacement and environmental and social risks) as well as economic reasons.

6.7 Alternative Material Sites

Alternative sites for sourcing materials has been identified by the feasibility study report. These sites are preliminary in nature and the private concessionaire will make an informed decision whether to source materials from these sites or select alternative sites.

6.8 Alternative Workers Accommodation Sites

The sites for worker's accommodation has not yet been identified and will be determined by the private concessionaire and therefore alternative sites cannot be analysed at this point in time and will be undertaken by the private concessionaire during the development of detailed designs.

6.9 Alternative Construction Sites

The construction sites for asphalt plants, batching plants, office blocks etc. have not yet been identified and will be determined by the private concessionaire and therefore alternative sites

cannot be analysed at this point in time and will be undertaken by the private concessionaire during the development of detailed designs.

6.10 Alternative Technology

There are different technologies for construction of highways including different machineries and equipment. Even though the private concessionaire will determine the technology for use in the construction of the road the bidding documents require that the highway be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements.

The bidding documents require the use of machineries like asphalt mixers, crushers and other construction equipment and machineries be incorporated with pollution control devices like dust arrestors/precipitators, emission control, noise abatement devices and desulfurization devices. The bidding documents require that the equipment and vehicles should have highest levels of combustion efficiency, capability to use cleaner fuels like biofuels and should have enhanced safety features. The machines should also have heat recovery and conservation mechanisms to ensure sustainable use of the available energy source.

7 CHAPTER 7. STAKEHOLDER ENGAGEMENT

Consultations on the project were undertaken by the Transaction Advisor and KENHA throughout 2015-2016, and by KENHA in early 2018. This chapter present the results of the most recent consultations.

Stakeholder consultations for the proposed road project were conducted in order to capture the major concerns associated with the project from all concerned and interested parties. The exercise was carried out using questionnaires, phone calls, courtesy calls and discussion. General interviews were conducted with government agencies and other development agencies, conservationists, private sector (business community, crop and livestock farmers, landowners, transporters, etc.); associations, NGOs and CBOs active in the project areas. Consultation methods therefore included formal and informal meetings, interviews, questionnaires, and focused group discussions.

The stakeholder consultative meetings provided views, opinions and suggestions on the most appropriate considerations on the development and use of the proposed road. The sessions also laid out fears and concerns to be addressed during development and operation. To ensure that both male and female views were taken on board in the project development; public consultations were conducted in an all-inclusive manner.

Through this process, stakeholders and the public had an opportunity to contribute to the overall project design by recommending and raising concerns on certain aspects of the proposed project. In addition, the process created a sense of responsibility, commitment and local community ownership for smooth implementation of the project.

7.1 Community Consultations

The consultations sought community participation and feedback into the project especially related to matters of environmental, road alignment, public education and awareness on road usage and management, resettlement and compensation for the PAPs. The consultations created awareness and identified positive and negative socio-economic impacts of the road project, proposed mitigation measures to address the potential impacts during project implementation and operation.

7.1.1 Consultations Along Rironi-Naivasha-Mau Summit Section

Consultations were held with the local community members and issues arising are as shown in box 7-1 below. Annex I contains list of consulted participants.

Box 7-1. Issues and Concerns from Public Consultations

- Investors who had privately constructed acceleration and deceleration lanes feared that these could be destroyed leaving them with no adequate accesses while those who planned to improve entry into their premises wondered if they should proceed;
- There were concerns that linkage between the proposed road and railway could lead to conflicts.
- There is need to provide access to the various facilities e.g., schools and trading

centers;

- Interconnections between the proposed project road and other roads especially at Mai Mahiu Narok Junction, Nyahururu and Naivasha turn off. As such, interchanges will be done to join Rironi Mau Summit road and acceleration lanes to connect to other roads provided.
- Fears and concerns associated with the road including increased road accidents, influx of foreigners with new cultures, foreign diseases such as T.B. and HIV/AIDS and reduction in morals;
- Roads have in the past been destroyed to provide for services that run across the road including water lines, sewer lines and optic cables. The project road should therefore in cooperate service ducts to avoid the cutting if the road to pass the services.
- There is traffic jam all the way from Rironi, Uplands, Lari, Kimende, and Kijabe. Kinungi and in the Major Urban centres. This calls for provision of adequate ways of mitigating this in the engineering design.
- There should be dedicated tunnels on the road for service line like water and fiber cables.
- There is need to construct pedestrian bridges at all the major markets and urban centres along the road corridor. These bridges should be designed in a way so as to serve the physically challenged including the elderly who might have hardship in using them. Ramps should be provided on the foot bridges to provide for the challenged;
- Further, the pedestrian foot bridges design should be high so as to serve the tall containers. In addition, a service lane or bus stop should be provided near the pedestrian bridges;
- As part of the road project, it will be necessary to provide for non-motorized transport infrastructures such as 2 meters wide foot paths along the full section of the road. Once provided, enforcement strategy should be put in place to ensure the residents use them. Such strategies will include sensitization by the local leaders and the administration on the use of the facility;
- Other services that may need to be designed and provided will include Sanitation facilities, Matatu stages and bus parks under KeNHA's Corporate Social Responsibility.
- The construction workers and materials should be sourced from the local area where possible to enhance income to local communities;
- Thorough investigations should be undertaken when it comes to issues of compensation to halt people from being conned. In addition, a notice of 9 months should be given before any eviction is carried out. However, traders should avoid any further encroach into the road reserve.
- There is a possibility of undervaluation of land and development calling for full involvement and participation of the affected persons in the resettlement action plan and land acquisition process;
- Properties close to the road reserve could be affected by vibrations as a result of constructions works. In such cases, the contractor will take responsibility and pay accordingly.
- Contractors are in the habit of leaving behind open and unattended borrow pits which pose a safety concern. There is therefore need to ensure that an agreement is signed

with the contractor stipulating clearly the state at which the borrow pits and material sites should be left

- Accidents are common at points such as Kinungi. The engineering design should emphasize on safety by constructing a reinforced concrete wall to separate both sides of the road rather than steel ones which are prone to vandalism. As such, the contractor will use plastics and concrete to reduce theft and vandalism.
- Construction of reinforced concrete barriers between two sides of the road may however be an obstruction to residents who often crisscross the road in efforts to access common natural resources notably firewood, grass and water or for social purposes.
- Payment (toll) for using the road may increase cost of goods and services and thus increase cost of living;

7.1.2 Consultations Along Rironi-Mai Mahiu-Naivasha Route

The aim of stakeholder consultations was to give a platform for information sharing and opinion gathering in relation to the proposed Project. The outcome of the meetings and resulting issues were then analyzed and presented to design team for finalization of Project designs and planning on how best to implement the Project.

Table 7-1 below presents a summary of consultations held along the (Rironi-Mai Mahiu-Naivasha) road corridor with the local community members and institutions.

Table 7-1: Schedule of Public Participation

Date	Location	Stakeholder Consulted	Attendance		
			Female	Male	Total
3 rd January 2018 (10am)	Maai Mahiu Township Chiefs Office	<ul style="list-style-type: none"> • Chief and Sub Chief – Maai Mahiu Location • Project Affected Persons • Truck drivers • Maasai pastoralists representatives • Women, youth and general public 	52	95	147
3 rd January 2018 (10am)	16	<ul style="list-style-type: none"> • Chief and Sub Chief – Longonot Location • Representative of Mt Longonot Game Park • Project Affected Persons • Truck Drivers • Women, youth and general public • Maasai Pastoralists representatives 	22	48	70
4 th January 2018 (10am)	Mutarakwa Chiefs Office	<ul style="list-style-type: none"> • Chief and Sub Chief – Mutarakwa Location • Representative of Escarpment Curial traders • Project Affected Persons • Women, youth and general public • Representative of Ngubi forest Catchment Association (FCA) 	47	43	90
4 th January 2018 (11am)	Kayole Chiefs Office (Naivasha Town)	<ul style="list-style-type: none"> • Chief and Sub Chief – Kayole Location Naivasha Town • Representative of Naivasha Game Reserve • Project Affected Persons • Women, youth and general public 	6	10	16

Table 7-2. Issues and Response from consultations

ISSUE	RESPONSE
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Communities wanted to know measures that will be put in place to ensure their livestock is safe (livestock road kills) since it's a major economic activity in the area. Residents also requested for the expansion and addition of water pans near centers for watering their livestock	Wildlife and livestock crossing points have been identified and will be constructed as part of the project.
Residents wanted to know measures that will be put in place to ensure pedestrians are safe whiles using the road.	Design has factored non-motorized transport facilities including pedestrian crossings, foot bridges, speed humps etc.
Community members wanted to know if they will get employment opportunities during project implementation phase.	Concessionaire will prepare a detailed labour and recruitment plan that must consider employment for the local community members (skilled and unskilled).
Resident wanted to know what will happen to people with assets on the road reserve.	A Resettlement Action Plan is being prepared and will determine the PAPs who will be physically and economically displaced including category of losses. Compensation will be based on the RAP report.

7.2 Consultations with Kenya Wildlife Service

In view of the fact that the project route runs close to protected ecosystems, consultations were held with Kenya Wildlife Service (KWS) on 24th October 2017. The Rironi - Mau Summit road traverses through key wildlife areas including: Kinale forest, Kenya Wildlife Training Institute (KWSTI), Marula Ranch, Soysambu Conservancy and Koibatek Forest. Minutes of consultation meetings with KWS is contained in annex I.

Box 7-2. Issues and Concerns by Kenya Wildlife Service

1. Along Kinale forest there may be some wildlife movement routes across the road that require confirmation to inform the kind of crossing that may be incorporated into the design to facilitate the wildlife movement across the road.
2. The area between Naivasha and Nakuru is inhabited by a substantial population of wildlife in the dispersal area that includes the private wildlife sanctuaries and ranches. It was noted that some conservancies and ranches have already erected fences on their land along the road corridor but some have not been effective partly because their designs are not very good and existing crossings structures especially the under pass are converted into management roads and usually closed for any effective wildlife movement across the road and partly that they have fenced only one side of the road.
3. KWS was concerned about incidences of wildlife kills along this road and indicated that mitigation measures need to be put in place to minimize conflict between the wildlife and road usage.
4. KWS requested that resources be availed, particularly water provision for wildlife on both sides of the road to avoid their movements across the road.
5. KWS requested that a joint site visit to the identified existing and proposed wildlife crossing points marked along the alignment be undertaken to mark and propose the type of crossing at the identified points.
6. KWS offered to give advice on the kind of crossing designs that they deem appropriate for each particular identified point.
7. KWS requested that consultations be undertaken with the owners of wildlife conservancies and ranchers (Kigio, Soysambu, Marula, Kedong) to incorporate their views and concerns.

Another additional consultation was held in January 2017 with officials from the Kenya Wildlife Service to determine the perceptions of KWS with respect to project impacts on wildlife resources. Those consulted included:

- Dr. Charles Musyoki – Director, Kenya Wildlife Service Training Institute
- Arthur Tuda – Head of Ecosystem Conservation and Management
- John Kariuki – Research Scientist, EIA section
- Martha Nzisa – Resource Planning Officer
- Peter Hongo – GIS officer

7.3 Consultations with Kenya Forest Service

Consultations were held with officials from the Kenya Forest Service to determine the perceptions of NMK with respect to project impacts on cultural resources and biodiversity. Those consulted included:

- Dr. Charles Musyoki – Director, Kenya Wildlife Service Training Institute
- Arthur Tuda – Head of Ecosystem Conservation and Management
- John Kariuki – Research Scientist, EIA section
- Martha Nzisa – Resource Planning Officer
- Peter Hongo – GIS officer

7.4 Consultations with National Museums of Kenya

Consultations were held with the officials from National Museums of Kenya in January 2017 to determine the perceptions of NMK with respect to project impacts on cultural resources and biodiversity. Those consulted included:

- Laban Njoroge (invertebrates)
- Dr. Peris Kamau (plants)
- Vincent Muchai (herptiles)
- Joseph Gathua (fish)
- Risky Agwanda (small mammals)

7.5 Consultations with Kenya Bird Prey Trust for Soysambu Conservancy

Consultations was held with a representative of Soysambu Conservancies in January 2017 to determine the perceptions of the conservancy with respect to project impacts on wildlife and biodiversity. Those consulted included: -

- Simon Thomsett

7.6 Kiambu County Government

Consultations was held with a representative of Kiambu County Government in January 2017 to determine the perceptions of the conservancy with respect to project impacts. Those consulted included: -

- David Kuria – County Executive Committee Member, and expert on Kikuyu Escarpment Forest wildlife

7.7 Consultation Pastoral Communities

Consultations were undertaken on the 16th January 2018 to consult the Maasai groups residing along the project highway corridor especially in Naivasha and Gilgil areas. This was part of the wider public consultation to include their concerns as one of the vulnerable groups along the road project. Maasai group is one of the pastoralist tribe in Kenya who move from one place to the other in search of pasture and weather patterns determine their locations at any particular period. The team made discussions with five families who were located within private ranches of Marura and Illera-Naivasha. The exercise was carried out using questionnaires and discussions.

Consultation Findings

Some of the families interviewed come from Kiserian and Magadi in Kajiado County and Ntulele in Narok County and they said sometimes they search for pasture all the way to Marigat in Baringo County. The families provided views, opinions and suggestions on the most appropriate considerations on the proposed development. The following are some of the views and concerns raised by the group: -

- Safety and security of their livestock;
- Resource (water) competition with the contractor;
- Cultural interference during construction by worker;
- Employment opportunities;
- Dust and noise pollution
- Increased wildlife road kills; and
- Bush clearing leading to loss of pasture
- The project to provide water for the communities;
- Communities living along the project road to be prioritized in employment opportunities;
- The project to construct crossing points for livestock and wildlife; and
- The project will create numerous business opportunities

Table 7-3. Summary of views captured from pastoralists (16th January 2018)

Name	Issues and comments	Response
Miriabei ole Nkoiboni	<ul style="list-style-type: none"> • The dualing of the project will result to loss of grazing space along the road; • Dust and noise pollution as a result of construction activities will occur affecting the people settled along the road; • Employment opportunities to be prioritized for the communities along the road project; and • The project to consider animal crossings along the road 	<ul style="list-style-type: none"> • The project has identified livestock crossing points and these will be included in the design and established. Further studies on the migratory patterns of the Maasai and their livestock will be undertaken to establish more crossing points. • Impacts related to air and noise pollution will be minimized through detailed air and noise quality studies and development of management programs as part of the construction management program to be developed by private concessionaire. • A detailed labour recruitment plan will be developed by private concessionaire to cater for employment interests of the local communities

James ole Nkoyo	<ul style="list-style-type: none"> • He welcomed the project since it will create employment opportunities as well as facilitating traffic movements; • New business opportunities will emerge along the road corridor; • Requested for water sharing; • The dualling of the road will result to increased animal kills as a result of enhanced speeds; • Requested project sponsors to drill boreholes for them; and • He was concerned about interference of cultural values as the project brings in workers from different parts of the country 	<ul style="list-style-type: none"> • The project concessionaire will develop an in-migration plan to minimize risks associated with cultural erosion • The project has identified livestock crossing points and these will be included in the design and established. Further studies on the migratory patterns of the Maasai and their livestock will be undertaken to establish more crossing points.
Matayo ole Siran	<ul style="list-style-type: none"> • The dualling of the project will result to loss of grazing areas along the road project; • He was concerned about safety/security of their animals as a result of increased speeds and theft; • Requested that the community to be offered job opportunities during construction 	<ul style="list-style-type: none"> • The project has identified livestock crossing points and these will be included in the design and established. Further studies on the migratory patterns of the Maasai and their livestock will be undertaken to establish more crossing points. • A detailed labour recruitment plan will be developed by private concessionaire to cater for employment interests of the local communities
Giosi ole sinkiran	<ul style="list-style-type: none"> • There will be increased road kills as a result of the dualling • He requested for more consultations with the communities along the road project • Road construction will result to dust and noise pollution 	<ul style="list-style-type: none"> • The project has identified livestock crossing points and these will be included in the design and established. Further studies on the migratory patterns of the Maasai and their livestock will be undertaken to establish more crossing points. • Impacts related to air and noise pollution will be minimized through detailed air and noise quality studies and development of management programs as part of the construction management program to be developed by private concessionaire. • A detailed labour recruitment plan will be developed by private concessionaire to cater for employment interests of the local communities • A Stakeholder Engagement Plan (SEP) will be developed by the Private Concessionaire and KeNHA and will be the premise under which additional

		consultations will be undertaken.
Brian ole Nkoiboni	<ul style="list-style-type: none"> • Dualling will reduce cases of accidents along the road project; • Livestock might be endangered as a result of vehicular speed. • Loss of vegetation as a result of bush clearing 	<ul style="list-style-type: none"> • The project has identified livestock crossing points and these will be included in the design and established. Further studies on the migratory patterns of the Maasai and their livestock will be undertaken to establish more crossing points. • A construction management plan will be developed by private concessionaire and will address risks associated with vegetation loss

Table 7-4. Consultations with Stakeholders in Nakuru County (Christ The King Church) 23rd January 2018

Issue	Response
<p><u>Salгаа Area MCA</u></p> <ol style="list-style-type: none"> 1. Wanted the clarity of the red X-markings on their property i.e. if they mean individuals have encroached the road reserve or they mean intention to acquire the land 2. Informed that there are land ownership disputes in the area and therefore the National Land Commission should thoroughly consult on who should be compensated both on land acquired and on loss of livelihoods. 3. Commended that underpasses and crossing points to be provided along the institutions. 	<p><u>AD-ESS Mr. Adams Muriithi-KeNHA</u></p> <ul style="list-style-type: none"> ➤ He informed that KeNHA has demarcated their road reserve using white marker post written KeNHA and therefore any development inside the marker post means encroachments and any area to be acquired is gazetted in the Kenya gazette to notify the public on the intention to acquire. ➤ He also informed the stakeholders that NLC will follow the due legal process to ensure the right owners of land are compensated in case there will be needed to acquire any land however there will be minimal land acquisitions since the road will follow the existing road alignment except at the proposed interchanges locations. ➤ He informed that the road design will incorporate underpasses and crossing points at the institutions along the road corridor and even for any future developments along the road corridor.
<p><u>Andrew Koros</u></p> <ol style="list-style-type: none"> 1. Claimed that KeNHA has not installed marker post to notify the public on the extend of the road reserve. 2. He informed KeNHA to incorporate the views of the locals at Salгаа area since they may have an experience or ideas on the cause of the various accidents that have occurred on the area. 3. He informed that people at Gilgil and Naivasha area have not been involved in the public participation forums and that they should as the project will also impact on them either directly or indirectly. 4. He claimed that KeNHA should compensate the people who have encroached the road reserve for failing to install marker post thus making people to develop on the road reserve 	<p><u>AD-ESS Mr. Adams Muriithi-KeNHA</u></p> <ul style="list-style-type: none"> ➤ The stakeholders were informed that locals at times tend to vandalize road furniture and relocate the road reserve marker post to other areas but should be informed that relocation does not change the extend of the road reserve since maps and the data is with the ministry of lands. ➤ He informed that the road design is still on course and that consultations are ongoing and is a continuous process to ensure all the views and captured and incorporated in the design and also in matters regarding community resources ➤ Sylvia informed that the encroachment is illegal offence and that the Government of Kenya does not compensate any encroachment on the road reserve. She also informed that individuals can go the ministry of land and with help of registered surveyors they can get assistance to know the extent of the road reserve to avoid encroachment as will result to negative repercussions.
<p><u>Biashara Area MCA</u></p> <p>How often do KeNHA do land acquisition in a particular road?</p>	<p><u>Tipape Sylvia-KeNHA</u></p> <ul style="list-style-type: none"> ➤ Informed that KeNHA acquires land where need be either for road construction depending on the class of the road or for

	other road side social amenities. e.g. for A8 which is a class A road the width is 60m and this will be for use as the carriage way, walk ways, drainage system and for future development like dualling.
Menengai West Area MCA Wanted to be informed of the due processes involved in design and other components along with the designs and timelines for the various processes.	➤ The area chief informed that the consultant is on the way to inform you of the due processes and how far they are but meanwhile he informed that the survey works have been concluded as the administration have been involved in the process.
Other Issues Raised ➤ There was a concern and fear that employment opportunities during the project might not give preference to the local people because the contractor working on the maintenance of the road currently imports works from far and fails to give local employment. ➤ Dust pollution was noted to be a major concern as the contractors who have worked in the area before do not bother suppressing the dust levels. ➤ They were a concern that the Mau Summit interchange does not have proper road signs, furniture and people crossing which pose safety risk ➤ There was an issues that beaconing of the ROW and clearance of fences within the ROW was being undertaken without informing the concern property owners	➤ It was agreed that during project implementation unskilled and semi-skilled -labour force would be sourced from the local communities ➤ The contractor will be advised to implement dust suppression measures ➤ The works on Mau summit are still on going and road furniture will be installed and proper signage erected ➤ The issue of beaconing was being undertaken by the corridor team. The representative from Corridor B promised to follow up on the issue of beaconing and the report of fence clearance without consultation
Way Forward It was agreed that since there are grievance committee all along the traverse that falls within Nakuru county, any issue or complaint that arises should be channeled through the respective committee chairperson	

Table 7-5. Consultations with Stakeholders in Nakuru County (Docklands Hotel Limuru) 23rd January 2018

Questions/ Concerns	Response
George Mwangi Ndirangu (a) RAP team to revisit Longonot and record details of some of the structures which were left out who are vulnerable. (b) Employment of the youths during the project construction through the office of the chief (c) Request for improvement of the existing markets (d) Are trees affected going to be compensated for? (e) Erection of speed bumps and signage especially near schools and markets	<ul style="list-style-type: none"> • The informal settlement was identified and vulnerable groups will be given a special consideration in the project • Employment to local community will be of priority during construction but the number is not yet known • The markets will be improved subject to further consultations with the local leaders and community as well as the available budget for the entire road project. • All the affected trees have been valued and will be compensated for • Road bumps will be erected and road signs put in the appropriate areas

<p>Samuel Kigundu</p> <p>(a) What is the extent of the road reserve? (b) Where can he get assistance on the marked structures to know how much he has been affected</p>	<ul style="list-style-type: none"> • The road reserve stretches 60 meters' wide • The assistance will be offered from relevant offices to know which structures have been affected
<p>Peter Karanja</p> <p>(a) How soon the project commences so that he can notify his tenants (b) How long the road reserve stretches</p>	<ul style="list-style-type: none"> • Notices will be issued to the people with modest time of not less than 30 days to relocate • The road stretches 60 meters' wide
<p>Donald Nganga Njoroge</p> <p>(a) Land owners were not consulted (b) Valuers were very arrogant (c) In Some areas, the road reserve stretches beyond the 60 meters (d) Vibrations during construction that can lead to development of cracks in the houses especially for those people near the road corridor (e) Effect on the community utilities like electricity and water (f) Landslides (g) Interferences on the livelihood of the people (h) Loss of businesses (i) Valuation of assets to be done using the current market prices (j) Compensation of the affected assets to be done before demolishing and notices issued with humble time to relocate (k) Some of the PAPs were not taken pictures (l) How are the people not available now going to be compensated for their affected properties?</p>	<ul style="list-style-type: none"> • Local leaders to help in identifying those people with grievances and assets were not coded • Apologies were made and promised to work better next time • There will be compensation for any newly acquired land • Investigations will be carried out and measurements of vibration impacts carried out to know if the houses will be safe for human stay • Every affected community utility will be put back in place • People will be compensated for and the local government will help in identifying and setting up areas where people can operate their businesses • The National Lands Commission (NLC) will deal with valuation of lands with amicable rates • Local leaders to help in identifying those people with grievances and whose assets were not recorded • Land acquisition will be gazzeted and when compensation is done, the money will be deposited to National Lands Commission (NLC) until the owners come back
<p>Samuel Kinyanjui</p> <p>(a) Drainage system to be developed during road construction in Kinungi-Keroche-C67 (b) Provision of a foot bridge in Mithuri where we have large informal settlement</p>	<ul style="list-style-type: none"> • Drainage system will be provided for the whole catchment area • Foot bridges and flyovers will be constructed in the identified areas
<p>Peter W. Gichuki</p> <p>(a) Consultation with the county government before construction of the proposed road project and payment of levies (b) Project partnership with the county government in the corporate social responsibilities (c) Provision of a Bodaboda lane (d) Submission of the report to the county before starting the construction works (e) Provision of water pans in the dry areas within the project area</p>	<ul style="list-style-type: none"> • No payment of levies because the project will bring benefits in the area • Partnership with the county government will be subject to discussions and moderations. • County government should help in the matter of provision of a Bodaboda lane • Final reports will be made available in the county offices • Corporate Social Responsibilities (CSRs)

	<p>must be within the available budget and most beneficial and safe to operators, however, further consultations will be conducted during project implementation.</p>
<p>Mary Wainaina Mburu</p> <p>(a) Construction of service lanes along the proposed road project</p> <p>(b) Vibrations during construction that might bring about cracks on the houses</p> <p>(c) Control of dust during construction</p> <p>(d) Tunnels to be elevated higher for vehicles to be able to pass</p> <p>(e) Foot bridges to be constructed closer to the access areas</p> <p>(f) How will the influx of aliens in the land be controlled?</p>	<ul style="list-style-type: none"> • Investigations will be carried out and measurements of vibration impacts carried out to know if the houses will be safe for human stay • Foot bridges and flyovers will be constructed in the identified areas • There will be strict code of conduct issued to the contractor and his team
<p>Kinyanjui</p> <p>(a) Some of the land/structure owners were not consulted because of their absence.</p> <p>(b) Where the 60 meter stretches from</p> <p>(c) Is it possible for KeNHA to acquire the little parcel of land left after land acquisition which the PAP might not put into any use</p>	<ul style="list-style-type: none"> • The RAP team will further assess the structures that were missed out but also the land/structure owners will consult further during inquires phase. • The 60 meters stretch varies depending on the topography and gradient of the land • He was referred to talk to the KeNHA representative about the matter.

7.8 Consultations with Representatives of Indigenous Peoples Organizations

As part of the preparation of this ESIA, a consultative meeting with representatives of indigenous groups (IPOs) along the project corridor was held at Sarova Panafric Hotel in Nairobi on 25th January, 2018.

Table 7-6. Consultations with IPOs

Minute No.	Discussion
Min 1/25/1/18	<p>Introduction</p> <ul style="list-style-type: none"> ➤ The meeting was called to order at 9.30 by Mr. Adams Muriithi, the Assistant Director Environment and social safeguards -KeNHA ➤ The meeting started with a word of prayer from Sylvia Seleyian
Min 2/25/1/18	<p>Overview of the A8 Road Project</p> <ul style="list-style-type: none"> ➤ Eng. Nyamwaro briefed on the IPOs on KeNHA mandate which is to manage, develop, rehabilitate and maintain national roads. He mentioned that KeNHA has been in existence for (No.7) years and that all the national highways are KeNHA's paths including the A8 road project. ➤ He informed them that the Government of Kenya through its implementing agency KeNHA is intending to expand, develop, operate and maintain the A8 project road from Nairobi-Nakuru-Mau Summit on the Public-private Partnership financing model an initiative of the GoK to develop the infrastructure.

	<ul style="list-style-type: none"> ➤ He further informed that KeNHA prioritized the A8 project under the PPP financing model with an aim of addressing safety concerns, traffic congestion; enhance visibility and capacity through dualling of the road.
<p>MIN 3/25/1/10</p>	<p>Scope of the road project</p> <ul style="list-style-type: none"> ➤ Eng. Nyamwaro informed that KeNHA is targeting 187km of the A8 Gitaru –Mau summit and 50km of the A8 Rironi South –Naivasha Nairobi since the Nairobi- Rironi section is already being constructed under the capacity enhancement of the James Gichuru-Rironi road project. ➤ He informed that the initial capacity enhancement of the A8 road project will be (No.4) lanes and will increase to (No. 6) lanes in the future and; ➤ The construction period will be (No.4) yeas and there after operation and maintenance will be (No.25) years. ➤ He noted that the road construction will follow the existing road corridor/alignment thus minimal land acquisition will occur except at the proposed interchanges sites. He further informed that the National Land Commission (NLC) are ongoing with the process of acquisition of the land with engagement with the land owners ➤ He also informed that the road construction will involve sourcing of materials from the community/individual land owners. He told that KeNHA has an in-house safeguard team working closely with consultants and the World Bank to guide on the implementation of the safeguards concerns. ➤ Eng. also informed that KeNHA has undertaken several consultations with various stakeholders e.g. NEMA, KFS, KWS among others with a reason of garnering views, and recommendations to be incorporated in the design. ➤ Ms. Margret Ombai added that this PPP road project is one of the projects prepared under the Infrastructure Finance PPP project financed by the World Bank and implemented by the National Treasury, whose Vulnerable Groups’ Framework was the subject of consultations with IPOs in February 2016. The current consultation was therefore a form of follow up of what was discussed by the IPOs at the intercontinental hotel on the GoK infrastructure PPP financing model initiative.
<p>MIN 4/25/1/18</p>	<p>PRESENTATIONS OF THE PROJECT DESIGN BY -JAYANTH</p> <p>Brief Content</p> <ul style="list-style-type: none"> ➤ Necessity of PPP in Kenya ➤ Impact on Industrialization due to Improved Infrastructure Facilities ➤ Key Technical Aspects of the Project ➤ Road safety features <p>Necessity of PPP in Kenya</p> <ul style="list-style-type: none"> ➤ Exploring PPPs as a way of introducing private sector technology and innovation in providing better public services through improved operational efficiency ➤ Imposing budgetary certainty by setting present and the future costs of infrastructure projects over time ➤ Utilizing PPPs as a way of developing local private sector capabilities through joint ventures with large international firms, as well as sub-contracting opportunities for local firms in areas such as civil works, electrical works, facilities management, security services, cleaning services, maintenance services ➤ Facilitating infrastructure base as well as giving a boost to its business and industry associated with infrastructure development <p>Impact On Industrialization Due to Improved Infrastructure Facilities</p> <ul style="list-style-type: none"> ➤ Core. The most fundamental impacts of transportation relate to the physical capacity to convey passengers and goods and the associated costs to support this mobility. This involves the setting of routes enabling new or existing interactions between economic entities. ➤ Operational. Improvement in the time performance, notably in terms of reliability, as well as reduced loss or damage. This implies a better utilization level of existing transportation assets benefiting its users as passengers and freight are conveyed more rapidly and with less delay. <p>Road User Benefits from The Development of the Project Road</p> <ul style="list-style-type: none"> ➤ With the Increased standards the design speed shall increase which will in turn reduce the travel

time, fuel consumptions, wear and tear of the vehicle etc.

- for example, the
 - Current vehicle operating cost of Matatu for 1 km=45 Ksh/vehicle/Km
 - Developed Highway's Vehicle operating cost of Matatu for 1 km=35 Ksh/vehicle/Km
 - Saving in Vehicle operating cost = 10 Ksh/Vehicle/Km
 - Part of the savings shall be collected as toll charges for using the facilities
- With the development of the project road under PPP better maintenance and operation of the project road is ascertained.
- Emergency services will be provided all along the project road for the safety and security of the Road users
- All the major junctions will be treated and grade separators will be provided as per requirement which shall segregate the local and through traffic and avoid congestion

Preliminary Project Road Development Proposals

- Preliminary Development Proposals of Project Road are as under
- 2 lane road to be widened to 4 lane divided carriageway for A8 and only rehabilitation, operation and maintenance of A8 South
- Service Road shall be provided for the local and non-motorized traffic movement
- Slip roads shall be provided for the existing underpasses and overpasses
- Interchanges at Rironi and Limuru shall be improved with additional loops and ramps; in addition to that interchanges at Nakuru – Nyahururu junction (B5), Njoro Turnoff and Mau Summit Turnoff shall be operated and maintained.
- Flyovers are provided at 9+100(Uplands), 31+900 (Thika Mangu Flyover),53+700 (Kenyatta Avenue to Naivasha Town), 114+400 (At the intersection of Lake Elementaita Road), 116+700 (Lanet)
- Elevated Expressway for Nakuru Town from Km 123+800 to Km 127+800 as immediate solution and Bypass for Nakuru as Long term improvement proposal.

Road Safety Features

Pedestrian safety facilities

- Foot over Bridges at all Built up locations.
- Footpath for Pedestrian movement shall be provided in urban locations.
- Metallic Crash Barriers at High embankment sections, major structures Great Rift Valley, Western rift Valley and deep valley locations.
- Steep descending roads, unsafe Horizontal geometry mainly in Great Rift Valley and western rift valley locations shall be rectified and improved. All other accident prone zones shall be accessed and suitable treatment will be provided.
- Road Signs and Markings are important means of communication to the road users, detailed assessment of road furniture has been made and provided on the project roads
- Road Curve Signs with Chevrons
- Delineator Posts
- Hazard Markers on Bridges & Culverts
- Advance Direction and Direction Signs at Major Intersections
- Warning and Stop Signs at Junctions
- Speed Limit Signs at Town Areas
- Project Facility Sign Boards
- (School, Bus Bays, Rest Area, Truck Lay Bye)
- As a Part of Road facilities several locations are identified at Mai Mahiu, Naivasha, Nakuru, Salgaa and Mau Summit (**to be executed as a part of separate contract**) apart from which small truck lay byes are also identified Near Thika Mangu flyover area, Kikopey, Gilgil, Nakuru, Molo

Preliminary ESIA Study

Several mitigations measures are suggested to reduce the susceptible Environmental and social impacts

- Geometrical Improvements and development proposals to facilitate free flow traffic which in

- turn reduces the Noise and air pollution due to congestion in Urban areas
- Fencing of Wild life conservancy, escarpment forests to facilitate its protection
- Provision of Cattle crossings
- Sensitive mitigation and safeguards measures are recommended to address the preservation of Environmental sensitive locations like Lake Naivasha, lake Nakuru, and Lake Elementita etc.

Overall Benefits of PPP In Improvement Of The Project Road

- Development of excellent Infrastructure facilities within requisite timeframe.
- Better Development, operation and maintenance standards
- Employment creation
- Reduced delays due to Budget allocation and Policy making
- Increase in Commercial developments along the project road
- User pay policy leading to direct benefits for the road users also facilitates and eases the government's cash flow.
- Private part involvement Compensates the government's inadequate organisational structure
- A8 linking the Mombasa port to other adjoining landlocked countries like Uganda, Rwanda, Burundi, South Sudan etc. forming the international corridor, improvement of which shall attract more international plying freight traffic

PRESENTATION OF PROJECT ESIA/RAP BY-CHARLES MUYEMBE

Introduction

- The proposed project road is 175Km long. It forms a part of the Trans-African Highway (Northern corridor), part of the main transport route serving east and Central African Countries through the Indian Ocean seaport of Mombasa.
- it starts at Rironi in Kiambu & terminates at Mau summit in Nakuru
- Private Public Partnership (PPP) model will be used to implement the project
- Current high traffic volumes & accidents called for expansion of the road
- The road passes through Rironi, Uplands Lari, Limuru, Kimende, Kijabe Kinungi, Naivasha, Gilgil, Mbaruk, Nakuru, Rongai, Salgaa, Sachangwan, Kibunja and Mau Summit
- It also passes through livestock grazing areas such as the Delamere and Longonot areas
- The Mai Mahiu-Naivasha road is also part of the project and has been proposed to be improved as it is expected to accommodate more traffic.
- Materials for construction will be obtained from within the project areas

Project Objectives

- The aim of developing the proposed road include:
- To decongest the road and contribute to improving traffic flow throughout the road;
- Eliminate delays;
- To improve safety; and
- To enhance Level of Service for traffic flow with corresponding economic, environmental and social benefits

Project Design

- Proposed road will change from current 2 lanes to 4 lanes
- Lanes to either direction will be divided to improve road safety
- Develop fly overs and underpasses to provide safe crossing for pedestrians, livestock and wildlife.
- Areas of VMG interests: Naivasha, Mai Mahiu, Longonot, Kikopey, Elementaita, Kariandusi, Nakuru, Rongai among others.

Project Impacts on Pastoralist

Findings of the ESIA Studies conducted indicate that the project will have the following impacts on pastoralists:

- Widened road will be a hindrance to herders and livestock
- Speeding of vehicles on the highway may cause accidents to people, livestock and wildlife

	<ul style="list-style-type: none"> ➤ Impacts associated with the borrows pits and quarries typically located off the ROW ➤ Redirection of waterways and storm water from the road may cause flooding and siltation of existing pans <p>Mitigation Measure An ESIA Report which will be relied on during implementation of the project has been prepared and recommends the following actions</p> <ul style="list-style-type: none"> ➤ Construction of new underpasses and overpasses and improvement of existing ones to ease movement of animals have been proposed ➤ Safety features including speed control will be provided along the road ➤ The contractor will ensure that all material sites are cordoned off during operations and rehabilitated progressively 	
MIN 5/25/1/18	<p>Plenary Session-By Adams Muriithi KeNHA Questions/Concerns</p>	<p>Response</p>
	<p>Daniel Ole Sapit</p> <ul style="list-style-type: none"> ➤ His first remark was appreciation for being involved in the road development project and he mentioned that it was necessary for them to first have an access to the already existing reports so that they can review and critic if there will be gaps. 	<p>His remarks were welcomed</p>
	<p>Joseph Towett</p> <ul style="list-style-type: none"> ➤ His major concern is whether the design has incorporated crossing and access to utilities and institutions especially schools. ➤ Wanted to be informed of the plans to decongest the Tall station at Gilgil. ➤ Also requested for the existing reports already developed. 	<ul style="list-style-type: none"> ➤ Eng. Nyamwaro informed that station Mr. Towett is referring to is not a tall station but a weighbridge station and the plan is to shift the weighbridge away from the road to decongest the area. ➤ He was also informed that the design of the road will incorporate access roads, foot bridges, and underpasses for the animals and all other road furniture facilities to accommodate existing institution and utilities as well as monitoring for any new development that will occur after the construction. ➤ Eng. Nyamwaro informed that the draft reports generated will be shared as the design is not final and that is the essence of the meeting is to collect their views so that they can be incorporated in the final design.
	<p>Michael Tiampati</p> <ul style="list-style-type: none"> ➤ He reiterated on what Joseph Towett said especially on circulation of the existing reports for their access. ➤ He mentioned that the frequent demonstration that has been witnessed in various projects is due to lack of public participation. He further gave an example of the SGR operations at the Mai Mahiu section where demonstration have occurred recently and led to shooting of a young man by a police officer. He explained that the SGR management has 	<ul style="list-style-type: none"> ➤ Mr. Charles emphasized that the reports will be shared and the design is still work in progress and therefore the minutes of the meeting will be incorporated in the report and that KeNHA knows the role of every organization and all their views will also be captured through consultations.

	<p>been dealing with individuals in matters that affect the entire community instead of dealing with the whole community in regard to access of materials and management of the material sites. He advised KeNHA to visualize the engagement with the community to ease their operations.</p>	
	<p>Joseph Ole Simel</p> <ul style="list-style-type: none"> ➤ He appreciated the involvement the indigenous groups in the road development project. He noted that public participation is a departure from the past and this will help to eliminate misunderstanding. ➤ He mentioned that they should be referred as indigenous people and not vulnerable and marginalized groups as per Kenyan constitution of 2010 article 56 and 260. ➤ He mentioned that disclosure of information to the public is a constitutional requirement and that it should be done in good time. He continued to tell that they will not accept a concluded document without their participation as per the national and financier standards and operational guidelines ➤ He further mentioned that people perceive pastoralist land as idle but are for grazing purposes. ➤ He wanted to know the language of communication with the indigenous people since most of them only understand their local language ➤ He mentioned that the report should clearly indicate the benefits the project will have and the negative impacts. ➤ He requested that in future, developers to engage experts in dealing with indigenous people as they understand the people well. He further elaborated this telling a scenario of KENGEN project that was stopped due to a wrong approach. 	<ul style="list-style-type: none"> ➤ The remarks were welcome and concerns raised are noted with an affirmation that KeNHA, World Bank and the Consultant will continuously engage the indigenous people to have all their concerns addressed. ➤ Margaret informed that the name indigenous people was replaced with Vulnerable and marginalized groups after a wider consultation with the GoK and its just recently that the pastoralist communities have been included in the list of VMGs. ➤ Mr. Adams Muriithi informed that KeNHA recognizes disclosure of public information as a constitutional requirement and that it has and will continue to engage the public in regard to information that concerns the interest of the public. ➤ Charles assured that all the benefits and the negative impacts will be captured in the reports and disclosure will be undertaken and per the established guidelines.

	<p>Kanyinke ole Sina</p> <ul style="list-style-type: none"> ➤ He informed that it was not right to for them to be informed of the project mid-way or at the end. ➤ He also mentioned that KeNHA to consider gender representation from the Indigenous people. ➤ He mentioned that the road A8 south- Mau summit is a grazing zone for the pastoralist and the road at the escarpment is very narrow and therefore the road design should consider animal crossings and widening of the area to mitigate accidents and also wanted clarification on what the engineer meant by strengthening of the project area. ➤ Land disputes issues are also along the A8 south road and therefore proper consultation should be considered. ➤ KeNHA should consider innovative ways of collection money from the public otherwise it may be a challenge to collect money directly from individuals as they may feel they are being exploited by the government. 	<ul style="list-style-type: none"> ➤ Eng. Nyamwaro informed that the tolling is just a mechanism and is still yet to be finalized and implemented the treasury. ➤ He clarified that strengthening of the escarpment area means that the road will be expanded, and safety furniture will be installed to enhance safety, capacity and visibility. ➤ Charles informed that mapping has been undertaken and all the concerns have been captured in resettlement action plan though consultation is a continuous process and therefore any omitted information can still be addressed.
	<p>Kimaren Riamit</p> <p>He informed that the community is now informed as the development of the SGR brought a lot of lessons that revolved around</p> <ul style="list-style-type: none"> ➤ Land issues i.e. Historical land rites, land grabbing and under rating land rates when buying from uninformed individuals. ➤ Employment Opportunities-He also informed that the developers have created a perception that the indigenous people cannot manage the unskilled labour and thus are being left out which is a bridge to the GoK constitution where local employment should be up to 70% of the unskilled labour and also skilled where opportunities are. ➤ Material sites- he informed that materials sites are badly excavated thus leaving the community members and the livestock safety compromised. He requested KeNHA to develop guidelines on the management of the material sites and if possible if they are left as water pans they should be safe for the people and their livestock 	<ul style="list-style-type: none"> ➤ Charles appreciated all the concerns raised and that all the concerns/information they shared are informative and that they have been noted. ➤ Mr. Adams Muriithi informed that it's a national requirement that the contractors/or developer to undertaken independent EIA for the material sites and when the licence is issued there are conditions attached in regard to the management of the licence. ➤ He further informed that KeNHA monitors all its development and associated developments to ensure compliance to the national, international and development partners' operational policies and guidelines to prevent hazards.
	<p>Michael Tiampati</p> <ul style="list-style-type: none"> ➤ Emphasized that pastoralist should be referred as indigenous people and not VMGs. ➤ Developers should look into 	<ul style="list-style-type: none"> ➤ Charles informed that KeNHA has a compressive engagement plan that will be implemented through the selected project company. ➤ He further noted that there already

	documentation from the GoK, ASAL among others that exist in regard to pastoralist and livestock safeguards and local protocols. He informed that this will be important in order to address the realities of the community interest which should never be superseded by the individuals' interest.	established Grievance Redress Mechanisms Committees that exist, He told that the people in the committees were nominated from the various consultative meetings that were undertaken.
	<p>Kobei Daniel</p> <ul style="list-style-type: none"> ➤ He informed that the question of language used is not answered and use of VMGs/Indigenous people is still not clarified and are upset for being tagged a name that they don't own. ➤ Wanted to be informed of the timelines for the feedback of the issues discussed and next meeting ➤ He also wanted clarity of the financier of the project 	<ul style="list-style-type: none"> ➤ Ms. Margaret informed that there were several consultations that were undertaken by the World Bank and the GoK to reach the agreement of the name VMGs, though the Bank has always been to the opinion of pastoralist to be referred as indigenous people. ➤ Eng. Nyamwaro informed that the project financier is still not identified since tolling mechanism will be used to pay the contractor and that the World Bank are just working with KeNHA to guide in terms of finance and safeguards requirements.
	<p>Joseph ole Simel</p> <ul style="list-style-type: none"> ➤ He emphasized that they appreciate their involvement in the development process but displeased for being referred as VMG, he further said that they were not part of the decision of pastoralist to be referred as VMGs and that should be carefully looked into otherwise it's a violation of human rights. ➤ He informed that indigenous people representatives cannot conclude the process of consultation and therefore KeNHA should organize a public baraza to notify the public on the intention of the government of Kenya. ➤ He emphasized that KeNHA and the World Bank should be clear on their engagement strategy to address concerns of the indigenous people. 	<ul style="list-style-type: none"> ➤ Ms. Margaret informed that name VMGs is noted by there is no much that they can do about it as per now since the name was reached at very high profile consultative forums ➤ Mr. Adams affirmed that consultation will be undertaken to inform the indigenous community along the project road and that there are established Grievance Redress System in place that take into consideration the indigenous local system to address community issues. ➤ Tito Kodiaga elaborated the link between KeNHA, World Bank, the consultant and the fourth party i.e. Project Company that will later be selected. ➤ He informed that the GoK treasury has developed a PPP financing model for the infrastructure. He told that the money had been awarded by World Bank and KeNHA is implementing the A8 pioneer project under the PPP model. ➤ He further noted that KeNHA has contracted the consultant to undertake detailed design, feasibility studies, economic studies, ESIA/RAP and the baseline studies. ➤ He further told that the Bank and just guiding in the ESIA/RAP studies to ensure all information is captured as there is a possibility of it being the guarantor.
	<p>Joseph Towett</p> <ul style="list-style-type: none"> ➤ He mentioned that among the positive impacts that the project development will 	<ul style="list-style-type: none"> ➤ The remark was welcomed and that all concerns of the people will be considered through a continuous community through the

	<p>deal is eradication of corruption which is a major vice on our highways contributed by the traffic police.</p> <ul style="list-style-type: none"> ➤ Wanted to be informed if proper mapping have been done along the road corridor since adequate mapping will ease addressing all the issues including labour, land acquisition, material sites and animal crossing points. 	<p>local existing community structures to ensure that the gaps in mapping are addressed</p>
	<p>William Rotich He mentioned that he would appreciate if they would get the design reports so that they can review and give an informed decision or views to be incorporated in the final design report.</p>	<p>Sharing of the documents was an agreed idea.</p>
<p>MIN 6/25/1/18</p>	<p>Remarks and Recommendations</p> <ul style="list-style-type: none"> ➤ It's agreed that the draft reports and minutes of the meeting will be shared to all the members for review and the gaps that will be identified will inform of the decision. ➤ The meeting was adjourned at 1pm with a closing prayer from Grace Naserian 	

8 CHAPTER 8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PROGRAMS

This chapter identifies the Environmental and Social Management Programs that need to be prepared by Private Concessionaire, Contractors and Kenya National Highways Authority (KeNHA) during different project phases. The Environmental and Social Management Programs will describe mitigation and performance improvement measures and actions that address the identified environmental and social risks and impacts of the Project.

More specifically, the management programs will:

- comprise a documented combination of operational procedures, practices, plans, and related supporting documents (including legal agreements) that are managed in a systematic way
- apply broadly across the Projects' design (KeNHA, the Concessionaire, contractors and primary suppliers over which the Concessionaire has control or influence, or to specific sites, facilities, or activities)
- use the mitigation hierarchy to address identified risks and impacts, i.e. avoidance of impacts over minimization, and, where residual impacts remain, compensation/offset, wherever technically and financially feasible
- establish specific measures and plans – with clear timelines and main assigned responsibility as above - which will define desired outcomes and actions to address the issues raised in the risks and impacts identification process, as measurable events to the extent possible, with elements such as performance indicators, targets, or acceptance criteria that can be tracked over defined time periods, and with estimates of the resources for implementation
- describe feasible, cost efficient and sufficient measures to mitigate and monitor the impacts identified in the ESIA, during pre-construction, construction, and operation of the toll-road, in accordance to the requirements of OP4.03, and in compliance with the laws and regulations of the GoK
- provide technical details for each mitigation measure, including the type of impact to which it relates, the conditions under which it is required (e.g., continuously or in the event of contingencies), as well as preliminary design, equipment descriptions, and operating procedures, as appropriate
- assign institutional responsibilities for implementing and monitoring these risk mitigation measures/plans/actions, and estimate the resources required for their implementation, distinguishing the roles and responsibilities of KeNHA from the responsibilities that KeNHA will include in the concession agreement; the latter will translate into the ESAP
- take into account the Project RAP, as necessary.

8.1 KeNHA Responsibilities

This environmental and social obligations that will remain with GoK, through KeNHA, include:

- Ensure that concessionaire, EPC and O&M contractors and their subcontractors are in compliance with the requirements of the Performance Standards, ESAP, and requirements under the national law
- Establish and maintain, throughout the duration of the concession, adequate

institutional E&S capacity and competency for monitoring and oversight of E&S issues the concession / PPP

- Incorporate a grievance mechanism (GM) at the level of the government to ensure transparency and accessibility for raising complaints and concerns for Affected Communities and with a clear interface and division of responsibilities with the concessionaire's GM
- Provide for regular reporting to the WB on the E&S performance of the concession / PPP.

KeNHA will engage an Independent E&S Consultant to:

- Review compliance with the E&S obligations of the concessionaire under the WB guarantee
- Report the outcomes of the review and present all areas of compliance and non-compliance and, where applicable, advise on corrective measures to be undertaken by the relevant party, define a timeline for their completion and report when completed
- Review, the E&S impact studies, the ESMS and related plans/procedures prepared by the concessionaire or contractors before starting of operations
- Semiannually during the first 2 years (i.e. during the time of construction activities) and annually for the time the guarantee is effective, review compliance of the concessionaire, contractors, and subcontractors with requirements of the Performance Standards and the ESAP
- Specifically review the implementation of the E&S mitigation programs and plans/procedures, and undertake independent verification field monitoring as needed
- Review and analyze the functioning of the Grievance Mechanism at KeNHA and concessionaire level.

8.1.1 Concessionaire Responsibilities

This environmental and social obligations of the concessionaire, which will be included in the bidding documents and in the concession agreement are highlighted below. These obligations will include:

- incorporating mitigation measures, as needed, into the Project design and operation; for example, overpasses for vehicles, pedestrians, livestock or wildlife
- establishing and maintaining an Environmental and Social Management System that meets the requirements of the Performance Standards, including: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review.
- Private Concessionaire will be required to recruit environmental and social specialists as well as health and safety specialist and community liaison officer.

8.1.2 Environmental and social management programs

As part of its management program to cover environmental and social issues, the list of the plans that the Private Concessionaire must develop and implement include: -

- Contractor management plan
- Construction management, including contractors, sub-contractors, and

- primary supply chains
- Traffic Management Plan
- Labour Management Plan
- Occupational Health and Safety Plan
- Waste Management Plan
- Water Quality Management Plan
- Emergency and Spill Response Plan
- Air Quality Management Plan
- Noise Quality Management Plan
- Stakeholder Engagement Plan
- Grievance Redress Mechanism and Plan
- Community Health and Safety Plan
- Biodiversity Management Plan
- Cultural Heritage Plan
- Site closure and restoration
- Staffing to monitor the plans, including roles and responsibilities
- Monitoring, reporting and control of the plans
- Code of conduct for workers (with relevant requirements and sanctions)

The private concessionaire will pass on to the contractors and sub-contractors the responsibility of preparing all the plans and actions highlighted in table 8-1 below.

8.1.3 Additional Studies during Design Phase Development

This RFP stage ESIA has identified a number of gaps with respect to data that need to be collected through additional studies and surveys in order to fully understand the baseline environment of the project highway and thereby define the risks and impacts more rigorously. The Critical and Natural Habitat Screening undertaken by The Biodiversity Consultants highlighted additional studies required.

Box 8-1. Natural Habitat Studies

- Further surveys to determine the extent, type and condition of Natural Habitat within the project footprint (including intersections).
- Targeted zoological and botanical surveys to determine the presence of any CH-qualifying species in these areas. Where seasonal or permanent wetlands occur, these should include rainy-season surveys for amphibians.

Box 8-2. Studies to mitigate barrier effects on wildlife

- Compile and analyse existing data on wildlife killed in road collisions (which species, where and when)
- Compile and analyse existing data on human-wildlife conflict, including bush meat poaching, as this will also shed light on animal movements
- Design and implement a study of animal movements in the Marula-Kigio-Soysambu area in relation to the A8 highway, using (a) observational sampling, (b) a network of camera traps, (c) satellite-tagging of individuals in priority species, which should include those

most often involved in collisions (thought to be zebra and buffalo) and Nubian (Rothschild's) Giraffe. This study should be geared to inform the final selection and design of wildlife crossings (underpasses and overpasses) for the upgraded road (see below). It should then continue in adapted form as a monitoring programme to assess the effect of the road on wildlife movements, and use of the crossings that have been put in place.

Box 8-3. Critical Habitat-qualifying species

A highly threatened fish species

- If residual impacts still remain, an offset may be required to achieve net gain.
- A carefully designed monitoring programme will also be needed to ensure that mitigation measures, and offset implementation, are effective.
- Survey the upper catchment streams crossed by the road to determine whether *Aplocheilichthys* sp. nov. is present
- Take rigorous steps during construction, and in design of culverts and of storm-water runoff for the road, to avoid and minimise the risk of pollution, sedimentation or hydrological disruption to these streams
- To achieve net gain for this species, investigate options to support improved catchment management through community-based projects, drawing on experience in other parts of Kenya (e.g. Lakes Naivasha and Nakuru).

Wetlands

- Locate and inventory all wetlands on or near the road alignment. Both dry and rainy season surveys should be carried out to identify seasonal and permanent wetlands.
- Survey identified wetlands for the CH-qualifying species (in the appropriate seasons)
- Where CH-qualifying species are present, every effort should be made to avoid and minimise direct or indirect impacts to wetland sites. This could entail dry-season only construction work in some cases.
- Take rigorous steps during construction, and in design of culverts and of storm-water runoff for the road, to avoid and minimise the risk of pollution, sedimentation or hydrological disruption to wetland sites, including potential downstream impacts
- Design culverts to avoid rapid flows washing out amphibians or other small animals, or preventing their movements.
- Take every opportunity to create additional crossing points for small animals through installation of appropriately-designed culverts
- To achieve net gain for these species, investigate options to support improved catchment management and protection of wetlands (including small, seasonal sites) through community-based projects, drawing on experience in other parts of Kenya (e.g. Lakes Naivasha and Nakuru).

A narrowly endemic snake species

Bitis worthingtoni occurs in dry grassland and scrub in the high central Rift Valley. Mortality from road crossings is a potentially serious impact to this species. Fences designed to keep impala and zebra off the road will not prevent snakes from attempting to cross.

- Conduct baseline surveys to determine the distribution, abundance and more precise

habitat preferences of this species along the road alignment between Naivasha and Nakuru.

- Take all opportunities to improve connectivity by providing additional crossing points for small animals, such as large culverts with raised ‘shelves’ for terrestrial species to cross safely. Target these at locations where this viper is found to be particularly abundant.
- Conduct long-term monitoring of viper populations to assess possible impacts of the road.
- To achieve net gain for this species, investigate options to support habitat management in conservancies or other areas where it occurs, once its ecology is better understood.

A threatened giraffe species (Nubian (Rothschild’s) Giraffe)

- Engage appropriate organisation such as the Giraffe Conservation Foundation, conduct a baseline study (with tagged individuals, camera traps and on-ground observations) to determine giraffe ranging patterns and behaviour, including seasonal variations.
- Implement recommendations for wildlife crossing points, including overpasses, adjusted as needed to take into account new behavioural information.
- Conduct long-term monitoring of giraffe movements and regular population censuses.
- To achieve net gain for this species, implement wildlife crossing-point recommendations to improve habitat connectivity for this species over the current situation. An increase in safe road-crossings by giraffe and changes in ranging patterns to include both sides of the road will be an indicator of success.

Box 8-4. Further studies on Rivers and streams

The road alignment crosses a number of major rivers and tributary streams. The upgraded road should not cause any habitat loss, but there is potential for habitat degradation through pollution and sedimentation if construction is not well managed. This could also impact some CH-qualifying species.

- Further surveys to determine the extent, type and condition of Natural Habitat within the project footprint (including intersections).
- Targeted zoological and botanical surveys to determine the presence of any CH-qualifying species in these areas. Where seasonal or permanent wetlands occur, these should include rainy-season surveys for amphibians.
- Redesign of the road alignment and planning of construction activities to avoid Natural Habitat loss under project footprint or through construction work to the maximum extent feasible.
- Careful planning and supervision of construction to avoid and minimise impacts on watercourses and wetlands from pollution, sedimentation or hydrological disruption. Where CH-qualifying amphibian species may be present, construction should be limited to dry seasons only.
- Where residual impacts on Natural Habitat or Critical Habitat-qualifying species cannot be completely avoided, quantification of losses and design of offsets to achieve no net loss of Natural Habitat and net gain of Critical Habitat.

Box 8-5. Further studies on Induced Risks and Impacts Studies

New or upgraded roads frequently facilitate unsustainable use of natural resources through making human access easier. In the Marula-Kigio-Soysambu area, bushmeat poaching is largely carried out near the existing A8 highway (KWS, pers. comm) as this allows poachers to make a speedy getaway. Marula Ranch has for some years collected data on (a) wildlife killed in road collisions, (b) human-wildlife conflict, including bush meat poaching.

These data are not currently compiled or accessible (KWS, pers. comm.).

Compile and analyse existing data on wildlife killed in road collisions (which species, where and when)

- Compile and analyse existing data on human-wildlife conflict, including bush meat poaching, as this will also shed light on animal movements
- Design and implement a study of animal movements in the Marula-Kigio-Soysambu area in relation to the A8 highway, using (a) observational sampling, (b) a network of camera traps, (c) satellite-tagging of individuals in priority species, which should include those most often involved in collisions (thought to be zebra and buffalo) and Nubian (Rothschild's) Giraffe. This study should be geared to inform the final selection and design of wildlife crossings (underpasses and overpasses) for the upgraded road (see below). It should then continue in adapted form as a monitoring programme to assess the effect of the road on wildlife movements, and use of the crossings that have been put in place.
- Wherever possible, maintain and/or improve other existing underpasses and culverts so as to improve connectivity for small animals, including CH-qualifying species where present

Table 8-1. Environmental and Social Management Programs for KeNHA

Program	Aspects	Responsible Party	Timeline
E&S monitoring system	<p>KeNHA will establish and maintain, throughout the duration of the concession, an E&S monitoring system that will:</p> <ul style="list-style-type: none"> • Ensure that concessionaire, EPC and O&M contractors and their subcontractors are in compliance with the requirements of the Performance Standards, ESAP, and requirements under the national law • Establish and maintain, throughout the duration of the concession, adequate institutional E&S capacity and competency for monitoring and oversight of E&S issues the concession / PPP • Incorporate a grievance mechanism (GM) at the level of the government to ensure transparency and accessibility for raising complaints and concerns for Affected Communities and with a clear interface and division of responsibilities with the concessionaire’s GM • Provide for regular reporting to the WB on the E&S performance of the concession / PPP 	KeNHA	Before effectiveness of the guarantee
Independent E&S Audit	<p>KeNHA will engage an Independent E&S Consultant to:</p> <ul style="list-style-type: none"> • Review compliance with the E&S obligations of the concessionaire under the WB guarantee • Report the outcomes of the review and present all areas of compliance and non-compliance and, where applicable, advise on corrective measures to be undertaken by the relevant party, define a timeline for their completion 	KeNHA	Before effectiveness of the guarantee

	<p>and report when completed</p> <ul style="list-style-type: none"> • Review, the E&S impact studies, the ESMS and related plans/procedures prepared by the concessionaire or contractors before starting of operations • Semiannually during the first 2 years (i.e. during the time of construction activities) and annually for the time the guarantee is effective, review compliance of the concessionaire, contractors, and subcontractors with requirements of the Performance Standards and the ESAP • Specifically review the implementation of the E&S mitigation programs and plans/procedures, and undertake independent verification field monitoring as needed • Review and analyze the functioning of the Grievance Mechanism at KeNHA and concessionaire level 		
Grievance Redress Mechanism	<p><u>Grievance Redress Management Plan to include: -</u></p> <ul style="list-style-type: none"> • Describe the process by which people affected by the project can bring their grievances to the company for consideration and redress. Who will receive grievances, how and by whom will they be resolved, and how will the response be communicated back to the complainant? • Describe any plans to involve project stakeholders (including Affected Communities) or third-party monitors in the monitoring of project impacts and mitigation programs. 	KeNHA	During Design Stage/Before Construction

	<ul style="list-style-type: none"> • Describe how and when the results of stakeholder engagement activities will be reported back to Affected Communities as well as broader stakeholder groups. • Management Functions 		
Stakeholder Engagement Plan	<p><u>Stakeholder Engagement Plan to include: -</u></p> <ul style="list-style-type: none"> • Summarize the purpose and goals of the program (either project-specific or corporate). • Briefly describe what information will be disclosed, in what formats, and the types of methods that will be used to communicate this information to each of the stakeholder groups identified • Briefly describe the methods and communication strategies that will be used to consult with each of the stakeholder groups identified • Describe how the views of women and other relevant sub-groups • Describe any other engagement activities that will be undertaken, including participatory processes, joint decision-making, and/or partnerships undertaken with local communities, NGOs, or other project stakeholders. • Provide a schedule outlining dates/periodicity and locations where various stakeholder engagement activities, including consultation, disclosure, and partnerships will take place and date • Identify Resources and Responsibilities 	KeNHA	During Design Stage/Before Construction

	<p><u>Stakeholder Engagement Framework</u></p> <p>In cases where the exact location of the project is not known, but it is reasonably expected to have significant impacts on local communities, prepare a Stakeholder Engagement Framework, as part of its management program, outlining general principles and a strategy to identify Affected Communities and other relevant stakeholders and plan for an engagement process compatible with this Performance Standard that will be implemented once the physical location of the project is known.</p>		
Reduction of road accidents / fatalities	Project must take into account reduction of road fatalities through cost-effective measures to integrate this aspect in project design and operation	KeNHA	Before effectiveness of the guarantee
Baseline study on wildlife crossings	<p>Commission a study to confirm (i) viability for expansion of existing wildlife crossing; (ii) exact locations of proposed wildlife crossings (especially the two proposed overpasses for large mammals), (iii) exact design parameters for all wildlife crossings to be constructed or modified. The study will, among other sources, take into account Kenya Wildlife Service (KWS) report dated November 2017, unless more recent relevant KWS data becomes available. The report must establish the baseline for monitoring of wildlife populations, and more specifically, those for which the area qualifies as Critical Habitat under PS6 in order to ensure adequate monitoring of compliance with PS6 requirements for achieving net gain.</p> <p>KeNHA will create an obligation on the concessionaire, through contractual clauses, to design, construct and maintain the identified wildlife</p>	KeNHA	Before effectiveness of the guarantee

	crossings as part of the concession.		
Study on IP impacts	KeNHA to commission a study on potential impacts on Masaai due to crossing the road with their livestock as part of their normal grazing patterns to confirm locations of livestock crossings and other necessary actions to increase effectiveness of such crossings in mitigating impacts on IPs to be implemented by the concessionaire as part of project design.	KeNHA	Before effectiveness of the guarantee
Inventory of wetlands in project area of influence	Conduct inventory of wetlands in order to determine potential presence (or absence) of Critically Endangered species that may be impacted by the project due to pollution of water sources, especially through drainage of untreated water into the hydrological network.	KeNHA	Before effectiveness of the guarantee
Agreement to ensure connectivity between natural habitats on both sides of the road	KeNHA will facilitate engagement between KWS and private land owners (in particular, Soy sambu, Kigio, and Marula ranches) regarding connectivity of habitats on both sides of the road in order to assure effectiveness of the wildlife crossings in achieving PS6 requirements (specifically those for no net loss and/or net gain).	KeNHA	Before effectiveness of the guarantee

Table 8-2. Environmental and Social Management Programs for Private Concessionaire (will be transferred to contractor)

Program	Aspects	Responsible Party	Timeline
Project's Environmental and Social Management System (ESMS)	Develop and implement policies and procedures for identifying and managing environmental and social risks including through an Environmental and Social Management System (ESMS), which will be an umbrella system to include: <ul style="list-style-type: none"> E&S policy statement approved by 	Private Concessionaire	Before financial closure

	<p>concessionaire’s senior management</p> <ul style="list-style-type: none"> • Sub-management plans at the concessionaire level (as identified below) • Sub-management plans at the contractor level (as identified below) • Internal Monitoring • Record-keeping • Compliance Reporting (as part of ESMS) • Procedures for oversight of EPC and O&M contractors and their subcontractors, including clear E&S performance criteria • Clear assignment of the concessionaire and contractors E&S responsibilities • Independent Audits (Construction and Operations phases) <p>Concessionaire will implement the Project’s ESMS for the life of the Project and will provide notice to KeNHA prior to implementing any ESMS updates/revisions.</p>		
Comprehensive Environmental and Social Assessment (ESIA)	<p>Prepare a comprehensive ESIA that will follow the principles of PS1 and:</p> <ul style="list-style-type: none"> • Clearly identify project area of influence based on full scope of the concession (including project facilities, associated facilities, and cumulative impacts) • Establish and maintain a process for identifying the environmental and social risks and impacts of the project 	Private Concessionaire	Before financial closure
Construction Management Plan	<p>Prepare a Construction Management Plan that will, at a minimum:</p> <p>Noise Quality Mitigation Plan to include: -</p>	Private Concessionaire	Before financial closure

	<ul style="list-style-type: none"> • Baseline Noise Assessment (Ambient Noise) • Sensitive receptors analysis • Noise Modelling Study • Blasting Management Plan for quarry sites 		
	<p>Prepare a Contractor Management Plan that will, at a minimum:</p> <p><u>Air Quality Management Plan to include: -</u></p> <ul style="list-style-type: none"> • Ambient Air Quality Study • Detailed emission inventory • Sensitive receptors analysis • Air Quality Dispersal Modelling Study 	Private Concessionaire	Construction and operation phases
	<p>Prepare a Contractor Management Plan that will, at a minimum:</p> <p><u>Water Quality/ Use Management Plan to include: -</u></p> <ul style="list-style-type: none"> • Water Quality Sampling Study • Sensitive receptors analysis • Water Resources Baseline • Water Uses Analysis • Water Resources Use Plan • Storm Water Management Plan • Emergency Preparedness and Response Plan 	Private Concessionaire	Construction and operation phases
	<p>Prepare a Contractor Management Plan that will, at a minimum:</p> <p><u>Waste Management Plan to include: -</u></p> <ul style="list-style-type: none"> • Waste characterization • Waste quantification • Waste segregation procedures • Waste disposal strategies 	Private Concessionaire	Construction and operation phases
	<p>Prepare a Contractor Management Plan that will, at a minimum:</p> <p><u>Landscape Management Plan to include: -</u></p>	Private Concessionaire	Construction and operation phases

	<ul style="list-style-type: none"> • Landscape characterization and mapping 		
Labour and Recruitment Management Plan	<p><u>Labour and Recruitment: -</u> Develop a site-specific labor recruitment plan that provides an analysis on how the project will be staffed (number of workers in construction phase, ratio of local workers to migrant workers, direct recruitment versus agency, description of how sub contractor’s recruitment of workers/treatment of workers will be overseen, management/supervisory & labor plan and general strategy and include approximate dates).</p> <p><u>Human Resources Management Plan</u> The concessionaire will develop/maintain, and require their contractors, to develop/maintain written human resources (HR) policies and procedures in accordance with Kenyan labor laws and PS2 requirements and ensure the relevant policies are available to all employees. The HR policy/procedures shall clearly describe working conditions, terms of employments, management of worker relationship, and roles and responsibilities among the concessionaire/its contractors and the workers. Key aspects to include: -</p> <ul style="list-style-type: none"> • Non-Discrimination and Equal Opportunity • Retrenchment • Grievance Mechanism • Working rules, hours and leave • Migrant labor • Child labor • Non-Discrimination and Equal Opportunity • Workers organization (unionisable) • Wages and benefits • Workers Engaged by Third Parties 	Private Concessionaire	Before financial closure

	<ul style="list-style-type: none"> • Forced labour • Provide workers with documented information that is clear and understandable, regarding their rights under national labor and employment law and any applicable collective agreements, including their rights related to hours of work, wages, overtime, compensation, and benefits upon beginning the working relationship and when any material changes occur. 		
	<p>Prepare a Contractor Management Plan that will, at a minimum:</p> <p><u>Occupational Health and Safety Plan to include: -</u></p> <ul style="list-style-type: none"> • Health and Safety Management System • Team in charge of health and safety including a training team • Regular training, and other aspects in conformance with the World Bank Group EHS Guidelines) • OHS Training Manuals • New Task Employee and contractor training • Visitor Orientation • Integrity of Workplace Structures • Workspace and Exit • Fire Precautions • Lavatories and Showers • Potable Water Supply • Clean Eating Area • Lighting • Safe Access • First Aid • Air Supply • Labeling of Equipment • Basic OHS Training 	Private Concessionaire	Before financial closure

	<ul style="list-style-type: none"> • Area Signage • Communicate Hazard Codes • Rotating and Moving Equipment • Noise and vibration • Electrical • Industrial Vehicle Driving and Site Traffic • Working Environment Temperature • Ergonomics, Repetitive Motion, Manual Handling • Working at Heights • Air Quality • Fire and Explosions • Corrosive, oxidizing, and reactive chemicals • Radiological Hazards • Personal Protective Equipment (PPE) • Special Hazard Environments • Confined Space • Lone and Isolated Workers • Verification of the effectiveness of prevention and control strategies. • Accidents and Diseases monitoring 		
PS 4	<p><u>Traffic Management Plan to include:</u> Concessionaire will prepare traffic management plan that will detail traffic, parking, and pedestrian management techniques to mitigate anticipated negative impacts.</p> <ul style="list-style-type: none"> • Adoption of safety measures that are protective of project workers and of road users, including those who are most vulnerable to road traffic accidents • Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. 	Private Concessionaire	Before start of operational phase

	<ul style="list-style-type: none">• Measures emphasizing safety aspects among drivers• Improving driving skills and requiring licensing of drivers• Adopting limits for trip duration and arranging driver rosters to avoid overtiredness• Avoiding dangerous routes and times of day to reduce the risk of accidents• Use of speed control devices (governors) on trucks, and remote monitoring of driver actions• Development of a transportation management plan for road repairs that includes measures to ensure work zone safety for construction workers and the traveling public; · Establishment of work zones to separate workers on foot from traffic and equipment by:<ul style="list-style-type: none">• Routing of traffic to alternative roads when possible• Closure of lanes and diversion of traffic to the remaining lanes if the road is wide enough (e.g. rerouting of all traffic to one side of a multi-lane highway)• Where worker exposure to traffic cannot be completely eliminated, use of protective barriers to shield workers• Training of workers in safety issues related to their activities, such as the hazards of working on foot around equipment and vehicles; and safe practices for work at night and in other low-visibility conditions, including use of high-visibility safety apparel and proper illumination for the work space (while controlling glare so as not to blind workers and passing motorists)		
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	<ul style="list-style-type: none"> • Provision of safe corridors along the road alignment and construction areas, including tunnels and bridges and safe crossings (preferably over or under the roadway) for pedestrians and bicyclists during construction and operation. • Crossing locations should take into account community preferences, including those related to convenience or personal safety (e.g. the prevalence of crime at potential crossing point locations). • Installation of barriers (e.g. fencing, plantings) to deter pedestrian access to the roadway except at designated crossing points; • Installation and maintenance of speed control and traffic calming devices at pedestrian crossing areas; • Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian facilities or bikeways • Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions; • Setting of speed limits appropriate to the road and traffic conditions; 		
PS 4	<p><u>Security Assessment and Plan</u> Concessionaire will prepare, and require contractor(s) to adopt and implement, a Security Assessment and Plan to include a statement that guards will be vetted before they are employed, and monitored and trained in use of force. Contractors will be required to provide worker code of conduct so that workers do not access unsafe areas, have</p>	Private Concessionaire	Construction and operation phases

	<p>in place policies on appropriate use of force, and include provisions for managing relations with public security forces.</p>		
	<p>Prepare a Contractor Management Plan that will, at a minimum: -</p> <p><u>Emergency Preparedness Response Plan to include: -</u></p> <ul style="list-style-type: none"> • Identification of areas where accidents and emergency situations may occur, communities and individuals that may be impacted, response procedures, provision of equipment and resources, designation of responsibilities, communication, including that with potentially Affected Communities and periodic training to ensure effective response. • Include specific training and practice (i.e., simulations and drills) schedules and equipment requirements for employees who are responsible for rescue operations, medical duties, threat and incident responses (e.g., hazardous material spill response), fire-fighting and other responses specific to the project sites, facilities and activities. • Document its emergency preparedness and response activities, resources, and responsibilities, and provide appropriate information to potentially Affected Community and relevant government agencies • Risks to community health and safety identified during the risks and impacts identification process • Identification of the emergency scenarios • Specific emergency response procedures • Training program for emergency response teams • Emergency contacts and communication 	<p>Private Concessionaire</p>	<p>Before financial closure</p>

	<p>systems/protocols (including communication with Affected Communities when necessary)</p> <ul style="list-style-type: none"> • Procedures for interaction with government authorities (emergency, health, environmental authorities) • Permanently stationed emergency equipment and facilities (e.g., first aid stations, firefighting equipment, spill response equipment, personal protection equipment for the emergency response teams) • Protocols for the use of the emergency equipment and facilities • Clear identification of evacuation routes and muster points • Emergency drills and their periodicity based on assigned emergency levels or tiers • Decontamination procedures and means to proceed with urgent remedial measures to contain, limit and reduce pollution within the physical boundaries of the project property and assets to the extent possible. 		
	<p>Prepare a Contractor Management Plan that will, at a minimum: -</p> <p><u>In-Migration Plan to include: -</u></p> <ul style="list-style-type: none"> • Communication; • Minimising potential for in-migration; • Managing and directing influx; • Enhancing physical infrastructure; • Building human capacity to manage influx; • Monitoring and evaluation of in-migration; and • Consideration of Project closure. 	Private Concessionaire	Before financial closure
	Prepare a Contractor Management Plan that will, at a	Private Concessionaire	Before financial

	<p>minimum: -</p> <p><u>Community Health and Safety Plan to include:</u></p> <ul style="list-style-type: none"> • Traffic Management Plan • Labour Influx Management Plan (In Migration) which spells out the Concessionaire's responsibility for impacts such as Sexual Exploitation and Abuse, GBV, conflicts over resources, cultural erosion etc • Waste Management Plan • Emergency Prevention, Preparedness and Response Plans to cover all other incidents presenting risks to public safety and the affected communities-contain what • Water Use Plan • Health Management Plan (HIV/AIDS and STIs) • Providing surveillance and active screening and treatment of workers • Preventing illness among workers in local communities by: Undertaking health awareness and education initiatives, • Training health workers in disease treatment • Conducting immunization programs for workers in local communities to improve health and guard against infection • Providing health services • Providing treatment through standard case management in on-site or community health care facilities 		closure
	<p><u>Archeological and Cultural Heritage Management Plan to include: -</u></p> <ol style="list-style-type: none"> 1. Chance Finds Procedure complying with international best practice to address any finds 	Private Concessionaire	Before financial closure

encountered during ground disturbing activities.

The Chance Finds Procedure will include among others:

- training relevant staff and contractors in recognition, handling, and response to archaeological chance finds;
- conducting look-ahead construction site inspections as the ground is cleared in advance of construction activity;
- deploying archaeologists to monitor construction fronts with archaeological potential to guide the recognition of and response to archaeological finds made during ground disturbance;
- establishing protocols for responding to chance finds, including review by an archaeologist, cessation of work for finds deemed significant by the archaeologist and notification of NMK;
- use of expedited procedures for evaluation and treatment of significant chance finds in order to limit impacts while minimising construction delays; and
- keeping an auditable record of monitoring activities.
- The procedure should include record keeping and expert verification procedures, chain of custody instructions for movable finds, and clear criteria for potential temporary work stoppages that could be required for rapid disposition of issues related to the finds.
- Outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority, as well as

	any agreed consultation procedures.		
	<p><u>Grievance Redress Management Plan to include: -</u></p> <ul style="list-style-type: none"> • Describe the process by which people affected by the project can bring their grievances to the company for consideration and redress. Who will receive grievances, how and by whom will they be resolved, and how will the response be communicated back to the complainant? • Describe any plans to involve project stakeholders (including Affected Communities) or third-party monitors in the monitoring of project impacts and mitigation programs. • Describe how and when the results of stakeholder engagement activities will be reported back to Affected Communities as well as broader stakeholder groups. • Management Functions 	Private Concessionaire	Before financial closure
	<p><u>Stakeholder Engagement Plan to include: -</u></p> <ul style="list-style-type: none"> • Summarize the purpose and goals of the program (either project-specific or corporate). • Briefly describe what information will be disclosed, to whom it will be disclosed, in what formats, and the types of methods that will be used to communicate this information to each of the stakeholder groups identified, including VMGs • Briefly describe the methods that will be used to consult with each of the stakeholder groups identified, including VMGs • Describe how the views of women and other relevant sub-groups will be taken into consideration during detailed design and implementation 	Private Concessionaire	Before financial closure

	<ul style="list-style-type: none"> • Describe any other engagement activities that will be undertaken, including participatory processes, joint decision-making, and/or partnerships undertaken with local communities, NGOs, or other project stakeholders. • Provide a schedule outlining dates/periodicity and locations where various stakeholder engagement activities, including consultation, disclosure, and partnerships will take place and date • Identify Resources and Responsibilities <p><u>Stakeholder Engagement Framework</u></p> <p>In cases where the exact location of the project is not known, but it is reasonably expected to have significant impacts on local communities, prepare a Stakeholder Engagement Framework, as part of its management program, outlining general principles and a strategy to identify Affected Communities and other relevant stakeholders and plan for an engagement process compatible with this Performance Standard that will be implemented once the physical location of the project is known.</p>		
	<p><u>Biodiversity Management Plan to include: -</u></p> <ul style="list-style-type: none"> • Further surveys to determine the extent, type and condition of Natural Habitat within the project footprint (including intersections). • Targeted zoological and botanical surveys to determine the presence of any CH-qualifying species in these areas. Where seasonal or permanent wetlands occur, these should include rainy-season surveys for amphibians. • Compile and analyse existing data on wildlife killed in road collisions (which species, where and 	Private Concessionaire	Before financial closure

	<p>when)</p> <ul style="list-style-type: none"> • Compile and analyse existing data on human-wildlife conflict, including bush meat poaching, as this will also shed light on animal movements • Design and implement a study of animal movements in the Marula-Kigio-Soysambu area in relation to the A8 highway, using (a) observational sampling, (b) a network of camera traps, (c) satellite-tagging of individuals in priority species, which should include those most often involved in collisions (thought to be zebra and buffalo) and Nubian (Rothschild's) Giraffe. This study should be geared to inform the final selection and design of wildlife crossings (underpasses and overpasses) for the upgraded road (see below). It should then continue in adapted form as a monitoring programme to assess the effect of the road on wildlife movements, and use of the crossings that have been put in place. <p>Invasive Species Protocol Management. These may include: -</p> <ul style="list-style-type: none"> • Uprooting and burning invasive plants before earth-moving operations, to prevent spreading seeds or plant parts that could propagate vegetatively • Rapid restoration, using native plant seed mixes, of cleared or disturbed ground • Screening building material source sites for invasive plants and implementing clearance, control or hygiene measures appropriately • Operating good-practice hygiene measures, e.g. cleaning of vehicles that might be carrying 		
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	invasive plant seeds, before they move to site.		
Vulnerable and Marginalized Groups Plan /Indigenous Peoples Plan	<p><u>Vulnerable and Marginalized Groups Plan: -</u> Prepare an IPP in accordance with the Indigenous Peoples Planning Framework (IPPF) prepared by KeNHA, that will, at a minimum: (i) identify IP groups present in the project’s area of influence (in particular Maasai and Ogiek as the case may be); (ii) clearly state stakeholder engagement actions that will target IPs located in the project’s area of influence; (iii) proposes mitigation measures commensurate with the impacts identified, if any, as part of preparing a comprehensive ESIA and that are within control of the concessioner; (iv) specifies interactions with relevant authorities and other stakeholders.</p> <p>Where necessary, additional IPPs may need to be prepared when additional project facilities are identified during the construction or operation of the project.</p>	Private Concessionaire	Before financial close
Confirmation of voluntary nature of all land transactions	Concessionaire will ensure that identification of locations for project facilities to be purchased or leased under willing-buyer-willing-seller principle are informed by community-level consultations.	Private Concessionaire	Before financial close

8.2 KeNHA's Monitoring and Reporting

8.2.1 Procedures for monitoring implementation of the environmental and social risk management measures

KeNHA has the overall responsibility for ensuring that the private concessionaire manages the environmental and social risks highlighted. There are a number of environmental and social risks management measures under its control and responsibility as highlighted in table 8-2 above.

Monitoring Performance of Private Concessionaire

KeNHA has the primary responsibility of managing environmental and social risks and impacts for this project and this includes monitoring the performance of the private concessionaire with respect to management environmental and social risks identified.

KeNHA will establish a Project Implementation Team (PIT) which will include 2 full time environmental and social specialists who will undertake routine monitoring of the performance of the private concessionaire.

The full-time specialists will be based in KeNHA's head office in Nairobi but will undertake site visits every 2 weeks to monitor performance. During these visits, the specialists will have working sessions with the environmental and social specialists from the private concessionaire and contractors side as well as site visits. Minutes of such meetings will be documented including action plans and archived for future reference.

KeNHA will require the private concessionaire and contractors to prepare environmental and social programs as specified in the ESAP and these programs will be the primary tool that will be used to monitor performance.

KeNHA will require the private concessionaire and contractors to employ full time environmental and social specialists who will be the main focal point of contact between the two parties.

KeNHA will hire 2 independent 3rd Party Monitoring Advisors (firms) who will be responsible for monitoring the performance of the private concessionaire on a day to day basis. One firm will be hired to undertake independent monitoring during the construction period and the other during the operation of the highway. These firms will have full time environmental and social specialists who will monitor environmental and social performance of the private concessionaire and contractors as per the ESAP. The independent monitoring advisors will prepare monthly and quarterly reports on the implementation and management of environmental and social risks by private concessionaire and submit the same to KeNHA. The reports will detail their view on the private concessionaire on environmental and social risks management, corrective actions needed including timelines for actions.

Reporting

KeNHA will expect the private concessionaire to submit quarterly progress reports of the environmental and social aspects of the project during the implementation phase. These reports

will be prepared by contractors, submitted to private concessionaire for review before submission to KeNHA's Project Implementation Team where the full time environmental and social specialists will review these reports before sharing the same with the Deputy Director Environmental and Social Interests.

Every quarter, the private concessionaire will prepare and submit quarterly reports of the environmental and social aspects of the project during the implementation phase. KeNHA's Project Implementation Unit (PIU) environmental and social specialists will review these reports and thereafter, have the private concessionaire take corrective action in the event of non-compliance. The private concessionaire will be required to recruit an environmental specialist, social development specialist, health and safety specialist and community liaison specialist.

Annually, in accordance with the EIA/EA 2003 regulations, the private concessionaire will prepare Environmental Audit (EA) report for submission to NEMA for review and approval. These EA reports will be submitted to KeNHA for review prior to submission to NEMA.

Report Outline

Ahead of regular World Bank implementation support missions, KeNHA jointly with private concessionaire will prepare environmental and social status report. The outline of the report and format is found in annex 12.

The following are some indicators that will be used by KeNHA to report on the implementation of risk mitigation measures to GoK and the World Bank, and will also be used by the Concessionaire to report to KeNHA.

Box 8-6. Monitoring Indicators

- Timely submission of Independent Audit Reports by concessionaire
- ESMS updates and review reports
- Functioning GRM
- Timely submission of Pollution monitoring reports
- Timely submission of Environmental and Social Monitoring Programs
- Implementation of workers' code of conduct
- Successful undertaking of natural habitats and wildlife surveys and studies
- Confirmation of voluntary nature of all land transactions
- Inclusion of mitigation measures proposed in detailed design report

8.3 KeNHA's Capacity for Environmental and Social Risk Management

The project proponent is the Kenya National Highways Authority (KeNHA), a state corporation, established under the Kenya Roads Act 2007 with the responsibility for the management, development, rehabilitation and maintenance of international trunk roads linking centres of international importance and crossing international boundaries or terminating at international ports(Class A road), national trunk roads linking internationally important centres (Class B roads), and primarily roads linking provincially important centres to each other or two higher-class roads (Class C roads). In undertaking this mandate, the Authority propels the country to achieve its infrastructure goals espoused in the Kenya vision 2030 blueprint.

KeNHA has a service charter which takes into consideration environmental and social Compliance. Among the Authority's core values is environmental stewardship. The Authority likewise has developed an environmental and social policy. KeNHA's environmental and social policy will be introduced and included as part of the contract requirement by private concessionaire.

One of the performance objectives in the Environmental Policy Statement that states "**The Authority is committed to employ contractors and other service providers who aspire to adopt the same environmental, safety and health standards in their work place.**" The concessionaire is expected to implement the construction and operation of the project while following and applying the same policy statement.

8.4 KeNHA's Capacity to Manage Private Concessionaire

The road projects portfolio in the Authority has substantially increased over time as a result of more investment by the Government of Kenya and from Development Partners like World Bank, European Union, AfDB, EIB, KfW, JBIC, JICA and EXIM Bank of China among others. The Authority has successfully managed to comply with stringent environmental and social safeguard conditions of these development partners.

The Authority has however not had experience in managing Environmental and Social risks in PPP funding model projects. This proposed project will be the first one. The experience gained in delivering multi-billion road projects will be useful in this project.

KeNHA has a full-fledged Department in charge of managing environment and social risks headed by a Deputy Director with a staffing of 9 competent environmental and social specialists.

The 9 full time staff possess graduate and post graduate qualifications in environmental and social management. KeNHA also engages short-term consultants to help in managing environmental and social risks of its projects. KeNHA will be required to fill these positions as well as including Health and Safety Specialist as part of the staff.

8.4.1 Project Implementation Arrangements

The project will be implemented by the KeNHA under a public private partnership arrangement. The private partner (Concessionaire) will establish a special purpose vehicle (SPV) that shall have contractual arrangements with KeNHA.

The Kenya National Highways Authority will be the implementing agency. The Director General, KeNHA has delegated day to day administration and management of the proposed project preparation and implementation to the Project Manager from PPP department who will be supported by experts of different discipline within the Authority.

During implementation, the Authority will establish a Project Implementation Team (PIT), which will comprise full time senior environmental and senior social safeguards specialists to manage day to day environmental and social issues with respect to the project including monitoring and oversee the environmental and social performance of the private Concessionaire.

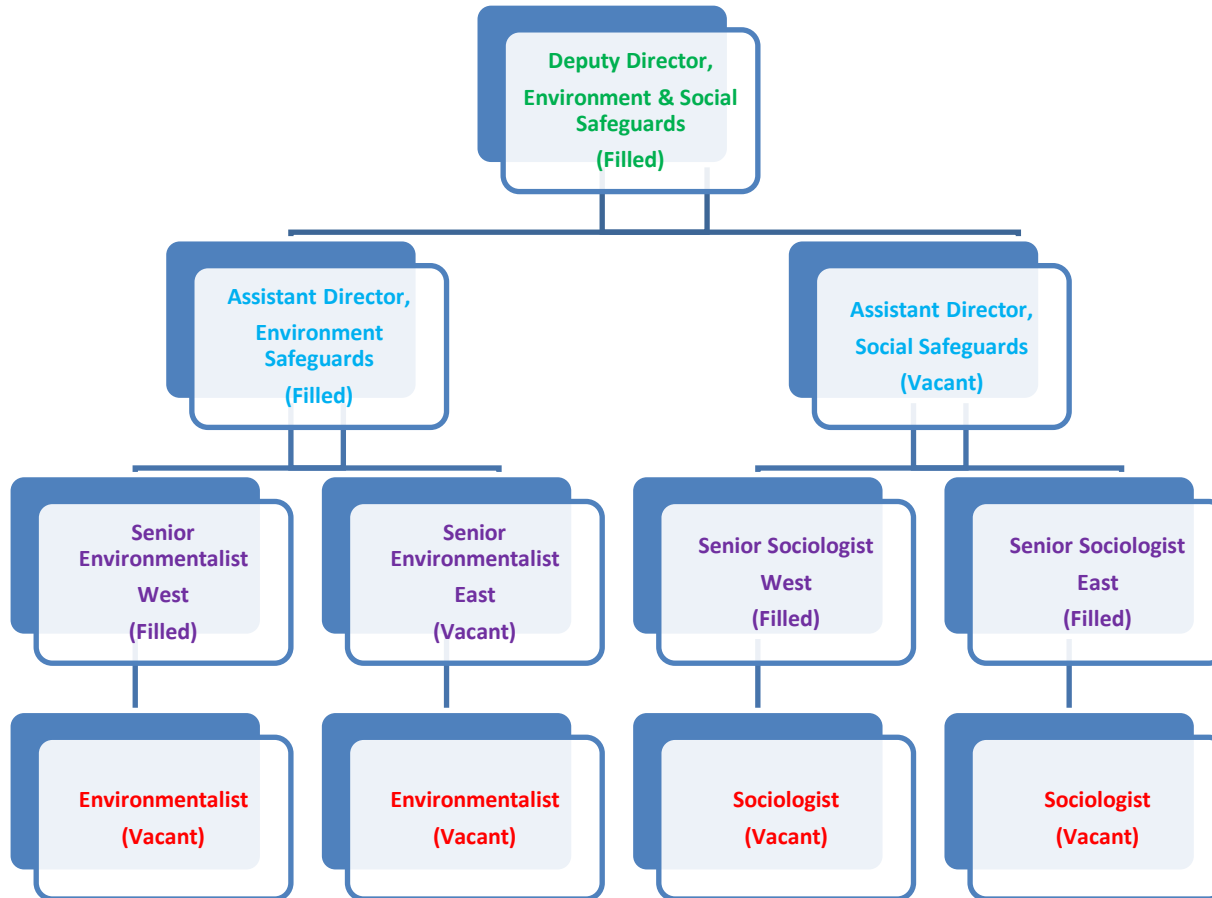
Training of KeNHA Staff

In view of fact that KeNHA does not have extensive experience in implementing projects that require application of OP. 4.03, a deliberate effort to build capacity of the environmental and social management specialists within the institution is proposed. Training and capacity building (short term) of KeNHA's staff is proposed including the development of a training program that is systematically thought through.

8.4.2 Third Party Monitoring

Third party independent monitoring advisory firm of experts (2) will be engaged in the project with the first expert firm responsible for supervision and monitoring of construction works and the other during operation of the highway. The independent experts will be responsible for supervision and ensuring compliance in engineering and works related as well as environmental and social risks.

Figure 8-1 Environment and Social Safeguards Organogram



8.5 Grievance Mechanism

This section describes the overall approach to Project's grievance mechanism, including the role and responsibility of both KeNHA and the Concessionaire.

The overall objective of the grievance redress mechanism is to establish an effective communication channel among the stakeholders for providing a timely and efficient two-way feedback mechanism to address any complaints made about the project, including those from members of the communities, local businesses and other stakeholders, as well as raising public awareness on the projects and on the availability of a grievance redress mechanism. The grievance redress procedure suggests resolution of grievances in the spirit of mediation between the parties, and will comply with the spirit of World Bank and Government of Kenya standards and practices.

KeNHA has put in place and implement a grievance redress mechanism for this project that will build on the Grievance Redress Mechanisms that it has already set up in the context of other World Bank supported projects which have worked thus far. This GRM will be harmonized with the GRM to be put in place as part of the Project Resettlement Action Plan (RAP) as well as the GRM to be established by the Concessionaire.

The KeNHA GRM will detail the procedures that communities and individuals who believe they are adversely affected by the Project can use to submit their complaints, as well as the procedures that will be put in place to systematically register, track, investigate and promptly resolve complaints.

KeNHA, and its Concessionaire, will each set up a focal point to handle Project activity-related complaints. Multiple access points (telephone, complaint box, website, email, text message, etc.) should be provided and advertised at subproject level so that beneficiaries have different ways to voice their concerns.

KeNHA will have the overall responsibility to address concerns brought to the attention of the focal points regarding any environmental and/or social impacts due to Project activities. Copies of complaints shall be recorded in the activity files and the progress reports, including the number and type of complaints and the results of their resolution.

8.5.1 Grievance Redress Steps

Where to Report Complaints and Grievances

In the project area, there are a number of government and non-government agencies that are mandated to receive complaints and grievances from the public and they include among others:

a) The Office of the Ombudsman,

This office is mandated to investigate the actions of public authorities including State Government departments, prisons, hospitals, schools and technical colleges, local governments and public universities.

b) Kenya National Human Rights Commission:

The mandate of the KNCHR is to enhance the promotion and protection of human rights in Kenya.

c) Ethics and Anti-Corruption Commission (EACC) of Kenya

Ethics and Anti-Corruption Commission gathers information on corruption occurring in Government and the public Sector from a variety of sources which include members of the public, heads of government departments and agencies, officials working in both the public and private sectors and the media

d) County and Sub-County Offices

These offices promote and facilitate community participation in the development of policies and plans, and delivery of services in the county.

e) Ministry of Interior and Coordination of National Government

This Ministry was created through the executive order No. 2/2013. It is charged with mandates, including; National government coordination at counties; Internal State functions; National Cohesion and Reconciliation Management; Chief Officers within the auspices of the Ministry include:

- the County Commissioners (CCs) and Deputy County Commissioners (DCCs),
- sub-county officers,
- chiefs/assistant chiefs

f) Village Elders, Local Leaders and Politicians.

These leaders represent community interests and disseminate them by providing leadership, identification of community concerns and fears and mobilization of the community for individual and community development.

g) Kenya National Highways Authority

KeNHA has customer desk in the Regional office in Nakuru Town and at the Headquarters in Nairobi. Complains, comments, suggestions and concerns are received here by trained officers. The officers sort what is received and forward it to relevant officers. This is guided by the Authority's service charter.

h) National Land Commission

This is the body mandated by law to acquire land for public use. The commission addresses all land acquisition and valuations grievance.

i) Kenya's Dispute Resolution Centre (DRC)

One avenue that could be of particular use is Kenya's Dispute Resolution Centre (DRC), which is an independent, not-for-profit organization that promotes the prompt, effective and economic resolution of disputes through arbitration.

8.5.2 Proposed Grievance Redress Mechanism

The following action lines will be considered:

- (i) Identifying and engaging key stakeholders both in the community and the project
- (ii) Understanding the current environment

- (iii) Defining the scope of grievances and
- (iv) Determining the purpose and goals of a grievance mechanism

KeNHA and the concessionaire will facilitate the community in forming Grievances Redress Mechanism Committees (GRMC) along the road corridor and within the locations that are traversed by the road project.

a) Identifying and engaging key actors in the community and the project

When establishing the grievances redress mechanism, KeNHA and the concessionaire will identify key stakeholders in the project area and seek for their support in the formation and operationalization of the mechanism. Effective stakeholder assessment will be necessary in order to identify leaders within the community who are trusted by the community. Therefore, people of decision making authority will be identified and approached for such cooperation.

It will also be important to ensure that there is proper representation from different community segments, such as women, youth and people living with disability among others. Such diversity will help in making the GRM be easily understood, assist with communication and educating others on the need and importance of the mechanism.

The process of identifying key stakeholders ensures that different players are committed to the process and that main decision makers are committed to the process and that they will respond to complaints quickly. Identification of key actors also build trust between the Contractor and the community and allows the parties to engage each other in a constructive manner.

b) Understanding the Current Environment

To understand the type of grievances and complaints existing in the project area, the KeNHA and concessionaire will undertake an assessment of the grievances that are likely to arise and any existing local methods, procedures or capacity to handle them.

Understanding the current environment involves visiting the project area and the community frequently to determine what kind of concerns the community have on the project. This step will help in understanding the types of complaints and grievances that are likely to be arise and be addressed.

c) Definition of the Scope of Grievances

To describe the range of the grievances within the project area, it means visiting the community frequently and finding out how people are affected by the daily operations of the project. The interaction of the project and the community forms the basis of scope of grievances and complaints.

d) Determine the on how to respond to grievances and complaints

To address complaints and grievances raised, KeNHA and the concessionaire will develop a plan or blueprint broken down into the following primary components.

e) Formation of a GRM Committee

The local committee (preferably location) with membership drawn from the identified stakeholders serves best. The core mandate of the committee is to receive complaints and submit them to the concessionaire and KeNHA for resolution.

Local people need a trusted way to voice and resolve concerns linked to a development project, and companies need an effective way to address community concerns. A locally based grievance resolution mechanism provides a promising avenue by offering a reliable structure and set of approaches where local people and the company can find effective solutions together.

- Development of Complaint and Grievances tools

To document people's grievances there is need to develop documents that will accommodate grievances raised. Such documents include:

- ✓ Complaint Form to be filled and filed by the complainant
- ✓ Complainants Register that contains all persons who have raised some grievances.
- ✓ Establishment of complaints collecting point or centre where aggrieved persons can walk and register their complaints or grievances.

- Receive and register a complaint.

When complaints and grievances are raised they will be:

- ✓ Received and acknowledged,
- ✓ Registered and filed for action
- ✓ Complaints is resolved and finalized
- ✓ Complaint is not resolved and finalized

- Screen and Assess the Complaints.

- ✓ The concessionaire receives and acknowledges receipt of grievances from the contractor
- ✓ Screens, assesses and resolves the complaints and grievances
- ✓ Screened and assessed grievances are not resolved and are referred to the GRM Committee for resolution.

- Resolution by the Location GRM Committee

On receipt of the grievances from the concessionaire, the GRM Committee will:

- ✓ Receive and Acknowledge the receipt of the grievances
- ✓ Resolve and finalize the complaints
- ✓ Complaints and grievances not resolved and finalized but referred to Sub – County GRM Committee for resolution.
- Resolution by the Sub -County GRM Committee
 - ✓ Receive and acknowledge receipt of the grievance
 - ✓ Resolves the grievance
 - ✓ Does not resolve but refers it to KeNHA for resolution

- Resolution by KeNHA

- ✓ KeNHA arbitrates and resolves the grievance.

Standard prescribed forms including grievance registration form, grievance disclosure form, grievance log and grievance redress monitoring form will be used. Clearly indicate the focal persons (this will be Social and Environmental specialist for social and environmental grievances accordingly)

The GM will clearly indicate how a complaint can be submitted. This can be by a letter, verbally, email, telephone, SMS, WhatsApp message, SMS etc. All grievances, suggestions/comments will be recorded in a Grievance Register by the Focal Person(s) / Complaint Handling Officer within specified working days of the receiving of the grievances. A unique number will be assigned to each grievance, suggestions and comment.

8.5.3 Procedure for Grievances

The steps taken by the company for receiving and handling any such concerns are outlined below.

STEP 1: Submitting a grievance to Contractor/Resident engineer

A grievance can be submitted in a number of ways.

- During regular meetings held between communities and concessionaire;
- Through the Local Consultative Forums established in the affected villages;
- During informal meetings with concessionaire;

Through communication directly with management – for example a letter addressed to site management, or other operational offices;

- Directly by e-mail to RE/contractor
- Placing a comment in the community suggestion boxes by dedicated fellows; and
- Through the Community Liaison Officer (CLO).

For grievances that have been submitted informally, the CLO will arrange for a meeting where the grievance can be explained in full, written down, and agreed upon. For all grievances the CLO will be the main point of contact, responsible for updating the complainant about the process.

STEP 2: Logging the grievance

Once a grievance has been received it must first be logged in the grievance database register and the CLO will be informed. This register is a live document.

STEP 3: Providing the initial response

The person/community/stakeholder that lodged the initial grievance will then be contacted within 3 days to acknowledge that concessionaire has logged the complaint. This response will either accept or refute possible responsibility for the grievance.

This notification will include details of the next steps for investigation of the grievance, including the person/department responsible for the case.

STEP 4: Investigating the grievance

Concessionaire will aim to complete investigation within two weeks of the grievance first being

logged. Depending on the nature of the grievance, the approach and personnel involved in the investigation will vary. A complex problem may involve external experts for example. A simpler case may be easier, and quicker to investigate. Contractor will involve the aggrieved in this investigation, where possible, to ensure participation.

Concessionaire, through the CLO, will continually update the aggrieved on the progress of the investigation and the timeline for conclusion.

STEP 5: Concluding/resolving the grievance

Concessionaire will outline the steps taken to ensure that the grievance does not re-occur. Consultation with aggrieved parties and views sought about company recommendations. If complainant is satisfied, then sociologist/CLO should seek their sign off from Resident Engineer and Project Manager.

STEP 6: Taking further steps if the grievance remains open

If, however the grievance still stands then the CLO will initiate further investigation and determine the steps for future action. This will be referred to the Resident Engineer who will constitute a team to determine a team to address the grievance and determine if the client must be notified.

Record Keeping

All comment responses and, grievances are to be logged using the Comment Response, and Grievance logging forms and registers. This includes details of the comments/grievance, the commenter/aggrieved, and ultimately the steps taken to resolve the grievance. Hard copies of the form are to be kept at the project sites, whilst soft copies will be saved on the Contractor server. Any accompanying documentation e.g. written statements, photographic evidence, or investigation reports are to be filed along with the grievance log both in hard and soft copies. A master database will be maintained by the CLO to record and track management of all comments and grievances, and audited by the CLSO. This will serve to help monitor and improve performance of the Comment Response and, Grievance Mechanism.

Comment Response and, Grievance Mechanism Log

A sample format for logging summary details of each comment response and, grievance must be provided. As noted above hard and soft copies should be kept on file.

Note:

- If it is a comment, the commented will receive a copy if he/she requests one
- If it is a Grievance, the aggrieved shall always receive a copy once complete for their own records.

Initial Response Template

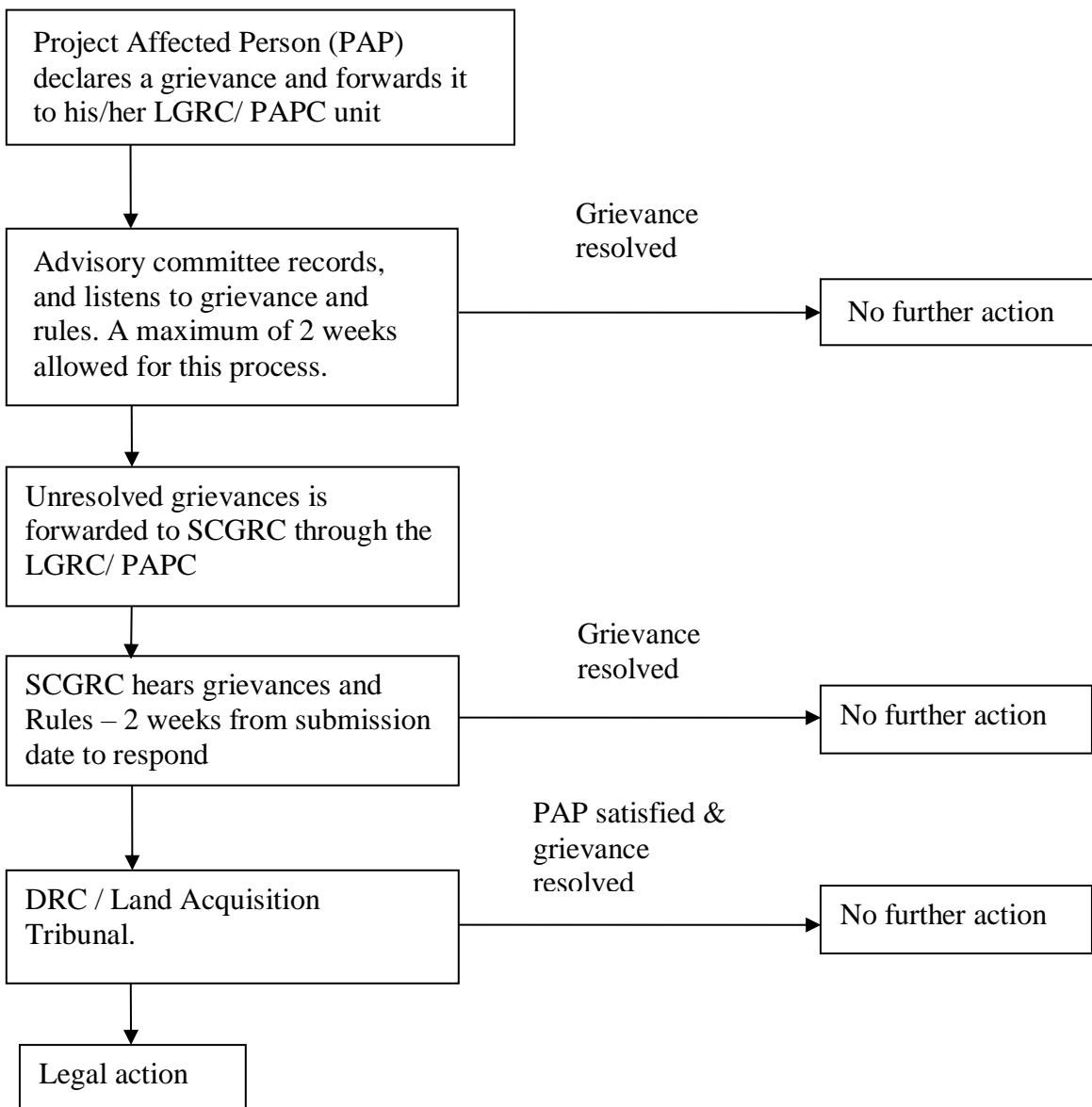
The template is necessary for providing the initial response to the aggrieved only in the case of Grievances. This should be written on headed paper. This response must be sent within 3 days of the grievance being entered into the logbook.

It is vitally important to monitor the effectiveness of the comment response and, grievance mechanism. Appropriate measures/KPIs for this include monthly reporting on the number of grievances received, resolved and outstanding. This will be undertaken by the sociologist and reported to the resident engineer. As part of the annual review/report, analysing the trends and time taken for grievance resolution will help to evaluate the efficacy of the comment response and, grievance mechanism.

Monitoring and Review

As part of stakeholder engagement and consultation, involving the views of the stakeholders for whom the Comment Response and, Grievance Mechanism is designed in this monitoring and review will help to improve effectiveness and stakeholder buy-in.

Figure 8-2. Grievance Redress Mechanism and Resolution Flow Chart



8.5.4 World Bank’s Grievance Redress Service

The Grievance Redress Service (GRS) ensures that complaints are promptly reviewed and addressed by the responsible units in the World Bank. The objective is to make the Bank more accessible for project affected communities and to help ensure faster and better resolution of project-related complaints. The GRS is open to all those who believe they have been affected by a Bank-financed project.

9 CHAPTER 9. IMPLEMENTATION SCHEDULE AND COST ESTIMATES

The costs estimated related to implementation of the proposed mitigation measures are difficult to quantify or even estimate in view of the fact that there are significant unknown aspects and more so because the Environmental and Social Management Programs specified in this ESIA have not been prepared and will only be developed by the Private Concessionaire.

Also, there are additional studies that have to be conducted in detail in order to clearly understand the risks and impacts and thereby develop mitigation programs after which costs estimates can be derived. In this regard, this chapter cannot provide a clear statement of financial responsibilities including summary of costs for implementation of the proposed mitigation measures including detailed estimated budget for all phases of the project including planning, implementation, monitoring and evaluation, with contingencies until the detailed designs are completed.

However, the following cost can be estimated namely: -

- Cost for Resettlement Action Plan (RAP): -This is cost will be met by the Government of Kenya and is estimated at Kenya Shillings 745,273,122.50.
- Cost for Third Party Independent Monitoring Advisor: -The cost will be met by KeNHA through the PPP facility and is estimated to be Kenya Shillings 100,000,000.00
- Training and Capacity Building of KeNHA on Environmental and Social Management is estimated at Kenya Shillings 5,000,000.00

10 CHAPTER 10. CONCLUSIONS

This is a much needed project for the Government of Kenya and its citizens in view of the beneficial impacts. Even though there are a number of risks and impacts identified, these are general construction risks that could be managed through application of the mitigation hierarchy and implementation of robust environmental and social management programs coupled with active supervision and monitoring by KeNHA.

The project is linear in nature, and will only acquire 80m of Right of Way (ROW) and in effect has a small footprint thereby minimizing the impact footprint including displacement related impacts.

There are a number of project components whose locations are not known and will only be determined by the private concessionaire. These components have been highlighted above and could have adverse environmental and social impacts and will require studies to identify the associated risks once the locations are known.

There 15km buffer zone for the project interlinks with Key Biodiversity Areas (KBAs) and Discrete Management Units (DMUs) with critically endangered species that could be impacted directly or indirectly by the proposed highway expansion. There is need for further baseline surveys and studies with respect to risks and impacts of the highway to determine the extent, type and condition of natural habitats within project foot print and targeted surveys to determine presence of critical habitats and long term monitoring of critically endangered species. Further, the proposed wildlife crossing points recommended by Kenya Wildlife Service (KWS) should be implemented and modified if necessary based on additional survey studies.

Where residual impacts on Natural Habitat or Critical Habitat-qualifying species cannot be completely avoided, quantification of losses and design of offsets to achieve no net loss of Natural Habitat and net gain of Critical Habitat is required.

Private concessionaire will be expected to prepare Environmental and Social Management Programs as outlined in the Environmental and Social Action Plan (ESAP).

Even though KeNHA has inherent capacity to manage the environmental and social risks in general including monitoring performance of the private concessionaire, it is noted that KeNHA's experience with implementation of Public Private Projects (PPPs) and specifically OP. 4.03 requirements is nascent and capacity enhancement through training and engagement of experienced consultants is recommended.

11 CHAPTER 11. ANNEXES

11.1 Annex 1. List of Consulted Participants

11.2 Annex 2. County Boundary Maps

11.3 Annex 3. Section Map of Road Corridor (A, B, C and D)

11.4 Annex 3. Maps of learning institutions along highway

11.5 Annex 4. Maps major settlements and towns

11.6 Annex 5. Maps of Archeological and cultural heritage sites

11.7 Annex 6. Maps of Drainage Features and Land Use

11.8 Annex 7: Maps of Protected and Environmental Sensitive Areas at 1: 20,000 scale

11.9 Annex 8. Map of Terrain at 1: 2,000 scale

11.10 Annex 9. Highway Alignment Sheets at 1: 2,000 scale

11.11 Annex 10. County Boundary Map (one maps showing road with all counties and 3 separate maps showing per county)

11.12 Annex 11. Critical and Natural Habitat Screening and Recommendations for Biodiversity Report

11.13 Annex 12. Environmental and Social Status Reporting Template

11.14 Annex 13. Stakeholder Engagement Plan (KeNHA)

11.15 Annex 14. Selected Photos