





Kenya National Highways Authority

Quality Highways, Better Connections



Financing by : The International Development Association (IDA)

# Phase 2: Draft Detailed Design

# Lake Victoria Ring Roads

Part 5 - Environmental & Social Impact Assessment Report Volume 1: Main Report



# Kenya Transport Sector Support Project (KTSSP)

Contract No.KeNHA/RD/CS/SP/1686/2015









February 2017



# DECLARATION

This report is made in accordance to the requirements of the Environmental (Impact Assessment and Audit) Regulations, 2003, pursuant to The Environmental Management and Coordination Act, (EMCA) 1999 and the World Bank Safeguard Policies

Further, this report has been prepared in accordance with the Terms of Reference and the Contract with the Kenya National Highways Authority (KENHA).

To our knowledge, this report responds satisfactorily to the Terms of Reference as was provided by Kenya National Highways Authority (KENHA) and also to the requirements of the Environmental Management and Coordination Act, (EMCA) 1999 of the Republic of Kenya.

Signed for Kenya National Highways Authority Date

Date

10<sup>th</sup> February 2017

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# **EXECUTIVE SUMMARY**

# Introduction

Egis International Kenya was commissioned to undertake consultancy services which included Feasibility Study, Environmental and Social Impact Assessment, preparation of Resettlement Action Plan and the Design and tender documentation for the Lake Victoria Ring Roads project on 26<sup>th</sup> June 2015. The contract was issued by Kenya National Highways Authority. This report therefore is a product of the environmental and social impact assessment for the proposed Lake Victoria Ring Roads project which traverses 5 counties and is expected to be a major linkage point between the various beaches of Lake Victoria as well as offer access to the areas around the project area.

This report comprises the description of the various environmental and socio - economic impacts that are likely to occur during the project life cycle i.e. site preparation and construction, operation and decommissioning. The report has been divided into ten (10) parts covering Executive Summary, Introduction, Policy, Legal and Regulatory framework, Project Description, Description of the Project Environment, Analysis of Project Alternatives, Stakeholders' and Public consultations, Potential Environmental and Socio - economic impacts and mitigation measures, Environmental and Social Management Plan (ESMP), Conclusion and Recommendations.

# Description of the project

The project road is approximately 450 km long. It is situated in the Lake Region of Kenya, and crosses the five following counties: Busia, Siaya, Kisumu, Homa Bay and Migori. It starts at the junction with B1 Road in Bumala Town, and runs along the Lake shore southwards, up to Muhuru Bay, near the Kenya - Tanzania Border.

As agreed during Preliminary Design phase, the project has been divided into 6 contracts:

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Contract 1: Bumala – Nyamonye/Kadimu (Total: 95.8 km)
   77.4 km of main alignment (paved and unpaved sections)
    18.4 km of spur road to Osieko (paved)
Contract 2: Nyamonye/Kadimu - Asembo (Total: 77.3 km)
   68.3 km of main alignment (unpaved)
   9.0 km of spur road to Luanda Kotieno (paved)
Contract 3: Asembo to Otonglo (Total: 52.8 km)
   46.3 km of main alignment (unpaved)
   6.5 km of spur road to Dunga Beach (unpaved)
Contract 4: Katito – Homabay (Total: 100.4 km)
   92.7 km of main alignment (paved and unpaved)
   7.7 km of spur road to Olambwe (unpaved)
Contract 5: Homabay – Nyangwethe (Total: 71.3 km)
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71.3 km of main alignment (unpaved)

Contract 6: Nyangwethe – Nyangwethe (Total: 70.7 km)

70.7 km of main alignment (unpaved)

→ Total length of the project: 468.3 km.

In addition, the following spur roads were considered in the economic model in order to assess their costs and benefits, and will be incorporated to the project as provisional sums, to be studied by the contractors:

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Spur road to Port Bunyala/Victoria: 3.2 km;

Spur road to Uhaya Beach: 5.5 km;

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Spur road to Sirongo Beach: 7.8 km;

Spur road to Kamuga: 3.5 km;

Spur road to Kaleloni Beach: 11.2 km;

Spur road to Nyandiwa Beach: 2.6 km;

Spur road to Muhuru Beach: 6.0 km;

Spur road to the Tanzanian border: 3.2 km.

The total cumulative length of proposed additional spur roads is approximately 43 km.

# **Objectives of the Environmental and Social Impact Assessment study**

This Environmental and Social Impact Assessment (ESIA) report has been prepared to identify significant linkages of the road project to the environmental and social settings of the project. The ESIA report provides management plans and intervention actions that are based on physical and biological environmental attributes and social features. Environmental Management Plans are also developed to guide the implementation of the mitigation measures proposed.

# Policy legal and regulatory framework

The objective of the review of the policy legal and regulatory framework is to ensure that the development is sustainable and does not compromise the future generations by destruction of the natural resources. It will also ensure that the relevant authorities are consulted to ensure provision of information to ensure that the project development runs smoothly. The relevant Acts reviewed include EMCA, 1999 and the respective regulations, Water Act Cap 372 of 2012, Occupational safety and Health Act, 2007, Work Injury Compensation Benefits Act, 2007, Sexual offenses Act, CAP 62, 2006, Public Health Act CAP 242, 2012, Physical planning Act, CAP 286, 2010; Traffic Act CAP 403, 2014; Public Roads and roads of Access Act, CAP 399, 2010; Lands Act, CAP 280, 2015; Kenya Roads Act, CAP 408, 2012; National Land Commissions Act, CAP 5D, 2012; Registration of Titles Act Cap 281, 2010; Forest Act, CAP 385, 2005; The Wildlife Conservation and Management Act, CAP 376, 2013; Agriculture Act Cap 318 of 1980 (revised 1986); Intergovernmental Relations Act, 2012; County Government Act, No. 17 Revised 2014 (2012) and Prevention, Protection and Assistance to Internally Displaced Persons and Affected Communities Act No. 56, 2012.

Policies relevant to the project were also reviewed. They include: Kenya Vision 2030; National Environment Policy, 2013; Millennium Development Goals; Integrated National Transport Policy; Land policy; Draft National Wetlands Conservation and Management policy; Ramsar Convention on Wetlands; Convention on Biological Diversity; World bank safeguard policies which include Environmental Assessment (Operational Policy, OP 4.01), Natural Habitats (Operational Policy, OP 4.04), Indigenous Peoples (Operational Policy 4.10), Physical Cultural Resources (Operational Policy 4.11), Involuntary Resettlement (Operational Policy 4.12), Forests (Operational Policy 4.36).

The institutional framework review included the following institutions: National Environment Management Authority; National Environment Council; Kenya Roads Board; Kenya National Highways Authority; Kenya Wildlife Service; Kenya Forest Service; The Water Resource Management Authority (WRMA); Beach Management Units (BMU); National Irrigation Board; Kenya Civil Aviation Authority; National Land Commission; Lake Basin Development Authority and the National Museums of Kenya

# **Project Environment**

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The road crosses five counties: Busia, Siaya, Kisumu, Homa-Bay and Migori. The project area generally experiences an inland equatorial climate, modified by the effects of relief, altitude and the influence of the large water body, Lake Victoria. The mean annual rainfall amounts range from 1,000 mm and 1,300 mm per annum while the mean annual temperature varies between 18 and 22°C.

The project area is characterised by an undulating landscape but generally the project area has a gentle slope south or westwards towards Lake Victoria. The project road corridor is characterized by varying degree of tree cover and density, and dominant species combination. The original vegetation type in the area which was Acacia-Balanites-Combretum woodland had been degraded over time due to human activities. Therefore, the ground cover comprises mostly of secondary species of vegetation which are homogenous and are of no specific conservation value. Terrestrial invasive weed species such as Prosopis juliflora and Opuntia opuntia were also found within the project area.

Environmentally sensitive areas which include wetlands such as yala swamp and Dunga wetland, hills and forests such as gwassi hills and forest, gembe hills were also identified along the project area. These support several aquatic and terrestrial animals some of which are of international significance such as the Sitatunga and the Roan antelope.

The area is mainly a rural country where the main air quality pollutants are components of emissions, principally carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), Nitrogen Oxides (NO<sub>x</sub>), Sulphur Oxides (SO<sub>x</sub>) and Particulate Matter (PM<sub>2.5</sub>, PM<sub>5</sub> and PM<sub>10</sub>). The current ambient noise and vibration conditions within the project corridor can be described as low with the exception of urban centres where typical urban noise is experienced and the paved sections where vehicular noise is dominant.

# **Potential Positive Impacts**

Several benefits are envisaged to accrue from the LVRR road project. The most important being spurring socio - economic development and reduction of poverty within the region. The project will also enhance the regional economy and the national economy in general through increased flow of goods and services, especially fish produce to major markets in the region and beyond. Ultimately such gains would contribute to poverty alleviation which is a cornerstone of vision 2030. Other benefits include improvement of access to social facilities, commercialization and value addition for land and buildings, tourism improvement, employment creation among others.

In environmental context, the construction of a bridge across Lake Kanyaboli and provision of several culverts across the rest of Yala Swamp is a positive impact that will re-invigorate the ecological health of Lake Kanyaboli and the associated wetlands.

# **Potential Negative Impacts**

Ranking of potential adverse impacts

	Element	Impacts		
HIGH	Resettlement	Family disruptions and relocation of business premises		
	Fish diversity, habitat pollution and disturbance	<ul> <li>Surface water pollution resulting from works especially Lake Kanyaboli, Potential overfishing in Lake Victoria and Lake Kanyaboli during operation</li> </ul>		
MEDIUM	Hills and mountain ecosystems	<ul> <li>Extent of vegetation clearance associated with quarries</li> <li>Exposure to potential over-exploitation of Gwassi hills forest during operation</li> </ul>		
	Ground cover and vegetation loss	<ul> <li>Extensive vegetation clearance required for project foot print</li> <li>Loss of isolated roadside mature indigenous tree</li> </ul>		

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		species
	Soil resources	<ul> <li>Unstable sandy soils across Sango Rita loop</li> <li>Loss of top soil hence alterations of soil profile at borrow pits</li> <li>Land clearance leading to exposure to erosion agents</li> </ul>
	Water resources	<ul> <li>Increased surface runoff and resulting soil erosion from channelled water</li> <li>Contamination of downstream surface water</li> <li>Water abstraction for construction</li> </ul>
	Wetland disturbance	<ul> <li>Creation of access road and deviations across Yala wetland</li> <li>Clearing the road foot print</li> <li>Works across Yala wetlands</li> <li>Enhanced access to the wetland potentially escalating resource exploitation</li> </ul>
	Noise and excessive vibration above ambient	Use of plant and equipment, construction traffic, blasting at quarries and long term vehicular noise
	Ecologically sensitive areas	<ul> <li>Works across the wetlands</li> <li>Works across Bala springs</li> <li>Encroachment – Yala Swamp</li> </ul>
	Land use compatibility and aesthetics	<ul> <li>New road through new alignments</li> <li>Change of visual quality (borrow pits, quarries, vegetation removal)</li> </ul>
	Air pollution	<ul> <li>Increased CO<sub>2</sub> emission from use of fossil fuel</li> <li>Dust and/or smoke generation during works</li> </ul>
MO	Alteration of mammalian, avifauna, reptilian and other invertebrate population	<ul> <li>Likely effect on wildlife number, diversity, breeding and eating habits</li> <li>Extent of vegetation clearance required</li> </ul>
	Geology and Hotsprings	Geological sensitivity of hotsprings
	Social disturbance	<ul> <li>Impacts on commercial activities at local centres and pedestrian movements</li> </ul>

# **Summary of Potential Impacts and Mitigation Measures**

Parameter	Potential impact	Proposed mitigation measures
Land acquisition, relocation and social disruption	This is the highest potential impact. Social disruption may occur as a result of displacements and relocations, through works across busy centres and through construction traffic.	A full Resettlement Action Plan (RAP) should be prepared prior to commencement of construction works. Where land is acquired, those affected should be appropriately compensated in advance, assisted to relocate and their means of livelihoods restored. Advance notice should be given the population/persons/institutions likely to be affected
sh resources	Disturbance and pollution of the fish habitats with emphasis on the wetlands.	The contractor shall cease bridge foundation works at all bridges between the months of April and May which coincide with the rainy season and fish breeding season at all major rivers. The contractor to restrict activities to project footprint across Yala Swamp and use best construction activities to avoid pollution and minimize disturbance
E E	Enhanced beach access, hence improved fish demand	Strong enforcement of fishing regulations by the Fisheries Departments in the respective counties.

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ifauna	or loss of fish population and diversity in the long term. This could occur in Lake Kanyaboli and the areas around the beaches south of Winam Gulf. Habitat disturbance footprint which may lead to disruption of the food chain, migration of birds and potential subsequent biodiversity loss.	meet the continuous increasing demand for fish is proposed KENHA should consider collaborating with CBOs dealing with wetland conservation to facilitate communit sensitization on the wise use and maintenance of wetlands. Keep site clearance to the project footprint and avoid of minimize clearance beyond the project corridor. Time sper around the sensitive bird areas should be minimized be adequately planning for the works and avoiding equipmer idling time. Construction activities within Yala swamp an
Av		around Dunga wetland should be reduced between April to June which coincide with the breeding and nesting seasons of the birds.
an resources	Habitat disturbance and interference with the feeding and breeding habits at specific spots of Yala swamp, riparian zones of Rivers Nzoia, Yala, Kuja, Migori and	Collaboration between KENHA and KWS should be initiated to formulate suitable approaches that would ensure the road is not a factor in any threats to wildlife. Such actions include erection of informative billboards across Yala Swamp, Lake Kanyaboli crossing, Lisuka / Bodi and Gwassi areas.
Mammali	other streams. River Yala hosts the threatened sitatunga antelope that could be threatened in the long term.	The contractor should ensure that no construction worker kills any wild animal and that construction workers should report any cases of wildlife poaching to the contractor who will report to the RE.
	Disturbance, fragmentation and reduction of the wetland coverage, though the latter is insignificant.	Proper rehabilitation of the disturbed areas outside the road footprint across all wetlands after completion of works must be achieved. Keep vehicles on established access roads and minimize foot traffic by workers. These actions amongst others should be contained in the sub plans that the contractor will develop.
Wetlands		To the extent possible construction works involving heavy equipment and machinery should be scheduled during the dry season to minimize soil compaction.
	Creating all weather access to Yala wetland could lead to accelerated exploitation of the wetland resources such as	KENHA shall collaborate with the county government and CBOs for community sensitization on the wise use and maintenance of wetlands.
	<i>Bambusa vulgaris, Cyperus papyrus</i> and fish	Consider erecting informative billboards on wise use of resources and the importance of the wetlands
Insecta and road safety	Heavy swarms of may fly or lake flies (Chaoborus spp) could affect motorists' vision on sections south of Homa Bay	Design a road sign warning motorist of this potential safety issues and install along the affected sections between sori and Nyandiwa

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Invasive plant species	These have the potential colonisation of newly cleared or excavated sites within the project area by weeds especially <i>Prosopis juliflora, Parthenium hysterophorus</i> and <i>Opuntia opuntia</i>	A plan for control of noxious weeds and invasive plants that could occur as a result of new surface-disturbing activities at the site should be developed. Spread of the weeds should be carefully monitpored	
resources	Water pollution arising from contamination runoff and chemical pollutants originating from contractor's camp, asphalt plant and sites of concentrated works. Works across wetlands	Uncontrolled water discharges should not be allowed to be channelled into water sources and camp sites, waste disposal and soil dumping areas should be located at least 20 m away from the highest water point of any surface water body. Grey water should be channelled to a soak pit to prevent mixing with run off that would eventually find their way to nearby water sources. All stockpiles should be covered especially during the rainy season	
Water	Pressure on water resources as a result of abstraction from the water sources within the project area.	Water permits for the abstraction of water shall be obtained from WARMA to ensure that existing water rights and uses will not be affected by the road project for its diverse water needs. Consultations with the Water Resource Users Association (WRUAs) should be done prior to abstraction to gain their support	
	Soil erosion can occur during and after removal of vegetation cover during site clearance, exposing the soil to water and wind erosion	Practice sound road engineering by maintaining good drainage and natural water flows. However, the drainage ditches should only be constructed where necessary. The contractor should develop an erosion control and revegetation plan to delineate measures to minimize soil loss and reduce sedimentation to protect water quality especially for sections that will interact with water resources.	
resources		Works should be limited to cleared areas to project footprint to avoid unnecessary exposure of soil to agents of erosion and line side-drains with concrete or by stone pitching in erosion prone soils to avoid gully formation	
Soil	Physical degradation of soil occurring due to excavation and ground clearance as well as material sourcing.	Create awareness with the locals along Kadianga loop (Sango Rota) on the need to protect road embankments from sand mining	
		KENHA to consider prohibiting all types of mining and resource exploitation on their road reserves country wide. Contracts between the material site owners and the contractors should be looked at or verified by the RE to ensure restoration measures are incorporated	
Soil Pollution	Soil pollution as a result of accidental oil and fuel spills	The contractor to use Best Engineering Practices	



Paleontological and cultural resources	Chance find especially within contracts 4 and 5	Report any chance find to the National Museums of Kenya and cease all works in the area immediately
Vegetation Resources	Vegetation loss as a result of vegetation clearance for the project footprint estimated at around 385 ha mostly along new roads	Compensatory tree planting at a ratio of 1:2 shall be adopted, i.e. plant cumulative total of about 768 ha anywhere within the project area. Except to the extent necessary for establishing the construction site and carrying out the construction works, vegetation shall not be removed, damaged or disturbed nor should any unauthorised planting of vegetation take place;
Waste management	Solid waste generated from road works and associated installations such as camps, plants and material sites	The contractor shall develop a comprehensive waste management plan that must meet basic requirements of the NEMA Waste Management Regulations. Implementation of the plan is Construction workers shall be sensitized on the need for proper waste disposal
Hazardou s materials	Fuel, oil and hazardous substances	A safety and emergency response plan will need to be developed for all operations with emphasis on the protection of the environment prior to start up. The contractor is also expected to develop hazardous materials management plan
Air quality	Air pollution, especially dust will be important to the same sensitive receptors as for noise, especially those located within 200m of the road.	Restrict excavations to the project foot-print to minimize surfaces exposed to wind erosion. The contractor should inform the management of sensitive institutions on the days that excess dust is likely to be generated so they can be prepared. The same applies to works along the urban centres.
0	Noise pollution which can affect the sensitive receptor areas 200m from the project road These are 284 Schools; 215 Places of worship;	Exploit quarries that are located in isolated areas away from settlements or human made structures. Employ careful blasting methods and warn nearest residents of you intention to blast one week to scheduled blasting. Follow National Guidelines on use of explosives.
se and vibrations	127 Towns / Market centres / Adminsitrative centres and 51 Health facilities totalling 677	Carefully select batching plant locations that are at least 200m away from any sensitive institutions or settlements
	sensitive facilities.	Restrict working hours to daytime when ambient noise levels are generally high and avoiding work at night
		Inform potentially affected people or institutions located within 200 m of a potentially noisy activity at least one week in advance - of the intention to undertake noisy operations and advice on the timing
	Noise pollution that will be occasioned by increased	Vehicles using the road should adhere to the Traffic Act where they are supposed to keep the vehicles in roadworthy

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	traffic in the project area in relation to the sensitive	conditions; Maintain the road to keep standards
	receptors indicated above.	Where possible the bus stops should be sited at a reasonable distance (200m) from the sensitive receptors
Construction material sourcing	The borrow pits and quarries used for material sourcing if not properly rehabilitated shall remain of poor quality and unproductive besides being visually intrusive. Furthermore, they may be a source of accidents	Rapid environmental appraisal of material sites, sand pits and quarries are contained in Volume 2 of this report. Environmental Impact assessment studies will be required for all borrow pits. For borrow pits the contractor should prepare a borrow pit and quarry rehabilitation and management plan to be used during the construction phase of the project and to be approved by the RE. Out of the 75 material sites identified five were deemed of high risk and not recommended. The rest are recommended but with varying degrees of caution.
Occupational Safety and Health	Accidents, occupational diseases, ill health and damage to property can occur during the project life cycle if precautionary measures are not taken.	Follow OSHA regulations at all times

### **Conclusion and recommendations**

The findings of this Environmental and Social Impact Assessment indicate that the overall impact of the Lake Victoria Ring Road project is positive on the socio - economics of the project. However as expected for such large scale projects, land acquisition is inevitable in some sections especially along Contract 3. This is the only potential impact that is rated high. There are some potential negative impacts on the bio - physical environment with the impacts on fish resources, vegetation, soil resources, and wetlands all rated moderate. The other potential impacts are expected are considered low both during the construction and operational phases of the project. However, all the impacts rated moderate to low can be sufficiently mitigated using the measures that have been proposed in this report.

The most significant feature that will lead to positive impact is the proposed bridge across Lake Kanyaboli. The bridge will replace the existing causeway and this is expected to improve the ecological health of the lake. On the other hand the road may open up the wetland to potential over exploitation of the resources in the future. This will call for awareness creation among the locals.

Sand mining across lower Nyakach contract 4 is likely to escalate as a consequence of the paved all weather road offering easy access to the area. However, as a long term measure, KENHA should gazette regulations that expressly prohibit all mining activities within all road reserves unless for use in road maintenance.

We have proposed compensatory tree cover to be undertaken in conjunction with the Kenya Forest Service for the permanent loss of vegetative cover. Impacts on faunal resources are expected to be low to insignificant; however there could be indirect impacts on the threatened sitatunga antelope in Yala Swamp during the operational phase. The seasonal emergence of the swarming insect Chaoborus spp (locally called sam) close to the lake can be a road safety concern to motorists in the

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future once the road is completed. It is recommended that KENHA designs a suitable cautionary road sign for motorists.

Indirect off-site impacts relate to vegetation resources that are presently in remote hard-to-access highlands in Migori County. Similarly enhanced access to beaches especially in Migori county has the potential to encourage over-fishing in the long term. A pro-active harvesting control of these resources should be seriously considered by relevant agencies.

Rapid environmental screening was done for material sites namely Borrow Pits, Sand Pits and Quarries and presented in Volume 2 of this report. Resettlement Action Plan (RAP) for the project that has been developed alongside this ESIA proposes measures and actions that will sufficiently address land acquisition and relocation issues. The overall conclusion is that the mitigation measures proposed for the various potential negative impacts should be implemented at all stages of the project. Bespoke Environmental and Social Management Plan (ESMP) that aims to ensure mitigation measures are taken up during construction is presented in Volume 3 of the ESIA report. Implementation of the safeguard measures proposed therein should be strictly enforced during construction.

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# LIST OF ACRONYMS

AIDS	Acquired Immuno-Deficiency Syndrome	
СВО	Community Based organization	
СН	Chainage	
CIDP	County Integrated Development Plans	
СО	Carbon monoxide	
CPP	Consultative Public Participation	
CRC	County Resettlement Committee	
CSR	Coperate Social Responsibility	
DOHS	Directorate of Occupational Health and Safety	
EMCA	Environmental Management and Coordination Act	
ESA	Environmentally Sensitive Area	
ESIA	Environmental and Social Impact Assessment	
ESMP	Environmental/Social Management Plan	
FGD	Focus Group Discussions	
FIDIC	International Federation of Consulting Engineers	
GoK	Government of Kenya	
НН	Household Head	
HIV	Human Immuno-deficiency Virus	
IBA	International Bird Area	
IUCN	International Union for Conservation of Nature	
ITCZ	Inter-tropical Convergence Zone	
KeNHA	Kenya National Highways Authority	
KeRRA	Kenya Rural Roads Authority	
KFS	Kenya Forest Services	
KIHBS	Kenya Integrated Household Budget Survey	
Km	Kilometre	
KNASP	Kenya National Aids Strategic Plan	
KNBS	Kenya National Bureau of Statistic	
KRB	Kenya Roads Board	
KURA	Kenya Urban Roads Authority	
KWS	Kenya Wildlife Service	
LVRR	Lake Victoria Ring Road	
LVEMP	Lake Victoria Environment Management Programme	
m	Metre	
masl	meters above sea level	
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MCA	Member of the County Assembly
MDG	Millennium Development Goals
NEMA	National Environmental Management Authority
NGOs	Non-governmental Organisations
NMK	National Museums of Kenya
NMT	Non-Motorized Transport
NOx	Oxides of Nitrogen
OD	Origin and Destination
OSHA	Occupational Health and Safety Act
PAP	Project Affected Persons
PAPC	Project Affected Persons Committee
PCR	Physical Cultural Resources
PI	Public Involvement
PM	Particulate Matter
PPE	Personal Protective Equipment
PSV	Public Service Vehicles
RE	Resident Engineer
RHS	Right Hand Side
RMI	Roads Maintenance Initiative
SO2	Sulphur dioxide
STI	Sexually Transmitted Infections
ToR	Terms of Reference
WRMA	Water Resources Management Authority



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### **INTRODUCTION** 1

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#### 1.1 Overview

Egis International in association with Egis Kenya Ltd. was contracted to carry out Preliminary Design, Detailed Engineering Design and Preparation of Tender Documents for the Construction of the Lake Victoria Ring Road (LVRR) which traverses 5 counties. The road is expected to be a major linkage point between the various beaches as well as offer access to the areas around the project areas. Preparation of this Environmental and Social Impact Assessment (ESIA) report was one of the tasks that were expected to be delivered as part of the contract.

This ESIA report has been carried out according to the requirements of Environmental Management and Coordination Act (EMCA) 1999 (Revised, 2015) and Environmental (Impact Assessment and Audit) regulations, 2003. Further, this study was carried out in accordance with the terms of reference issued by the client as well as the World Bank standards since the project is funded by World Bank. The objectives of the study included documenting the baseline conditions of the project environment, identifying the anticipated positive and negative impacts as a result of the project, identifying mitigation measures for the negative impacts, developing an environmental and sociaL management plan and formulating an environmental and social monitoring plan.

#### 1.2 Project Objectives

The Lake Victoria Ring Road project is expected to create major linkages that will:

- Facilitate easy access from the national road network to all points on the lakeshore by providing a road running parallel and in close proximity to the lakeshore and connecting this road to the rest of the national road network at suitable intervals and positions
- Improve the economic growth prospects of the riparian area around Lake Victoria
- Help the security sector to respond to insecurity and distress calls from the remote areas that are currently very difficult to access
- Upgrade certain sections of currently unpaved alignment to bitumen standard while linking to existing paved sections that will receive periodic maintenance or rehabilitation if necessary

#### 1.3 Justification of the project

Lake Victoria is the largest freshwater body in Africa and lies within southwestern Kenya, south eastern Uganda and north western Tanzania. The lake enables water-borne transport services and is a substantial source of fish protein. At present, poor road access to the lake shore on the Kenyan side constrains the economic growth prospects of the riparian areas by limiting the benefits of water transport and hindering the evacuation of fisheries produce while slowing governmental response to local situations. In order to realise the full socio-economic potential available from the presence of the lake, the Government of Kenya intends to facilitate easy access from the national road network to all points on the lakeshore. This will be achieved by providing a road running parallel and in close proximity to the lakeshore (the "ring road") and connecting this road to the rest of the national road network at suitable intervals.

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#### 1.4 **EIA** Objectives

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#### 1.4.1 **Broad Objective**

This Environmental and Social Impact Assessment (ESIA) report has been prepared to identify significant linkages of the road project to the environmental and social settings of the project. The ESIA report provides management plans and intervention actions that are based on physical environmental and social features, defined timelines and implementation cost elements. The management actions are also based on design concepts and principles.

# 1.4.2 Specific Objectives

- To collect and document environmental and socio economic baseline data for the project
- To identify potential environmental impacts of the proposed LVRR project
- To assess the significance of these impacts
- To assess the relative importance of the impacts of alternative plans, designs and sites
- To propose mitigation measures for the significant negative impacts of the LVRR project on the environment
- To generate baseline data for monitoring and evaluation of the efficiency of those measures being implemented during the projects' cycle
- To present information on the impact of alternatives

#### 1.5 Justification of the ESIA

The Lake Victoria ring road project falls in the category of projects listed in the second schedule of the EMCA, 1999 (Revised, 2015) that require an ESIA to be done before their implementation. This ESIA report will also be used as a tool to enumerate the anticipated environmental impacts and to evaluate their magnitudes. The report will also suggest the mitigation measures for the identified negative impacts as well as generate an environmental and social management plan (EMSP) which will inform the process of decision making on the project.

#### 1.6 **Project** location

The Project is located in West Kenya and covers the roads along Lake Victoria, starting at Bumala (Busia County) in the northwest (close to the Uganda Border) and ending at Muhuru Bay (Migori County) in the southwest at the Tanzanian Border. It crosses 5 counties (from north to south) namely Busia, Siava, Kisumu, Homa-Bay and Migori counties. According to the Terms of Reference (TOR), the LVRR is expected to be continuous and remaining in close proximity (about 500 from the shore) and parallel to the Kenyan shore of Lake Victoria.

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Figure 2-1: The location of LVRR project relative to the general map of Kenya

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### **PROJECT DESCRIPTION** 2

#### 2.1 Road alignment

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The project corridor includes several sections of existing paved and unpaved roads, which have been integrated into the LVRR: as far as their current location responds to the purpose of the project. In some instances, local realignments may have been proposed in order to comply with the chosen standards. The different sections of the project can be divided into 3 different categories, as described below:

#### 2.1.1 Existing paved roads

Where the existing paved roads location and alignment are suitable for the project requirements, they have been incorporated into the Ring Roads. Horizontal alignments and vertical profiles have been evaluated in order to confirm compliance with the chosen standards, and some minor re-alignments proposed in some particular areas.

#### 2.1.2 Existing unpaved roads

Where the existing unpaved roads location and alignment are suitable for the project requirements, they have been incorporated into the Ring Roads. Horizontal alignment and vertical profile have been checked in order to confirm compliance with the chosen standards, and some re-alignments proposed locally, in order to obtain a smoother alignment, and preserve local activities and habitations.

The existing cross section will be widened in order to comply with the chosen road category's standards.

All the sections will be upgraded to bitumen standards. Road drainage will also need to be improved in order to ensure the road sustainability.

It is expected that most of the existing structures will require replacement in order to comply with road standards. Some protection works may be required in structures proposed to be retained and incorporated into the works in order to prevent the structures from being undermined further due to erosion as observed in several bridges.

#### 2.2 New alignments

Some new alignments have been studied in some sections, either because there is presently no existing road, or because the existing alignment does not meet the project's requirements.

# 2.2.1 River crossings

The alignment crosses a number of rivers namely: Nzoia River, Yala River, Mugu River, Sondu River, Riwa River and finally Kuja River. All of these rivers originate from the highlands located all around the Lake and flow mainly from east to west direction crossing the project road from left hand side to the right hand side (considering the project going from North to South).

There are several small and other medium drainage channels currently crossed using single and multiple cells Pipe and Box culverts. Generally most of the crossings have hydraulically deteriorated overtime with some small and medium size crossings being either silted or clogged at the entrance and the exits.

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#### **Design standards** 2.3

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#### 2.3.1 Geometric standards

The project road is designed according to the "Road Design Manual - Part 1: Geometric Design of Rural Roads", issued by Ministry of Works, Roads Department in January 1979.

The proposed alignment follows the existing alignment as far as is possible except in sections where the existing alignment requires improvement so as to achieve minimum design standards and/or safety requirement.

The design attempts to avoid affecting people's houses and other properties on both sides of the existing road. The general effect on existing properties has been minimized as much as feasible.

#### 2.4 Road classification

The project road is a primary road designated as class C and provides a link along the Lake shore. It facilitate easy access from the national road network to all points by providing a road running parallel and in close proximity to the lakeshore and connects this road to the rest of the national road network..

The major function of Class C roads is to provide both mobility and access.

#### 2.5 Access control

In consideration of the Primary roads (Class C) category of the project road, partial access control should ideally be exercised. This means that the authority to control access is exercised to give preference to the through traffic to a degree such that in additional to access connections with selected public roads, private access connections have also been incorporated.

The degree of private access connections has been determined purely by the nature of land use along the project road. Nevertheless, some of the roads partially included within the Ring Road have been proposed for re-classification to upper class:

- A12: IBD Busia Kisumu Kericho Mau Summit (previous B1);
- B1: Muhuru Bay Kehancha Lolgorian Ololunga (previous C13);
- B10: Osieko Bondo Kisian (previous C27);
- B2: Masara Sori Sindo Mbita Homa Bay Kendy Bay Katito (previous C19/D210);
- B9: Luanda Kotieno Bondo Siaya Rang'ala (previous C28/D246).

#### Road reserve width 2.6

The desirable road reserve width applicable for a Class C road is 40m, according to the Road Design Manual. This has been adopted for the entire project road. Locally, the necessary right of way can exceed the 40 m corridor (deep cuts/fills).

Though a number of buildings within some centres along the road will be affected by the 40m road reserve, it is reasoned that it is a better long term solution to adopt this reserve width now (and pay

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appropriate compensation) and enhance safety operation and appearance of the road as well as for provision for future road connections, changes in alignment, road width and development of future junctions.

#### 2.7 **Cross-section**

#### 2.7.1 Cross section type

The design proposes cross - section type II as described in the road design manual having considered traffic volume, selected design speed and the road function. Table 4.2.1 in Chapter 4 of the Road Design Manual, defines the standard Type II cross-section as follows:

# Table 3-1: Typical cross section as per Road Design Manual

Туре	Lanes	Surfacing	Total Width	Shoulder Width	Carriageway width	Normal Cross-fall
II	2	Bitumen	10.00 m	1.50 m	7.00 m (2 x 3.50)	2.5 %

It is important to note that regarding recent major roads currently under construction or constructed, the Ministry of Road has adopted 2.00m shoulders, instead of the standard 1.50 m.

Therefore, and due to the safety issues, including presence of many pedestrians along the project road, the design has adopted 2.00 m on the outer shoulders generally (except where climbing lanes or bus bays are present, and in urban sections of road where footways are present). However, a berm of 0.50 m will be created in fill in order to put guardrails where it is required according to the contents of Note 1, appertaining to Table 4.2.1 in Chapter 4 of the Road Design Manual.

The following Table defines the cross-section proposed for the project:

# Table 3-2: Typical cross section proposed for the project

Туре	Lanes	Surfacing	Total Width	Shoulder Width	Carriageway width	Normal Cross-fall
II	2	Bitumen	11.00 m	2.00 m	7.00 m (2 x 3.50)	2.5 %

On the sections which are already paved, systematic widening is proposed wherever the existing cross section does not meet the above requirements, except on the following sections:

- Got Bondo to Homabay
- Oseno to Mbita.

Indeed, these 2 sections already present 7.0 m carriageway and 1.50 m shoulders, which is already compliant with the standards. Moreover, considering that overlay is required, a widening would not be economically viable.

# 2.7.2 Fill and cut slopes

Chapter 4 of the Road Design Manual defines some recommendations for fill and cut slopes as follows:

Table 3-3: Fill and Cut slopes as per Road Design Manual

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Fills		Cuts		
Height of Fill	Fill Slope	Depth of Cut	Cut Slope	
hf ≤ 1.00 m	4H / 1V	dc ≤ 1.00 m	3H / 1V	
1.00 m < hf ≤ 3.00 m	2H / 1V	1.00 m < dc ≤ 3.00 m	2H / 1V	
3.00 m < hf	3H / 2V	3.00 m < dc	3H / 2V	

Considering the geological and geotechnical context of the project, these recommendations have been adapted to the type of soils and materials encountered along the project route.

The following table defines the fill and cut slopes proposed for the project:

Table 3-4: Fill and Cut slopes proposed for the project

Fills		Cuts		
Height of Fill	Fill Slope	Depth of Cut	Cut Slope	
Rock fills		Rock cuts		
hf ≤ 10.00 m	1.5H / 1V	dc ≤ 10.00 m	1H / 1V	
hf > 10.00 m	2H / 1V	10.00 m < dc ≤ 20.00 m	1.25H / 1V	
-	-	dc > 20.00 m	1.5H / 1V	
Soil fills		Soil cuts		
dc ≤ 5.00 m	2H / 1V	hf ≤ 1.00 m	4H / 1V	
dc > 5.00 m	3H / 1V	1.00 m < hf ≤ 3.00 m	2H / 1V	
-	-	3.00 m < hf ≤ 6.00 m	1.5H / 1V	
-	-	hf > 6.00 m	2H / 1V	

Rock fills slopes have been applied in all the swampy areas crossed by the project where rock fills have been proposed whereas soil fills slopes have been applied elsewhere. Rock cuts slopes have been applied in the mountainous section majorly between Mbita and Sori whereas soil cuts slopes have been applied elsewhere. Refer to Part 2 - Materials and pavement Design for the detailed assessment.

#### 2.7.3 Longitudinal drainage ditches (side ditches and cut-off ditches)

Side and cut-off ditches types shown in Figure 4.3.1 of Chapter 4 of the Road Design Manual have been adopted for the project road, and selection was made following the guidelines provided in Table 4.4.1 of the same.

Erosion control measures are proposed in all side ditches susceptible to scour or erosion and a schedule of the same is provided in the book of drawings.

#### 2.7.4 Cross fall and super elevation

In accordance with Table 4.2.1 of Chapter 4 of the Road Design Manual, the adopted normal cross fall on the project road is 2.5% on the carriageway and 2.5% on the shoulders. The 4% shoulders were indeed recommended in the manual since in early designs; the shoulders were of inferior material and needed a steeper slope for drainage purposes. Since both the shoulders and carriageway will be sealed, the need for 4% slope in the shoulders is no longer necessary.

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Proposed maximum super elevation is 6% along the project road, in accordance with the stated requirements of Section 5.3.4 of the Road Design Manual.

Super elevation is applied about the centreline and in accordance with the requirements of Section 5.3.4 of the Road Design Manual.

# 2.7.5 Pavement widening

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Pavement widening on horizontal curves is applied in accordance with requirements of Section 4.6 of the Road Design Manual.

#### 2.8 Design speed

Table 3.7.1 from Chapter 3 of the Road Design Manual, provides the following guidance in the selection of appropriate design speeds for different terrain categories and for Class C roads:

Table 3-5: Guide v	alues for design	speed as per F	Road Design Manual
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Terrain	Road Class C
Level	90-100
Rolling	60-90
Mountainous	40-60

The following design speeds have been proposed according to the topography:

- Level terrain: a design speed of 100 km/h has been considered wherever terrain and safety conditions allow.
- **Rolling terrain**: a design speed of 80 km/h is adopted in those areas.
- Mountainous terrain (e.g. from Sindo to Karungu): as per Road Design Manual, and in order to reduce the magnitude of earthworks required, to the design adopts a design speed of 50 km/h in those areas.
- Villages and town crossings: for safety purposes, the design speed in villages and town crossings is 50 km/h.

#### 2.9 Sight distance

In accordance with Section 5.2 of the Road Design Manual, the design provides for at least all the minimum stopping site distances. Passing site distances are maximized wherever possible, but where the desired passing sight distances cannot be provided due to physical/economic constraints, appropriate road markings are designed to prohibit overtaking at these locations, in order to improve road safety.

The sight distances for the applied design speeds are as follows:

### Table 3-6: Sight distances as per Road Design Manual

Design Speed	50 km/h	80 km/h	100 km/h
Desirable stopping sight distance	60 m (grade 0 %)	130 m (grade 0 %)	200 m (grade 0 %)
Minimum stopping sight distance	55 m (grade 0 %)	100 m (grade 0 %)	140 m (grade 0 %)

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Desirable passing sight distance	250 m	475 m	575 m
Reduced passing sight distance	175 m	325 m	375 m

The minimum value can be used in arid and semi-arid areas where dry road surfaces are likely to be encountered. For this project, the road surface is expected to be wet part of the year and the design has adopted the desirable value of 200 m as the considered stopping site distance for 100 km/h, 130m as the considered stopping site distance for 80 km/h, and 60m as the considered stopping sight distance at 50 km/h.

The stopping sight distance must be checked at every point along the road.

The minimum horizontal radius to ensure the minimum stopping sight distance is R=S<sup>2</sup>/(8\*M), where M & S are defined as follows:



Figure 3-1: Sight distance for horizontal curves

# 2.10 Horizontal alignment

All the horizontal alignment elements are compliant with the requirements of section 5.3 of the Road Design Manual for the horizontal alignment design as presented below:

Table 3-7: Minimum	horizontal r	radius as per	Road Design	Manual
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Design Speed	50 km/h	80 km/h	100 km/h
Minimum horizontal radius	100 m	350m	600 m
Minimum horizontal crown radius	350 m	1200 m	2200 m

# 2.11 Vertical alignment

In accordance with Section 5.4 of the Road Design Manual (Vertical Alignment) the maximum gradients to be used in the vertical alignment design for the project road, for different design speeds and topography categories, are tabulated below:

Table 3-8: Maximum gradient as per Road Design Manual

Design Speed	50 km/h	80 km/h	100 km/h
Flat	-	4 %	3 %
Rolling	7 %	5 %	4 %
Mountainous	9 %	-	-

In practice the following maximum values have been adopted:

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### Table 3-9: Maximum gradient adopted for the project

of

Design Speed	50 km/h	80 km/h	100 km/h
Flat	-	4 %	4 %
Rolling	7 %	5 %	-
Mountainous	8.2 %	-	-

Minimum sag and crest curves values have been calculated based on the sight distance, according to Figure 5.3.1 of the Road Design Manual. Considering the applied sight distances, sag and crest curves values adopted for the project are as follows:

## Table 3-10: Minimum sag and crest curves as per Road Design Manual

Design Speed	50 km/h	80 km/h	100 km/h
Minimum sag curve	1100 m	3000 m	5000 m
Minimum crest curve (stopping distance)	400 m	4000 m	10000 m
Desirable minimum crest curve (passing distance)	8000 m	11000 m	15000 m

# 2.12 Project contracts

The Preliminary Design phase of the project has divided the project into 6 contracts:

- Contract 1: Bumala Nyamonye/Kadimu (Total: 95.8 km) 77.4 km of main alignment (paved and unpaved sections) 18.4 km of spur road to Osieko (paved)
- Contract 2: Nyamonye/Kadimu Asembo (Total: 77.3 km) 68.3 km of main alignment (unpaved) 9.0 km of spur road to Luanda Kotieno (paved)
- Contract 3: Asembo Otonglo (Total: 52.8 km) 46.3 km of main alignment (unpaved) 6.5 km of spur road to Dunga Beach (unpaved)
- Contract 4: Katito Homabay (Total: 100.4 km) 92.7 km of main alignment (paved and unpaved) 7.7 km of spur road to Olambwe (unpaved)
- Contract 5: Homa-Bay Nyangwethe (Total: 71.3 km) 71.3 km of main alignment (unpaved)
- Contract 6: Nyangwethe Muhuru-Bay (Total: 70.7 km) 70.7 km of main alignment (unpaved)

The Total length of the project is 468.3 km. In addition, the following spur roads were considered in the economic model in order to assess their costs and benefits, and will be incorporated to the project as provisional sums, to be studied by the contractors:

- Spur road to Port Bunyala/Victoria: 3.2 km;
- Spur road to Uhaya Beach: 5.5 km;
- Spur road to Sirongo Beach: 7.8 km;
- Spur road to Kamuga: 3.5 km;
- Spur road to Kaloloni Beach: 11.2 km;
- Spur road to Nyandiwa Beach: 2.6 km;
- Spur road to Muhuru Beach: 6.0 km;

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Spur road to the Tanzanian border: 3.2 km.

The total cumulative length of proposed additional spur roads is approximately 43 km.

# 2.13 Description of the alignment

The characteristics of the alignment of existing roads along the project has been described in this section. The right of way required for the project, and expected impacts are presented in the subsequent sections of this document.

## 2.13.1 Contract 1: Bumala to Nyamonye (total length 95.8 km)

The works comprise of Construction and development of a section of The Lake Victoria Ring Road from Bumala to Nyamonye and including rehabilitation of the section from Nyamonye to Osieko along Bondo - Usenge - Osieko Road. The project length is approximately 77.4km from Bunyala to Nyamonye and 18.4 Km from Nyamonye to Osieko.

### CH 0+000 to CH 13+400:

The road alignment starts at the junction of C778 road (Bumala - Nangina road), and A12 road (Kisumu – Busia road). From Bumala to Nangina, the alignment follows the existing C778 road, which is paved, in a relatively good condition. Terrain is relatively flat, and the section does not present any particular difficulty. It crosses the villages of Ligingo and Funyala, where particular attention to safety issues is required.

The current geometry is mainly compatible with an 80 km/h design speed, except for few sharp curves. These curves, comprised between 175 and 330 m radius, represent a total length of around 940 m (e.g. 7 % of total length). They are located within town areas, and the speed limit will therefore be limited to 50 km/h. Only a short section (3+700 to 6+300) allows a speed of 100 km/h.

Regarding to the vertical profile, the existing road profile complies with an 80 km/h design speed, whether it concerns curves parameters or grades (maximum grade: 4.9 %).

The pavement-surfacing layer consists of a single seal, which is underlain by a lateritic base. The overall extent of defects is below 10%.

### CH 13+400 to 23+400:

This section follows the existing C828 (Nangina – Sio Port – Budalangi road), which is currently an unpaved road.

The horizontal alignment does not comply with an 80 km/h design speed. Several curves are sharp, with radius values around 100 m or less. The alignment therefore needs to be improved to comply with the expected level of service.

The topography along this route is relatively flat, and presents no particular difficulty, excepted from a short hilly section from CH 34+300 to CH 36+550, where the grade approaches 6 %.

### CH 23+400 to CH 34+400:

The crossing of Sio Port presents very sharp curves (30 to 55 m radius), with several junctions. The proposed alignment bypasses the town centre, before joining the existing E1202 earth road. The

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topography along this route is relatively flat, and presents no particular difficulty. Nevertheless, the current alignment corresponds to a low standards road. Alignment will therefore be improved.

### CH 34+400 to 41+500:

South of Sisenye, the E1202 road ties in road C828, but the project alignment continues along the shore, going around the western side of Nzagalobe hill. This can be considered as a new road, as there is currently only a small path on part of the project road. At CH 40+750, the alignment joins the existing C828 which in this section is paved, for a short stretch.

### CH 41+500 to 77+400:

From CH 41+500, whereas the paved road continues towards the jetty of Port Bunyala/Port Victoria (end of the road currently under construction), the Lake Victoria Ring Roads alignment quits the C828 and leads towards Nzoia River. There is currently no bridge to cross this river, which represents an important disconnection point regarding mobility along the shore. A new bridge is however currently under construction by Kenya Rural Roads Authority (KERRA) together with approach roads on both sides. The current horizontal alignment in this area presents curves between 100 and 200 m radius, which complies with a 50 km/h geometry. The southern approach road joins the existing unpaved C827 (Magombe - Boro road) from CH 44+500 to 49+850, this existing road sections follows the edge of the Yala Swamp, with a relatively smooth geometry, except for a 50 m horizontal radius at CH 47+300 (C827). Then the alignment follows E1163 towards Lake Kanyaboli from CH 49+850 to 60+900, with several minor realignments.

From Lake Kanyaboli crossing, the alignment follows an existing unpaved road (reclassified as C839, Nyamonye - Siaya road), with a relatively sinuous geometry along Dominions Farm. Due to the presence of sharp curves (minimum radius: 40 m), several realignments are necessary.

Regarding to vertical profile, the whole section is mainly flat, with most of the natural grades being close to 0 %.

From CH 72+550, the alignment crosses Yala River, and gets out of the Yala swamp area, meeting a gently rolling section. Some minor re-alignments are necessary to improve the horizontal alignment, whereas the existing vertical profile presents a grade around 6.5 %.

At CH 77+400, the alignment joins the existing paved B10 road (Osieko - Bondo road) in Nyamonye/Kadimu.

### Section Nyamonye to Osieko (18.4 km):

Due to the difficulty of Yala Swamp crossing on the western side, Osieko is left out of the main alignment. Nevertheless, rehabilitation is considered from Kadimu/Nyamonye to Osieko, through Usenge. This road follows the existing B10, already paved. The horizontal geometry presents few curves which are not compliant with a design speed of 80 km/h, with some radii comprised between 150 and 300 m. The topography along the section is relatively flat, except in located areas.

## 2.13.2 Contract 2: Nyamonye to Asembo (70.4 km)

The works comprise of Construction and development of a section of The Lake Victoria Ring Road from Nyamonye to Asembo and including rehabilitation of the section from Ndigwa to Luanda Kotieno

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along Ndori - Lwanda Kotieno Road (B9 Road). The project length is approximately 70 Km from Nyamonye to Asembo and 12 Km from Ndigwa to Lwanda Kotieno.

## • CH 0+000 to 27+250:

Along this section, the alignment follows a succession of small unpaved roads, presenting poor alignment characteristics. Several curves present radius values below 50 m. Therefore a general improvement is necessary, with partly new alignment.

The topography is relatively flat to gently rolling, with natural grades up to 6.50 %.

### CH 27+250 to 70+400:

At CH 27+250 the alignment joins the C840 (Kipasi - Manywanda - Misori) and the followed alignment is already paved from that point. At Ndigwa, the road ties in the existing paved B9 (Lwanda Kotieno – Bondo – Siaya – Rang'ala road) and then the C838 from Owimbi (Owimbi – Ndori road), and follows the shore up to the North towards Asembo. This complete paved section presents around 20 curves which do not comply with an 80 km/h design speed: 1 curve has a 80 m radius, which does not even comply with 50 km/h design speed (CH 41+600). Amongst the others, half of the curves have radii between 100 m and 200 m, and the rest between 200 m and 350 m. The total length of curves below 350 m radius represents around 8 % of the section. The road being in fairly good condition, it is proposed to improve only the 80 m radius curve, and maintain the geometry on the rest of the alignment, providing speed limitation according to the geometry.

The topography is relatively flat to gently rolling, and the vertical alignment generally presents grades below 4 % and wide vertical curves, except at the end of the section, with few grades between 4 % and 7 % in the last 8 km section.

The entire section-surfacing layer is in the form of a single seal overlying a lateritic and gravely base. The overall extent of defects is below 10%.

## Section Ndigwa to Lwanda Kotieno (12 km):

From Ndigwa, the existing B9 paved road continues towards the South, and ends at Lwanda Kotieno, at the extremity of the peninsula. Even though it was recently reclassified as a Class B road, the horizontal geometry presents several sharp curves, between 100 and 200 m radius, and down to 65 m when reaching Lwanda Kotieno. The topography is rolling in some places, with several short sections at 4 %, and one long and steep grade of around 6 % on nearly 300 m.

## 2.13.3 Contract 3: Asembo to Otonglo (49.8 km)

The works comprise of Construction and development of a section of The Lake Victoria Ring Road from Asembo to Otonglo and including Construction of the section to Dunga Beach. The project length is 46.3 km from Asembo to Otonglo and 3.5 km from Kisumu Impala Park to Dunga beach.

### CH 0+000 to 8+900:

The alignment follows the existing unpaved C842 (Kalandini – Wang'Arot road). The existing horizontal alignment comprises curves from 50 to 100 m radius, corresponding to a design speed below 50 km/h. Therefore it is necessary to provide a smoother alignment.

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Regarding to the vertical profile, the first 2.5 km of this section presents grades between 4.5 % and 6.7 %. The rest of the section is relatively flat, with grades below 4 %.

### CH 8+900 to 18+600:

There is no existing alignment along this section.

### CH 18+600 to 24+000:

The alignment follows a section of the existing unpaved road E137. The horizontal alignment is quite sinuous and will be rectified in order to provide smoother characteristics. The smallest radius value is around 35 m. The topography along this section is relatively flat, and none of the grades exceed 3.5 %.

### CH 22+400 to 27+450:

There is no existing alignment along this section.

### CH 27+450 to 46+300:

The alignment follows several existing small unpaved roads, including part of E1115 and part of D272 (last kilometers, joining to A12 in Otonglo). There are several sharp curves, with radius around 100 m or below (down to 35 m), and the alignment needs to be improved with smoother characteristics.

The topography varies from relatively flat to hilly terrain, with a maximum natural grade of around 7 % at CH 28+100.

### Section Kisumu Impala Sanctuary to Dunga Beach (3.5 km):

From the Kisumu Impala Sanctuary, this section follows the UCB17-KSM (A12 - Orongo Primary -Dunga road) towards Dunga. The paved section ends 250 m before entrance of Kisumu Yacht Club. The geometry is acceptable for a 50 km/h design speed.

## 2.13.4 Contract 4: Katito – Homa Bay (99.2 km)

The works comprise of Construction and development of a section of The Lake Victoria Ring Road from Katito to Homa Bay and including construction of Sango Rota Road. The project length is approximately 92.7 km from Katito to Homa Bay and 6.5 km on Sango Rota Road.

## CH 0+000 to 41+850:

The alignment follows the existing paved B2 (Katito - Homa Bay - Mbita - Sindo - Masara road), from Katito (junction with the A12) to past Kendu Bay. The horizontal alignment of this section is fully compliant with a 100 km/h design speed up to CH 22+700 (except village/town crossings), and with an 80 km/h design speed for the rest of the section. The sharpest curve presents a 650 m radius, which is well above the minimum required. Except for CH 33+250 where the grade is around 4.5 %, the topography along this section is relatively flat, with main of the grades below 2 %.

Except the last kilometre which has an asphalt surfacing layer the remainder has pavement layers that are composed of a single seal overlying a gravel base. The overall extent of defects is indicative of sections that have been significantly deteriorated.

It has to be noted that this section was under maintenance at the time of writing this report.

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## CH 41+850 to 84+400:

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From past Kendu Bay, the alignment follows the existing unpaved road C865 (Kadel - Oriang road) along Nyangweso peninsula up to CH 75+700. The existing alignment presents few sharp curves below 100 m radius, which need to be improved, but no major realignment is necessary. From CH 75+700, the alignment follows smaller earthen roads, on which realignments are necessary.

The topography on this section is relatively hilly, with some 7 % grades in some areas.

## CH 84+400 to 92+700:

From God Bondo, the alignment joins the existing paved B2 road. Towards Homa Bay, the alignment is generally compliant with a 80 km/h design speed, except for 2 curves, with radius below 350 m (respectively 330 m at CH 85+800 and 320 m at CH 86+600). These curves represent around 15 % of length of the road from God Bondo to the entrance of Homa Bay Town. Within Homa Bay, curves are greater than 100 m and therefore fully compatible with a 50 km/h design speed.

The topography on this section goes from relatively flat to gently rolling. There is no major issue regarding the existing vertical profile, the most important grade is around 5.3 % within the town section. The other grades remain below 5 %.

The entire section-surfacing layer is in the form of a single seal overlying a 50 mm Asphalt Concrete, which itself is underlain by a cement treated base. The last 500m in Homa Bay is not covered by a single seal and it seems an AC overlay was carried out. The overall extent of defects is below 10%.

### Sango Rota road

There is an existing earth road, but with poor geometrical characteristics. The first 6 km and last 3 km are located in very close proximity to the shore, which raise some hydraulic issues, and mitigations to prevent flooding of the road will have to be considered if the option is adopted. The topography is flat, with a medium natural grade close to 0%. An additional bridge is required to cross River Sondu/Miriu.

## 2.13.5 Contract 5: Homa Bay to Nyagwethe (71.4 km)

The works comprise of Construction and development of a section of The Lake Victoria Ring Road from Homa Bay Town to Nyagwethe Centre. The project length is approximately 71.4 km.

### CH 0+000 to CH 26+750:

Homa Bay being already congested, the new alignment will avoid crossing the centre. This will help splitting transit and local traffic, and therefore should reduce the congestion within town centre.

From Homa Bay, the proposed alignment quits the existing B2 road, partially following existing small unpaved roads (below E category + small section on E117A). There are few sharp curves, with radius below 100 m, and the alignment needs to be improved with smoother characteristics. There are also short sections of new alignment. The topography is changing from relatively flat to gently rolling. Around 50 % of the section presents grades below 2 %, whereas the other 50 % presents natural grades comprised between 4% and 7 %.

From CH 6+650 to CH 21+000, the alignment goes around Olambwe peninsula. The proposed alignment follows some existing earth roads, but with poor geometrical characteristics. The topography is gently rolling, with grades up to 6%.

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## CH 26+750 to CH 39+450:

From Lwanda to Mbita, the alignment follows the existing paved B2 road. The horizontal characteristics are mainly compliant with an 80 km/h design speed, except for 3 curves, with radius comprised between 150 m and 220 m. These curves represent 5 % of the total length of this section.

The topography presents a succession of relatively flat areas, and slightly hilly sections with grades up to 6.25 %.

The section surfacing layer is in the form of a single seal overlying a 50mm Asphalt Concrete which itself is underlain by what is seemingly a graded crushed stone base. The overall extent of defects is below 10%.

## CH 39+450 to CH 53+400:

This section, going from Mbita to Sindo, follows the existing unpaved B2 road. The horizontal alignment presents few sharp curves (from 35 to 60 m radius) which need to be improved.

From 45+625 to 47+850, the existing geometry exhibits very low standards, and will be realigned.

The topography in this area can be considered as rolling, with few existing grades up to 5%.

It has to be noted that this section was being upgraded with a low traffic volume seal at the time of writing the report.

## CH 53+400 to CH 71+400:

From 53+400, the crossing of Sindo town centre is bypassed by a short new section, closer to the Lake shore, in order to propose a smoother geometry and improve safety in the centre.

This section, going from Sindo to Nyagwethe, follows E114 unpaved road and non-classified roads. This section can be considered as rolling / mountainous. Therefore, the existing geometry is quite sharp, with horizontal curves from 25 m to 100 m. Several realignments are necessary.

Due to the topography, the existing vertical alignment presents several important grades, up to 13 %.

## 2.13.6 Contract 6: Nyagwethe to Muhuru (70.7 km)

The works comprise of Construction and development of a section of The Lake Victoria Ring Road from Nyagwethe Centre to Muhuru Bay. The project length is approximately 70.7Km.

#### CH 0+000 to CH 30+900:

This section, going from Nyagwethe to Karungu/Sori, follows several roads of category E and nonclassified roads. This section can be considered as rolling / mountainous. Therefore, the existing geometry is quite sharp, with horizontal curves from 25 m to 100 m. Several realignments are necessary.

A bypass is also proposed around the town centres of Nyandiwa and Karungu/Sori.

Due to the topography, the existing vertical alignment presents several important grades, up to 13 %

## CH 30+900 to CH 46+950

Just after Karungu/Sori, the alignment joins the existing unpaved road B2. The existing geometry is relatively smooth and only minor realignments in curves are necessary.

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The topography goes from gently rolling, with slopes going up to 6 % locally.

### CH 46+950 to CH 70+730

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The alignment leaves the existing B2 and then crosses Kuja River area, where there is no major existing road. This is therefore partly new alignment, and partly upgrade of E category roads or nonclassified roads. After crossing the swamp area, from CH 65+175 to the end, the alignment joins the existing B1 (Muhuru Bay - Kehancha - Lolgorian - Ololunga road) till the end of the project, which is located in Muhuru (jetty). The sharpest horizontal curve presents a 135 m radius. It needs to be improved in order to achieve a 80 km/h design speed.

The topography along this section is relatively flat, due to in Kuja River swamp area. Slopes are mainly comprised between 0 % and 3%.

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### **ESIA Methodology** 3

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#### 3.1.1 Desktop study

Available literature on the five counties was reviewed in order to get an understanding of the biophysical and social settings within these counties and to get an in-depth understanding of the project areas. These included published and unpublished literature on bio-physical conditions, socioeconomic setting of the project areas and legislative and policy framework applicable to the project. The list of documents and literature that were reviewed are contained in the references sub-section of this report.

## 3.1.2 Scoping

This was carried out to determine the key environmental issues to focus on during the study. Further, it was done to determine the anticipated impacts in the project life cycle. During scoping, main environmental and social issues were identified.

The scoping exercise mainly aimed to:

- Identify potential stakeholders with an interest in the project and inform them of the project and the EIA process
- Determine the spatial and temporal extent of the boundaries for the ESIA as well as the key issues to be addressed in the environmental and social assessment. This was done through a review of relevant background literature on the development in the project area and rapid field assessment in order to focus the environmental and social assessment on key issues requiring assessment and to identify reasonable alternatives
- Focus the study on key and relevant issues for quick decision making
- Identify areas of likely impact and environmental issues that may require further investigation in the subsequent ESIA

## 3.1.3 Fieldwork and study

#### 3.1.3.1 Reconnaissance survey

A reconnaissance survey was conducted from the 19<sup>th</sup> to 27<sup>th</sup> July, 2015 to get an appreciation of the project area.

#### Field survey 3.1.3.2

A detailed fielwork was carried out between 17<sup>th</sup> February and 2<sup>nd</sup> March and 8<sup>th</sup> November to 7<sup>th</sup> December 2016. This was conducted to gather data of the existing environmental and social conditions in the project area, key environmental aspects that were identified through the scoping process and consultations. The survey was conducted for the entire project area.

#### 3.1.3.3 Field survey techniques

The field survey adopted various techniques of baseline data collection on the existing environmental conditions, namely:

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- Direct observations and recordings, including photography, along the proposed alignment and its vicinity
- Sampling an array of environmental parameters
- Use of checklists for determining potential environmental impacts of the proposed project
- Discussions with key informants along the road and its vicinity

### 3.1.3.4 Checklists

Checklists are study instruments that aid in assessing possible environmental impacts during both construction and operational phases of a project. In this study, checklists were utilized to:

- Facilitate identification of potential environmental impacts
- Provide a means of comparing the predicted environmental impacts
- Indicate the magnitude of both positive and negative environmental impacts
- Indicate possible adverse environmental impacts that are potentially significant but about which sufficient information can not be obtained to make a reliable prediction
- Indicate negative potential environmental impacts in the project area, which merit mitigation measures and monitoring during project implementation as well as those that can be mitigated in the design of the project



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# POLICY, LEGAL AND REGULATORY 4 **FRAMEWORK**

### Constitution of Kenya 4.1

of

Environmental rights and freedoms which are presented in Chapter 5 Article 42 of the new Constitution, states that: '...every person has the right to a clean and healthy environment, which includes the right to have the environment protected for the benefit of present and future generations through legislative and other measures, particularly those contemplated in Article 69; and to have obligations relating to the environment fulfilled under Article 70.11...'

In fulfilment of this supreme requirement, it is expected that during the construction of the LVRR, utmost care would be taken to protect the environment from unnecessary degradation that could be attributed directly to the roadworks. The same measures would also apply during its operation.

### 4.2 Legal Framework

### 4.2.1 Environment Management & Coordination Act, (EMCA) 1999 (Amendment, 2015)

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

The Act also provides for the establishment of appropriate legal and institutional framework for the management of the environment.

This Environmental Social Impact Assessment report has been prepared in compliance with this Act.

### 4.2.1.1 Environmental (Impact Assessment and Audit) Regulations, 2003

These regulations are made under section 147 of the EMCA, 1999 (Amended 2015), and contain rules relative to content and procedures of an EIA in the sense of section 58 of the Act. They also contain rules relative to environmental impact audit (EA) and monitoring and strategic environmental assessment (SEA) and regulate some other matters such as appeal and registration of information regarding environmental impact assessment.

It states in Regulation 3 that "These Regulations shall apply to all policies, plans, programmes, projects and activities specified in Part IV, Part V and the Second Schedule of the Act.

Road construction is listed in the second schedule of the EMCA, 1999 (Amended 2015) as one of the projects that must undergo an ESIA prior to its commencement.

4.2.1.2 Environmental Management and Coordination (Conservation of Biological Diversity-BD) Regulations 2006

Part II of the Regulations provides for the conservation of biological diversity through the requirement of an environmental impact assessment for persons who engage in activities that may potentially have an adverse impact on the environment, propose to introduce exotic species in Kenya or **Draft Detailed Design** Part 5 – ESIA Volume 1 Main Report



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unsustainable use of natural resources. These regulations apply to conservation of biodiversity which includes conservation of threatened species, inventory and monitoring of biodiversity and protection of environmentally significant areas, access to genetic resources, benefit sharing and offences and penalties.

The project area has sections considered as environmentally sensitive areas (ESA) like forests e.g. the Gwassi Hills forest, conservation areas such as Lake Kanyaboli Reserve and wetlands e.g Yala Swamp and Dunga wetland. These areas require protection because they host some of the bird (avifauna), mammal and fish (ichthyofauna) species that are listed in the International Union for the Conservation of Nature (IUCN) Red List. The proponent and the contractor will need to ensure that disturbance to these areas is avoided or kept to a minimum.

### 4.2.1.3 Environmental Management and Co-ordination (Waste Management) Regulations 2006

The regulations are found under sections 92 and 147 of the EMCA, 1999 (Amended 2015). These regulations outline requirements for handling, storing, transporting and treatment/disposal of all waste categories including industrial waste, hazardous and toxic waste, pesticides and toxic substances, biomedical wastes and radioactive substances.

Construction of the road is likely to generate waste from construction process and waste generated by construction workers. The proponent and the contractor shall be obligated to ensure that proper waste management plan is generated and implemented effectively.

### 4.2.1.4 Environmental Management and Co-ordination (Water Quality) Regulations 2006

The regulations provide for the protection of lakes, rivers, streams, springs, wells and other water sources. The objective of the regulations is to protect human health and the environment. The regulations also provide guidelines and standards for discharge of poisons, toxins, noxious, radioactive waste or other pollutants into the aquatic environment.

The guidelines on discharge will be relevant anytime there is a discharge of effluent into the environment to ensure that the effluent meets the specified standards before discharge to the water bodies in the project area. The proponent in liaison with the contractor will ensure that the effluent is treated as per the specified guidelines before it is discharged into any of the water bodies around the project area.

Environmental Management and Co-ordination (Wetlands, Rivers Banks, Lake Shores 4.2.1.5 and Sea Shore Management) Regulations 2009

These regulations include management of wetlands, wetland resources, river banks, lake shores and sea shores.

Part II on management of wetlands and wetland resources states that the objectives of the regulations is to provide for the conservation and sustainable use of wetlands and their resources in Kenya to ensure the protection of wetlands as habitats for species of fauna and flora and also to prevent and control pollution and siltation of wetlands.

Part II 5(1) on principles of management of wetlands part 1(b) states that an EIA and EA as required under the Act shall be mandatory for all activities likely to have an adverse impact on the wetland.

Part IV 21(1) states that a developer intending to undertake a project which may have a significant impact on a wetland, river bank, lake shore or the sea shore shall carry out an environmental impact assessment in accordance with the provisions of the Act.

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Part IV 21(2) states that the developer referred to in sub-regulation (1) shall carry out an environmental audit as provided for by the Act, and the Authority to monitor such activities in accordance with the Act.

The regulation is important because the project interacts with a number of water bodies: there are specific sections that apply to the wetlands, rivers and river banks, wetlands and lake shores.

### Environmental Management and Coordination (Noise and Excessive Vibration Pollution) 4.2.1.6 Control Regulations, 2009

This law has given general prohibitions on excessive vibrations, and permissible noise levels. It gives provision related to noise from certain sources such as from motor vehicle, construction at night and noise, excessive vibrations from construction, demolition, mining or quarrying sites.

Facility		Maximum Noise Level Permitted (Leq) in dB(A)	
		Day N	light
(i)	Health Facilities, educational facilities, homes for the disabled etc.	60	35
(ii)	Residential	60	35
(iii)	Areas other than those proposed in (i) and (ii)	75	65

### Table 5-1: Maximum Permissible Noise Levels for Construction Sites (Measurement taken within the facility)

## **Time Frame**

Day: 6.01 a.m. - 6.00pm (Leq 14h)

Night: 6.01 p.m. – 6.00 a.m (Leq 14h)

The project will require reference to this section because of the machines and vehicles used in the construction phase as well as vehicles using the road in the operational phase.

Environmental Management and Co-ordination (Fossil Fuel Emission Control) 4.2.1.7 Regulations 2006

These regulations are contained in the Legal Notice No. 131 of the Kenya Gazette Supplement No. 74, October 2006. They apply to all internal combustion engine emission standards, emission inspections, the power of emission inspectors, fuel catalysts, licensing to treat fuel, cost of clearing pollution and partnership to control fossil fuel emissions used by the contractor.

The fossil fuels in this context are petrol, diesel and kerosene that will be used during the construction of the road. These will be combusted and emitted from the machines and construction vehicles used. Other emission sources include the vehicles that will be using the road as a result of diverted traffic.

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#### 4.2.2 Water Act Cap 372 of 2012

of

This is an Act of Parliament to provide for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water; to provide for the regulation and management of water supply and sewerage services. Water in Kenya is owned by the Government, subject to any right of the user, legally acquired. The control and right to use water is exercised by the Minister administering the Act, and such use can only be acquired under the provisions of the Act. The Minister is also vested with the duty to promote investigations, conserve and properly use water throughout Kenya. Water permits may be acquired for a range of purposes, including abstraction for roads construction.

The directives of this act will be relevant during abstraction and use of water from rivers and lakes within the project area during construction of the road. The contractor may be required to obtain a water use permit depending on the intended use, and the water source.

#### 4.2.3 Occupational safety and Health Act, 2007

This Act applies to all workplaces and workers associated with it; whether temporary or permanent. The main aim of the Act is to safeguard the safety, health and welfare of workers and non-workers. It is thus recommended that all Sections of the Act related to this project, such as provision of protective clothing, clean water, and insurance cover are observed so as to protect all from work related injuries or other health hazards.

Relevant regulations include:

- The Factories (Wood Working Machinery) Rules 1959;
- The Factories (Eye Protection) Rules 1978;
- The Factories (Electric Power) (Special) Rules 1978;
- The Factories (Building Operations and Works of Engineering Construction) Rules 1984;
- The Factories and Other Places of Work (Health & Safety Committees) Rules 2004;
- The Factories and Other Places of Work (Medical Examination) Rules 2005;
- The Factories and Other Places of Work (Noise Prevention and Control) Rules 2005;
- The Factories and Other Places of Work (Fire Risk Reduction) Rules 2007;
- The Factories and Other Places of Work (Hazardous Substances) Rules 2007.

The Act together with the rules will apply directly at all work areas and to all the construction workers as appropriate.

#### Work Injury Compensation Benefits Act, 2007 4.2.4

This Act provides for compensation to employees for work related injuries and disease contracted in the course of their employment and for connected purposes. Key sections of the Act include the obligations of employers; right to compensation; reporting of accidents; compensation; occupational diseases; medical aid etc.

In the event that any accidents or incidents occur during the project cycle, this Act will guide the course of action to be taken.

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#### 4.2.5 Sexual offenses Act, CAP 62, 2006

of

An Act of Parliament to make provision about sexual offences, their definition, prevention and the protection of all persons from harm from unlawful sexual acts, and for connected purposes.

This applies to the construction workers who may be tempted to engage in unwanted sexual acts.

#### Public Health Act CAP 242, 2012 4.2.6

Part IX Section 115 of the Act states that no person or institution shall cause nuisance or condition liable to be injurious or dangerous to human health. Any noxious matter or waste water flowing or discharged into a watercourse is deemed as a nuisance.

Section 118(c) state that any street, road or any part either street or road that is constructed if in the opinion of the medical officer of health is deemed to be offensive or to be injurious or dangerous to health then it is a nuisance liable to be dealt with in the manner provided for in the Act.

The act will be relevant since it will act as a guideline in ensuring that appropriate measures will be taken in accordance to the Act in order to safeguard the health of project workers and the general public within the project area.

#### Physical planning Act, CAP 286, 2010 4.2.7

Section 29 of the Act empowers the County Government to reserve and maintain all land planned for open spaces, parks, urban forests and green-belts. The same Section allows for prohibition or control of the use and development of such an area. Section 30 states that any person who carries out development without development permission will be required to restore the land to its original condition. It also states that no other licensing authority shall grant license for commercial or industrial use or occupation of any building without a development approval granted by the respective County Government.

Since the project will pass through different counties, this Act will be relevant in consultation with the Physical planning departments of the respective counties.

## 4.2.8 Traffic Act CAP 403, 2014

This Act emphasizes that motor vehicles use appropriate fuel. The Traffic Regulations in the Act specify that all the vehicles are required to be well constructed, maintained and used so as not to emit any smoke or visible vapor. This Act also consolidates the laws relating to traffic on all public roads. It also prohibits the encroachment on and damage of roads including land reserved for roads. It also allows the Highway authority the jurisdiction to close the road while carrying out construction works.

The proposed project is essentially under the provision of this Act.

### Public Roads and roads of Access Act, CAP 399, 2010 4.2.9

This is an Act of Parliament which provides legal guidance on roads of public travel and access to public roads. Section 8 and 9 of the Act provides for the dedication, conservation or alignment of public travel lines including construction of access roads adjacent to lands from the nearest part of a public road. Section 10 and 11 allows for notices to be served on adjacent land owners seeking permission to construct the respective roads. Public meetings should be held for purposes of public consultations and notifications before implementing a road project.

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Elaborate public consultations will be required during the planning and design stages and all stages of implementation.

## 4.2.10 Lands Act, CAP 280, 2015

This is an act of Parliament that gives effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources.

In situations where private and public land will be required for the project, then reference shall be made to the Act.

## 4.2.11 Kenya Roads Act, CAP 408, 2012

This is an Act of Parliament which provides for the establishment of the Kenya National Highways Authority (KeNHA), the Kenya Urban Roads Authority (KURA) and the Kenya Rural Roads Authority (KeRRA). It also provides for the powers and functions of the authorities.

The Act legitimizes the proponent to undertake the project and to observe all provisions of relevant laws.

## 4.2.12 National Land Commissions Act, CAP 5D, 2012

This is an act of Parliament which makes further provisions as to the functions and powers of the National Land Commission, qualifications and procedures for appointments to the Commission. It also gives effect to the objects and principles of devolved government in land management and administration.

## 4.2.13 Registration of Titles Act Cap 281, 2010

This Act provides for the transfer of land by registration of titles. Parts within the Act elaborate on mechanisms of bringing land under the Act, grants, transfers and transmission of land, registration of titles, and mode and effect of registration, transfers, leases, charges, powers of Attorney, and rectification of titles, among others.

This Act will be important during the land acquisition and especially during the transfer of titles by the affected persons.

## 4.2.14 Forest Act, CAP 385, 2005

The Forest Act No. 7 of 2005 guides the establishment, development and sustainable management, including conservation and rational utilization of forest and woodland resources for the socioeconomic development of the country. The Act also provides guidelines for management and registration of forests and woodlands.

During operation, the new road will open up some forest resources which may call for stricter application of relevant sections of the law.

## 4.2.15 The Wildlife Conservation and Management Act, CAP 376, 2013

This Act provides for the protection, conservation and management of wildlife in Kenya. The Act deals with areas declared as National Parks, under the Act. The Act controls activities within the park, which may lead to the disturbance of animals. Further the Act protects wildlife outside the parks. The Act prohibits killing of wildlife for any purpose whatsoever unless authorized by the KWS.

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Although there are limited wild animals outside the protected areas in the project area the act will be applied for Lake Kanyaboli Reserve which is within the project area.

## 4.2.16 Agriculture Act Cap 318 of 1980 (revised 1986)

This Act has the stated objectives to promote and sustain agricultural production, provide for the conservation of the soil and its fertility, and stimulate the development of agricultural land in accordance with the accepted practices of good land management and good husbandry. Authorized officers are empowered to prohibit the clearing of vegetation and the grazing of livestock and to require the planting of trees to protect the soil from erosion, as well as to impose penalties under the Act.

The Act is relevant for soil conservation that might be required for earthwork deposit sites.

## Fisheries Act Cap 378 (Rev 1991)

of

The Act's objective is to provide a legal framework for the management, exploitation, utilization and conservation of fisheries resources in Kenya. It is however applied in cross- reference with other related laws. The Act restricts destructive practices and advocates for the protection of fish breeding areas. It prohibits use of certain nets or under-sized mesh, beach seine, spearguns and dynamite fishing. The Fisheries Act also regulates licensing of local and foreign fishermen and fishing vessels, fisheries scientific research, landings and landing sites and puts restrictions on purchase of fish. The Fisheries Bill (awaiting parliamentary approval) will become the new Principal Act that will cover all fisheries activities.

This Act will apply during the operation phase to manage fishing efforts on the lake with the aim of avoiding over-fishing due to enhanced demand

## 4.2.17 Intergovernmental Relations Act, 2012

An Act of Parliament to establish a framework for consultation and cooperation between the national and county governments and amongst county governments; to establish mechanisms for the resolution of intergovernmental disputes pursuant to Articles 6 and 189 of the Constitution.

Since the project passes through different counties there will be need for wide consultations between the national and county governments on the project.

## 4.2.18 County Government Act, No. 17 Revised 2014 (2012)

An Act of Parliament to give effect to Chapter Eleven of the Constitution; to provide for county governments' powers, functions and responsibilities to deliver services.

Consultations with the respective county governments will be needed and maintained throughout the implementation of the project.

## 4.2.19 Prevention, Protection and Assistance to Internally Displaced Persons and Affected Communities Act No. 56, 2012

An Act of Parliament that makes provision for the prevention, protection and provision of assistance to internally displaced persons and affected communities and give effect to the Great Lakes Protocol on the Protection and Assistance to Internally Displaced Persons, and the United Nations Guiding Principles on Internal Displacement.

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In the Act an internally displaced person means a person or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, large scale development projects, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized State border.

Part V section 21 (1) states that Subject to the Constitution, the Government shall abstain from displacement and relocation due to development projects or projects to preserve the environment and protect persons from displacement by private actors. Section 21 (2) states that In exceptional cases, displacement and relocation due to development projects or projects to preserve the environment may be — (a) authorized and carried out in accordance with the applicable law; (b) justified by compelling and overriding public interests in the particular case; and (c) conducted when no feasible alternatives exist. Section 21 (3) states that Where displacement and relocation cannot be averted, the Government shall minimize it, mitigate its consequences and assist and protect the affected persons as provided for in sections 7 and 8 of the Act. Section 21 (4) states that where the displacement is permanent, the Government shall provide the affected persons with a durable solution as provided for in section 9 of this Act.

Section 22 outlines the procedures for displacements that are induced by development projects.

Lake Victoria ring road is a large development project and may result in the displacement of some people to create room for the road reserve. The provisions under this Act shall be reviewed and applied.

### **Relevant National Policies** 4.3

### 4.3.1 Kenya Vision 2030

Through the social pillar Kenya aims to build a just and cohesive society in a clean, secure and sustainable environment. The economic, social and political pillars of Kenya Vision 2030 are anchored on macroeconomic stability; continuity in governance reforms; enhanced equity and wealth creation opportunities for the poor; infrastructure; energy; science, technology and innovation (STI); land reform; human resources development; security as well as public sector reforms. The 2030 Vision aspires for a country firmly interconnected through a network of roads, railways, ports, airports, water and sanitation facilities, and telecommunications.

### 4.3.2 National Environment Policy, 2013

This policy aims to protect the environment. Section 5.6 on Infrastructural Development and Environment 5.6.1 states that Infrastructural development includes among others buildings, roads, ports, railways, ICT, pipelines, irrigation systems, airports and electricity transmission. This section also emphasizes that the environment aspects of such infrastructural developments are distinct and unique such as effects on flora and fauna, social and psychological disruption, vegetation clearance, excavation works and spillages during construction. This policy states that the government will:

- Ensure Strategic Environmental Assessment (SEA), Environmental Impact Assessment, Social Impact Assessment and Public participation in the planning and approval of infrastructural projects
- Develop and implement environmentally-friendly national infrastructural development strategy and action plan

## **Draft Detailed Design**





Ensure that periodic Environmental Audits are carried out for all infrastructural projects 

## 4.3.3 Millennium Development Goals

The MDG goal No. 7 target 7A requires that the principles of sustainable development are integrated into the policies and programs of the country; reverse loss of environmental resources.

The construction of the road as a development will require the principles of sustainable development to be integrated at all stages of implementation and operation.

#### 4.3.4 Integrated National Transport Policy

This is a national policy which aims to develop, operate and maintain an efficient, cost effective, safe, secure and integrated transport system that links the transport policy with other sectoral policies, in order to achieve national and international development objectives in a socially, economically and environmentally sustainable manner.

## 4.3.5 Land policy

Environmental management principles: To restore the environmental integrity the government shall introduce incentives and encourage use of technology and scientific methods for soil conservation. Fragile ecosystems shall be managed and protected by developing a comprehensive land use policy bearing in mind the needs of the surrounding communities. The sustainable management of land based natural resources depends largely on the governance system that defines the relationships between people, and between people and resources. To achieve an integrated approach to management of land based natural resources, all policies, regulations and laws dealing with these resources shall be harmonized with the framework established by the Environmental Management and Coordination Act (EMCA),1999 (Revised 2015).

### Draft National Wetlands Conservation and Management policy 4.3.6

Kenya has no comprehensive wetland policy in place currently. However a Draft National Wetlands Conservation and management policy exists.

### World Bank Safeguard Policies 4.4

The Lake Victoria Ring Road project is financed by the World Bank. Besides the national legislations, there are guidelines that govern infrastructure developments like roads particularly those tied to conditions on funding road projects. The World Bank has developed guidelines for pollution prevention and abatement measures as well as emission measures that are acceptable to the bank (World Bank Group, 1998).

#### 4.4.1 Environmental Assessment (Operational Policy, OP 4.01)

The objective of this policy is to ensure that Bank-financed projects are environmentally sound and sustainable, and that decision making is improved through appropriate analysis of actions and of their likely environmental impacts (World Bank, 1989). It is also used to ensure that potentially affected persons have been properly consulted.

Annex B provides a guideline on how to carry out and what to look out for in the assessment of a Category 'A' project such as LVRR.

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This policy will be relevant since the project is likely to have potential (adverse) environmental risks and impacts on its area of influence. It will also cover impacts on the natural environment (air, water and land); human health and safety; physical cultural resources; and transboundary and global environment concerns. It will also be relevant in assessing the project as a Category A and adhering to all the outlined principles.

### Natural Habitats (Operational Policy, OP 4.04) 4.4.2

This policy aims to promote environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development.

This policy is relevant since the project has the potential to cause significant conversion (loss) or degradation of natural habitats, whether directly (through construction) or indirectly (through human activities induced by the project).

## 4.4.3 Indigenous Peoples (Operational Policy 4.10)

The objective of this policy is to ensure that the development process fosters full respect for the dignity, human rights, and cultural uniqueness of indigenous peoples. The policy ensures that adverse effects during the development process are avoided, or if not feasible, ensure that these are minimized, mitigated or compensated.

This does not apply since there are no indigenous peoples in the project area.

## 4.4.4 Physical Cultural Resources (Operational Policy 4.11)

This policy aims for the protection of physical cultural resources, which are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, and may be above or below ground, or under water. This policy aims to ensure that the impacts associated with these resources are addressed.

The project passes through places which potentially have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. These areas (and their resources) will need to be protected against any potential damage or interference. The contractor shall be on the lookout for any other discoveries that may be discovered during the process of excavation during construction.

## 4.4.5 Involuntary Resettlement (Operational Policy 4.12)

This policy aims to avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

This policy will be relevant since some people may be relocated along some sections. The aim will be to ensure that the disruption to their lives is kept to a minimum.

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### 4.4.6 Forests (Operational Policy 4.36)

of

The objective of this policy is to ensure that the potential of forests is harnessed to sustainably reduce poverty, is integrated effectively in sustainable economic development as well as in ensuring that the vital local and global environmental services and values of forests is protected.

The project environment has several forests, some not very far from the proposed road. This policy will be vital in ensuring that the LVRR development does not have adverse impacts on the available forest resources.

### **Relevant International Policies** 4.5

### 4.5.1 Ramsar Convention on Wetlands

This is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands as a contribution towards achieving sustainable development throughout the world. The Ramsar Convention on Wetlands is primarily concerned with the conservation and management of wetlands. Parties to the Convention are also required to promote the wise use of wetlands in their territories and to take measures for their conservation by establishing nature reserves in wetlands, whether they are included in the Ramsar list or not. Kenya ratified the Ramsar Convention in June 1990. Although Yala Swamp and Lake Kanyaboli are not listed as Ramsar sites, the proposed project is expected to adhere to the Ramsar Convention's principles on wetlands.

The project area has wetlands and therefore it will require that the guidelines for protection of the wetlands be adhered to.

### **Convention on Biological Diversity** 4.5.2

The convention requires that implementation of development projects to avoid significant adverse impacts on biodiversity. The Convention requires parties to implement ESIA recommendations effectively to avoid or minimize significant adverse impacts on biodiversity. It also introduces the Strategic Environmental Assessment (SEA) to assess environmental implications of policies and programmes particularly for those with major implications on natural resource use.

The road crosses Lake Kanyaboli which is a refugia for an array of cichlid fish species that are already extinct in Lake Victoria. Yala swamp hosts the rare sitatunga antelope.

### 4.6 Institutional Framework

### 4.6.1 National Environment Management Authority

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This is the government agency that is responsible for the implementation of all the policies relating to the environment. It was established under the Environmental Management and Co-ordination Act No. 8 of 1999 (EMCA). This agency is responsible for reviewing the ESIA report and verifying the information in the report. They are also responsible for overseeing and ensuring compliance to the environmental guidelines therein.

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#### 4.6.2 National Environment Council

of

The National Environmental Council (the Council) is responsible for policy formulation and directions for the purposes of the Act. The Council also sets national goals and objectives, and determines policies and priorities for the protection of the environment.

#### Kenya Roads Board 4.6.3

Strengthening the institutional framework is one of the strategies the government of Kenya (GoK) has adopted to improve the road network in Kenya. The Roads Maintenance Levy Fund manages the roads in repair and rehabilitation.

#### 4.6.4 Kenya National Highways Authority

This is an autonomous road agency, responsible 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).

The agency will be responsible for the implementation of the project once the design and funds procurement for the project have been completed.

#### Kenya Wildlife Service 4.6.5

This is a state corporation that was established by an Act of Parliament (Cap 376), with the mandate to conserve and manage wildlife in Kenya, and to enforce related laws and regulations. The corporation undertakes conservation and management of wildlife resources across all protected areas in collaboration with stakeholders. Its mandate is to work with others to conserve, protect and sustainably manage wildlife resources.

There are wildlife protected areas in the project area and some rare and threatened species of both flora and fauna.

#### 4.6.6 Kenya Forest Service

This is a State Corporation established in February 2007 under the Forest Act 2005 to conserve, develop and sustainably manage forest resources for Kenya's social-economic development. They shall provide guidelines for the protection of the important forest resources within the project environment.

#### The Water Resource Management Authority (WRMA) 4.6.7

This is a state corporation and the lead agency in water resources management. Its responsibilities include; to develop principles, guidelines and procedures for the allocation of water resources; to monitor, and from time to time reassess, the national water resources management strategy; to receive and determine applications for permits for water use; to monitor and enforce conditions attached to permits for water use; to regulate and protect water resources quality from adverse impacts; to manage and protect water catchments in accordance with guidelines in the national water resources management strategy, to determine charges to be imposed for the use of water from any water resource; to gather and maintain information on water resources and from time to time publish

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forecasts, projections and information on water resources; to liaise with other bodies for the better regulation and management of water resources; to advise the Minister concerning any matter in connection with water resources.

#### Beach Management Units (BMU) 4.6.8

of

These are fisheries management units formed under the fisheries Act, 1989 and whose objectives include to strengthen the management of fish landing stations, fishery resources and the aquatic environment; support the sustainable development of the fisheries sector; help alleviate poverty and improve health, welfare and livelihoods of the members through improved planning and resource management, good governance, democratic participation and self - reliance; recognize the various roles played by different sections of the community including women in the fisheries sector; ensure the achievement of high quality standards with regard to fish and fishery products; prevent or reduce conflicts in the fisheries sector.

#### 4.6.9 National Irrigation Board

National Irrigation Board (NIB) was established and incorporated in 1966 as a state corporation through the Irrigation Act, Cap 347 of the Laws of Kenya. The objective of the board is to provide for the development, control and improvement of irrigation schemes.

The NIB has plans to expand the dykes that supply water downstream from Munana dam. There will be need for consultations when designing the road to avert future conflicts as relate to the location of the two projects.

## 4.6.10 Kenya Civil Aviation Authority

This is an Authority (KCAA) which was established on 24th October 2002 by the Civil Aviation (Amendment) Act, 2002 with the primary functions towards; Regulation and oversight of Aviation Safety & Security; Economic regulation of Air Services and development of Civil Aviation; Provision of Air Navigation Services, and Training of Aviation personnel. The mandate of the authority is to plan, develop, manage, regulate and operate a safe, economically sustainable and efficient civil aviation system in Kenya, in accordance with the provisions of the Civil Aviation Act, 2013.

Consultations will be made with the authority in the area around Homa-Bay Airstrip as well as Kisumu International airport should there be cases of dust that affect operations at the airport during construction.

## 4.6.11 National Land Commission

This is a commission which was formed under the provisions of Land Act 2012 and had the responsibility to manage public land on behalf of national and county governments, to monitor and have oversight responsibilities over land use planning throughout the country among others.

Consultations shall be made to the National Land Commission especially for the areas where there is no road completely to ensure land use compatibility and avert future incidents of conflict.

## 4.6.12 Lake Basin Development Authority

This is a State Corporation mandated to spearhead development in the Lake Basin Region covering about 72 constituencies. The Authority mobilizes for resources and assets to enable equitable development. It also provides for integrated planning, coordination and implementation of projects and programmes within the various river basins in the region.

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## 4.6.13 National Museums of Kenya

of

This is a state corporation established by an Act of Parliament, the National Museums and Heritage Act, 2006 no. 6 of 2006. It is a multi-disciplinary institution whose role is to collect, preserve, study, document and present Kenya's past and present cultural and natural heritage. This is for the purposes of enhancing knowledge, appreciation, respect and sustainable utilization of these resources for the benefit of Kenya and the world for now and the future. World Bank OP11 Physical Cultural Resources (PCR) deals with protection of PCR and avoiding their damage or destruction. The corporation will therefore help in fulfilling this obligation if any of the PCRs are discovered within the project area.

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### **BASELINE BIOPHYSICAL CONDITIONS** 5

### 5.1 Climate

### 5.1.1 Agro-ecological zones

of

The road crosses five counties: Busia, Siaya, Kisumu, Homa-Bay and Migori. The project area generally experiences an inland equatorial climate, modified by the effects of relief, altitude and the influence of the large water body, Lake Victoria. Agro-ecological zones (AEZ) lower midlands (LM) 4 and 5 dominate most of the landscape. In terms of rainfall, the project area falls under agro-climatic zones I, II, III and IV classified respectively as humid, sub-humid, semi -humid to semi-arid. The average rainfall in the project area varies from 600 to 2700 mm with high altitude areas receiving more rain. Rainfall is mainly convective in origin and is largely influenced by the movement of the inter-tropical convergence zone (ITCZ). However, the lowland areas have harsher climatic conditions than the highlands.

### 5.1.2 Rainfall season and amounts

Nonetheless, rainfall amounts are partly influenced by the expansive Lake Victoria. Due to the convective origins of rainfall, there is high seasonal variability exhibiting high intra and inter-seasonal variation in onset, duration and amount of precipitation. The amounts range between 1,000 mm and 1,300 mm per annum. Besides the effect of the lake, relief also has an influence on the rainfall patterns in different areas. The high altitude of Gwassi hills, for example, is largely responsible for the relief rainfall that occurs on the lower side of the hill across the Lambwe Valley and beyond. The region receives reliable rainfall of over 1,200 mm per year, distributed in two seasons. The rainwater is for domestic and livestock use. The region is an important agricultural zone. There are two fairly distinct rainy seasons: the long rains peaking between April and May and the short rains peaking between November and December.

### Humidity and temperature 5.1.3

Due to the proximity of the project area to Lake Victoria, the area records high rates of evaporation of between 1,800 mm and 2,000 mm per year. Thus, humidity is relatively high. In terms of temperature, the project road falls under agro-climatic zones 3 and 4. These correspond to warm and fairly warm temperatures, respectively. The average maximum temperature ranges between 24 and 28°C and the average minimum temperature ranges between 12 and 16°C; the coldest months being July to August, while October and March are the hottest. The mean annual temperature varies between 18 and 22°C.

### 5.1.4 Winds pattern and efects

The wind pattern in the region largely follows the principle of land and see breezes that result in the formation of convectional rainfall. The buildup of cloud during the day can be explained by the heating of air over Lake Victoria. As the warmed air rises, it cools. As it cools it loses its ability to hold moisture and so the warm moist condense in the nearby cloud mountain e.g. Nandi hills near Kisumu or Gwassi hills. After condensing, it falls back as rain on the windward side of the lake while the cool dry air also blows to the leeward side of the mountain.

Of particular importance to Lake Victoria and surrounding region are the south east trade winds that picks moist air from the lake while passing. Diurnal behaviour of convection is triggered by local land-

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lake breeze effect: in day time winds are onshore, during night offshore. This circulation interacts with the easterly trade winds during day, onshore flow converges with trade winds on east side of lake, leading to enhanced convection and precipitation on the eastern shore. On the west side of lake, the flow diverges and convection is reduced. During the night, this pattern is reversed. Stronger convective triggering occurs on the western part of the lake. Resulting thunderstorms on the lake during the night.

### 5.2 Geology and Soils

of

### 5.2.1 Geology

There are diverse geological resources and features in the project area. These range from active volcanic sites to sites where sedimentary deposition has occurred over long periods. Presence of recent volcanic activities in the area is manifested by the hills and high altitude landscapes that dot the project area. Notably the Samia and Funyula hills in Busia, Homa Hills in Homa-Bay and the Gwassi Hills in partly Migori and Homa-Bay counties stand out. The Gwasi hills, rising to 2,130 metre above sea-level, are part of an old dissected volcano, of even larger areal extent than Mount Elgon. There are other small volcanic hills within the project area. Homa Hill area has a geologically active site at Bala Hot springs, some 7 km to the south east of the Homa Hilll. This site is regarded as an ecologically sensitive area (ESA) and, since the LVRR will pass closeby, further details have been provided under the ESA subsection.

According to past studies of the project area, the rocks exposed include Precambrian volcanic rocks, meta-sediments and shallow intrusions of the Nyanzian System, with conglomerates and arkoses of the Kavirondian System. These rocks are mildly metamorphosed and have been invaded by granites and dykes of various types. Just like topography, the Kavirondian Rift (Figure 6-1) has influenced the geology of the lowlands.



## Figure 6-1: Geological map of the Kavirondo Rift region.

Source: Soil Erosion and Conservation in Western Kenya: Report of the Research Project, No. (A) 15253006 (2003-2005) by the Grant-in-Aid for Scientific Research

The rock type in the project area is complex, underlain by various rock types mainly agglomerates, conglomerates, tuffs, sandstone, granite and other deposits. Common rock types consists of feldspars, quartz, hornblende and biotite. Others are metabasalts, amphibolite, schists, dolerites,

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pegmatites and quartz. Pre-Cambrian volcanic and intrusive rocks, tertiary volcanic rocks and quaternary sedimentary deposits characterize the geology of the lowland area. The oldest rocks in the area are the Nyanzian metavolcanics, here predominantly represented by metabasalts and metaryolites.

The oldest exposed volcanic rocks such as basalt, elite and ryolite cover the project area in Siaya and Busia Counties geologically. Others include intrusives of post Nyanzanian/pre Kavirondian age. In Uyoma Peninsula are found tertiary volcanoes consisting of the nephline lava agglomerates while in Homa-Bay volcanic activity is still evident from the hot springs at the foothills of the Homa Hills. The geology of Rachuonyo area and south to Muhuru Bay are found pre-cambrian volcanic and intrusive rocks, tertiary volcanic rocks and guaternary sedimentary deposits. Rocks owing their origin to sedimentary deposition can be recognized within the alignment zone. Thick deposits are said to have been deposited in Lambwe valley during the Pleistocene pluvial periods, and less extensive deposits at Karungu and at Kaksingiri.



Plate 6-1: Bala Hotspring in Karachuonyo, Homa-Bay County (L) and Granitic rock outcrops in Seme area, Kisumu County

The project area is also endowed with geological resources of economic value. Gold is mined in small scale in Bondo, Rarieda in Siaya County. Extensive deposits are also found in Kadem, Masara and Macalder regions in Migori County. Macalder area is also said to have copper azurite and silver which can be explored. Currently, there are exploration works going on for potential oil deposits in parts of Ahero (Kano plains) and Nyakach areas of Kisumu County. There are also areas that border volcanic centres such as Kisingiri (Rangwa), Bala area in Karachuonyo (near Homa Hills), Ruri and Sindo areas near Gwassi hills where carbonatites are developed. The carbonate-rich rocks and soils are mined by locals as a traditional salt 'bala' for domestic and small-scale commercial usage. These grounds also serve as communal salt lick areas for livestock.

Various rock types, namely, agglomerates, conglomerates, tuff sandstone, granite and other deposits which are useful in the construction industry are also being extracted and sold by the locals and entrepreneurs. Because it is a generally low lying area, sand harvesting especially along the long river mouths is common. Prominent areas include Sangorota and Sangoburu areas within river Sondu-Miriu floodplain in Homa-Bay and Angugo area within the river Kuja floodplain in Migori. There are also sand mining activities along river Nzoia bed and riparian zones.

The exploitation of the geological resources found within the project area by the locals face a number of hurdles. Salt mines at Homa areas and at Sindo down the slope of Gwassi Hills are now being

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threatened by soil erosion. Heavy soil erosion has deposited silt from the mountains on the sites, making mining of "bala" (salt) difficult. Gold deposits have also been extensively mined, and almost exhausted. Prospectors now have to dig deep into the ground as they trace the mineral. This has resulted in frequent cases of accidents and fatalities as mining caves collapse on the miners.

#### 5.2.2 Soils

There are noticeable variations in soil properties along the entire alignment. The project sections (contracts 1-6) are dominated by soils characterized by medium to course-textured particles: mostly loams, sandy loams, loamy sands and in some patches pure sandy soils. The landscape is also punctuated by patches of either black cotton soils, shallow sandy soils, dominated by rocks or fine textured alluvial deposits, mostly occurring along the river or stream valleys and at natural depressions. Just like the textural variations, the soil colour also varies along the project length. While large portions of the area are dominated by bright coloured soils with the colours alternating between red, shades of brown (light and dark), the dominant colours are broken in some sections by dark coloured soils, mostly black, grey or light grey.

Except for the lake fringing and other wetland areas, most of the areas covered under contracts 1 and 2 running from Bumala to Asembo are dominated by loamy soils. These soils are mostly well-drained and support a variety of agricultural activities. For this stretch, the black cotton soils mostly dominate the sections covering Bunyala areas, the Yala swamp and Rarieda areas (around km 130+...). Nonetheless, pockets of black cotton soils punctuate other parts of contracts 1 and 2. The area with extensive black cotton soils like Bunyala and Yala swamp areas are mostly paddy fields. Similarly, in the parts of Budalangi and Funyula area that adjoin Lake Victoria, soils are poorly drained and mainly of clay type due to frequent flooding. In the swamps there are heavy clay types, which are very difficult to cultivate, both when it is dry and wet.



Plate 6-2: Unstable sandy soil and sand mining at Osodo along Kadiang'a loop

The third section (Contract 3) of the alignment (Asembo to Otonglo in Kisumu) also has varying soil types. The coarse-grained soil types such as sandy and sandy loams dominate. The prominent colour is dark brown. These soil types interchange with rocky terrains in some sections like Seme area. Yet still parches with black cotton soils or other forms of loamy soils are intermittent, especially on lowland

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areas. The Kano area that falls within Contract 3 also comprises black cotton soils that swell after absorbing water during rainy season and crack during dry season. This makes them vulnerable to erosion. The high clay content in the soil also impedes infiltration resulting in massive runoff.

Various soil types are found within the Contracts 4 and 5 of the project which runs from Katito to Nyagwethe (some kilometres from Mbita). Sandy and black cotton soils are prevalent on the Katito-Karachuonyo-Homa-Bay sections of alignment. The sandy soils are either dark or brown colour. Sandy conditions are mostly found within the Sondu-Miriu river mouth, and have been extensively degraded through commercial sand harvesting. There are massive gullies around Kendu escarpment, with gullies which have the braided channel bed and plenty of earth pillars characteristics. It is not surprising to find people harvesting sand not only in the river valleys but inside the gullies as well.

Karachuonyo and Homa-Bay areas towards the Homa Hill are also characterized by patches of sodic soils especially in the Homa springs ecosystems that also cover the Lake Simbi ecosystem. These soils are light in weight, hence also prone to soil erosion. The other segment of contracts 4 and 5 that runs between Homa-Bay and Nyagwethe (and partly Mbita areas) has mostly black cotton soils dominating the landscape. Erosion issues are also evident, especially for sections of the alignment that run through Nyamaji and Ruri hills ecosystem.



## Plate 6-3 Eroded sodic volcanic soils at the foot of Homa Hills

This trend continues for the alignment parts covering partly contract 5 and the whole of contract 6 between Mbita and Muhuru Bay. The section running between Mbita and Sori beach generally has dark-coloured soils, with the dominant soil types alternating between clay loams and black cotton soils on some sections. This section is also characterized by steep and rocky terrains. The hill slope soils are generally shallow. As a result of the steep slopes, the soils have undergone repeated soil erosion. The numerous hills including Gwassi hill ranges has resulted in excessive concentration of overland flow during heavy rains which has incised large gullies on both topsoil and underlying unconsolidated sediments. The stretch covering Sori Bay upto the riparian zones of River Kuja and upto the end of the project have soils that are predominantly light in colour and coarse textured. Brown (light or dark) sandy loams or sandy soils are common. These are well drained and support mostly the root crops. Just like the Sondu-Miriu mouth, the areas around Kuja mouth also experience massive sand harvesting.

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In summary, due to the influence of undulating landscapes, rainfalls of above 1,000 mm and the differences in the dominant soil types, the entire project area has a low to moderate soil erosion except for the steep slopes and some highlighted areas which had high erosion levels like the Kendu-Miriu-Karachuonyo areas.

### 5.3 Topography

The project area has an undulating landscape. Meaning the road runs through a series of alternating terrain with areas of steep slopes, gentle slopes, rocky terrain (in Seme area and between Mbita and Karungu) and flat areas, mostly flood plains. Tectonic earth movements and erosion of different rock types over long periods have created varied morphology of lowlands bounded by upland areas. The Kavirondian Rift System (Figure 6-2) determines the topography of the lowland areas.



Figure 6-2: Kavirondian/ Nyanzian Rift System

Generally, the project area has a gentle slope south or westwards towards Lake Victoria. The lower regions and lake shores have altitude ranges of between 1,000 m - 1,300 m above sea level (m.a.s.l). These lowland areas include pristine wetland areas that are crossed by the project like Yala swamp area, lake fringing wetlands that runs parallel to Lake Victoria and the riverine wetlands associated with the floodplains of the major rivers within the project like Nzoia, Yala, Sondu-Miriu, Kuja and little Migori. Other lowland areas comprise of the seasonally flooded areas and patches of swampy areas and floodplains. The highland areas are covered by a range of hills (Table 6-1) forming conspicuous topographic features along the alignment.

Table 6-1: Examples of Hills found	within the project a	area
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County	Hills
Busia	Nzalagobe; Samia; Funyula
Siaya	Got Ramogi; Odiado; Utonga

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Kisumu	Oduyo; Ongielo; Serawongo
Homa Bay	Gembe; Gwassi; Gera; Nyamaji; Ruri
Migori	Okuodo; God Kwach; Got Kachola



## Plate 6-4: The undulating landscapes of Gwassi hills, Homa Bay

Most of these hills have been exploited and incised for settlement and farming. The hilly areas, due to their relatively steep slopes, are prone to erosion. In some cases, the slopes are traversed by numerous gullies.

### 5.4 Vegetation

The road corridor is characterized by varying degree of tree cover and density. In nearly all the sections (contracts 1-6), it was evident that the original vegetation type in the area which was principally Acacia-Balanites-Combretum woodland has been degraded over time due to human activities especially settlement and agriculture etc. The ground cover therefore comprises mostly of secondary vegetation. These secondary vegetation has a narrow species diversity and are of no specific conservation value. Throughout the alignment the vegetation occurs as either replanted or those that re-emerged post clearing. There are, however, other sections of the project area which are still dominated by pockets and remnants of original vegetation (the Acacia-Balanites-Combretum association is still evident) even though they are also of no conservation value, and largely consist of local shrubs and bushland or woodland species. Tree stands are usually found in relatively scattered patches in wooded grassland.

Example of planted tree species include: Eucalyptus spp., Euphorbia spp., Casuarina equisetifolia, Grevillea robusta and Leucaena leucocephala among other species and are commonly seen on borders of farms and homesteads or institutions. These trees occur either as pure stands or a combination of more than one species. Other mature species found within this area include Jacaranda mimosifolia, Senna siamea, Spathodea campanulata, Terminalia mantaly, T.

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brownie, and Markhamia lutea. The woody biomass provide fuelwood while the shrubs provide fuel sticks to the almost 80% of the population throughout the project areas.



Plate 6-5: An association of planted and natural vegetation on a section of the alignment

Vegetation within predominantly agricultural or settled areas is rather poor from a naturalist point of view. What remains of the natural vegetation is restricted to some few areas that are not easily accessible like hilly areas and valley bottoms, or much closer to the lake shore and within swamps. Shrub and tree species like Lantana camara, Thevetia peruviana, Tithonia diversifolia, Cassia didymobotrya, Carissa edulis, Agave sisalana, Aloe, Senna didymobotia, Harrisonia abyssinica, Euphorbia candelabra and E. tirucalii, Acacia nilotica, A. tortilis, A. Xanthophloea, Balanites spp., and Combretum spp., dominate the terrestrial landscape throughout the alignment. There are remarkable spatial variations in density of one species over the other. While most of these native species exist naturally, others like Thevetia peruviana, Agave sisalana and Euphorbia tirucalii would either occur naturally, or exist as boundary fences for homesteads and farms.



Plate 6-6: An appreciation of native floral species' combination observed along the sections of alignment

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Several relatively old indigenous tree species are found on isolated locations throughout the project length. Most of these trees occur as single trees. The very old and unique trees are sometimes used as landmarks or sacred landscapes by the local community. Examples include: Albizia coriara, Ficus sycomorus and Balanites aegyptiaca. There are also some tree species such as Kigelia africana that have cultural values and/or historical significant to the local communities. These trees were mostly observed as mature stand-alone trees some close to the roadside or within the road reserve.



Plate 6-7: Occasional large trees on the road reserve serving both social and ecological functions

Special vegetation habitats within the area include wetlands, valleys and hills. The conventional wetlands like Yala swamp, the lake fringed wetland areas, riparian zones of rivers within the project area and their tributaries, and the seasonally flooded patches within the project area are mostly covered by floral species associated with wetlands and swampy or water-logged ecosystems. The dominant species include: Sesbania sesban, Phragmites mauritianus, Echinochloa pyramidalis, Cyperus esculentus, Cyperus papyrus. Cyperus papyrus is common on the lake fringes and the Yala swamp ecosystem. Phragmites mauritianus on the other hand, are mostly prominent within the riverbanks or shallow parts of the swamps.

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## Plate 6-8: Wetland vegetation species around Dunga beach, also indicating the extent of invasion by water hyacinth

The hilly areas still have some semblance of the Acacia-Balanites-Combretum association. Because of the low accessibility due to poor roads, these hills are still regarded as biodiversity hotspots. At the peak of Gwassi Hills, there are deciduous seasonal forests while in the Lambwe Valley and associated hills such as Gera, thicket and Savannah type of vegetation dominate. Gwassi Hills still hold some great reservoir of plant genetic resources. It has some rare species of trees that is hardly found in other forests except in Ssesse Island in Uganda.

The diverse floral species in the area face a number of threats. Besides being predominantly harvested for fuel and poles, the majority of vegetation are simply being cleared to create room for human development activities like agriculture, housing and urban development, road contruction etc. There are other vegetation species that are facing increased demands for special-purpose usage. The poverty levels in the area means these special-purpose species are being subjected to intense harvesting for economic gains. Table 6-2 below gives a few examples of the trees:

Species	Common use
Phragmites mauritianus	Building
Cyperus papyus	Mat making and basket weaving
Agave sisalana	Rope making, weaving
Rhus natalensis	Fish smoking

## Table 6-2: Examples of special-purpose plants

The project area also has diverse plant species of economic importance, mostly agricultural crops within farms. The dominant crops in these farms vary, but include maize, bananas, sweet potato, rice and cassava, tomato, kales, sugarcane.

### **Invasive Species** 5.5

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The Lake Victoria basin has both terrestrial and aquatic invasive weeds. Aquatic weeds, mostly water hyacinth, threaten to choke the ecosystem Table 6-3.

Invasive weeds species		
Terrestrial species	Aquatic species	
Opuntia opuntia (prickly pear)	Eichornia crassipes (water hyacinth)	
Prosopis juliflora (mathenge)	Echinocloa stagnina (hippo grass)	
Lantana camara (tickberry)	Pistia stratiotes (water lettuce)	
Parthenium hysterophorus	Salvinia molesta (water fern)	

## Table 6-3: Invasive weed species

Alien invasive species are increasingly taking over productive land in many agricultural ecosystems. These include *Prosopis juliflora*, and Lantana camara among others.

Aquatic invasive weeds found in the project area are the water hyacinth (*Eichornia crassipes*), the water lettuce (*Pistia stratiotes*) and the water fern (*Salvinia molesta*). The most problematic ones are *Eichhornia crassipes* and *Pistia stratiotes*. The water fern (*Salvinia molesta*) is also found in the littoral areas of Lake Victoria. These weeds are found further inland along some rivers such as Nzoia, Yala, Wachara and Sare. Both hippo grass and water hyacinth have extensively invaded the waters of Winam Gulf and parts of the waters of Homa-Bay County. The water hyacinth is the most problematic aquatic species because it grows fast and can cover large swathes of the water body within days. Continued eutrophications of the lake caused by run off from the surrounding agricultural lands and warm temperatures have created a perfect environment for the multiplication of the water hyacinth. The Figure 6-3 below shows changes in aquatic vegetation (water hyacinth and lilly) in the Winam Gulf area for a twelve (12) year period.



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# Figure 6-3: Changes in aquatic vegetation (water hyacinth and lilly) in the Winam Gulf area for a twelve (12) year period

The images above indicate the rapid invasion of the water hyacinth within a 12 year period. However, it should be noted that the extent of weed coverage of the waters of Winam Gulf is seasonal depending on the dominant wind direction. In some seasons the gulf is clear of the weed while in others the gulf is almost completely choked up with the weed.

The water hyacinth covers the water surface and preventing penetration of sunlight to the lower parts of the lake, they also deoxygenate the water resulting in suffocation of fish that cannot survive low oxygen. Its invasion, therefore, is a threat to biodiversity since they offer breeding grounds for pests and vectors as well as reduce the water quality through their death and decay.



Plate 6-9: Patch where hyacinth has been harvested for biomass energy production (L) and the weedy Opuntia opuntia in Usigu area along the project road (R)

On the spur road to Kaloleni beach, around Dumba centre (Chainage 7 + 500 contract 4) there is evidence of clogging of the drains caused by water hyacinth. Water hyacinth is also a problem in Nyakatch areas on Kadiang'a loop. Physical harvesting of the water hyacinth is being attempted to reduce its invasion but with little success.

#### 5.5.1 Prosopis iuliflora

There was a Prospois juliflora bush identified within the Sangorota section of Kadianga, a possible indicator of the existence of many other bushes within the Sangorota loop. Prosopis juliflora is an introduced tree species that is rapidly gaining the status of an invasive weed in a large swathe of the East and Horn of Africa drylands. In Kenya, the Prosopis species were introduced from mid 1970s and early 1980s, mainly in arid and semi-arid areas to mitigate the impacts of drought and famine and to safeguard the existing natural vegetation from over exploitation due to rising human population. However, due to its prolific invasive nature, the species has spread to many areas, mainly on disturbed sites and, in some places, replacing the indigenous vegetation.

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Plate 6-10: The weedy Prosopis juliflora (mathenge) bush in Sango Rota area on the Kadiang'a loop (L) and Invasive species of Parthenium hysterophorus (R)

The highest Prosopis invasion in Kenya has been reported in Tana River, Garissa, Baringo and Turkana counties, where pasturelands, farmlands and wetlands have been invaded. Within the project area so far the weed has not gained the notoriety that is associated with it in the northern Kenya and parts of Rift Valley. However, the fact that a bush has been identified means it is only a matter of time before their invasion gets notoced.

#### Parthenium hysterophorus 5.5.2

Also known as ragweed parthenium, this is an annual herb that aggressively colonises disturbed sites. The species have been positively identified in Homa-Bay County and probably occurs in parts of Migori County. The principle mode of dispersal is through road vehicles and on animals.

The other terrestrial species like Lantana camara is found on the roadside along most parts of the project area except in the lower areas of the project between Karungu and Muhuru bay. Opuntia opuntia was identified predominantly in Seme area of Kisumu County.

#### Water Resources 5.6

The project area is generally considered well-endowed with water resources. Lake Victoria is the largest water body in the project area. The lake is a huge system being fed by rivers and streams that originate from far-off areas. The major rivers Nzoia (Busia), Yala (Siaya), Nyando, Sondu-Miriu (Kisumu) and their network of tributaries originate from the Kericho and Nandi Hills areas. Rivers Kuja and little Migori (Migori) originate from Kisii and Narrok counties. There are also a number of small streams, including seasonal streams that do not necessarily form system with the major rivers mentioned above. These category of streams originate from the nearest catchment areas, and discharge their waters directly into Lake Victoria.

In addition, there are several other water resources within the project area, including the small lakes Namboyo in Busia, Kanyaboli and Sare in Siaya and Simbi in Homa Bay. Other resources include community dams like Munana and Dokiko in Busia County. There are also a number of community water pans spread across the landscape. Besides, swampy areas and other seasonal wetlands also serve as seasonal sources of water and water-related resources for the local communities. Several shallow wells, boreholes and springs are also found within the area.

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Plate 6-11: Cattle drinking at an outlet of Munana dam (L) and Water pan approximately 100 m from the road. Cattle crossing signs may be required on the road (R)

The water resources within the project area are critical socio-economic drivers providing fresh water supply, transport, recreation, tourism, and being important for their ecological roles such as supporting biodiversity. Rivers Sondu-Miriu and Kuja also support hydro-electric power (HEP) generation. In the lakes (Victoria, Kanyaboli, Sare, Namboyo), the littoral zones provide a very important habitat for fish and other organisms.

A typical lake has distinct zones of biological communities linked to the physical structure of the lake. The littoral zone is the near shore area where sunlight penetrates all the way to the sediment and allows aquatic plants (macrophytes) to grow. Light levels of about 1% or less of surface values usually define this depth. The 1% light level also defines the euphotic zone of the lake, which is the layer from the surface down to the depth where light levels become too low for photosynthesizers. In most lakes, the sunlit euphotic zone occurs within the epilimnion.





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Source: http://www.lakeaccess.org/habitats.html
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The higher plants in the littoral zone, in addition to being a food source and a substrate for algae and invertebrates, provide a habitat for fish and other organisms that is very different from the open water environment. Unfortunately, these water resources currently face various threats which potentially affect their quantity, quality and overall usefulness.

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Continued pollution of Lake Victoria is a critical issue. The lake, being a huge system fed by rivers that originate from far-off areas, is undergoing pollution from both on-site and off-site sources. For example, the lake is the main recipient of pollutants from the upland (catchment areas) examples of which are listed below:

- Agro chemicals/fertilizer (non point sources of pollution of the lake)
- Eroded soils from the catchment (farming) areas
- Water hyacinth
- Direct discharge of sewers into the lake
- Car washing along the beaches

of

- Clothes washing and bathing in the lake
- Agro-based industrial water release into rivers

The lake is under extreme pressure and evidence of nutrient build-up is increasing. Previous studies have shown that secchi depth (being measurement of water transparency) is low, mostly associated with high levels of suspended solids from feeding rivers. Cases of algal bloom have been reported on the lake fringes with blue-green algae blooms being a common occurrence. Microcystis aeruginosa and Anabaena circinalis are the dominant bloom-causing algal species. This phenomenon is linked to the increased usage of agrochemical in the agricultural areas, principally Nandi hills, Kisii highlands, Kericho and Narok areas. Since these areas receive higher amounts of rainfall and act as the river catchment, the agrochemicals are washed onto the rivers and tributaries. There is also heightened soil erosion, with the eroded soils also being carried to the rivers. These suspended and dissolved materials eventually reach the lake.



### Plate 6-12: Highly turbid water at the Sio Port beach

Besides agro-chemical and sediment loads, Lake Victoria also receives a substantial amount of industrial, municipal and/or domestic wastes from the towns and fish landing beaches that it serves. The satellite lakes (Namboyo, Kanyaboli, Sare and Simbi) and wetlands also face similar threats.

The water catchment functions of the highlands are also under threat through degradation of ground cover and land-use change. Vegetation clearing also means that the issue of soil erosion becomes prominent, more so in areas of steep terrain. Reclamation of wetlands and overgrazing of the swampy areas continue to reduce their capacity to retain water.

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#### 5.7 Fauna

#### 5.7.1 Mammalian Resources

of

A wide variety of mammals are supported by the numerous wetlands and rivers found in the project area. There are also those that habitate the terrestrial areas. However, the diversity and population of wildlife in terrestrial ecosystems is fairly low since their habitats have largely been destroyed or converted into farmlands, settlements areas, and for urbanization.

There are some critical wetland dependent animals found within the many wetlands especially Yala swamp and Lake Kanyaboli, Lake Victoria fringing wetlands and the riparian zones of the rivers. Examples include the Sitatunga antelopes (Tragelaphus spekii) that, even though their conservation status in the International Union for the Conservation of Nature (IUCN) red list is unknown (not listed), are still rare mammals in Kenya. Sitatunga antelope mostly feed and breed in Yala swamp and Kanyaboli wetlands and are, thus, restricted to the papyrus and swampy areas. Other major fauna include spotted-neck Otters (Hyrictis maculicollis) which are not entirely wetland mammals but are known to live in wetland areas where there is plenty of fish, crabs, molluscs and amphibians which they feed on.

Additionally, there are other animals found within the wetland ecosystems in the area, including: hippopotamus (Hippopotamus amphibius), vervet monkeys (Chlorocebus pygerythrus), olive baboons (Papio anubis), warthogs (Phacochoerus africanus), bush pig (Potamochoerus larvatus), wild pig (Sus scrofa), water-buck (Kobus spp), and reedbuck (Redunca redunca). It should be noted that other than hippos that predominantly depend on the wetlands for food and habitat, the other mammalian species listed above are not entirely wetland dwelllers, rather they access the wetlands to access food. They can also be found on the terrestrial ecosystem, depending on circumstances. Hippos are found on shallow inlets and bays of Lake Victoria.

There is also a limited diversity of wild animals found in diverse locations within the project area that are not associated with either wetlands or water bodies. Notable example are hyenas, banded mongoose (Mungos mungo), porcupines and antelopes (notably impala- Aepyceros melampus, dikdik- Madoqua kirkii, water buck-Kobus spp., roan and sitatunga antelopes). These are less well represented in the area due to human disturbance of their original habitat and extensive cultivation. Hyenas and leopards are reported by the locals to be very rare, but can still be found mostly in the rocky and mountainous landscapes such Seme area in Kisumu, Gwassi and Nyandiwa areas in Homa Bay. Other wildlife such as hares, dikdiks can be found in the rangelands or bushlands close to populated areas, and are sometimes hunted by the locals for their meat



Plate 6-13: Online images of hippo (L) and sitatunga antelope (R)

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Human-wildlife conflicts occur in the project area, and may be considered a major threat to the wildlife diversity. A very important point to note is that while the mammalian species highlighted here may be abundant eslewherein Kenya, and may be of least concern in the IUCN red list, they may still be considered of interest when viewed in the context of LVRR. Crop destruction and damage by raiding monkeys, hippopotami, waterbuck, wild/bush pigs and porcupines is one form of conflict. The other form consists of injuries and sometimes death by dangerous wildlife species such as hippopotami. Like many carnivores, hyenas and leopards come into conflict with humans when they prey on livestock. Whatever the cause of the conflict (human/livestock-wildlife), farmers often retaliate and kill the offending wildlife. Ffurther, as human population expand and growth of agriculture, settlements, and roads results, wildlife is losing space in which it was previously able to roam freely. Road projects have also resulted in substantial number of accidental killing of different wildlife.

#### 5.7.2 Avifauna

Wetlands are critical biodiversity areas often hosting a large variety of bird life. Of the 1,089 bird species found in Kenya, 255 species from 44 families are associated with water and aquatic systems, implying wetlands support approximately 25% of Kenya's avifauna. Of the 255 species, freshwater bodies support 235 species or slightly over 92%. In total, 170 species are supported by the Lake Victoria wetlands, and out of this number, 82 are dependent on aquatic vegetation and water edge habitats. Wetlands in the project area are fairly well stocked with fishing birds like the Gulls, Terns, Pelicans, Kingfishers and Cormorants.

The highest concentration of birds is in the designated International Bird Areas (IBA) namely Yala swamp, Kusa swamp and Sio Port and most lake fringing wetlands in the area. Other high concentrations of birds are found within the numerous fish landing beaches of Lake Victoria. Past studies indicate that Yala swamp has the largest number of birds in terms of diversity within the lake basin. The swamp is also home to eight (8) out of Kenya's nine (9) Lake Victoria biome bird species, including the globally-threatened Papyrus Yellow Warbler (Calamonastides gracilirostris), the nearthreatened Great Snipe (Gallinago media), and even Palearctic migrants. Because of its size and the vibrancy of the emergent vegetation especially papyrus, the Yala Swamp complex is an important site for East Africa's papyrus endemics.

Because of their numbers and diversity, the birds in the area have distinctive behaviour and conservation status. For example, Great egrets (Cosmerodius albus) do not eat at night. During the day, they forage alone or in mixed flocks, catching fish by standing motionless in the water. They are considered regionally threatened and only available in small numbers. On the other hand the Papyrus gonolek (Laniarius mufumbiri) species is listed as Near Threatened because it is estimated to be in moderately rapid population decline owing to the on-going conversion and degradation of its wetland habitats. It is confined to papyrus swamps and beds, in meandering river valleys and along lakeshores. It feeds on ants, beetles, weevils, small flies, bees, caterpillars, snails and fruit. This species' highly specialised habitat requirements make it susceptible to threats such as drainage, burning and the over-exploitation of wetlands. The Papyrus Yellow Warbler is found mainly in papyrus-swamps but occasionally in other marshy habitats, especially reeds. It occurs singly or in pairs, foraging in the mid and upper levels of papyrus for tiny insects. This species is listed as Vulnerable because it is believed to have a small and severely fragmented population, which is suspected to be undergoing a continuing decline owing to drainage and human exploitation of its papyrus-swamp habitat.

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A sample of bird species found on different section of the alignment is provided in the Table 6-4 below. More analysis of these birds in terms of conservation status, habitat preference, breeding and feeding habits and the likely threats they face in the wild is provided in Annex 2 of this report.

Common name	Scientific name
Papyrus Gonolek	Laniarius mufumbiri
Village weaver	Ploceus cucullatus
Papyrus canary	Serinus koliensis
White-winged Swamp Warbler	Bradypterus carpalis
Black-tailed godwit	Limosa limosa
Sharpe's Pied-babbler	Turdoides sharpie
Red-chested Sunbird	Cinnyris erythrocercus and Nectarinia erythrocerca
Northern Brown-throated Weaver	Ploceus castanops
Carruthers's cisticola	Cisticola carruthersi
Great Egret	Casmerodius albus
Baillon's Crake	Porzana pusilla
Red-billed quelea	Quelea quelea
Swallows	Hirundinidae
Marabou stork	Leptoptilos crumeniferus
Hamerkop	Scopus umbretta
Pied crows	Corvus albus
Doves and pigeons	Columbidae
Black-winged pranticole	Glareola nordmanni
Common quail birds	Coturnix coturnix
Long toed plover/ lapwing	Vanellus crassirostris
Hadada ibis	Bostrychia hagedash
Nyanza swift	Apus niansae

Table 6-4: A sample of common bird species observed on different location of the LVRR

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African sacred ibis	Threskiornis aethiopicus
Speckled mousebird	Colius striatus
Grey crowned crane	Balearica regulorum
Martial eagle	Polemaetus bellicosus
Common bulbul	Pycnonotus barbatus
Pied kingfisher	Ceryle rudis
African pied wagtail	Motacilla aguimp
Curlew Sandpiper	Calidris ferruginea

Some of these birds are grain eating (for example weaver bird and quelea bird) and are in most instances considered of economic threat to agricultural production. This threat is more in the rice producing areas like the Dominion farm in Yala, or in other grain prodicing area. Most of the birds, however, have diverse dietary preferences. Those that wade on swampy areas prefer to feed on young amphibians, reptiles and fish. There are also those that feed on insects, plant nectar.



Plate 6-14: Rich birdlife within the wetland areas of Uhembo area near L. Kanyaboli, Siaya (Top, L), Dunga beach, Kisumu (Top, R) and at the R. Kuja mouth, Kadem (above) Source: Fieldwork

The potential loses that is associated with the grain eating bird has prompted a number of responses that expose these birds and other species which rely on this kind of ecosystem to potential threats. In

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Dominion farms for example, there are reported cases of occasional aerial spraying using chemicals. This, according to the locals, is allegedly to make the birds drowsy, hence less active. However there are possibilities that the fumigants ultimately kill the birds. The strong odour of the fumigants are also said to reach the nearby homesteads. Besides spraying, there is burning of the vegetation not only within the Dominion farms, but in other wetlands that support birds. While the Dominion case may be to scare the birds away by destroying their habitats, in other areas this burning is primarily as a form of land preparation for agriculture. Nobetheless, the destructive effects of burning in both cases (either intentionally to scare bird away, or as form of land cearing to create room for agriculture) remain the same.

#### 5.7.3 Reptiles, Amphibians and other Invertebrates

The vegetated areas, mostly bushes, wetland and riverine areas play host to diverse species of snakes that are associated with the tropical conditions where the project area is located. These include snakes like python (Python sebae), black mamba (Dendroapis polylepis), green mamba (D. viridis), puff udder, green snakes (Liochlorophis vernalis), among others. While some of the snakes above can still be sited randomly, pythons are no longer widespread as before. They are most restricted to hunting reserves, national parks and secluded sections.

In the area crocodiles (Crocodylus niloticus) are naturally restricted to the water bodies, mostly prefering protected shores and banks. Just like hippos, human-wildlife conflicts associated with crocodiles have been reported to occur around Lake Victoria, sometimes resulting in fetalities. Tortoises, lizards such as monitor lizards (Varanus niloticus) and other lizards and geckos form the wider reptilian diversity of the region. While monitor lizards prefer exposed open areas near the river in burrows, other lizards will be widespread.

Countless numbers and diverse amphibians, insects, worms and other invertebrates inhabit the area. Different species of frogs (Phrynobatrachus keniensis, Xenopus laevis, Amietia angolensis) dominate the list of amphibians. Ants and termites, butterflies and moths, dragon flies, locust and grasshoppers, beetles, bees, among others, are found almost all over the project area: either in water, on ground and on trees. While all these insects are important for maintenance of ecological balance, some species such as ants and termites, bees, mayflies and lakeflies have direct economic and cultural importance to the local people.

The highest concentration of the reptiles, amphibians and other invertebrates are found on or within wetlands and water bodies like the lager Yala swamp and its ecosystem, Lake Victoria fringing wetlands, rivers Nzoia, Sondu Miriu, Kuja. Most of these invertebrates and amphibians shares the same geographical areas and same ecological characteristics hence those within the Lake Kanyaboli region, for example, are also likely to be in large populations within the River Nzoia or Kuja belt. Additionally, the conservation or ecologically sensitive areas like Gwassi Hill, Homa Hill, Mboha valley, Ndere Island Park and any other section of the project area that is least exposed to human activity have higher invertebrates' numbers and diversity.

Just like the birds, fish and mammalian species within the area, the reptiles, amphibians and invertebrates also face diverse and serious threats, mostly posed on them by anthropogenic activities including agriculture, settlements, overgrazing, burning, sand harvesting, pollution, eutrophication, siltation. Reptiles, mostly snakes, also face additional threat of being directly killed by human beings due to the general fear of the animal.

Of the insect species, the lake flies belonging to the Chaoboridae and Charonomidae family (Chaoborus sp, Chironomus sp.) will be of interest to the project. These are aquatic insects whose **Draft Detailed Design** Part 5 – ESIA Volume 1 Main Report





immature stages live in fresh water, where their presence indicates a clean, unpolluted environment. Female lake flies lay many eggs on the water surface, which hatch and transform through insect stages to adult. One of their larval stage is a favourite food of many fish species.



# Plate 6-15: Images of midge (Chironomidae) (L) and Chaoborus sp larva (R) in different resting positions {Source: Online images}

The lake flies normally patch on specific shrubs or hills near the lakeshore commonly known in Luo as kitambo (a small hill or a raised ground with shrubs near the lake shore). In certain villages, such hills are protected shrines for collection of the flies. Some villagers revere the sites as sacred land. The insects are called sam by the villagers who live along the lake region in Kenyan.

The flies are likely to be of concern to motorists especially at night or dusk when the LVRR becomes fully operational because of their synchronised swarming nature during breeding. The males form a swarm above the water and the females flying into the swarm to mate. In many species and subspecies, the emergence is synchronised with dawn or dusk, and light intensity seems to be an important cue for emergence. That implies that the flies will be attracted to lights from vehicles, just like they get attracted to lights in nearby towns and villages. But other factors may also be involved.

The insects are said to be plenty during the onset of rains, with peak abundance reported in the month of April. The villagers use swarming of lake flies to predict the onset of the raining season. At the beginning of the rain, the size of the swarm predicts the amount of rains expected. Large swarms are said to precede heavy rains. Studies have shown that the flies are available only along the lake region due to their inability to fly far inland after they emerge from the lake, making the road alighnment sections that run parallel and close to the lake shores more prone. Regular sighting is between Nyandiwa and Muhuru Bay).

Considering that the lake flies swarming peaks with peak rainfall and the fact that the flies mostly swarm at dawn or dusk when visibility is naturally low, their potential contribution to public (motorist) safety concerns cannot be ignored. When vehicle lights attract the insect to a moving car, they are like to block the windscreen thereby compromising the drivers' visibility.

#### 5.8 Fish Resources

Lake Victoria, Yala swamp and its associated wetlands and small lakes like Sare, Kanyaboli and Namboyo are the most important sources of commercial fish in the area. The major rivers Nzoia, Yala, Sondu-Miriu, Kuja also support fish but at a local level, mainly harvested for subsistence. There

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are also private commercial fish farming activities especially around wetlands. The lakes' literal zones are soad to support the highest concentration of fish species.

There are variations in species composition and population of fish in the lakes, wetlands and the rivers. Lake Victoria, for example, is world famous for its many endemic species, especially cichlid endemism of 99% with 300 species. However, fish volumes and species composition within the lake have changed substantially over time. The lake that once supported hundreds of commercially viable endemic cichlid species now supports only three species of commercial value, the native pelagic minnow called omena (Rastrineobola argentea), the introduced Nile perch (Lates niloticus), and Nile tilapia (Oreochromis niloticus).

Since the introduction of the Nile Perch and Nile Tilapia in the late 1950s and early 1960s, there has been a large change in the ichthyofauna of the lake. The Nile perch is a voracious predator preying on the cichlids particularly Haplochromis spp. With the reduction of populations of Haplochromis spp, the Nile Perch has switched to the pelagic cyprinid, the small benthic shrimp, Caridina nilotica, and even juveniles of the Nile Perch itself (WKIEMP, 2004). Nile tilapia (Oreochromis niloticus) is a tropical diurnal, omnivorous fish species. It feeds on phytoplankton, periphyton, aquatic plants, small invertebrates, benthic fauna, and detritus (waste or debris of any kind). Nile tilapia can filter feed but it usually grazes the surface of periphyton. Because they reproduce at such a rapid rate, they overcrowd and out-compete native species. This loss of biodiversity leads to genetic erosion and greater susceptibility to disease.

As a result, the above wetlands act as important ecosystems that provide habitat for fish species. Yala swamp and its satellite lakes act as fish nursery ground (gene banks) for certain endemic haplochromine fish species like Oreochromis esculentus and Oreochromis variabilis which are otherwise disappearing or substantially reducing from Lake Victoria. There are also vulnerable species like H. Maxillaries. The wetlands therefore help in replenishing natural stocks in Lake Victoria. Other species also found in the swamp include cat fish (Clarias gariepinus) and lung fish (Protopterus aethiopicus). This means the swamp and other wetlands also sustain commercial and subsistence/artisanal fisheries.

Endangered species in Lake Victoria	Local name	Species found in Lake Kanyaboli	Local name
Haplochromis spp	'Fulu' (Luo-general	Haplochromis phytophagus	'Fulu'
	nancy	Haplochromis alluaudi	'Hamaga' - Luo
Astratoreochromis alluaudi	Alluaud's haplo ('Hamaga' - Luo)	Astatoreochromis alluaudi	Alluaud's haplo ('Hamaga' - Luo)
Clenopoma murei	Ocellated labyrinth fish ('Sire'-Luo)	-	-
Oreochromis niloticus	Nile tilapia	Oreochromis niloticus	Nile tilapia (ngege)

Table 6-5: A comparision o	f some fish species in Lake	Victoria and Lake Kanyaboli
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Oreochromis esculentus	Singida tilapia ('Ngege'- Luo)	Oreochromis esculentus	Singida tilapia ('Ngege'-Luo)
Clarias spp	Catfish	Clarias gariepinus	North Africa catfish ('Mumi'- Luo)
Barbus spp	Barb	-	-
		Protopterus aethiopicus	Marbled lung fish ('Kamongo'-Luo)
		Aplocheilichthys pumilus	Tanganyika lampeye

Source: WKIEMP, 2004.

A few species have been highlighted here for illustration of the fish diversity in the area, especially those that are now supported by the wetlands around Lake Victoria. Additional information about other selected fish species is provided in **Annex 1** of this report:

# Oreochromis esculentus (Singida Tilapia)

This species is assessed as Critically Endangered has almost been eliminated from its previous range in lakes Victoria and Kyoga through predation, competitive exclusion and ecological displacement by introduced fishes. The main population (in Lake Victoria) has declined by 80% over the past 20 years. The remaining population is limited to sub-populations in a few satellite lakes, including Lake Kanyaboli. This species was originally (before competitive exclusion by the introduced species) confined to water less than 20 m deep and was most abundant in sheltered gulfs and bays where the bottom is composed of soft algaceous mud. It is a plankton feeder, using the mucus-trap mechanism combined with the combing action of the pharyngeal teeth. Breeding fish are found throughout the year and distinct spawning areas can be identified in the lake. Females brooding eggs often move off to the shelter of macrophyte beds or swampy areas. The young become independent at a length of about 15 mm when they are often found in channels in papyrus swamps.

# Haplochromis (Xystichromis) phytophagus (Christmas Fulu)

The fish species locally known in Luo as Christmas Fulu is an endangered species. It is already considered extinct in Lake Victoria, but is still quite common in Lake Kanyaboli. The name: Christmas fulu is due to the shimmering and festive look displayed by the males during the breeding period. The species has been found over sandy substrate in the littoral zone. This species is thought to be a planteater. The main threat to this species is hybridization due to decreased water transparency (on account of eutrophication and erosion leading to increased sedimentation and runoff) interfering with mate recognition visual cues. An additional threat is predation by Nile Perch.

### Paralabidochromis dichrourus

The population density in the Northern part of the Mwanza Gulf suffered a significant decline of over 90% in the 1980s, due to the introduction of the Nile Perch (Lates niloticus). The Nile Perch density has declined since 1990s. Whilst many Haplochromis species suffered dramatic population crashes, many have shown signs of recovery in the last few years, however this species has not been seen since 1986 despite repeated surveys within its known range. If it is still present it is likely to be extremely rare with very few individuals, but it may now be Extinct. The species has been found in the

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littoral zone, the sub-littoral zone and off shore, over sand and mud. It is classified as a piscivore (subsist on a diet consisting only of fish). The main threat to this species is predation by Nile Perch (a potentially reversible threat). It is also potentially threatened by hybridization due to decreased water transparency (on account of eutrophication and erosion leading to increased sedimentation and runoff) interfering with mate recognition visual cues.

## Oreochromis variabilis

This species has suffered a large reduction in extent of occurrence and is now restricted to a few small satellite lakes having been virtually eliminated from its original range in Lakes Victoria and Kyoga through predation, competitive aggression and ecological displacement by introduced fish species. Its current distribution is highly fragmented and its remaining habitat continues to be degraded and it is subject to heavy fishing pressure. Most abundant on exposed and sandy shores where there is considerable water movement. It also occurs in the calm waters of water lily swamps. Found at a depth range of 0–40 m but most commonly in water less than 10 m deep. The young fish feed on planktonic algae and may ingest small copepods. The adults feed predominantly on bottom algae but they also feed directly on plankton and may graze algae from rocks and aquatic plants. It spawns on firm or sand habitats and breeding males may occasionally be seen guarding their circular nests in water a few feet deep at the edge of the lake.

## Haplochromis maxilaris

The main threat to this species which was responsible for its dramatic decline in the early 1980s was the introduction of the Nile Perch (Lates niloticus) to Lake Victoria. As this can be found throughout the lake, it is very likely this species is found at very few locations, and it is therefore assessed as Vulnerable. More information may show that this species gualifies for a higher threatened status, or may even be classified as Possibly Extinct. The main threat to this species is predation by Nile Perch (a potentially reversible threat). It is also potentially threatened by hybridization due to decreased water transparency (on account of eutrophication and erosion leading to increased sedimentation and runoff) interfering with mate recognition visual cues. The species has been found over sand and mud in the littoral and sub-littoral zone. The species is a peadophage (consumes the young of other species).

The rivers and their tributaries in the area also provide habitat for certain fish species, either exclusively or in association with Lake Victoria (for those species that move between the two ecosystems). A sample of common fishspecies (especially in rivers Nzoia and Kuja) has been provided in Table 6-6 below.

Fish species in rivers Nzoia and Kuja	Common name
Amphilius jacksonii	Marbled mountain catfish
Mormyrus kannume	Elephant snout fish
Marcusenious grahami	Graham stonebasher
Barbus paludinosus	Straightfin barb

# Table 6-6: Selected fish sspecies found on rivers Nzoia and Kuja

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Barbus kerstenii	Redspot barb
Barbus nyanzae	Nyanza barb
Barbus radiatus	Redeye barb, Beira barb
Barbus jacksonii	Jackson barb
Labeo victorianus	Victoria labeo ('Ningu'-Luo)
Alestes nurse	Nurse Tetra, Characin
Alestes macrolepidotus	Large Scaled Robber, Characin, Silverside,
Clarias massambicus	Sharptooth catfish
Clarias alluaud	Alluaud's catfish
Synodontis fischeri	Fischer's Victoria Squeaker
Amphilius platychir	Mountain Barbel
Mastacembelus frenatus	Longtail spiny eel
Pseudocrenilabrus multicolor	Egyptian mouthbrooder
Cyprinoid spp	-

Besides the natural decline of certain species due to predation, the fish industry also faces other threats such as harvesting of juveniles and fingerlings through use of substandard nets and overexploitation. In addition, the increase in population within the project area has led to over exploitation of the fish for both domestic and commercial use. The total volume of fish production from Lake Victoria at the various beaches has increased from 118,643 metric tonnes in 2012 to 124,643 metric tonnes in 2013 (Table 6-7).

Table 6-7: Lake Victoria fish landings by S	Species and Weight 2011 – 2013
---------------------------------------------	--------------------------------

	2011		2012		2013	
Species	Metric tons	% composition	Metric tons	% composition	Metric tons	% composition
Lates niloticus	46,612	35	52,472	44	43,736	35
Ratrineobola Argentae	72,314	54	52,948	44	66,717	54
Tilapia niloticus	8,240	6	6,081	5	7,445	6

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Clarias	2,537	2	2,403	2	2,329	2
Protopterus	1,166	1	1,003	1	1,070	1
Haplochromis	527	0	715	1	1,112	1
Others	2,405	2	3,370	3	2,233	2
TOTAL	133,801	100	118,993	100	124,643	100

According to this report the contribution of the various counties is different with Homa Bay County recording the highest volume of total fish landing i.e. 64.3%, Siaya 19.7%, Migori 7.5%, Kisumu 4.5% and Busia 4.1%. The fish landing volumes also varied with species with Rastrienobola niloticus recording a total of 53.5% of the total landing, 35.1% Lates niloticus, 6.0% Oreochromis niloticus, 1.9% Clarias spp, 0.9% Protopterus aethiopicus, 0.9% Haplochromis spp. and the others combined 1.8%.



Plate 6-16: Cat fish catch from the lake fringing wetlands at Sio Port (L) and Massive Omena catch at the Nyandiwa beach (R)

#### 5.9 Sensitive Areas

The proposed road corridor crosses areas that can be categorized as environmentally sensitive areas (ESA). These include (i) the highlighted wetlands, (ii) hills like Gwassi, (iii) hot springs like Bala, (iv) parks and reserves like Ndere Island, Ruma, and Lake Kanyaboli. These areas are considered as ESA due to their ecological functions and because they act as local biodiversity hotspots with regard to indigenous plant and animal species of the area. Besides the ESA, there are also areas that are considered likely to be of archeological or paleontological or cultural/historical or religious importantce. Some of these areaas have been discussed in the following subsections. In order to avoid a possible and unnecessary biodiversity loss in the ESA, the LVRR alignment has been designed to to follow the existing roads thereby minimizing encroachment onto the environmentally sensitive areas.

#### 5.9.1 Wetlands

In Kenya wetlands include deltas, estuaries, mangroves and mudflats, swamps, marshes, flood plains, shallow lakes, rivers and the edges of deep lakes and rivers. Of Kenya's 583,000 km<sup>2</sup>, some 3-4% (or approximately 14,000 km<sup>2</sup>) are wetlands. The project area has various wetlands notably Yala **Draft Detailed Design** Part 5 – ESIA Volume 1 Main Report





swamp and its satellite lakes (Kanyaboli, Namboyo and Sare), Dunga swamp; seasonal swamps like Otok in Homa-Bay, Mboha in Seme, Kisumu; Kogweno, Nyakwere; many river deltas (Nzoia, Yala, Nyando, Sondu Miriu, Awach Kibuon, Awach Tende, little Migori and Kuja and their associated streams and river mouths); Lake Victoria, and Simbi. These wetlands are protected by a number of guidelines that regulate land use, especially concerning riparian zones.

#### Lake Victoria Fringing Wetland

of

A special type of wetland in the project area is the shoreline wetlands fringing the lake. The shoreline on the Kenyan side of the lake is estimated to be between 550 and 620 km long. Within the shoreline there are approximately 300 beaches some of which are well known wetlands which includes wetlands within the Winam Gulf i.e. Nyando River Wetland, Dunga Wetland, Osieko Wetland, Luanda Konyango (Migori River) and the Yala Swamp; Osodo Swamp. Along the Winam Gulf shore, a number of smaller wetlands occur such as Kibos, Dunga, Nduru and Kusa swamps. Many of the inshore wetlands are also influenced by lake sedges and the backwater effect that bring in both surface and subsurface water during backflows. The shoreline and river-mouth wetlands in the Lake Victoria have remarkably high levels of biodiversity and support livelihoods of the riparian communities. In addition, they offer ecological functions, despite the eminent threats by adverse human activities and possibly climate change.

#### **Dunga Swamp**

Dunga wetland, located on the south eastern shores of Lake Victoria at (0.17125° S: 34.73712° E) is one of the 60 Endemic Bird Areas (EBA) in Kenya. The swamp is predominantly papyrus (Cyperus papyrus) which forms distinctive habitat type for papyrus specialist birds. According to the IUCN Red-List Data and the Kenya important bird area (IBA) directory, the birds include the restricted range endemics like the globally threatened Papyrus Yellow Warbler (Chloropeta gracilirostris), the near threatened papyrus gonolek (Linarius mufumbiri), white winged warbler (Bradypterus carpalis), carruthers's cisticola (Cisticola carruther) and papyrus canary (Serinus koliensis). The swamp is also a filter to sediment entering Lake Victoria, it controls flooding in the area among others.

# Yala Swamp

Yala swamp is a complex of wetlands in the delta of the Yala River, on the north-east shore of Lake Victoria. The site has three main components: the Yala Swamp itself (current area approximated at about 6,500 ha after drainage of the eastern fifth); Lake Kanyaboli in the north-eastern corner, a 3-m deep lake of around 1,000 ha; and Lake Sare, the most southerly of several outlets of the Yala River into Lake Victoria, around 5 m deep and 500 ha in area. Formerly, the Yala River flowed through the eastern swamp (now 'reclaimed') into Lake Kanyaboli, then into the main swamp, and finally into Lake Victoria via a small gulf.

The Yala flow is now diverted directly into the main swamp, and a silt-clay dike cuts off Lake Kanyaboli, which receives its water from the surrounding catchment and through back-seepage from the swamp. A culvert across the mouth of the Yala, some metres above the level of Lake Victoria, has cut off the gulf on the lake and, through back-flooding, created Lake Sare. The predominant vegetation is papyrus, with Phragmites mauritianus in shallower areas and swamp grasses around the periphery. Both Lake Kanyaboli and Lake Sare are surrounded by a thick fringe of Papyrus; in the case of Lake Sare, this merges with the main swamp.

The exact size of the swamp is not known, and figures keep varying from 17 ha to 30 ha with different reports. Yala swamp has attracted a number of controversies. The controversies are fast gaining

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both political and economic dimension and attention. The importance of the wetland ecosystem, comprising of Lake Victoria - River Yala - Lake Kanyaboli interaction, to fish breeding is well recognized. Fish species like catfish move between the three water bodies. But this is fast changing. Even the indigenous fish species that were relying on the ecosystem as their refuge are threatened by swamp reclamation. It therefore means the more development we initiate in this ecosystem, the faster the dying out process will be.

This importance has been recognized and a process of registering the Yalla Swamp-Lake Kanyaboli area as a reserve has been initiated. However, this process has elicited mixed reactions from the local community, with a court case initiated to oppose the move.

#### Importance of the Wetlands

of

The above wetlands are important ecosystems that provide an important habitat for fish species. Yala swamp and its satellite lake act as fish nursery ground (gene banks) for certain fish species which are otherwise disappearing or substantially reducing from Lake Victoria. They therefore help in replenishing natural stocks in Lake Victoria. Yala swamp ecosystem contains three freshwater lakes: Kanyaboli, Sare and Namboyo which have a unique interaction and contain some endemic haplochromine fish species like Oreochromis esculentus and O. variabilis that are otherwise disappearing from Lake Victoria. Other species also found in the swamp include cat fish (Clarias gariepinus) and lung fish (Protopterus aethiopicus). This means the swamp and other wetlands also sustain commercial and subsistence/artisanal fisheries.

Compared to the other areas along the project, the wetlands have the highest level of biodiversity. They support a large number of bird species that depend on these wetlands for food and habitat. Lake Simbi attracts flamingoes that feed on its rich planktons. Lake Kanyaboli and Yala swamp are known to host the rare sitatunga antelopes. Waterbuck (Kobus defasa), bushbuck (Trigelophus sriptus), Speke's sitatunga, reedbuck, and vervet monkey are some of the important fauna found within these wetlands. The birds and mammals supported by the wetland ecosystem can in turn attract tourists which bring in revenue to the local economy.

Another important aspect is that communities around the wetlands are increasingly harvesting wetland vegetation like papyrus reeds as a source of their livelihood. The plants are harvested to provide materials for construction and thatching, the cottage industry, canoes, fishing baskets and traps. The papyrus in Dunga wetland is exploited by the local people mainly for making baskets and mats. There are other plants which are also used for medicinal purposes and as a food source (yams and edible herbaceous plants).

Wetlands act as a sponge, absorbing excess storm from heavy rainfall, thereby ensuring that the flow is regulated hence flood control and soil erosion prevention. Flood waters are stored in the soils or retained as surface water, thereby reducing floodwater volumes into Lake Victoria. In addition, the swamps vegetation slows down the flow of floodwater resulting in silt and sediment retention and Lake Victoria protection. Wetlands also have a retention ability which enables sustainable water discharge and recharge into Lake Victoria. The drainage is impeded and thus allows the water to stay in one place long enough to maximize infiltration, enhancing recharge of Lake Victoria and groundwater and aquifers. This ability is fast becoming less and less effective as large swathes of the wetlands like Yala swamp are reclaimed for agricultural and other developmental purposes.

The diverse vegetation in the wetlands absorbs nutrients and toxic substances from inflowing water from agriculturally active upstream areas thereby improving the quality of water being discharged into Lake Victoria. The nutrients and the toxic substances may originate from agricultural, domestic and

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industrial sources. The materials eroded in the watershed are filtered by the swamps vegetation resulting in water purification. This function, again, is becoming less and less effective as evidenced by the frequent cases of algae blooms being reported on the lake indicate an increased euthrophication level.

Additionally, wetlands are among the most effective ecosystems for carbon storage. The vegetation takes up carbon from the atmosphere and converts it into plant biomass during the process of photosynthesis. In many wetlands, waterlogged soil conditions prevent decomposition of the plant material thereby retaining carbon in the form of un-decomposed organic matter (peat). The long retention of carbon in wetlands prevents excessive amounts of atmospheric carbon, thereby reducing global warming. This therefore means that with the drainage and aeration process that are currently being witnessed as wetlands are converted to agricultural uses, they may in turn become emitters of carbon into the atmosphere.

Other identified wetlands like rivers Kuja, Nzoia and Yala and their tributaries also serve other important purposes of sustaining the local livelihood. They provide water for domestic and agricultural use. The locals also occasionally fish on the rivers and water their animals from there. Kuja and Sondu-Miriu provide water for hydro-electric power (HEP) generation.

#### Current threats to the Wetlands

Besides the identified importance, the wetlands in the project area are faced with a number of threats that would diminish their usefulness over time. As stated elsewhere, parts of wetlands have been drained and reclaimed for agricultural development e.g Dominion Farms have drained part of Yala Swamp for agricultural development, human settlement and industrial development. This is contributing to the reduction in the size of the wetland.

There are also parts of the wetlands which have been reclaimed for settlement. The increasing human population and change from subsistence to commercial exploitation of the wetland resources by this population has continued to exert even more pressure. This has resulted in a decline in quality as well as the quantity of ecological, biological and socio-economic products and functions derived from the wetland.



Plate 6-17: A burnt tree with birds' nests at the Dominion Farm, Yala Swamp

The quality of many water sources in Kenya is declining as a result of municipal, agricultural and industrial wastes / discharges. These have negatively impacted water quality and biodiversity within the wetlands thereby reducing its value. Increased nutrient loads have led to eutrophication and episodes of algal blooms in most wetlands. Excessive abstraction of waters, diversions, and

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catchment degradation has also contributed to the degraded water quality in the wetlands. Dunga wetland has also suffered pollution in the form of sewage and solid wastes due to its close proximity to Kisumu city.

# 5.10 Forested Hills

of

The project area has several pockets of small hills and elevated areas, most of which have substantial vegetation cover, forming forested lands. While most of the hills are not gazette as forested ecosystems, they remain of conservation interest. Although natural vegetation in the forests has been exploited, relatively inaccessible areas like Gwassi hills still has pockets of intact natural vegetation. These hills are biodiversity spots and contain indigenous plant species of conservation value. This implies the hills are a great reservoir of plant genetic resources. However degradation continue to occur in the hills and consequently to their forest thereby threatening conservation of the remaining pristine vegetation.

# Gwassi Hills

The Gwassi Hills ecosystem (and its forest conservation programme) covers a total of 12,140 hectares and is made up of 24 hills of which 4 are in Gwassi Central, 4 in Gwassi West, 6 in Gwassi East, 5 in Kaksingri and the rest in Gwassi North. The hills are located in Gwassi Division and Central Division of Suba District. To the West of the hills are Ruma National Park and Kanyamwa escarpment. To the North is Ruri Hills and to the South and West is Lake Victoria.



### Plate 6-18: Scenic forested hills around Sindo in Homa Bay

As mentioned under the vegetation sub-section of this report, the Gwassi Hills still hold some great reservoir of plant genetic resources (Table 6-8). It has some rare species of trees that is hardly found in other forests except in Ssesse Island in Uganda. The hills also serve as home to a variety of wildlife. Common wildlife species found in the hills are warthogs, porcupines, bushpigs, dik dik, hare, baboons, civet cat, gazelles, bush-backs, leopards, hyena, velvet monkey and hippopotamus down at the lake stream. Game animals found in the hills that are facing extinction are leopards and Columbus monkey.

# Table 6-8: Common tree species in Gwassi hills and their uses

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Species biological name	Status of now	Description	Common use
Abrus precutorius	Rare	Herb	Herb
Acacia polycantha	Rare	Tree	Timber, Charcoal
Acacia lahai	Rare	Tree	Timber, Charcoal
Albizai coriara	Threatened	Herb	Charcoal
Boswelia alba	Rare	Herb	Vegetable
Bridelia microcantha	Rare	Tree	Medicine, firewood
Catha edulis	Rare	Tree	Timber
Combretum molle	Rare	Tree	Charcoal, firewood
Erythrina abyssinica	Rare	Tree	Medicine
Prunus africana	Rare	Tree	Charcoal, Timber
Olea Africana	Threatened	Tree	Charcoal, Timber
Sepium elliptcum	Rare	Tree	Charcoal
Tamarindus indica	Rare	Tree	Fruits, medicine, Timber

Source: Osienala-http://www.osienala.org/downloads/gwassihillsbooklet.pdf

#### Importance of Gwassi Hills and Forest

Forests are considered important ecosystems. They protect the water resources by decreasing the speed at which water disperses and favour slow but total infiltration of rainwater; particularly in dry areas thereby providing a recharge mechanism for the water resources within these areas. The forest canopy also slows down the wind while its dense network of roots holds the soil in place hence protecting the soil against wind and water erosion, land movement (mass slides and falling rocks and under cold climates, the risk of avalanches).

Forests also influence the local climate and help in the reduction of gas emission impacts. Through the control of wind velocity and air flows, the forest influences local air circulation and may thus retain solid suspensions and gaseous elements within its canopy; it can also filter air masses and retain contaminants like carbon dioxide. They also offer a habitat to flora and fauna. If well conserved the forests are able to protect the indigenous species hence biodiversity protection. Forests have also been used for cultural and religious functions by the local communities.

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Specifically, Gwassi hills are important to the community in that these hills not only provide an abode for wildlife but are also important for the traditional Gand cultural activities of the communities. The forests on the hills are inhabited by wild animals that are important for tourist attraction. Among the wild animals are Ungoye baboons that live in the cliffs of Ungoye. They are unique to the hills and are also known to "watch Lake Victoria every morning when the sun rises and evening when it sets". Destruction of forests have made the baboons relocate to the lowlands where conflicts arise between the baboons and farmers. It is being alleged that they have changed their living habits by feeding on goats and poultry.

The hills are known for unique bird species such as fish eagle that preys on tilapia of Lake Victoria. The fish eagle has a local name in Gwassi that is synonymous with the Gwassi location. Other common bird species are guinea fowl and Quelea quelea, which is a delicacy for the local people. The small quelea birds are harvested in the month of April near the hills named "Singa Mire" taken after the birds' names. Some other wild life species are also found within the hills and these include warthogs, porcupines, bushpigs, dik dik, hare, baboons, civet cat, gazelles, bush-backs, leopards, hyena and velvet monkey. Game animals found in the hills that are of serious conservation concern are leopards and Colobus monkey. These wild animals are an important heritage and also for tourist attraction.

The hills are also associated with socio-cultural beliefs and functions. For example, Gwassi is famous for large reptiles. It is believed that Kiboye the grandfather of Gwassi people died and turned to a large reptile. The Gwassi people until today offer sacrifices to a large reptile if it is seen. Kiboye the reptile live in a sacred hill near Kirambo. Only bonafide grandsons of Kiboye are supposed to offer sacrifice to animals.

Due to the ecological linkages within the region, Ruma National Park ecosystem is also dependent on the adjacent hills and ranges including Gwassi as the hills provide refuge and additional space for some types of wildlife. In addition, the forested hills provide catchment areas for the water that drains into Ruma Park which is a home for the Endangered Roan antelope. Indeed, in the recent past degradation of Gwassi forest has reduced the flow of water from the hills. To illustrate this further, it is also reported that most of the streams that originate from the hills i.e. Rwancharo, Kisaku, Mwivoche, Mumisa, Omuonyodero, Rwambori and Kisirivira have turned into seasonal streams.

#### **Threats to Hills and Forests**

Gwassi hill and its forest, just like any other forest and hills, are facing many threats. There is conversion of forests and hills to agricultural fields and settlements by the increasing population around these areas. Illegal logging is also contributing to the reduction of land and species in these hills and forests. Some forests are also being converted for development of infrastructure projects. The loss of certain indigenous species has also been attributed to effects of climate change, specifically due to failure of trees to adjust to the drastic climatic changes leading to the trees dying or failing to thrive as well as reduction of the area under forests and hills. It is therefore possible that future and uncontrolled development have the potential to highten these threats.

# 5.10.1 Protected Areas (Parks, Reserves and Sanctuaries)

There are a number of conservation areas within the project area. Lake Kanyaboli in Siaya and Ndere Island in Kisumu County are designated as national reserve and park, respectively. Kisumu County also host the Impala Sanctuary. In Homa-Bay County there is Ruma National park and the Lake Simbi

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national Sanctuary. There are no government established national parks, game reserves or animal orphanage in the project sections covered in Busia and Migori Counties (Table 6-9).

These protected areas, falling within the project area, are used for conservation and tourism purposes. Kanyaboli ecosystem is known for being home for Sitatunga antelopes, which are rare in Kenya. Ndere Island is host to a number of animals such as zebras (which were introduced), crocodiles, several snake species, warthogs, and antelope species like impalas (Aepyceros melampus) as well as the Sitatunga antelopes. Impala Sanctuary also hosts a number of animals. Ruma national park is home to the rare Roan antelope (Hippotragus equines). Other animals found here include: mountain red buck, leopard, buffalo, Jackson's hartebeest, endegered Rothschild's giraffe, hyena, impala, oribi (long-necked small antelope), and vervet monkey.

Apart from Lake Kanyaboli national reserve where the LVRR will pass directly through, the other parks and reserves will not be touched directly by the project. However, they are considered close enough and are likely to be influenced by the impacts of the project especially during operation (improved access may bring in more visitors to these areas).

Park / Reserve / Sanctuary	Description	Species of conservation value	Other species found
Lake Kanyaboli	Located near the vast Yala Swamp. This reserve is home to papyrus specialist birds that are endemic to the basin and depend entirely on the habitat for survival.	The globally Endangered Papyrus yellow Warbler, Critically Endangered haplochromines <i>L.</i> <i>maxilaris</i> and <i>X.</i> <i>phytophagus</i> Regionally rare sitatunga antelope	Papyrus gonolek, Papyrus canary, Caruthers cisticola Lipochromis maxilaris, Astatotilapia nubila, Astatotilapia 'bigeye' (Kaufman), Pseudocranilabrus multicolor victoriae, Xystichromis phytophagus and Astatoreochromis alluaiudi, O. niloticus, O. leucostictus, T. zilli, Clarias mossambicus,Protopterus aethipicus and Xenoclarias sp.
Lake Simbi National sanctuary	It is located close to Kendu Bay town, Lake Simbi is a tiny crater Lake measuring about one kilometre in radius.	Not listed	Lake Simbi site supports a substantial bird population that includes flamingos, little grebes, little egrets and Egyptian geese
Ndere Island National park	Ndere Island is a small island (4.2 km <sup>2</sup> ) in Winam Gulf of Lake Victoria in Kenya, some 50 km from Kisumu	Not listed	African fish eagles, swifts, hippopotamus, nile crocodiles, zebras
Kisumu	Locatedwithin Kisumu City, Kisumu	Regionally rare sitatunga	Buffalos, giraffes, cheetahs

### Table 6-9: Summary of parks and reserves

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Impala park	Impala Sanctuary lies on the	antelone	and several primate species		
inipala park	abaraa of Laka Victoria apvoring	antelope			
			non		
	less than 1km <sup>-</sup>				
Rumo	la a torractrial Bark in the antira	ILICN logat concern Roon	Mountain road buck		
Ruma	is a terrestrial Fark in the entire	antelope, Endangered Rothschild's giraffe, globally threatened blue swallow which is a scarce intra-African migrant	would reed buck,		
National Park	Nyanza Province in Kenya. It was		leopards, buffalo, Jackson's		
	established as the Lambwe Valley		Hartebeest, Rothschild's		
	Game Reserve in 1966 to protect		giraffe, hyena, impala, vervet monkey, Oribi, black rhinos, bush pig, serval cat, honey		
	its indigenous population of rare				
	roan antelopes which exist				
			badgers.		

#### Lake Kanyaboli National Reserve

Lake Kanyaboli (10.5 km<sup>2</sup>) is one of the satellite lakes associated with Yala Swamp which is Kenya's largest freshwater wetland habitat. Other satellite lakes within the boundaries of Yala wetland complex include Nyamboyo (2.0 km<sup>2</sup>) and Sare (5.0 km<sup>2</sup>). Rivers Nzoia and Yala pass through Yala Swamp and replenish water of L. Kanyaboli. Lake Kanyaboli is the largest and most economically and ecologically important of the Yala wetland complex lakes. The lake contains relic populations of cichlids that have severely been reduced or almost extinct in Lake Victoria. Viable populations of the native Lake Victoria tilapias (Oreochromis esculentus and Oreochromis variabilis) that have virtually been eliminated from Lake Victoria due to Nile perch predation occur in Lake Kanyaboli.

Lake Kanyaboli acts as refugia for the following haplochromine species: Lipochromis maxilaris, Astatotilapia nubila, Astatotilapia 'bigeye' (Kaufman), Pseudocranilabrus multicolor victoriae, Xystichromis phytophagus and Astatoreochromis alluaiudi. L. maxilaris and X. phytophagus are critically endangered haplochromines. Molecular phylogenetic studies have uncovered a very high genetic variation in the Lake Kanyaboli haplochromines. This illustrates that Lake Kanyaboli can act as a 'genetic reservoir' for the Lake Victoria species flock. Other fish fauna that are found in Lake Kanyaboli include O. niloticus, O. leucostictus, T. zilli, Clarias mossambicus, Protopterus aethipicus and Xenoclarias sp.



### Figure 6-5: The existing causeway on Lake Kanyaboli, where the LVRR will pass

The adjoining Yala swamp forms an important habitat to the regionally rare sitatunga (Tragecephalus spekeii) and a number of bird species, including the following: the Blue breasted bee eater, the papyrus gonolek, the Swamp flycatcher, the Papyrus canary, the White winged warbler, the Great **Draft Detailed Design** Part 5 – ESIA Volume 1 Main Report





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snipper and the Baillor's crane. Other fauna include vervet monkey, Hippopotamus, African python (Python sebae) and spottednecked otter.

Peripheral communities' livelihoods and survival is linked to Lake Kanyaboli. Fishing, hunting, farming, livestock grazing, papyrus exploitation, salt lick, brick making, medicinal plants collection, traditional vegetables collection, tourism and water supply are some of the direct benefits the community derive from the lake. Lake Kanyaboli and Yala Wetland Complex therefore possess intrinsic biophysical and socio-economic features necessary for Ramsar Site.

## Lake Simbi National Sanctuary

of

This is a small crater lake which is a few kilometres from the shores of Lake Victoria and about 3 km from Kendu Bay town in Homa-Bay County. The lake's water is alkaline and carries a strong smell that can extend several kilometres away. The lake has been gazetted as a Bird sanctuary and is currently managed by the Kenya Wildlife Service. The lake supports migratory birds especially from the Rift Valley lakes and hosts several white stalks and flamingos. The lake is critical transitional refugia of migrating flamingos from Rift Valley lakes especially from Lake Nakuru due to its favourable climate and food abundance. It is also a home to diverse resident birds. Both Lake Simbi and adjacent Ondago sites support a substantial bird population that includes flamingos, little grebes, little egrets and Egyptian geese.



### Plate 6-19: Flamingo invasion of Lake Simbi (Photo from Ecofinder)

However, anthropogenic activities which include pollution and clearing of fringe vegetation threaten the lake. The lake margin, which should be a natural habitat for migratory birds, is diminishing due to invasion and encroachement by humans. A number of homes and facilities such as schools and dispensaries have been constructed nearby. There is also ongoing mining (carbonate-rich salts-Bala) from the areas which should form the lakes boundary or riparian zone. The natural vegetation around the lake has also been extensively destroyed and this has led to erosion and siltation of the lake.

Another problem facing the lake is eutrophication which has initiated the decomposition of cyanobacteria blooms that produce various toxins and foul smell especially, during hot conditions. These are seen in the form of a thick mat of decomposing cyanobacteria. Because of these toxins, the lake's water cannot be used for drinking or for other domestic purposes. Lack of adequate waste water management and lack of sustainable farming can be major causes of this condition, especially, when added to a growing population. Additionally, multiple sources of erosion, destruction of wetlands/natural vegetation, use of non-biodegradable phosphate rich detergents and soaps and lack of adequate garbage disposal all contribute to the eutrophication process.

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Lake Simbi also attracts tourists because of the legend associated with the formation of the Crater Lake and needs to be protected.

# 5.10.2 Hot Springs

#### **Bala Hot Springs**

This site, within the Homa Hills area, Homa-Bay County, is considered geologically active. It is located about 50 km North of Kendu Bay in the Nyanza Rift, and about 7 km south east of Homa Hill. The area of influence is indicated in Figure 6-6 below. The Homa Hill resource area lies within geographical location (Easting 661000 m to 674000 m and Northing of 9950000 m to 9965000 m), or approximately 155 km<sup>2</sup>.



Figure 6-6: Homa Hills geologically active area (Source: Langat, 2010).

The road passes through this geologically active area that is charcaterized by active hot springs on the lower reaches of Homa hills. The hot springs also have cultural importance to the local community because they use the water that is rich in carbonates for traditional cooking of special dishes, especially vegetables. The water is also believed to cure certain skin diseases because of its high sulphur content. The soils being rich in carbonates (bala) are also used for cooking, besides being a common salt lick for livestock. Sometimes this soil is harvested by locals and barter-traded in other areas.

# 5.11 Archeological, Paleontological or Cultural sites

A number of areas and locations that will be traversed by the LVRR have the potential of being geologically active or regions with potential paleontological and archeological resources. Majority of

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these potential areas fall within Homa-Bay County and include areas covering Homa hill and Bala hotspring, the areas that are under the influence of Lambwe valley, covering Mbita into Sindo. There are also sites in Siaya and Kisumu counties.



Figure 6-7: Map of Winam Gulf, showing selected sites with potential archeological/paleontological resources.

{Source: Christian A. Tryon et al. (2012)}

https://www.researchgate.net/publication/234130619 Late Pleistocene artefacts\_and\_faunafrom\_Rusinga\_and\_Mfangano\_isl andsLake\_Victoria\_Kenya

Besides the potential paleontological and archeological heritage sites, the project landscape is also doted by sites that are regarded by the local communities as either of cultural, religious or historical importance to them. Gwassi hills for example are associated with socio-cultural beliefs and functions. For example Gwassi is famous for large reptiles. It is believed that Kiboye the grandfather of Gwassi people died and turned to a large reptile. The Gwassi people until today offer sacrifices to a large reptile if it is seen. Kiboye the reptile lives in a sacred hill near Kirambo. Only bonafide grandsons of Kiboye are supposed to offer sacrifice to animals. Lake Simbi also attracts tourists because of the legend associated with the formation of the Crater Lake and needs to be protected.

Site	Location	Reported Discovery
Rambugu	Located along C 27 (Kisian-Bondo– Usenge) road possibly just before Kadimu (Nyamonye) in Asembo area	Stratified leaves artifacts (deposits). There are also thin-shaped rocks (lithic) deposits found on site
Muguruk	Located on the left bank of the Muguruk River, in Kisumu (some 3 km north of the present day shore of the Winam Gulf in Lake Victoria)	Middle stone age artifacts that represent a stone line concentrated by the action of termites
Randhore	Located to the south of Muguruk site	Middle stone age assemblages of rare obsidian (a hard, dark, glasslike volcanic rock formed by the rapid solidification of lava without crystallization) flake

Table 6-10: Sites within the L	VRR project likely to be	of archeological and	historical importance

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Wadh Lon'go	Located at the foot of Nyakach hills	Very old (Holocene period = 11,700 years ago) assemblages of lithic rocks
Luanda	Located between Waondo and Kirindo along Homabay-Mbita road	Very old (Holocene period = 11,700 years ago) assemblages of lithic rocks
Nyamgondho Wuod Ombare	Located near Nyandiwa Trading Centre in Central Gwassi	Human foot-prints and those of domesticated animals (said to be visible on the rocks, especially during early morning hours when the lake waters are clean)
Wanyama beach	Stands afew kilometers off Wanyama beach in Rusinga Island	Two rocks resembling the fighting bull
Soklo Kipenji	A rock island located off the Mirunda and Malela beaches in Lambwe Location	The story goes that the rock island ( <i>Nyama gi Ware</i> ) is inaccessible by any human being

The specific locations of some of the sites, especially those that are considered of cultural and/or historical importance, are known, but for others (archeological and paleontological) the impact area is open and wide and singling out a specific spot is difficult. It therefore means that for as long as the LVRR passes through areas considered to have potential archeological or paleontological sites, the possibility of discovery remains high. Just like the many sites that have been identified to be excavated for road construction materials (sand, hardcore and stones), the project actions like road clearing and topsoil removal are also likely to unearth potential archeological and/or paleontological resources. The cultural/heritage or religious sites that are not likely to be impacted directly by either project construction or material sourcing may still be influenced by the road indirectly through opening up initially inacessible area and increasing access to those areas.

# 5.12 Air Quality

Being mainly rural country, air quality along project corridor is mainly influenced by emissions from vehicular sources and attendant generation of particulate matter mainly in the form of dust. The proposed project alignment covers both paved and unpaved section. The unpaved sections comprise of all-weather and dry-weather roads. There are also sections of the alignment that are without a proper road and currently exist as footpaths. Except for urban setups with slightly high concentration of vehicles and motorbikes emissions from vehicular sources and attendant generation of particulate matter are relatively low given the low traffic experienced in the region.

The main air quality pollutants are components of emissions, principally carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), Nitrogen Oxides (NO<sub>x</sub>), Sulphur Oxides (SO<sub>x</sub>) and Particulate Matter (PM<sub>2.5</sub>, PM<sub>5</sub> and PM<sub>10</sub>). There are also hydrocarbons (H<sub>x</sub>C<sub>x</sub>), fuel aerosols and soot. The paved sections have low dust and PM generation, but can be considered to have relatively high emissions of CO, NO<sub>x</sub> and  $H_xC_x$  due to high traffic frequency experienced in these sections. The unpaved sections of the alignment, especially in areas with frequent traffic, have elevated levels of PM being generated. The magnitude of the dust generated is evidenced by the level of dust which settles on the leaves of nearby roadside vegetation. These dust and emission pose a number of respiratory risks to the people who settle and operate within these areas.

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There are also minor sources of air quality pollutants related to agricultural activities such as burning agricultural fields; and biomass energy production and use, especially charcoal burning and domestic use of fuelwood. Other sources include the localized foul smell of decaying fish remains in the various fish landing beaches that dot the landscape.

The most important air quality receptors are sensitive institutions along the project road. For this project, these receptors have been either identified as primary (occurring in areas where the road will be newly constructed) or secondary (found along the tarmacked sections that may only need minor repairs). These institutions include learning centres, health facilities and urban centres, the latter being sites of concentrated settlements. Table 6-11 below summarizes the common receptors that were within 200m of the road alignment. These receptors are evenly distributed all along the project road with learning institutions forming the bulk of the sensitive receptors. Full details are in Annex 4.

Major Receptors	Number
Schools	284
Places of worship	215
Town / Market centres / Offices	127

51

677

Table 6-11: Sensitive receptors and their approximate numbers

# 5.13 Noise and Vibration

Total

Health facilities

The current ambient noise and vibration conditions within the project corridor can be described as low with the exception of urban centres where typical urban noise is experienced and the paved sections where vehicular noise is dominant. Throughout the project area the source of noise that was evident was from the vehicles and motorbikes used as means of transport. The Table 6-12 below provides a summary of noise and vibration conditions along the corridor.

Section	Chainage	Ambient Noise Rating	Most critical phase	Remarks
Bumala to Turn-off to Sio Port	0+000 -13+400	Medium	Construction	Rural, moderate settlement
Sio Port turn-off to re-joining Bumala road to River Nzoia	13+400 – 42+000	Low	Operation	Rural, low settlements
River Nzoia to Kagwa	42+000 – 103+000	Low	Operation	Rural, low settlements

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Kagwa to Asembo Bay	103+000 – 148 + 000	Medium	Construction	Paved highway but low traffic	
Asembo Bay to Otonglo Kisumu	148+000 – 192+000	Low	Construction	Rural, low settlements	
Kisumu section	192+000 – 202+000	High	Insignificant	Urban, high traffic volume, aircraft noise	
Kisumu to Katito	202+000 - 236+000	High	Insignificant	International Highway	
Katito to turn off to Sango Rota	236+000 – 254+500	High	Insignificant	Highway	
Sango Rota loop	254+500 – 261+000 (Loop of 12 km)	Low	Construction	Rural, moderate settlement	
End of Sango Rota loop to turn off to Homa Hills	261+000 - 277+000	High	Insignificant	Highway, several market centres, Kendu Bay town	
Homa Hills loop to Got Bondo	277+000 – 319+000	Low		Rural, moderate settlement	
Got Bondo to Homa Bay	319+000 – 327+000	High	Insignificant	Highway, Homa Bay Town	
Homa Bay to Waondo Including Olambwe loop	327+000 - 346+000	Natural	Construction Low settler / Operation rural		
Waondo to Mbita	346+000 – 359+000	High	Insignificant	Highway	
Mbita to Muhuru	359+000	Low Construction Low rural		Low settlement rural	

The receptors for noise and vibration in the areas covered by the project are similar to those highlighted in Table 6-11 under air quality sub-section.

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### **BASELINE SOCIO-ECONOMIC CONDITIONS** 6

### 6.1 **Project Location**

of

The Lake Victoria Ring Road starts in Busia County at B1/C30 junction through Siaya, Kisumu, Homa Bay and Migori counties.



Figure 7-1: Counties traversed by the project

The above Figure and Table reveal that the project road will primarily open up and serve the interior regions of all the five counties and the fourteen sub-counties traversed. Secondarily, the project road connects various rural and/or trunk roads serving and linking the wider Western and rift valley regions as well as Kenya as a nation and the East African countries.

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The proposed road will serve many national and county government administrative and security centers thereby enhancing access to services provided thereof. Some offices along the project road include: Ligigo assistant chiefs Office, chiefs offices namely Sega, Bunyala South and Bujuba and Deputy county commissioner Samia and; Nyamanye and, Usigu Administration police among the many others.

### 6.2 Demography

The Lake Victoria Ring Road is located in an area with favourable conditions for agriculture, fishing and other economic activities. The region has one of the most densely populated regions of Kenya with over 10 million people which constitute about 25% of the population in the country. During each decade, population growth within a 100-km buffer zone around the lake outpaced the continental average. The above figure reveals that over the last decade, population density in the lake region almost doubled from an average of 60 to over 100 persons per km<sup>2</sup>. This reflects growing dependency and pressure on the lake's resources. The population change in the Lake Victoria region over the past 55 years is presented in the figure below.



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Source: United Nations Environment Programme (http://na.unep.net); April 2006

The counties traversed by the Lake Victoria Ring Road project have a total population of 4,436,123. According to the 2009 population census, Kisumu County had the highest population of 968,909 people closely followed by Homa Bay County with 963,794. Busia County had the lowest population total of 743,946 followed by Siaya County with 842,304 persons. The average household size in the project counties is 4.8 members where Busia County has the highest average size of six members while Siaya and Kisumu have the lowest of four members. The individual county population figures are presented in the Table 7-1 below:

County	Male	Female	Total	Number of households	Average household size	Population growth rate
Busia	355,934	367,701	743,946	42,575	6	2.98
Siaya	419,227	466,535	842,304	199,034	4	1.58
Kisumu	474,687	494,222	968,909	226,719	4	1.86
Homa Bay	462,454	501,340	963,794	206,255	5	2.49
Migori	444,356	472,814	917,170	180,211	5	3.19
Totals	2,156,658	2,302,612	4,436,123	854,794	4.8	2.4

Table 7-1: Population Distribution by Sex, Number of Households, and growth rate in the project Counties

Source: Kenya National Bureau of Statistics, 2009

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The project counties' population at the growth rate of 2.4% is estimated to be 5,263,983 by 2017 and increase to 5,594,407 by 2020. The population growth in Lake Victoria ring road project counties and sub-counties is presented in the following Table.

County/constituencies	2009 census	Projected population (2015-2020)							
		2015	2016	2017	2018	2019	2020		
Busia	743,946	825,921	840,353	855,038	869,978	885,180	900,648		
Siaya	842,304	963,007	984,308	1,005,816	1,027,795	1,049,979	1,070,797		
Homa Bay	963,794	1,101,901	1,126,270	1,150,871	1,176,010	1,201,378	1,225,243		
Kisumu	968,909	1,107,755	1,132,264	1,157,020	1,182,320	1,207,865	1,231,745		
Migori	917,170	1,048,602	1,071,803	1,095,238	1,119,186	1,143,366	1,165,974		
Total	4,436,123	5,047,186	5,154,998	5,263,983	5,375,289	5,487,768	5,594,407		

Table 7-2: Population projections in the project constituencies

Source: Kenya National Bureau of Statistics, 2009

In the project counties, 29% of the population is within the labourforce age group of 15 to 64 years. The large proportion of labourfoce will provide adequate support during the road construction especially for the casual workers. The following Figure illustrates the distribution of selected age groups in the project area.



Figure 7-2 Population of the project counties for Selected Age groups

Source: CIDPs

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The project counties' average population growth rate is 2.42% where Migori has the highest rate at 3.19% followed by Busia County with a growth rate of 2.98%. Siava has the lowest population growth rate of 1.58% followed by Kisumu with a growth rate of 1.86% per annum. Owing to high fertility rates among women, all the five project counties have child rich populations where the 0-14 year olds constitute 48% in Busia and Homa Bay, 45% in Siaya, 44% in Kisumu and 50% in Migori. The high fertility rate is however on the decline in all counties except Homa Bay and Migori.

Kisumu County has the highest population density of 464 persons per km<sup>2</sup> whereas Homa Bay has the lowest of 303 persons per km<sup>2</sup>. Busia has 439 persons per km<sup>2</sup>, Siava 333 persons per km<sup>2</sup> and Migori 356 persons per km<sup>2</sup>. The high density pocket areas along the project road include (peri-) urban and market centres namely Bumala, funyula, Port Victoria, Usonga, Kisumu, Homa Bay, Mbita, Sido, Sori and Muhuru Bay. Other pocket areas with high population densities include the rural areas with high agricultural potentials namely Budalangi, parts of Rarieda and Nyatike sub-counties (Figure 7-3).



Figure 7-3: Population density along the proposed project road

Source: Socio - Economic Atlas of Kenya

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Population density is influenced by the climatic conditions, topography, soil composition, and infrastructure and land ownership. Population in the project Counties is concentrated within and around the trading centres and towns, high potential zones and fish landing sites. The high potential areas along the project road in Siaya county include in South-Alego, Yala, Central Sakwa and Asembo Central locations.

The construction of the project road is likely to have a significant impact on the current population levels which will likely increase against improved local mobility and access to markets with easier movement of goods and people. The increased population size and density along the project road will call for increased demand for products and services such as education, transport, healthcare and agricultural products among others. The project road is expected to facilitate efficient movement of passengers, goods and services in the area.

#### 6.3 Urbanisaton

An Urban area constitutes a built up environment, a population size of over 5,000 people with centralized social services. There is rapid urbanization in the Lake Region which is projected to double in the next decade. The migrants into urban areas in the region are dominated by the youth migrating from rural to urban centres in search of employment. About 74.6% (or 3,266,023) of the population in the project counties lives in the rural areas while 25.4% (1,170,100) live in urban areas. Kisumu County has the highest urban population while Siaya has the lowest (Table 7-3).



# Table 7-3 Residence of populations in the project counties

Source: Kenya National Bureau of Statistics, 2009

The major counties' urban centres traversed by the project road include Bumala, Port Victoria/Bunyala, Asembo, Kisumu, Kendu Bay, Homa Bay, Mbita, Sori and Muhuru Bay. The Table below gives an estimated population of the major urban centres traversed by the project road.

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County	Urban centre	Total Population		
Pusio	Bumala	6,561		
Dusia	Port Victoria	3,504		
Siaya	Usenge	10,098		
Kisumu	Kisumu	388,311		
	Kendu Bay	14,747		
Homa Pay	Homa Bay	58,936		
Homa Day	Mbita Point	11,989		
	Sindo	6,362		
Migori	Sori	8,964		
Migon	Muhuru Bay	6,254		

### Table 7-4: Population of Urban centres traversed by the Project road

Source: Kenya National Bureau of Statistics, 2009

Majority of those moving out to urban areas in search of formal employment are the young people. The increasing trend of rapid population growth in urban areas will put pressure on the infrastructure and social institutions 9education, water and health facilities) that were initially constructed to meet demand for a few people.

#### 6.4 Settlement and Housing

House provision is mostly owner occupier in the rural areas. In urban areas, provision is mostly by the private developers, National Housing Cooperation (NHC) and Ministry of Housing for civil servants. NHC has land for future development at the County headquarters. The project counties as well as the road corridor have two types of housing units namely permanent and semi-permanent. Permanent dwellings are constructed using materials that can maintain stability for more than two decades such as tiles, iron sheets, ballast, cement, wood and iron bars. Semi-permanent dwelling units on the other hand are constructed using materials that are both permanent and temporary such as clay, wood or grass that cannot maintain stability for more than a decade (Table 7-5).

# Table 7-5: House building materials in the project counties

County	Floor			Wall			Roof			
	Earth	Cement	Tiles	Mud & Bricks / Cement Corrugated iron sheets				Corrugated iron sheets	Grass	Tiles and concrete
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Consultancy services for the Feasibility Study, Environmental and Social Republic Impact Assessment, preparation of Resettlement action Plan and the design and tender documentation for the Lake Victoria Ring Roads

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Busia	74.9	24.7	0.4	81.1	9.45	0.7	8.8	46.4	53.05	0.1
Siaya	70.1	29.0	0.4	63.8	36.0	0.1	0.1	65.9	32.1	2.0
Homa Bay	74.7	24.4	-	65.6	12.3	16.5	5.6	82.3	15.1	2.6
kisumu	55.2	42.4	1.5	49.6	3.2	21.2	26.0	89.3	9	1.7
Migori	74	25	0	71	16	9	3	73	27	0.0

Source; Kenya integrated Household Budget survey, 2005

Areas traversed by the project road are dominated by clustered settlements found in urban areas, irrigation sites of Bunyala and Kuja, commercial farming site of Yala (dominion farms) and fishing communities and scattered settlements in the dry areas of Nyamonye to South Sakwa, Akado to Kaloka markets, Pala to Kadiege and Kitare, Sido to Nyagwethi and sections of Nyatike.

Linear settlements are found along the project road but notably in market centers along which businesses compete to lie along the road which enhances customer success. Homesteads are fenced with Euphorbia. House floors are raised to avoid flooding in Budalangi are and homesteads located on area prone to flooding especially those near the lake shore. Settlement patterns within the project area range from scattered settlement (homes), clustered to densely populated areas.



View of settlement pattern at the foot of Homa hills

A typical local homestead (Homa Hills)

#### Plate 7-1: Settlement patterns along the road alignment

#### 6.5 Land ownership and use

#### Land Tenure Systems 6.5.1

Land tenure implies all rights provided by a legal system through which individuals and groups gain access to land including owning and disposing off. In the project area customary freehold tenure dominated where land was held either communally by local communities or in trust by government with most of the lands in the urban areas remaining under private leaseholds (common in the urban areas and smaller trading centres). However, the status is changing due to a number of factors including growing population pressure, a growing economy that is increasing the demand of outsiders and entrepreneurs for land, improper adjudication and a private land market. Consequently more land

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is being subdivided and registered as private property with individual titles, where property rights are all under private ownership with registered title deeds.

On average, 44.3% of land owners across all the project counties have title deeds. Large percentage of land owners do not have title deeds as they reside on communal ancestral lands with no official documents of ownership mainly in Siaya (65%), Busia (69%) and Homa Bay (56%).

Construction of the proposed Lake Victoria Ring Road will open up even remote areas of Homa Bay leading to increased demand for land due to increased accessibility. This will result to increasing land values and subdivision into smaller parcels per household. In addition, land currently owned communally or under trust by the government may be sold to private land owners through unscrupulous procedures.

#### 6.5.2 Land use

Land use in the project area includes protected state forests, the large commercial Dominion farm in Siaya, small holder farming areas and irrigated rice farms in Bunyala, as well as industrial use. Other uses include mining, construction of human settlements, business, social and public amenities, collateral to obtain credit as well as for aesthetic purposes (Figure 7-4)



Figure 7-4: Land Use in the project area

The proposed road project has the potential for changing, intensifying or reducing extend of land use in the project area where more land may be changed from farmlands to building while idle land may **Draft Detailed Design** Part 5 – ESIA Volume 1 Main Report





be put into intensive cultivation. To address this problem, there is need for the respective county governments to implement appropriate policies on spatial Planning.

#### Social Environment 6.6

of

#### 6.6.1 Education

The project counties have a total of 9,114 education institutions. These include 4,724 early childhood development (ECD) centres, 3,526 Primary schools, 792 secondary schools, 70 tertiary institutions (colleges/universities, youth polytechnics). The number of education institutions in the project counties is presented in the following Table 7-6:

County	ECD	Primary	Secondary	Tertiary institutions		
	Centres	SCHOOIS	SCHOOIS	Colleges and youth polytechnics	University colleges	
Busia	459	450	105	17	3	
Siaya	989	700	204	16	3	
Kisumu	997	655	158	2	8	
Homa Bay	1,183	905	118	2	3	
Migori	1,096	816	207	13	3	
Total	4,724	3,526	792	50	20	

#### Table 7-6: Education institutions and numbers

The total number of pupils enrolled in schools traversed by the project road is 1,364,909 (242,982 in ECDs and 1,121,927 in primary schools). There are 353,097 students enrolled in secondary schools. The following table summarized the number of pupils enrolled in ECDs, primary and secondary in the project counties.

Table 7-7: Total school enrollment i	in 2009
--------------------------------------	---------

County	ECD	Primary	Secondary
Busia	51,160	220,101	23,100
Siaya	61,118	202,658	58,302
Kisumu	47,014	240,538	113,314
Homa Bay	83,690	204,630	59,970

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Migori	109, 990	254,000	98,411
Total	242,982	1,121,927	353,097

In Kenya, the national literacy level is 90%. In the project area, Kisumu County has the highest with 83% followed by Migori County which has 75.2%. In Homa Bay County, literacy levels stand at 73.3% while Busia has the lowest of 56.7%. In the project counties on average, 20% have no formal education while majority (62%) have Primary level of education and the rest (18%) have attained Secondary level of education and above. Kisumu County has the lowest proportion (18%) of people who have no formal education while Busia has the largest proportion (23%) of population under this category.



# Figure 7-5: School enrollment and literacy levels in the LVRR project counties

Source: County Integrated Development Plans for various counties

Figure 7-6 illustrates highest education levels attained by the population in each project county.

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# Source: County Directors of Education

There are over 284 learning institutions along the project road. Among these include 36 in Busia, 63 in Siaya, 43 in Kisumu, 67 in Homa Bay and 31 in Migori. In addition, there are many private academies as well as community libraries along the project road. Full details of these institutions are listed in **Annex 4** of this report.



Plate 7-2: Sample photos of some of the education institutions along project road

There are a number of education stakeholders in counties traversed by the project road. These are as follows among others;

- National and County government
- Constituency development fund

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- Banking sector KCB, Cooperative bank and Equity bank
- NGOs and Civil society organisations Plan international, millennium villages, UNICEF, World vision, Aphia Plus, Girl-child network, Nyako Ber Foundation, Red cross, Access AID, AMURT Africa
- International organisations-UNEP
- Private sector
- Publishers Longhorn, KLB, EAEP
- Education groups Jicho Four Production, Illuminate Africa
- Churches Anglican Church of Kenya, Catholic Church.
- Mainstream ministries Ministry of Health, Ministry of Devolution and Ministry of Security & Internal Affairs.

These are involved in various activities ranging from advocating for human rights, child protection, community sensitization on road use, health and education awareness as well as provision of classroom infrastructures. Their roles during road construction and maintenance could include sensitization on road safety, Human and child rights protection and securing the affected schools.

The government departments (e.g education and interior security) play a major role in promoting quality education, monitoring education activities, planning fields for schools providing infrastructure and security. The government departments will play several roles during the road construction including child protection, sensitizing communities in road safety as well as ensuring child rights and protection. NGOs and CBOs include Joshva, SBNN, World Vision, Plan International, Pamoja Trust, Impact Research, and Walter Reed. These are engaged in varied activities and will play several activities during the road construction including HIV/AIDS awareness creation, livelihood restoration and provision of school infrastructure

Children especially in areas around lake Kanyaboli, and the full road section from Sido through the remote areas to Muhuru Bay have to walk long distances to and from school leaving many unable to access education. The poor infrastructure has also been responsible for failure to attract qualified personnel to schools in these areas. The road project will in these remote areas reduce time it takes children to get to school, thereby increasing their access to education and may lead to greater school enrolment, reduced drop out rates, increased teachers' willingness to work in these areas and improved literacy levels in the counties. The road can also lead to establishment of more schools especially the private academies.

In the project counties, school - going population is faced with various challenges which often lead to high dropouts rates. These challenges include peers pressure, high poverty levels, orphanhood, child labour and diseases especially HIV/AIDS. The table below summarises the various challenges facing school children which often lead to dropout.

Table 7-8: Challenges faced by school - going population in the project area

The education challenges facing males	The education challenges facing females		
i. Child labor hence absenteeism to do manual work, smuggle goods along the border, engage in	i. Poverty		

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sand harvesting and sell of market products boda boda business and Rural-urban migration	
ii. Poor economic background and/or High Poverty levels hence lack of school fees	ii. Low academic performance compared to boys
iii. HIV/AIDS	iii. Early marriages and unwanted pregnancy due to poverty
iv. High rate of orphan hood	iv. Hiv/aids
v. Floods disrupting learning activities	v. Child labour to work as House helps, Selling fish
vi. Malaria, and water borne diseases	vi. Fishermen and bodaboda confusing girls
vii. Peer pressure	vii. Inadequate parental support
viii. Inadequate parental support on education	
ix. Indiscipline (e,g Widows confusing school boys) due to inadequate guidance and counseling	

Source: Field interviews with education stakeholders

The proposed project road will enhance access to education institutions and thereby improving literacy levels and therefore skilled labour into the project counties and Kenya as a country. It will relatively shorten the duration children have to reach schools as they can easily get travel serviced from the improved.

#### 6.7 Health

Health services in the project counties are provided by the Ministry of health run by the GoK, private sector and Non-Governmental Organizations (NGOs) as well as the faith baised Organisations and the private sector.

The project counties have a total of over 931 health facilities, majority (499) being dispensaries. Siaya County has more facilities than the rest with a total of 276 while Kisumu has the least with 87. The following table summarises the number of facilities per county by levels of the facility:

Table 7-9: Health facilities	in the project counties
------------------------------	-------------------------

	Level of fac					
County	Hospitals	Nursing homes	Health centres	Dispensaries	Private clinics	Total
Busia	5	3	12	50	10	80
Siaya	11	2	32	110	121	276
Kisumu	10	9	9	54	5	87
Homa Bay	13	6	73	155	0	247

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Migori	11	9	35	130	56	241
Total	50	29	161	499	192	931

Source: Counties Integrated Development Plans, 2013 - 2017

The health facilities operating include hospitals, maternity and nursing homes, health centres, dispensaries and clinics. There are also private health centres run by religious organizations and private practitioners. The most common diseases in the project area include Malaria, Respiratory tract infections and Intestinal worms/typhoid. Epidemiology data are presented in Table 7-10.

Table 7-10: Commonest diseases along the project counties

County	Disease prevalence (%)					
	Malaria	Respiratory tract infections	Intestinal worms/typhoid			
Busia	42.2	2.2	17.0			
Siaya	54	15	4			
Kisumu	44.7	9.0	3.2			
Homa Bay	36	15	11			
Migori	53	7	3.2			

# Source: Project County CIDPS and Profiles

Other common diseases include sexually transmitted infections, Diarrhea, Pneumonia, meningitis, tuberculosis and skin diseases. The average distance to health facilities is about six kilometers. Preliminary assessment revealed that there are 51 health facilities along the project road. Some of the health institutions touching the project road include

Sio port, Port Victoria, Got Agulu hospitals; Bumala, Uhembo, Nango, Funyula and Mbeka Health centres and; Uhembo, Osieko, Serawongo, Usege and Nyagunda dispensary among others. Annex 4 of the report presents some of the notable health institutions along the project road.

Construction of the proposed road will enhance access to health care where the sick will travel easily to reach health facilities including referrals cases, medical supplies will easily be delivered to health centres and medical personnel could reach centres of emergency needs with minimal strain and within a shorter time.

#### 6.8 Infrastructure

#### 6.8.1 Transport

The project counties are served with various infrastructure facilities including roads and water while Busia and Kisumu have a railway line. The project counties have a total length of 8,581.2 kilometers of

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roads consisting of 735.4 kilometres of bituminous Road, 3,748.4 kilometres of Gravel Surface roads and 4,097.4 kilometres of Surface Roads. The distribution of roads by level of finishing is presented in Figure 7-7.



Figure 7-7: Distribution of roads infrastructure in the project counties

Source: CIDPs

All the project counties have a total of one Airport and 12 airstrips. The airport is located in Kisumu while five of the air strips are located in Homa Bay county and three in each of the countis of Migoei and Siaya. Only Kisumu and Busia counties are connected with the railway.

Besides road transport, water transport is also common within the area, especially within and across Lake Victoria and the bridgeless sections of rivers Kuja and Nzoia.



Plate 7-3: Canoeing across River Kuja (L) and Nzoia (R), acting as the main transport linking the north and southern part of the rivers

The proposed Lake Victoria Ring Road is approximately 450 km long and much of it lies on earth sections of various classes including C, D and E as well as unclassified sections. The road descriptions and lengths in various counties is explained below:

In Busia County, the project road length is approximately 60Km 

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- In Siaya County, the road starts off at the border of Busia and Siaya Counties and traverses through Sidundo, Kodunga, Nyamonye, Nango, Manywanda and Ndigwa before terminating at Asembo, a length of approximately 85.8km, of which 46.3km is paved.
- In Homabay county, the total length of the proposed project road is 102km with 40km being paved sections. The proposed project also includes loop roads at Nyangweso and Olmbwe areas.
- The current entire alignment of the proposed project road in Migori County is 42km long and is comprised of unpaved gravel/earth roads of varying classification. Part of the consultant's task is a route location along the shores of Lake Victoria for the proposed road from Karungu to Muhuru Bay. Also included is the viability of a 3.2km spur road connecting to Tanzania through Kobadia Border Crossing. The Project road traverses Migori County at the shores of Lake Victoria, through Nyatike Sub-county. In Migori County, the proposed project continues from Suba Sub County Lak-Nyiero in Kachieng ward and passes through Raburor Karungu, Sori Town, Lwanda-Konyango, North-Kadem, and Got-Kochola before terminating at Muhuru Bay in Muhuru Ward.

A number of sections of the study road are paved including Bumala to Nangina; Mundere - Sirisia in Busia County; Amuoyo - Maywanda - Nyakongo - Ragengni - Owimbi-Asembo in Siaya County and Katito – Kendu Bay- Oriang, Homa Bay Town and Lwanda – Oseno – Mbita in Homa Bay County.

Paths in the villages traversed mainly follow the roads but there are also unofficial walking paths that lead to important places like between the beach and the village area where vehicles normally never need to go leaving motor bikes and bicycles as the only means of transport. Behind. The project road is adjoined by other access roads some of which include: Ruambwa-Mukhobola-Mabinju.

Transport is dominated by bicycles then motorbikes, pedestrian path access routes parralel through river Nzoia. It costs a person Kshs. 20 to cross Nzoia river by boat. Dykes along river Nzoia whose top is used as foot paths

The proposed road will serve as a trunk road for all accesses to the interiors of the sub-counties and into the lake beaches. The notable access roads adjoining this road include: Mahera - makabira and Mubwayo - siamuga road in Busia county and Rathono - Siaya in Siaya county among others.

Transport means along the murrum sections of the project road include Matatus, Bicyles, motor bikes and donkey. In some areas, there are locally constructed temporal bumps of soils by which residents hope to slow down mainly the speeds of motor bikes

During construction of the proposed road, the contractor will employ local casual labourers who may also be involved during road maintenance. This acts as an avenue for on-job training for the casuals as well as generating valuable employment opportunities for poor people while also empowering women and vulnerable groups along the project corridor.

Construction of the proposed road will increase the diversity of transport means along the project corridor. Currently, the dominant means of mobility involves walking; use of motorcycles, bicycles, tricycles, animal- drawn carts or pack animals while distant travelers and transporters of goods (business persons) use buses, trucks, pickups, private cars and taxis. There may be increased investment in public transport which may drive the current motorcycle/bicycle/animal- drawn carts or pack animals to interior routes that are not served thereby acting as feeders to transport in the proposed road. The poor quality of many of the roads in the project area has increased "wear and

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tear" of vehicles and their operating costs. Constructing the proposed project road will therefore lower the costs of transportation thereby making it more affordable for users especially the poor.

The project road will provide both National and Local functions. The National Function of the project road regional connectivity while the local function is to provide access to localities along its alignment. Local access will be achieved by providing a road running parallel to and in close proximity to the Lake Shore and connecting the road to the rest of the national road network in Homa Bay County.

#### 6.8.2 Communication

The most common mode of communication is through mobile telephony (by the four operators that is Safaricom, Airtel, Orange, and Yu networks) and internet and coverage is over 90% of the area. The proposed road will be an impetus for provision of underground communication cables that would enhance connectivity along areas of the road corridor and the "outside" world.

#### 6.8.3 **Energy source**

About 18.3% of Kisumu county population has access to electricity compared to 3.3% in Homa Bay County. In Busia, 6.0% of the population has access to electricity while Siaya has 4.3% and Migori 5.3%. Majority of the trading centres and education institutions along full stretch of the project road are supplied with electricity. Majority of rural homesteads are not connected to electricity due to distances from powerline/transformers and ability to pay.

Various cooking and lighting power sources are used in the project counties. For cooking, majority use firewood followed by charcoal while for lighting, paraffin is used followed by electricity. The following figures illustrates extend of power use in the project counties:





The proposed road will facilitate faster response incase of electrical emergencies. In addition, the road may induce increased provision of power to households and institutions who are currently not served.

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#### 6.9 Cross – cutting issues

of

#### 6.9.1 Cultural environment

The project areas of BUSIA are occupied by a number of Bantu Tribes namely the Samia who speak Lusamia, the Marachi who speak Lumarachi and Banyala who speak Lunyala. Each of these tribes consists of many clans. The main food for the Luhya people is ugali (made from maize flour/cornmeal) served with vegetables and meat of cattle, goat, fish or chicken. Chicken is a delicacy among the Luhya people. The Kakapel National Monument is the main archeological site in Busia County.

A majority of the people living along the shores of lake Victoria areas of Siaya, Kisumu, Homabay (except Suba and part of Mbita sub counties) and Migori are the Luo tribe, and their language Dholuo. The Suba and parts of Mbita sub counties are occupied by the Abasuba of Bantu origin who, however are being assimilated by the Luo tribe. The main cultural aspects of the Luo tribe include initiation to manhood through removal of six teeth from the lower jaw, wife inheritance, mourning ceremony, teroburu, which are however slowly fading away. most Luos have converted to Christianity. The Luos favourite meals includes fish especially tilapia, usually accompanied with ugali (called kuon in Dholuo) and vegetables.

Other ethnic groups include the Suba-Luos, Kuria, Kisiis and small pockets of Somalis, Indians, Arabs and Nubians among others.

Most modern day residents along the project road are Christians. The full project stretch has about 215 places of diverse religious institutions including churches of many denominations and mosques Annex 4.



#### Plate 7-4: Religious institutions along the project road (churches, L, and traditional tree, R)

There are several recreation facilities along the project road including designated and undesignated play grounds. The lake shores and main rivers are used for Cloth washing, bathing and livestock water drinking. Archeological sites along Lake Victoria shore include Simbi Nyaima, Kanjera archaeological sites; Homa hills hot springs, Asego hill and Nyam Gondho.

The proposed project road runs along the lowland shores of the Lake Victoria region where cultural heritage sites exists but is however threatened by increasing human activities (bush clearing and construction). Access to these cultural sites is prohibited through taboos and totemic hindrances. The

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sites are used for pilgrimage and for meditation especially by indigenous African Christian religious groups. The sites are also used for Medicinal (Tetradenia riparia, Eryhterina abyssinica, Entada abyssihica, Spathodea campanulata, Acacia hokii, Vernoca amygdalina and Tagetes spp), firewood, Crafts, Fruits (Tamarindus indica, Artocarpus heterophyllus, Citrus lemon, Morus alba and Canarium schweinfurthi), Building Materials and Grazing pasture. The proposed road project may lead to erosion of cultural heritage as well as loss of ancestral lands.



Plate 7-5: Part of Thim Lich Ohinga Source: https://thetreasureblog.files.wordpress.com/2013/01/dsc6127-17.jpg

# 6.10 Livelihoods

Livelihood sources in the project counties include mixed farming including food and commercial crops and livestock, formal/casual employment and trading dominated by the informal sector. Agriculture sector comprises of livestock production, veterinary, agriculture and fisheries departments. Poverty, largely defined as a state of having low household incomes to the extent of not being able to earn even one dollar per day so as to afford basic needs of life. Poverty in the project counties manifests itself in food insecurity, unemployment, low literacy levels and poor health. High poverty levels are attributed to retrogressive cultural practices, socio economic issues, especially those surrounding HIV and Aids, poor physical infrastructure, socio-political issues, socio cultural practices such as early marriages, polygamy, wife inheritance and discrimination against women and girls.

#### Table 7-11: Poverty in the project counties

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County	Population living below the poverty line (%)	Percentage of poverty gap, based on KIHBS (2005/06)
Busia	64.2	26.8
Siaya	47.56	11.8
Kisumu	60	14.2
Homa Bay	44.1	15.2
Migori	45.6	19.0

Source: KDHS 2009

52.3% of the population in the project counties living below the poverty line. Busia county leads the pack where 64.2% live below the poverty line with Homa Bay having the lowest number of poor people of 44.1%. With these high poverty levels, it is important that the road project be designed and implemented focused on pro-poor policies and approaches targeted at poverty alleviation, equitable wealth creation and the creation of an environment in which individuals can be holistically productive.

# 6.11 The vulnerable population

The most vulnerable members of the community include the cane cutting community, the peasant farmers, the OVCs, the widows, the elderly and people living with physical disabilities.

Table 7-12: Vulnerable population in the project counties

Form of vulnerability	Statistics by county					
		Kisumu	Homa Bay	Siaya	Busia	Migori
Female headed households	65,198	-	82,880	42,575	28,113	
Children needing special protection	Children in labour	32,000	34,290	19,304	N/A	-
	Orphans	35,000	112,367	68,911	18,365	-
Physically disabled persons the lame, blind, deaf, dumb, and the paralysed)	52,517	72,689	61,036	35,413	18,418	
Aged population (65 and above	e):	33,807	7,425	29,790	29,790	29,240

Source: CIDPs

# 6.12 Gender

Women account for 52% of the counties population according to the 2009 census. Access and control of productive resources is determined by culture and women empowerment. Traditionally, ownership

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and control of productive resources within the Luo community remains in the hands of men. Along the project road, majority of men and women are engaged in subsistence farming. However, most of the household chores like fetching water, preparing food, looking for firewood and tending children are done by women. For example, mothers take care of children more than fathers and female often have less access to productive resources like land.

Women face various economic, cultural and education challenges including:

- Low level of education making them unable to access employment opportunities that would enable them acquire financial resources;
- A highly patriarchal orientation of the society where there is persistence male dominance in the control of resources and power structures as well as dictation of decisions and actions;
- Limited income generating opportunities;
- Others including poor road network, more time wasted while travelling, lack of funds for economic empowerment; early pregnancies; unemployment; lack of sufficient empowerment; child labor, battering and defilement /raping

Men are faced with challenges of poor road network, inadequate transportation, lack of funds, low levels of awareness, health management, poverty and unemployment.

Others including poor road network, more time wasted while travelling, lack of funds for economic empowerment; early pregnancies; unemployment; lack of sufficient empowerment; child labor, battering and defilement /raping

Construction of the proposed road will reduce time spend travelling and accord women to devote more time to productive activities. It will take lesser time to travel and participate in development and socially related activities. Enhanced mobility and reduced time spent walking over long distances will allow women to be more mobile thereby increasing their opportunities for empowerment by allowing them to participate more in communal activities.

# 6.13 HIV/AIDS

Prevalence for HIV/AIDS is high throughout the Lake Victoria region, where infection rates range from 10 to 40%, far higher than the national average. Thus, the Lake Victoria ring Road traverses areas where communities have been severely affected by HIV/AIDS which has led to increased widows and orphaned children headed households.

On average, HIV prevalence in the project Counties stands at 18.04% which is high compared to the national average of about 6.04%. Homa Bay has the highest prevalence at 25.7% and Busia has the lowest at 6.8%. Over 394,200 people are living with HIV in these counties where there are 24,840 new HIV infections annually. Homa Bay County has the highest number of People living with HIV as well as New HIV Infections. The most affected have been those between the ages 15-45 years who are considered to be sexually active. HIV/AIDS situation in the project counties is presented in the following Table 7-13.

#### Table 7-13: HIV/AIDS situation in the project counties

County	Prevalence rate (%)	Number of people	People living	Number of people living	New HIV Infections per year		
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		tested for HIV	with HIV	with HIV on antiretroviral treatment	
Busia	6.8	141,134	19,238	8,456	51
Siaya	23.7	175,754	128,568	40,102	9,869
Kisumu	19.3	284,820	134,826	39,614	10,349
Homa Bay	25.7	229,972	158,970	53,962	12,279
Migori	14.7	198,487	88,405	37,692	6,786
Total	18.04	1,030,167	530,007	188,506	39334

# Source: Kenya HIV County Profiles, 2014

The five project counties have high HIV prevalence rates with Siaya, Kisumu and Homa Bay falling under the category of counties within the Hyper endemic levels of over 15% prevalence levels as presented in the following figure:



# Figure 7-9: HIV prevalence in the project counties

#### Source: Kenya HIV County Profiles, 2016

Despite the above figures, the HIV/AIDS average prevalence, the figures for specific sub-counties and health facilities are even higher. For example, in Sido hospital, the HIV/AIDs prevalence for the subcounty was over 30% as of end of 2016. Various reasons have been contributed to the high HIV/AIDs prevalence in the region including:

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- Competition on fishery resources following reduced catch rates where sex often is a condition for access to fish. Other reasons include living in remote locations, mobility of fishers, daily cash income, cultural norms affected by living way from home, the lower status of women in many cultures, higher ratio of men to women at fish landing beaches and attitudes to risk.
- Retrogressive cultural practices such as "wife inheritance" have been blamed for the high prevalence of HIV/AIDS among certain ethnic groups.
- Others include multiplicity of partners, alcohol and drug abuse.

# 6.14 Economic Environment

of

The Lake Victoria is a resource of great socio-economic potential where residents in the area are involved in several activities where the economy of the project area is dominated by agriculture, fishing and trade. The residents in the area are involved in fishing, farming, bee keeping, trading activities, quarrying tourism, and mining to support their livelihoods. More than 80% of the population is engaged in agricultural production. The majority are small scale poor farmers and livestock owners producing maize and cash crops such as sugar, tea, coffee, cotton and meat. On average, the mean holding size is 2.08 acres for small scale farmers and 6.2 acres for large farms. The small scale farms are mainly utilised for subsistence farming while the large scale farms, mainly found in Nyatike, are utilised for livestock and cash crop farming.

The Lake Victoria Ring Road will traverse across a number of notable economic zones comprising of cultivated land, arable land, uncultivated land, hills, forests, wetlands and the built environments (infrastructure). These include agricultural production hubs such as Bunyala rice farms and Dominion farm; urban trading centres such as Prot Victoria, Kisumu City and Homa Bay town among others, numerous fish landing bays; tourist attraction sites including the numerous beaches, the Ndere Island National Park, Ruma National Park, Kanjira Archaeological Site, Simbi Nyaima Lake and Kit Mikayi rock and Mfangano and Rusinga islands.

# 6.14.1 Agriculture

Farming and fishing are the dominant agricultural activities in the region. In the lowlands around the lake where the proposed roads project is located, fishing is a dominant economic activity. The main crop grown here is maize with potential for the production of rice, sugarcane and cotton. The lowlands also have potential for livestock farming and an expansion of fishing and aquaculture activities. In Migori, a blending of fishing and farming exists. Main crops grown include maize, sugarcane and sorghum. Agriculture is however constrained by the following factors:

- Use of traditional farming methods;
- Cultural practice of generational subdivision of land which has led to dominance of small size land holdings;
- Farmers do not have title deeds stating their ownership of the land and are thus unable to use their land as collateral for credit qualification and;
- Low levels of education among the small holder farmers who cannot access extension services that could boost their productivity.

# Crop production

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The crops grown in a given area is influenced by soil type, local agro-ecological zones (AEZ) and to a lesser extent the cultural practices of the people. Agronomical practices employed by farmers are still rudimentary with family labour as the main source of labour. The major implements in use are the hand hoe and panga. Use of animal traction is common and mechanization is minimal and restricted to large commercial farms like Dominion farm.

The project counties despite having fertile soils do not experience favorable climatic conditions suitable for agricultural activities. The main food crops grown include; maize, sorghum, millet, beans, cowpeas, cassava, sweet potatoes, groundnuts and finger millets. Majority of the farmers produce maize and beans which are considered the staple foods across all project counties Others crops grown include irrigated rice (Bunyala, Yala and Ahero), palm oil, chili, sugarcane, sweet potatoes; Green vegetables (kale and indigenous greens). There are a number of major irrigation schemes including Bunyala, Ahero, Kucha, Yala Kano Nzoia Irrigation scheme, Nyangera and Wangusu among others. Within the lake Kanyaboli, Yala swamp and along numerous sections of the lake, the natural vegetation of papyrus is burnt to establish farms where crops including maize, beans, bananas and vegetables are grown. Horticultural crops like kales, tomatoes and onions are grown on irrigated fields, mostly on riparian and wetland areas. Fruits grown in the region are; mangoes, pawpaw, bananas and oranges. The notable agricultural sites include Dominion Farm growing Rice and maize as well as fish farming in Km 57+900 and Bunyala irrigation scheme (Km 46+230 Contract 1) concentrating on rice growing.



Plate 7-6: Some of the major crops along the project road

Agro forestry or tree growing on farm is also practiced in the project counties. Various species of trees can be seen growing in homesteads, on cropland, as boundaries, in fallow and grazing lands and in woodlots. The common agro forestry trees grown include blue gum, gravillea and casourina among others.

Improved road can lead to more land being put under agriculture activities thereby increasing productivity where farmers have been unable to even market the little that they produce due to poor road infrastructure. The improved road can also significantly reduce the cost of transporting farm produce thereby enabling farmers and middlemen to realize higher profit margins.

# Livestock production

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Livestock keeping involves rearing of local breeds that make up most of the livestock with the main animals kept in the project districts being Zebu, Dairy Cattle, Goats and local poultry. Other livestock reared include Sheep, Pigs and Rabbits. The project counties have a total 14,380,858,000 of as of 2014 as presented in Table 7-14.

County	Cattle		Sheep	Goats		pigs	Rabbits	Poultry			
	Dairy	Beef	Hair	Dairy	Meat			Broilers	layers	indigenous	others
Busia	15895	165880	54991	1684	63000	54824	4145		1861 4	789315	
Siaya	5,698	492,59 1	143,75 2	4,65 6	260,25 2	13,45 3	12,32 4	63,688	40,39 4	804,161	24,26 2
Kisumu	17,32 2	268,35 6	219,84 9	1,79 8	220,46 2	5,348	12,01 5	124,91 6	73,71 2	849,535	42,80 3
Homaba <sup>y</sup>	10,51 8	636,35 6	333,33 4	4,10 2	383,37 3	36,71 9	15,75 1	13,950	47,26 8	2,380,39 3	26,55 1
Migori	11,42 8	331,53 5	212,48 4	3,97 6	307,81 5	4,604	7,603	17,799	63,88 3	4,648,18 7	13,53 4
Total	60861	1894718	964410	16216	1234902	114948	51838	220353	243871	9471591	10715 0

# Table 7-14: Livestock Population ('000) by County, 2014

Source: County Offices

Livestock products include Milk, Beef, Mutton, Poultry meat, Egg, Honey and Pork. Volumes of livestock products in the project counties varied from one county and type of animal to another as presented in Table 7-15.

# Table 7-15: Livestock products ('000) by County for year 2014

County	Milk (Kg)	Beef (Kg)	Chevon (Kg)	Mutton(Kg )	Pork(Kg)	Rabbit meat(Kg )	Poultry meat(Kg)	Honey(Kg )	Wax (Kg )	Eggs(Trays )	Skins (No.)	Hides (No. )
Busia	13,813,000	6,635,000	252,000	220,000	987,000	3,300	791,184	350,000		4,388,990		
Siaya	24,308,478	2,688,107	639,733	312,527	132,532	60,469	1,609,446	436,550	8,108	630,495	-	-
Kisum u	24,730,000	2,768,100	12,603,00 0	13,241,000	19,579,00 0	189	33,354,00 0	34,673	2,809	723,932	-	-
Migori	43,574,569	6,536,100	815,900	1,331,500	96,300	-	1,728,080	67,174	11,493	2,548,005	76,71 6	74,720
Homa Bay	38,051,807	4,655,420	893,580	2,455,510	37,114	10,440	924,146	133,168	128	573,387	-	-
Total	144,477,85 4	23,282,72 7	15,204,21 3	17,560,53 7	20,831,94 6	74,398	38,406,85 6	1,021,565	22,538	8,864,809	76,71 6	74,720

Source: County Offices

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The seasonally flooded areas found in pockets throughout the project area serve as the major livestock grazing areas. The grazing fields also have watering pans for livestock. Grazing along the full stretch of the road reserve where possible including such areas as Sinyanya and Wagusu in Siaya county, The main diseases faced by livestock are as follows:

- i. Contagious Bovine pleuropreumonia (CBPP) and Rinderpest controlled by vaccinations;
- ii. Trypanasomiasis and;
- iii. Tick-borne diseases including Anaplasmosis, Heart-water and East cost fever - ECF. Control is mainly by spraying animals with accaricides and treating clinical cases).



Plate 7-7: Cattle grazing within the wetlands around Lake Kanyaboli

# 6.15 Fishing and fish farming

Besides agriculture, fishing traditionally practiced among the lakeshore communities is one of the major economic activity being found along the full stretch of Lake Victoria ring road. . In addition, a number of household based fish ponds have been established. Fishing provides an exit option for local communities when the local farming activities are depressed. The common fish species catch being Oreochromus Osculentus (Ngege), Catfish (mumi), Nile perch, Rastrineobola argentea (omena), and Protopterus acthiopus (kamongo) and tilapia among others.

Interms of Quantity and Value of Fish Production by Water Bodies, Lake Victoria produced 128, 708 M. tons which is 90% of all catch in Kenya valued at kshs. 14,601,790,000 in 2014. The following Table summarizes fish production and value by project Counties 2012 – 2014.

	2012		2013		2014		
	Quantity	antity Value (		Value	Quantity	Value	
County	Metric tons	000 Kshs	Metric tons	000 Kshs	Metric tons	000 Kshs	
Busia	4,544	472,239	5,079	610,211	5,468	642,198	

Fable 7-16: Fish production and	value by project Counties 2012 - 2014
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Siaya	25,694	2,665,667	24,703	3,046,858	28,519	3,380,209
Kisumu	4,892	486,418	5,550	626,290	5,556	642,595
Homa bay	76,710	7,483,436	80,105	8,543,655	81,399	9,099,437
Migori	7,265	684,332	9,400	1,043,673	7,899	847,817

Source: County Offices

There are many fish landings throughout the full road stretch which include: Port Victoria, Kaloka Beach, Dunga Beach, Sori, Busije, Namabusi, Samia, Mabinju, Usenge, Osieko beach, Uhanya beach, Nyenye beach and Oele beach. Others are Utonga beach, Wichlum beach, Asembo bay, Nadhiwa beach, Nduru Beach, Osondo bay, Rukwaro bay, Alum beach and nyandiwa among others. There are slight variations in volumes and species of fish which land in these beaches. For example, substantial amounts of Nile perch land at Port Victoria and Dunga beaches. Omena landing is common among the beaches south west of Mbita town especially Nyandiwa beach.



Plate 7-8: Fish (omena) in Nyandiwa beach and Fish boats at Kaloleni beach

Fishing gears used in Lake Victoria include gillnets, longlines, traps used for large fish species, beach seines and small seine nets for dagaa, castnets and handlines. Gillnets are the most important fishing gears for the commercial fishery. About 71% of fishing boats are gillnets operators, while 23% use dagaa seine nets, 5% long lines and 1% of boats use traditional traps (MNRT, 1996). The fishing industry is however not fully developed and use of rudimentary tools such as paddles and sails which limit fishing is common.

# 6.16 Trade and Industry

There are numerous trade centers traversed by the project road including Bumala, Ligingo, Funyula, Mulikhoni, Sio Port, Busembe, Bumbe, Usenge, Kisumu, Kanyandwa, Sijeje, Luanda, Homabay, Kirindo, Kobe, Mbita, Rowo, Niger, Karungu, Sori and Muhuru Bay. Industries noted along the project route include fish processors (Samia fish processors). There are numerous banks located in the major towns and financial institutions spread across the full stretch of the project road. The notable banks included Kenya commercial bank and Cooperative bank. Various financial institutions/services noted are Funyula financial services.

The notable industrial establishments along the road project include fish-processing factories at Kisumu, Homa Bay, Mbita and Sori. Carpentry and joinery, metal and mechanical works are the other

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major trades in the industry. Technical promotion of industries in these counties is supported by Kenya Industrial Estates (KIE) and Kenya Industrial Research and Development Institute (KIRDI).

The project road passes and serves many urban centres and markets as presented in the following Table.

Busia	Siaya	Kisumu	Homa Bay	Migori
Ligigo	Sidundo	Aram	Oyuma	Sori
Odiado	Nyamonyie	Kalandini	Pala,	Muhuru Bay
Funyula	Majengo	Rodi shops	Nyangwete	Aneko
Aginga	Hawinga	Kopudo	Kandiege	
port Victoria	Usege	Akado	Kitare	
Maumau	Ulanda	Konamu	Sindo	
Khaigha	Lenya	Bodi	Kipasi	
Lindi	Wangusu	Kaloka	Nyandiwa	
Mukhobora	Nango	Bridge/Lisuka	Nyagwethe	
Uwasi	Manyuado	Ogalo		
Mubwayo	Chama kwero			
Madiaba	Yomirio			
Bumbe	Kawoda			
	Chiada			
	Rangegani			
	Konamu			
	Ndigwa			
	Kodunga,			

#### Table 7-17: Some urban centres and markets abating the project road

#### Source: Field work

In addition to the markets and urban centers, there are numerous make shift Kiosks that may grow into centres with impetus of the project road.

# 6.17 Tourism

Over one million international tourists visit Kenya every year with the sector earning over KSh. 70 billion annually. Thus tourism remains a key source of foreign exchange earnings in the country. The Lake Victoria Ring Road lies within the western tourism zone of Kenya presented in the following figure:







# Figure 7-10: Kenya's Western Tourist Circuit

Kenya's western tourist circuit is home to several natural and cultural/historical attractions. Most of these attractions are not known to domestic and international visitors and are therefore rarely visited. Table 7-18 below presents a list of Tourist attractions in Kenya's western circuit.

Table 7-1	18: Tourist	attractions	in k	Kenva's	western	circuit
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Category of Tourist attraction	Specific Examples and County	Type of tourism	Current level of utilization for ecotourism development
Wetlands	Yala Swamp and L. Kanyaboli (Siaya); Kingwal Swamp (Nandi), Saiwa Swamp (Trans-Nzoia), Dunga Beach and wetland	Wetland ecotourism, research tourism	Low
Forests	Kakamega Forest (Kakamega), Malava Forest (Kakamega), Kibiri Forest (Vihiga); Gwasi Hills Forest (Homa Bay), Wire and Kodera Hills Forests (Homa Bay); Cherangany Hills Forest, Mt Elgon Forest (Bungoma and Trans-	Forest-based ecotourism, Avitourism, Nature tourism	Low

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Adventure tourism

Nzoia); Mbaga Hill Forest (Siaya), Tinderet

Forest (Nandi), Kimondi Forest (Nandi), Nandi

	North and South Forests (Nandi)		
Lakes and Major Rivers	L. Victoria (Kismu, Homa Bay, Siaya, Busia) L. Kanyaboli (Siaya), L. Simbi Nyaima	Freshwater-based	Low
	(Homa Bay),L. Sare (Siaya), Nzoia River (Bungoma, Busia, Nandi, Trans-Nzoia) Yala River (Nandi, Vihiga, Siaya), River Sondu Miliu (Kisumu, Nyamira), River Kuja (Nyamira, Kisii, Migori)	ecolounam	
Mountains, Hills and Escarpments	Mt. Elgon (Bungoma, Trans-Nzoia), Homa Hills (Homa Bay), Usenge Hill (Siaya), Sega Hill (Homa Bay), Maragoli Gills (Vihiga), Nyabondo Plateau (Kisumu), Chelangany Hills (Trans-Nzoia), Gwasi Hills (Homa Bay), Nandi Rock (Nandi), Got Ramogi and g Got Abiero Hills (Siaya), Riat and Kisian Hills (Kisumu), Kaptumek Nandi Escarpment	Mountain and hills ecotourism	Low
Caves and Rocks	Mungoma Caves (Vihiga), Got Abindu Caves and Rocks (Kisumu), Kapsetany Community Caves (Trans-Nzoia), Mwibale Rock, Menjeywo Caves (Nandi), Kiti-Mikay Rock (Kismu), Mt. Elgon Caves (Trans-Nzoia), Sangalo Twin Rock (Bungoma), The "Crying" stone of Ilesi (Kakamega)	Rocks and caves ecotourism	Low
Historical/Cul tural/Archeolo gical sites/ Museums	Thim-Lich Ohinga (Migori), Jaramogi Oginga Odinga Mausoleum, Koitalel Museum, Kisumu Museum, Kitale Museum, Tiriki Community Shrines, Nganyi Community Shrines (Weather forecasting)	Cultural Ecotourism	Low
Beaches	Several beaches on shores of L. Victoria beaches including: Dunga, Kanyagweng, Usenge, Miyandhe, Asat, Bao, Asembo Bay, Homa Bay Beach, Wich Lum, Ogal, Usoma, Muhuru Bay , among others	Beach ecotourism	Low
Protected areas (National Parks, Game Reserves, Sanctuaries	Mt. Elgon National Park (Bungoma and Trans- Nzoia), Ruma National Park (Homa Bay), Ndere Island National Park (Kisumu), Impala Sanctuary (Kisumu)	Wildlife tourism/Ecotouris m, nature-based tourism	Moderate
Water falls	Webuye Falls (Bungoma), Tindinyo Falls (Nandi), Sidindi Water Falls (Bungoma), Chepkiit Water falls, Gogo Falls (Migori)	Ecotourism/nature tourism	Low

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Islands	Mfangano and Rusinga Islands (Homa Bay), Migingo Island, Ndere Island (Kisumu)	Island Ecotourism	Low
Tea plantations	Tea plantations (Nandi County)	Agro-ecotourism	Low
Nature Conservancies	Kitale Nature Conservancy (Trans-Nzoia), Chep-Kitale Conservancy (Trans-Nzoia), Kingwal swamp conservancy	Ecotourism Nature tourism	High

Source: International Journal of Liberal Arts and Social Science, ISSN: 2307-924X

In the western tourist zone, hotel bed-nights occupancy for the period 2011 to 2015 is shown in the following figure. The figure shows that there has been marked increase by 20% in the number of bed occupancy in the region over the period from 374,900 to 448,800. The Impala Sanctuary (Kisumu) is the most visited in the Western region and is presented in figure (b) below.



# Figure 7-11: Performance of tourism in the Western region

Across the Lake Victoria, recreational sailing and sport fishing is a major tourist attraction. In addition, there are numerous Beaches are many along the project road including Samia, Osieko, Uhanya, Nyenye, Dunga, Nandiwa and Nduru as well as excellent accommodation. The Lake Victoria Ring road will serve a number of tourist destination areas including wildlife sanctuaries and archeological sides. The various attraction sites in the project counties are:

- Busia county has the Kakapel National Monument and the rocky hills of Kisoko.
- Siaya county has Lake Kanyaboli Game Reserve
- Kisumu county has Ndere Island measuring 4.2 km2 which boasts of the African fish eagles. Activities include Hiking in the long Savannah grass, picnicking, camping, game viewing, bird watching. Other sites are Hippo point, Dunga village, Kisumu Impala Sanctuary, Songhor Paleontological Historic site, the legendary Luanda Magere site in Miwani, Kit Mikayi a large rocky outcrop with three towering rocks and Kisumu Museum.

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- In Homa Bay county, there is Ruma National Park spanning of 120 km2 with main attractions being the rare roan antelope, Roan antelope, black rhino, leopard, buffalo, hyena, Rothschild giraffe oribi, Jackson, and lelwel hartebeest, impala, Bohor reedbuck, serval cat, baboons, velvet, monkey, honey badger, bush pig, and many more including the over 400 species of birds. Activities in Ruma national park include Game drive, bird watching, picnic and camping. In addition, the county has a number of islands in Lake Victoria such as Rusinga and Mfangano.
- In Migori county, there is Thim Lich Ohinga museum, Muhuru Bay Tourist Site, Mugabo caves and stones and Godkweru religious site.



Ndere Island

The Roan antelope of Ruma National Park



Source: https://en.wikipedia.org

Plate 7-9: Tourist features in the project counties

# 6.18 Banking and Financial Institutions

Banks along the project road are mainly located in the major urban centres such as Port Victoria, Kisumu and Homa Bay. The common banks in these areas include Kenya Commercial Bank, National Bank of Kenya, Equity Bank, and Diamond Trust and Cooperative Bank. In addition, there are numerous financial institutions including Kenya Women Finance Trust, Faulu Kenya, K-Rep Bank,

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and KADET among others. There are also numerous M-pesa and bank agents providing for the especially rural areas where banks have not been established.

# 6.19 Other economic activities

of

Other economic activities in the project counties include charcoal burning for sale in the urban centers; Timber harvesting for construction purposes and making of furniture and; Brick making industry. There is also Intensive commercial sand harvesting occuring in areas predominated by sandy soils especially Osodo area at the mouth of Sondu Miriu River and Angugo area at the mouth of River Kuja. The sand harvesting activities have left pockets of derelicted landscape.in various lake sites including Sio Port and Osieko beach and Nzoia and Kuja rivers, brick making mostly in Busia, Siaya and Migori counties. In addition, there is reed harvesting especially along river Nzoia and Kunja as well as various sections of Lake Victoria. In Seme, Asembo and Sirongo (Serawongo hill) areas minimal game hunting is practiced. Rabbits and small antelopes found in the bushlands are hunted for game and meat.



Plate 7-10: Sand harvesting at the Kuja riparian and Brick making near Sio Port

The economy of the project area is poor owing to inadequate transport infrastructure. Commercial and industrial establishments have avoided the road corridor despite enormous resources because it is more difficult to efficiently move inputs from available sources and end products to the markets. Improving the transportation infrastructure and services in the lake shore region will therefore contribute to improved investment climate through easened transport and enhanced competitiveness in the market.

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#### ANALYSIS OF PROJECT ALTERNATIVES 7

#### 7.1 No Project Alternative

of

This option entails leaving the project in its current state. The no project alternative is desirable because it will eliminate the environmental impacts that will be associated with the project. However this is not a viable option because it will not achieve the objectives of the project. This alternative also means that the anticipated benefits that are expected to accrue from the implementation of the project will be foregone. These benefits include:

- Facilitating easy access from the national road network to all points on the lakeshore
- Improving the economic growth prospects of the area around Lake Victoria
- Improving government response to local situations around the area
- Creation of job opportunities during the implementation phase of the project
- Improving accessibility to areas that were otherwise inaccessible

#### 7.2 The Project

Possible alternative alignments have been proposed. The final selection of the most feasible of these alternatives will take account of many other criteria such as those related to environmental impact.

(A) Option 1: The Nzalagobe Hill Area

The option 1 falls within project contract 1. The two alignment options branch off approximately 500m from the western footslopes of Nzalagobe hill, in Sisenye area.

# (A) South of Sisenye - Nzalagobe hill - Mundere Junction - Mubwokholo - Bulemia market

This can be called the 'upper' option. From the divergent point with option 'B', this alignment (E1202) option proceeds eastwards, and runs for approximately 1km, before taking a smooth curve and proceeding southeastwards through a pass in Nzalagobe hill. The pass runs for some 800m, before the option joins the paved C828 (Port Bunya-Nangina road) at the Mundere Primary school junction. It proceeds with the paved for about 4km past Mubwokholo, Bulemia market and joins option 'B' some 850m south of Bulemia market. The alignment is roughly 6km in length, of which about 2/3 of the length is paved.

# (B) South of Sisenye - Nzalagobe hill – Budubusi Primary - Khulwasi Junction

From the divergent point with option 'A', this alignment option takes a smooth curve to the south, and then proceeds along the shoreline of Lake Victoria, and parallel to and going around the western side of Nzagalobe hill. It goes past Budubasi primary school. Afrter about 4km from the junction with option 'A' the alignment takes another smooth curve eastwards at the point where the Nzalagobe hill terminates close to Lake Victoria. It then runs east for some 900m before turning south again past Oyiolo road junction into Khulwasi area, before joining the paved C828 (Port Bunya-Nangina road)

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and option 'A'. The option is also roughly 6km in length, all considered as a new road, as there is currently only a small path on part of the project road.



Figure 8-1: The proposed LVRR project's main and optional alignmments

(B) Option 2: Budalangi-Yala Swamp Area

Option 2 is also within project contract 1. The alternatives branch off some 1.5km after crossing River Nzoia.

# (A) Mukanda – Mubwayo – Uwasi - Lake Kanyaboli – Dominion - Kadimu/Nyamonye

From the divergent point with option 'B', the alignment proceeds eastwards with the existing unpaved C827 (Magombe - Boro) road through Mukinda area, Mubwayo market. This existing road sections follows the edge of the Yala Swamp. The alignment then leaves the C827 road and proceeds with a small road (E1163) southwards past Uwasi and Uhembo schools towards the lake Kanyaboli causeway. After the L. Kanyaboli crossing, the alignment runs parallel to the Dominion farm dykes, on the unpaved road (reclassified as C839, Nyamonye - Siaya) road, before crossing River Yala. The alignment leaves the C839 road past Kagak primary school and joins the existing paved B10 road (Osieko - Bondo road) at Kadimu (Nyamonye). The alternative is about 36km long.

# (B) Mau Mau Market - Rukala Centre - Bulwani – Osieko - Kadimu

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This alignment precedes downwads from the junction with the above option 'A'. It passes through Mau Mau market centre, crossing a wetland area and feeding into into Idokho centre. It then runs from Bulwani area to join the existing paved B10 road (Osieko - Bondo road) at Osieko. From Osieko it turns eastwards going past Usenge to rejoin the other alternative at Kadimu (Nyamonye). The option is about 31km long, with over half of it (18km) paved.

# (C) Option 3: Kadiang'a Loop

of

The options fall within project contract 4. The alternative alignments branch off at Kong'ou centre, about 19km from Katito (junction with the A12).

# (A) Kong'ou - Sangorota - Osodo - Kobala

Branches off existing paved B2 (Katito - Homa Bay - Mbita - Sindo - Masara) road at Kong'ou center and proceeds northwestwards (on Kong'ou- Sangorota road) towards Sangorota centre. It then turns at Sangorota and proceeds westwards before eventually turning south just past Obange primary scool to cross Sondu-Miriu river. Past the river it joins Osodo - Sand road and runs parallel to Lake Victoria in Osodo area. It then rejoins the B2 at Kobala market. It covers an approximate length of 13km. It runs veery close to the lake in some sections between R. Sondu and junction Kobala and SangoRota and Kong'ou junction.

# (B) Kong'ou – Sang'oro – Koguta- Nyakwere- Kobala

The alignment proceeds with the paved paved B2 (Katito – Homa Bay – Mbita – Sindo – Masara) road and rejoins the alternative 'A' at Kobala. It is about 7km long.

(D) Option 4: Nyangweso Loop

The options fall within project contract 4. The alternative alignments branch off some 900m east of Kawiti primary school, within the Nyangweso peninsula.

# (A) Kawiti - Bala Hot springs - Kwoyo Kochia - Jnc CB2

This alternative leaves the existing unpaved C865 (Kadel - Oriang) road and takes a dip to the south. The alignment then follows smaller earthen roads with black cotton soil, some of which are unmotorable. The alignment proceeds southwestwards towards Bala Hot springs. From Bala the road goes further down past Kuoyo Kochia to rejoin the existing paved B2 (Katito - Homa Bay - Mbita -Sindo – Masara road). The alignment is about 9km long.

# (B) Kawiti - Kandiege - Nyangweso/Kadel market

The alternative proceeds on a southeasterly direction with the existing unpaved C865 (Kadel - Oriang) road towards Kandiege centre and rejoins the existing paved B2 (Katito - Homa Bay - Mbita - Sindo - Masara road) at Kadel. From Kadel, it proceeds southwestwards with B2 past Olare to join the junction with the alternative 'A'. This road is about 17km in length, with the paved section accounting for about 11km. The unpaved section is in all-weather condition.

# (E) Option 5: Olambwe options

The options fall within Olambwe peninsula of project contract 5. The alternative alignments branch off about 7km west of Homa-Bay town.

(A) Rabondo - Got Rateng' – Waiga – Awendo –Nyamaji –Kimbo – Aguro school- Ngondhe-Kuge- Lwala (Wasaki)

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The alignment goes around Olambwe peninsula. It branches off just after Rabondo hill and takes a northwest direction towards Sikri. It passes at the feet of Gotrateng and Waiga hills. Past Waiga, the road takes a smooth bend to the west towards Nyamaji hill before turning southwestwards towards Lwala in Wasaki area. It is about 14km long and is generally impassable during the rains.

# (B) Rabondo - North Ruri market - Lwala (Wasaki)

After the junction past Rabondo hill, this alignment (about 7km in length) proceeds westwards going past Ruri and rejoining the option 'A' at Lwala. This option is also in poor, mostly unmotorable, condition.

# (F) Option 6: Magwar Options

of

The options fall project contract 6. The alternative alignments branch off in Angugo region, about 4km to the northeast of R. Kuja crossing.

# (A) Angugo - Got Kochola - Aneko - Kuja River - OthochRakuom

The option branches off the the existing unpaved B2 (Katito – Homa Bay – Mbita – Sindo – Masara road) at Angugo area and proceeds towards the river Kuja - Migori riparian zone (floodplain). Most of the alignment passes through section without clear road network. The alternative joins the B1 (Muhuru Bay - Kehancha - Lolgorian - B7 Ololunga) road at OthochRakuom and proceeds to Muhuru-Bay. This option is about 18km long.

# (B) Angugo – Nyakwere – Wath Ong'er - Nyakore – Othochrakuom

From Angugo area, this alternative follows the existing unpaved B2 (Katito - Homa Bay - Mbita -Sindo – Masara road) upto Wath-Ong'er centre, from where it takes a southwesterly direction towards Nyakore centre, where it joins the B1 (Muhuru Bay - Kehancha - Lolgorian - B7 Ololunga) road. From Nyakore, then it proceeds downwards to join alternative 'A' at OthochRakuom. The alignment is wide and all-weather. It's about 16km long.

#### 7.3 Assessing Environmental Impact Implications of the Alternatives

Out of the six (6) options described above, a rapid comparative environmental impact assessment was done on three (3) of the options to rank their alternatives according to the magnitude of impacts and two main possible routes for each section were selected for a comparative analysis. The other options were not subjected to analysis as justified in the Table 8-1 below.

# Table 8-1: Creteria adopted for comparative analysis of project alternatives

Options	Option Areas	Descriptive Characteristics	Decision made
1	Nzalagobe Hill Area	A large proportion of alternative 1 is paved.	Not compared. Environmental comparison could be biased since a large proportion of alternative 1 is paved, hence most of the anticipated impacts on the alternative have already

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			occurred.
2	The Budalangi- Yala swamp area	Though option has paved section, both options pass through the wetland area. Both will be associated with ground clearing and associated earthworks.	Environmental comparison justified. Analyzed
3	Kadiang'a Loop	Option 1 has been considered for implementation, while option 2 runs through an already paved section.	Not compared. Option 1 considered as part of the main project, while the anticipated impacts on the paved alternative 2 have already occurred.
4	Nyangweso Loop	Though option 2 has paved section, it still has substantial lengths which which is unpaved, whih will be associated with ground clearing and associated earthworks.	Environmental comparison justified. Analyzed
5	Olambwe options	Both alternatives are unpaved, and will involve ground clearing and associated earthworks.	Environmental comparison justified. Analyzed
6	Magwar Options	Both are unpaved section, and are almost equidistant.	Environmental comparison justified. Analyzed

Key environmental parameters were used as the main factors, and for each environmental parameter, three criteria was used to evaluate the impacts as follows:

- The nature of impact - whether positive or negative
- Magnitude of impact
- Possibility for mitigation

Impacts were evaluated as follows:

#### Table 8-2: Guide used for evaluating the project alternative impacts

Criteria	Score	Description
Nature of impact	-	If impact is perceived to be negative
	+	If impact is perceived to be positive
Magnitude of impact	0	No impact or uncertain impact
	-1	Low negative impact

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	-2	Medium impact
	-3	High impact
Possibility of mitigation	0	Uncertain
	+1	Minimal Mitigation is possible
	+2	Mitigation can reduce the magnitude of impacts to about half
	+3	Full mitigation is possible

The scores were then integrated to guide in recommending the best alignment option from an environmental perspective.

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# (A) Option 2 Budalangi – Yala Swamp options

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ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
Developments within the current alignment RoW	<ul> <li>The project runs along existing road network, including a C827 and C839 roads in some parts</li> <li>Other parts have motorable but narrow alignment.</li> <li>Properties are still considered close enough to the RoW in some parts with class D or E roads.</li> <li>Compensations and relocations medium</li> </ul>	-	-2	+2	<ul> <li>Some sections will be new (no existing road)</li> <li>Developments in the remaining sections are close to the road, and encroaching substantially on the road RoW</li> <li>The new alignment section passes through farms and built-up areas</li> <li>Compensations and relocating homesteads and centres will be costly and disruptive</li> </ul>	• -	-3	+2
Extent of new earthworks	• Compared to the <i>Alternative 2</i> alignment, overall earthworks will be less as since realignments are few mainly to smoothen sharp bends	-	-2	+2	<ul> <li>Massive earthworks will be required on the virgin lands to clear and pave way for project footprint</li> <li>Several sections of the remainder will require realignments. The new alignments will occasion</li> </ul>	• -	-3	+1

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ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description substantial earthworks	Nature of impact	Magnitude of impact	Possibility for mitigation
Land degradation, especially Soil erosion potential	<ul> <li>The expected soil erosion during construction will be proportional to the expected earthworks</li> <li>The comparatively gentler terrain in most places imply soil erosion will be comparatively low as runoff from paved surface would easily soak into the adjacent soil</li> </ul>	-	-1	+2	<ul> <li>Contingent upon the expected major earthworks, soil erosion will be noticeably higher than the Alternative</li> <li>In some instances, the terrain is characterized by rolling hills that are steep in some sections, thus promoting soil erosion during construction when soil is exposed</li> <li>However, just like Alternative 1, comparatively gentler terrain in most places imply soil erosion will be comparatively low as runoff from paved surface would easily soak into the adjacent soil.</li> </ul>	• -	-3	+1
New Land consumption	<ul> <li>Because the project largely follows an existing road alignment, there will be comparatively less land consumption since RoW is adequate in some parts</li> </ul>	-	-1	+2	<ul> <li>Substantial land consumption is expected, mostly associated with the green alignment sections</li> <li>Realigned sections and expansion of the other</li> </ul>	• -	-3	+1

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	Mukanda – Mubwayo – Uwasi - La Dominion - Kadimu/Nyamonye (Alternat	ake K tive 1)	anyab	oli –	Mau Mau Market - Rukala Centre - Bulwani – Osieko - Kadimu (Alternative 2)			
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
	<ul> <li>Sections with low class (D &amp; E) roads will consume new land during realignments process</li> </ul>				<ul><li>roads and the expected reclamation of the RoW.</li><li>Substantial undesirable impacts on the roadside agriculture will also be expected</li></ul>			
New road drainage and impacts on lower catchment (agric)	<ul> <li>Since this alternative largely follows the current alignment, and the road has been maintained in some sections, comparatively few new drainage channels will be required, hence lower new impacts on the lower catchment</li> <li>The sections that pass through Lake Kanyaboli and those that touch Yala Swamp will require new road drainage</li> </ul>	-	-1	+2	<ul> <li>New alignments, new cut slopes and widened RoW will require new drainage channels. These could affect agricultural fields below the drainage discharge points on the lower catchment</li> </ul>	• -	-3	+2

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ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
Borrow areas and Hard rock sites	• Since the section that runs along the C839 and C827 and certain other smaller roads are in useable condition, meaning they must have been better maintained, some of the old material sites used for maintenance could be re-used, with lower impacts	-	-2	+2	<ul> <li>With 85% of the alignment being new alignment, there is greater likelihood of some virgin lands being opened up for materials, than Alternative 1. This would imply new impacts on the environment</li> </ul>	• -	-3	+2
Dust	<ul> <li>Because this alternative has largely motorable section, it therefore has comparatively more traffic compared to <i>Alternative 2</i></li> <li>Thus ambient dust levels are relatively high</li> <li>The short-term incremental impact (during construction) would therefore be more tolerable than in the</li> </ul>	-	-2	+3	<ul> <li>Traffic on this road is nonexistent, thus new dust associated with construction would have comparatively greater impact</li> <li>Settlements are also closer to the road</li> </ul>	• -	-3	+2

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ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
Impacts on wildlife	<ul> <li>The area traversed by this option is generally low in wildlife, except those that are found within the wetland areas</li> <li>Habitat disturbance during construction phase could cause some appreciable impact on feeding or breeding patterns of these wildlife</li> </ul>	-	-1	+3	<ul> <li>Diverse species of fish (including those not found in lake Victoria), mammals like Sitatunga antelopes and diverse birds depend on the Yala swamp</li> <li>Construction works and even operation of the road through the swamp will disrupt their normal patterns substantially</li> </ul>	• -	-3	+2
Loss of native and non-native vegetation	<ul> <li>Considering that the RoW is fairly sufficient in some parts, vegetation clearance would be comparatively lower</li> <li>In addition, this Alternative runs through an existing alignment, hence less vegetation clearance</li> </ul>	-	-1	+3	<ul> <li>Far much more vegetation will be cleared since the road RoW will have to be reclaimed mainly from bushlands, swampy areas and crop fields</li> <li>The sections that run through Yala swamp has thick growth of wetland vegetation</li> <li>During operation, this Alternative might also spur more exploitation of certain species of wetland</li> </ul>	• -	-3	+2

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ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
Impacts on protected areas	<ul> <li>The alignment passes through the Lake Kanyaboli area, considered a home for a variety of wildlife, including Sitatunga antelopes</li> <li>The lake is also considered a gene bank for certain fish species absent in Lake Victoria</li> <li>A bridge is proposed across the lake in place of the current causeway, hence some positive impacts on the ecology of the lake</li> </ul>	-	-2	+3	<ul> <li>The road will pass at the heart of Yala swamp, considered an important gene bank to both fish and reptiles and certain mammals</li> <li>Massive earthworks may tamper with the ecological function of the swamp, however temporary</li> </ul>	• -	-3	+2
Impacts of noise and vibration during construction	<ul> <li>Compared to the alternative, this impact will be lower since the road already has relatively higher normal traffic that generates noise and</li> </ul>	-	-1	+1	<ul> <li>This alternative has comparatively fewer to no traffic</li> <li>Because of its remoteness, the number of settlements and social buildings like schools,</li> </ul>	-	-2	+1

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ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
	<ul><li>vibration</li><li>The number of sensitive receptors are higher in this alternative</li></ul>				<ul> <li>health centres etc are fewer</li> <li>Tthe noise and vibration will be new in most sections making it's a significant new impact</li> </ul>			
Impacts of noise and vibration during operation	• The ambient noise levels are higher than the alternative due to higher traffic, thus comparative incremental noise will be low	-	-2	0	<ul> <li>This impact will be relatively higher compared to the alternative</li> </ul>	-	-3	0
Societal disruption during construction	• This Alternative is already associated with some traffic, thus increased traffic volume would have less impact compared to <i>Alternative 2</i>	-	-1	+2	<ul> <li>The normal lifestyles will be substantially disrupted by the construction crew, diversions, noise, vibration etc.</li> </ul>	-	-2	+2
Societal disruption during operation	• Whereas increased traffic volume is expected during operation, the local population is expected to adjust much faster than the alternative. This impact is considered comparatively	-	-1	+1	<ul> <li>This impact will persist for the first few years of operation, as the local population adjust to new traffic and lifestyle. This impact is relatively high in the medium-term</li> </ul>	-	-3	+1

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	Mukanda – Mubwayo – Uwasi - La Dominion - Kadimu/Nyamonye (Alternat	ike K tive 1)	anyab	oli –	Mau Mau Market - Rukala Centre - Bulwani (Alternative 2)	– Osie	ieko - Kadimu Magnitude of impact Possibility for mitigation			
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation		
	low									
Diseases	• Possible spread of communicable diseases is less since parts of the alignment is already in use	-	-1	+3	<ul> <li>Possible spread of diseases is higher since alignment is passing through a less trafficked country</li> </ul>	-	-2	+3		
Socio-economic benefits	Given the relatively batter road condition and the current traffic on the road, socio-economic benefits accruing to the local population are comparatively less	+			<ul> <li>New traffic through the road may bring increased trade, as well as improved agriculture and livestock production through better access to markets</li> <li>Easy and convenient passenger transport for the community along this alignment</li> <li>These benefits are relatively greater for the local community</li> </ul>	+				
Aggregate			-19	27			-39	22		

Conclusion: The recommended alternative for this section is Mukanda – Mubwayo – Uwasi – Lake Kanyaboli – Dominion – Kadimu (Alternative 1)

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# (B) Option 4 Nyangweso loop options

	Kawiti - Bala Hot springs - Kwoyo I (Alternative 1)	Kochia	a - Jr	nc CB2	Kawiti – Kandiege – Nyangweso/Kadel market	(Alterr	native	2)
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
Developments within the current alignment RoW	<ul> <li>Smaller earthen roads exist, some of which are unmotorable with a number of developments, including settlements along the alignment's RoW</li> <li>There will be need for compensations</li> </ul>	-	-3	+3	<ul> <li>Since the road is already existing and the carriageway fairly defined in most parts, compensations and relocations will be minimal</li> <li>Developments are a distance from the RoW</li> </ul>	-	-1	+3
Extent of new earthworks	• The smaller earthen roads will require massive earthworks in comparison to the alternative 2	-	-2	+2	• Less earthworks required since the road is already existing and the carriageway fairly defined	-	-1	+2
Land degradation, especially soil erosion potential	<ul> <li>Contingent upon the expected major earthworks, soil erosion will be noticeably higher than alternative 1.</li> <li>Due to comparatively more expected earthworks, there will also be</li> </ul>	-	-3	+2	<ul> <li>Since the road is existing and the carriageway defined less cut and fill will be required and ultimately less soil erosion anticipated</li> <li>Similarly, the comparatively rugged terrain implies that soil erosion will be comparatively</li> </ul>	-	-2	+2

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	Kawiti - Bala Hot springs - Kwoyo I (Alternative 1)	Kochia	a - Jr	IC CB2	Kawiti – Kandiege – Nyangweso/Kadel market	(Alterr	rnative 2) Wagnitude of impact -2 +2 -2 +2		
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	
	proportionately more soil erosion during construction				high as runoff from flows through the rugged slope				
New Land consumption	• Some degree of land consumption is anticipated since the alignment is narrow in some sections	-	-2	+2	• Far much less land consumption since the road is existing and additional required land shall be less in comparison to alternative 1	-	-1	+2	
New road drainage and impacts on lower catchment (agriculture)	• This alignment will require a number of culverts for drainage of the area. These could affect agricultural fields below the drainage discharge points on the lower catchment	-	-3	+2	• Since this alternative largely follows the current alignment, and the road has been more regularly maintained, comparatively few new drainage channels will be required, hence lower new impacts on lower catchment	-	-2	+2	
Borrow areas and Hard rock sites	<ul> <li>There is greater likelihood of some virgin land being opened up for materials in comparison to alternative</li> <li>1. This would imply new impacts on the environment</li> </ul>	-	-3	+2	<ul> <li>Since the section appear to have been better maintained, some of the old material sites used for maintenance could be re-used, with lower impacts</li> </ul>	-	-2	+2	



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	Kawiti - Bala Hot springs - Kwoyo H (Alternative 1)	Kochia	a - Jn	c CB2	Kawiti – Kandiege – Nyangweso/Kadel market (Alternative 2)						
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation			
Dust	<ul> <li>Traffic on this road is low, thus new dust associated with construction would have comparatively greater impact</li> </ul>	-	-3	+2	• The section has comparatively more traffic on unpaved road thus ambient dust levels are very high. Incremental impact would be more tolerable than in the alternative	-	-2	+2			
Impacts on wildlife	Neutral (at least during this initial environmental screening)										
Loss of native and non-native vegetation	<ul> <li>Far much more vegetation will be cleared since the road RoW will have to be reclaimed mainly from adjacent lands including bushlands, wetlands and crop fields</li> </ul>	-	-2	+3	<ul> <li>Considering that the RoW is fairly sufficient in most parts, vegetation clearance would be comparatively lower</li> </ul>	-	-1	+2			
Impacts on protected areas	Neutral (at least during this initial environmental screening)										
Impacts of noise and vibration	This alternative has comparatively fewer traffic	-	-2	+1	<ul> <li>Compared to the alternative, this impact will be lower since the road already has relatively higher normal traffic that generates</li> </ul>	-	-1	+1			

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	Kawiti - Bala Hot springs - Kwoyo H (Alternative 1)	Kochia	a - Jn	c CB2	Kawiti – Kandiege – Nyangweso/Kadel market (Alternative 2)         Description         Nature of Limbact         Noise and vibration			
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
during construction	• Some of the settlements are very close to the road including schools. Noise and vibration could thus constitute a significant new impact				noise and vibration			
Impacts of noise and vibration during operation	<ul> <li>This impact will be relatively higher compared to the alternative</li> </ul>	-	-3	0	• The ambient noise levels are higher than the alternative due to higher traffic, thus comparative incremental noise will be low	-	-2	0
Societal disruption during construction	• The normal lifestyles will be substantially disrupted by the construction crew, diversions, noise, vibration etc.	-	-2	+2	• This Alternative is already associated with some level of traffic thus increased traffic volume would have less impact	-	-1	+2
Societal disruption during operation	<ul> <li>This impact will persist for the first few years of operation, as the local population adjust to new traffic and lifestyle. This impact is relatively high</li> </ul>	-	-2	+1	<ul> <li>Whereas increased traffic volume is expected during operation, the local population is expected to adjust much faster than the alternative. This impact is considered</li> </ul>	-	-1	+1

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	Kawiti - Bala Hot springs - Kwoyo I (Alternative 1)	Kochia	a - Jn	c CB2	Kawiti – Kandiege – Nyangweso/Kadel market	(Alterr	native	2)
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
	in the medium-term				comparatively low			
Diseases	• Possible spread of diseases is higher since alignment is passing through a less trafficked country	-	-2	+3	<ul> <li>Possible spread of communicable diseases is less since the alignment is already being used</li> </ul>	-	-1	+3
Socio-economic benefits	<ul> <li>New traffic through the road may bring increased trade, as well as improved fishing and diversification of the economic activities within the area e.g. agriculture and livestock production through better access to markets</li> <li>Easy and convenient passenger transport for the community along this alignment</li> <li>These benefits are relatively greater for the local community</li> </ul>	+			• Given the road condition and the current traffic on the road, socio -economic benefits accruing to the local population are comparatively less	+		

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	Kawiti - Bala Hot springs - Kwoyo Kochia - Jnc CB2 K (Alternative 1)				Kawiti – Kandiege – Nyangweso/Kadel market (Alternative 2)         Description			
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
Aggregate			-32	25			-18	23

Conclusion: The anticipated positive impacts from the two alternatives are almost equal. However the negative impacts anticipated in alternative 1 is higher than the positives. This is because the alternative will require more works and RoW acquisition, hence increases the social cost of the project. Alternative 2 conforms to the project objective of keeping closer to the Lake Victoria shoreline and should be adopted.

# (C) Option 5 Olambwe options

	Rabondo - Got Rateng' – Waiga – Aw Kimbo – Aguro school- Ngondhe- Kuge-	endo Lwala	-Nyam (Was	naji — aki)	Rabondo - North Ruri market - Lwala (Wasaki) (Al	ternat	ive 2)	
	(Alternative 1)							
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation		Nature of impact	Magnitude of impact	Possibility for mitigation
Developments within the current	<ul> <li>The alignment option runs along existing earth road, narrow and un- motorable in most section, especially</li> </ul>	-	-3	+2	<ul> <li>The alignment option runs along existing earth road, narrow and un-motorable in most section,</li> </ul>	-	-2	+2

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	Rabondo - Got Rateng' – Waiga – Aw Kimbo – Aguro school- Ngondhe- Kuge- (Alternative 1)	endo Lwala	–Nyan a (Was	naji – aki)	Rabondo - North Ruri market - Lwala (Wasaki) (Al	ternat	ive 2)	
ENVIRONMENTAL ISSUE	Description	Vature of mpact	Magnitude of mpact	Possibility for mitigation		Vature of mpact	Magnitude of mpact	ossibility for nitigation
alignment RoW	<ul> <li>during rains</li> <li>Developments in the remaining percentage are close to the road, and encroaching substantially on the road RoW, especially at the centres</li> <li>Compensations and relocating homesteads and centres will be costly and disruptive</li> </ul>				<ul> <li>especially during rains</li> <li>Developments in the remaining percentage are close to the road, and encroaching substantially on the road RoW, especially at the centres</li> <li>Compensations and relocating homesteads and centres will be because of the short length of the road and relatively few homesteads and centres compared to alternative 1</li> </ul>			
Extent of new earthworks	• Earthworks will be required. Most of the sections will also require realignments since the current alignment consist of earth roads which are fairly narrow and have sections with sharp bends	-	-3	+1	• Earthworks will be required. Most of the sections will also require realignments since the current alignment consist of earth roads which are fairly narrow and have sections with sharp bends	-	-3	+1
Land degradation, especially soil	• The expected soil erosion during construction will be proportional to the	-	-3	+2	• The expected soil erosion during construction will	-	-2	+2

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	Rabondo - Got Rateng' – Waiga – Awa Kimbo – Aguro school- Ngondhe- Kuge-	endo Lwala	-Nyan (Was	naji – aki)	Rabondo - North Ruri market - Lwala (Wasaki) (Al	ternat	ive 2)	
	(Alternative 1)							
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of	Possibility for mitigation		Nature of impact	Magnitude of impact	Possibility for mitigation
erosion potential	<ul> <li>expected earthworks</li> <li>The comparatively gently rolling to slightly hilly terrain in most places imply soil erosion will be comparatively medium to high as runoff from paved surface would be accelerated by the slope</li> <li>However, the close proximity in some places to the lake Victoria makes the likely impacts of eroded soils on the lake much higher than the Alternative 2</li> </ul>				<ul> <li>be proportional to the expected earthworks</li> <li>However, compared to alternative 1, this alignment is in a comparatively flat terrain. Soil erosion during construction when soil is exposed will be comparatively low than the alternative as runoff from paved surface would easily soak into the adjacent soil</li> </ul>			
New Land consumption	• The project largely follows an existing earth road alignment, so there would be comparatively less land consumption	-	-3	+2	<ul> <li>The project largely follows an existing earth road alignment, so there would be comparatively less land consumption</li> <li>However, the whole alignment is narrow hence</li> </ul>	-	-3	+2

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	Rabondo - Got Rateng' – Waiga – Aw Kimbo – Aguro school- Ngondhe- Kuge- (Alternative 1)	endo Lwala	–Nyan I (Was	naji – aki)	Rabondo - North Ruri market - Lwala (Wasaki) (Al	ternat	ive 2)	
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation		Nature of impact	Magnitude of impact	Possibility for mitigation
	• However, the whole alignment is narrow hence the RoW is inadequate in most parts. Realignments process will consume new land during				the RoW is inadequate in most parts. Realignments process will consume new land during			
New road drainage and impacts on lower catchment (agriculture)	<ul> <li>Though this alternative largely follows existing alignment, most sections of the road have not been maintained</li> <li>The alignment is also an a black cotton soil area, therefore a number of new drainage channels will be required, hence higher new impacts on lower catchment</li> </ul>	-	-2	+2	<ul> <li>Though this alternative largely follows existing alignment, most sections of the road have not been maintained</li> <li>The alignment is also an a black cotton soil area, therefore a number of new drainage channels will be required, hence higher new impacts on lower catchment</li> </ul>		-2	+2
Borrow areas and Hard rock sites	<ul> <li>Since most sections of the road have not been maintained a number of sites will be opened to extract material for upgrading, making the</li> </ul>	-	-3	+2	• Since most sections of the road have not been maintained a number of sites will be opened to extract material for upgrading, making the impact medium to high, depending on material	-	-3	+2

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	Rabondo - Got Rateng' – Waiga – Awa Kimbo – Aguro school- Ngondhe- Kuge-	endo Lwala	–Nyan I (Was	naji – aki)	Rabondo - North Ruri market - Lwala (Wasaki) (Al	ternat	ive 2)	
	(Alternative 1)							
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation		Nature of impact	Magnitude of impact	Possibility for mitigation
	impact medium to high, depending on material site				site			
Dust	<ul> <li>Because this alternative runs through a number of beach and other centres with relatively medium population than the Alternative 2, it therefore has comparatively more dust receptors</li> <li>Thus new dust associated with construction would have comparatively greater impact Alternative 2</li> <li>This road, because it is mostly unmotorable, it has very few motor vehicles using it, making incremental</li> </ul>	-	-3	+3	<ul> <li>Unlike the Alternative 1, the alignment section is comparatively short and has low population</li> <li>The short-term incremental impact (during construction) would therefore be more tolerable than in the Alternative 1</li> <li>However, just as the alternative 1, this road, because it is mostly un-motorable, it has very few motor vehicles using it, making incremental dust issue a concern</li> </ul>	-	-2	+3

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	Rabondo - Got Rateng' – Waiga – Awa Kimbo – Aguro school- Ngondhe- Kuge- (Alternative 1)	endo Lwala	-Nyam ı (Wasa	naji — aki)	Rabondo - North Ruri market - Lwala (Wasaki) (Al	ternat	ive 2)	
ENVIRONMENTAL ISSUE	Description dust issue a concern	Nature of impact	Magnitude of impact	Possibility for mitigation		Nature of impact	Magnitude of impact	Possibility for mitigation
Impacts on wildlife	<ul> <li>Though the area traversed by this option is generally occupied by human being, and would be generally low in wildlife, there hills in the area could still serve as potential habitat for certain species of wildlife</li> <li>Habitat disturbance during construction phase could cause some appreciable impact on feeding or breeding patterns of these wildlife</li> </ul>	-	-2	+3	<ul> <li>Though the area traversed by this option is generally occupied by human being, and would be generally low in wildlife, there hills in the area could still serve as potential habitat for certain species of wildlife</li> <li>Habitat disturbance during construction phase could cause some appreciable impact on feeding or breeding patterns of these wildlife</li> </ul>	-	-1	+3
Loss of native and non-native vegetation	<ul> <li>Considering that the RoW is inadequate in most parts, vegetation clearance would be comparatively high</li> <li>In addition, the presence of the hills</li> </ul>	-	-2	+3	<ul> <li>Considering that the RoW is inadequate in most parts, vegetation clearance would be comparatively high</li> <li>In addition, the presence of the hills means they could still act as refugia for certain species of</li> </ul>	-	-1	+3

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	Rabondo - Got Rateng' – Waiga – Awa Kimbo – Aguro school- Ngondhe- Kuge-	endo Lwala	–Nyan ı (Was	naji – aki)	Rabondo - North Ruri market - Lwala (Wasaki) (Al	ternat	ive 2)	
	(Alternative 1)							
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation		Nature of impact	Magnitude of impact	Possibility for mitigation
	means they could still act as refugia for certain species of conservation value				conservation value			
Impacts on protected areas	• Though the Alternative runs close to the lake Victoria fringing wetland in some parts, a safe distance from the riparian zone has been maintained for the required minimum riparian zone	-	-2	+3	<ul> <li>The road will pass a typical rural area without any sensitive areas</li> </ul>	-	-1	+3
Impacts of noise and vibration during construction	<ul> <li>Compared to the Alternative 2, the number of sensitive receptors are higher</li> <li>This impact will be medium to higher since the road hardly have any traffic that generates noise and vibration</li> </ul>	-	-2	+2	<ul> <li>Because of its low population, the number of settlements and social buildings like schools, health centres etc are fewer</li> <li>Nonetheless, the noise and vibration will be, just ike in Alternative 1, be medium to higher since the road hardly have any traffic that generates noise and vibration</li> </ul>	-	-1	+2

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	Rabondo - Got Rateng' – Waiga – Aw Kimbo – Aguro school- Ngondhe- Kuge-	endo Lwala	–Nyan a (Was	naji – aki)	Rabondo - North Ruri market - Lwala (Wasaki) (Al	ternat	ive 2)	
	(Alternative 1)							
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation		Nature of impact	Magnitude of impact	Possibility for mitigation
Impacts of noise and vibration during operation	• The number of sensitive receptors are higher in this alternative than in the Alternative 2, thus comparative incremental noise will be have medium impact	-	-2	0	<ul> <li>This impact will be relatively lower compared to the Alternative 1</li> </ul>	-	-1	0
Societal disruption during construction	• The normal lifestyles will most likely be disrupted by the construction crew, diversions, noise, vibration etc	-	-2	+2	<ul> <li>The normal lifestyles will most likely be disrupted by the construction crew, diversions, noise, vibration etc</li> </ul>	-	-1	+2
Societal disruption during operation	• Whereas increased traffic volume is expected during operation, the local population is largely expected to adjust. This impact is considered comparatively medium-term	-	-1	+1	• Whereas increased traffic volume is expected during operation, the local population is largely expected to adjust. This impact is relatively high in the medium-term	-	-1	+1
Diseases	<ul> <li>Possible spread of communicable diseases is medium since most parts</li> </ul>	-	-1	+3	<ul> <li>Possible spread of communicable diseases is medium since most parts of the alignment are</li> </ul>	-	-1	+3

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	Rabondo - Got Rateng' – Waiga – Awa Kimbo – Aguro school- Ngondhe- Kuge-	endo - Lwala	-Nyam (Wasa	naji — aki)	Rabondo - North Ruri market - Lwala (Wasaki) (Al	ternat	ive 2)	
	(Alternative I)							
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation		Nature of impact	Magnitude of impact	Possibility for mitigation
	of the alignment are not in use				not in use			
Socio-economic benefits	<ul> <li>Given the relatively close proximity to the lake than the alternative, batter road condition and the improved traffic on the road, fishing which is the main socio-economic activity will immensely benefit</li> </ul>	+			<ul> <li>Improved traffic through the road may bring increased trade, as well as improved agriculture and livestock production through better access to markets</li> <li>Easy and convenient passenger transport for the community along this alignment</li> <li>These benefits are relatively greater for the local community</li> </ul>	+		
Aggregate			-34	22			-13	31

**Conclusion:** The differences in the negative (-ve) values between alternatives 1 and 2 is due to temporary disruption of the socio-economic lifestyles. The Alternative 1 for this section has higher negative impact than alternative 2 because the alignment section is double the length of alternative 2. That mean the alternative 1 has more reeptors than alternative 2. Nonetheless, if the suggested mitigation measures are strictly adhered to, the **Rabondo - Got Rateng' – Waiga – Awendo –Nyamaji –Kimbo – Aguro school- Ngondhe- Kuge- Lwala (Wasaki) (Alternative 1)**, is still preferred because it meets the criteria for the project objective of maintaining close proximity to Lake Victoria.

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# (D) Option 6: Magwar Options

	Angugo – Nyakwere – Nyakore – Othoc	h Rakı	uom		Angugo – Got Kochola – Aneko - Matoso - Othoch Rakuom			
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
Developments within the current alignment RoW	<ul> <li>Developments are a distance from the RoW</li> <li>Since the road is already existing and the carriageway fairly defined in most parts compensations and relocations minimal</li> </ul>	-	-1	+3	• There are minimal developments in the area except for the settlements along the alignment hence there may be need for compensations	-	-3	+3
Extent of new earthworks	<ul> <li>This is an existing all weather road and therefore in comparison there will be less earthworks required</li> </ul>	-	-2	+2	<ul> <li>More earthworks required since the area has no road completely and whatever is present are footpaths</li> </ul>	-	-3	+2
Land degradation, especially Soil erosion potential	• Contingent upon the expected major earthworks, soil erosion will be noticeably lower. Since the road is existing and the carriageway defined less cut and fill will be required and ultimately less soil erosion	-	-2	+2	<ul> <li>Due to comparatively more expected earthworks, there will also be proportionately more soil erosion during construction</li> <li>Similarly, the comparatively rugged terrain implies that soil erosion will be comparatively high as runoff from flows through the rugged</li> </ul>	-	-3	+2

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Republic<br/>of<br/>KenyaConsultancy services for the Feasibility Study, Environmental and Social<br/>Impact Assessment, preparation of Resettlement action Plan and the<br/>design and tender documentation for the Lake Victoria Ring Roads

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	Angugo – Nyakwere – Nyakore – Othoc	h Rakı	uom		Angugo – Got Kochola – Aneko - Matoso - Ot	hoch F	Rakuor	n
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
	<ul> <li>anticipated</li> <li>The terrain is characterized by fairly gentle terrain and hence there will be comparatively less soil erosion as runoff flows through the gentle slope</li> </ul>				slope			
New Land consumption	<ul> <li>Far much less land consumption since the road is existing and additional required land shall be less in comparison</li> </ul>	-	-1	+2	<ul> <li>Substantial land consumption is anticipated since this is a completely new road</li> </ul>	-	-2	+1
New road drainage and impacts on lower catchment (agric)	• Since this alternative largely follows the current alignment, and the road has been more regularly maintained, comparatively few new drainage channels will be required, hence lower new impacts on lower catchment	-	-1	+2	<ul> <li>New alignment, new cut slopes and widened RoW will require new drainage channels.</li> <li>This alignment will also cross R. Kuja hence the need for a new bridge as well as requiring several culverts. These could affect agricultural fields on the lower catchment</li> </ul>	-	-3	+2

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	Angugo – Nyakwere – Nyakore – Othoci	h Rakı	Iom		Angugo – Got Kochola – Aneko - Matoso - Othoch Rakuom				
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	
Borrow areas and Hard rock sites	• Since the section appear to have been better maintained, some of the old material sites used for maintenance could be re-used, with lower impacts	-	-2	+2	• There is greater likelihood of some virgin land being opened up for materials in comparison. This would imply new impacts on the environment	-	-3	+2	
Dust	• The section has comparatively more traffic on unpaved road thus ambient dust levels are very high. Incremental impact would be more tolerable than in the alternative	-	-2	+3	<ul> <li>Traffic on this road is low, thus new dust associated with construction would have comparatively greater impact</li> </ul>	-	-3	+2	
Impacts on wildlife	Neutral (at least during this initial environm	nental s	screen	ing)					
Loss of native and non-native vegetation	• Considering that the RoW is fairly sufficient in most parts, vegetation clearance would be comparatively lower	-	-1	+3	• Far much more vegetation will be cleared since the road RoW will have to be reclaimed mainly from adjacent lands including bushlands, wetlands and crop fields	-	-2	+2	

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	Angugo – Nyakwere – Nyakore – Othoch Rakuom			Angugo – Got Kochola – Aneko - Matoso - Othoch Rakuom				
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
Impacts on protected areas	Neutral (at least during this initial environmental screening)							
Impacts of noise and vibration during construction	<ul> <li>Compared to the alternative, this impact will be lower since the road already has relatively higher normal traffic that generates noise and vibration</li> </ul>	-	-1	+1	<ul> <li>This alternative has comparatively fewer traffic</li> <li>Some of the settlements are very close to the road including schools. Noise and vibration could thus constitute a significant new impact</li> </ul>	-	-2	+1
Impacts of noise and vibration during operation	• The ambient noise levels are higher than the alternative due to higher traffic, thus comparative incremental noise will be low	-	-2	0	<ul> <li>This impact will be relatively higher compared to the alternative</li> </ul>	-	ς	0
Societal disruption during construction	• This Alternative is already associated with some level of traffic thus increased traffic volume would have less impact	-	-1	+2	<ul> <li>The normal lifestyles will be substantially disrupted by the construction crew, diversions, noise, vibration etc.</li> </ul>	-	-2	+2

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	Angugo – Nyakwere – Nyakore – Othoch	uom		Angugo – Got Kochola – Aneko - Matoso - Othoch Rakuom				
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
Societal disruption during operation	• Whereas increased traffic volume is expected during operation, the local population is expected to adjust much faster than the alternative. This impact is considered comparatively low	-	-1	+1	• This impact will persist for the first few years of operation, as the local population adjust to new traffic and lifestyle. This impact is relatively high in the medium-term	-	-3	+1
Diseases	<ul> <li>Possible spread of communicable diseases is less since the alignment is already heavily used</li> </ul>	-	-1	+3	<ul> <li>Possible spread of diseases is higher since alignment is passing through a less trafficked country</li> </ul>	-	-2	+3
Socio-economic benefits	Given the road condition and the current traffic on the road, socio - economic benefits accruing to the local population are comparatively less	+			<ul> <li>New traffic through the road may bring increased trade, as well as improved fishing and diversification of the economic activities within the area e.g. agriculture and livestock production through better access to markets</li> <li>Easy and convenient passenger transport for the community along this alignment</li> </ul>	+3		

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	Angugo – Nyakwere – Nyakore – Othoch Rakuom			Angugo – Got Kochola – Aneko - Matoso - Othoch Rakuom				
ENVIRONMENTAL ISSUE	Description	Nature of impact	Magnitude of impact	Possibility for mitigation	Description	Nature of impact	Magnitude of impact	Possibility for mitigation
					These benefits are relatively greater for the local community			
Aggregate			-18	26			-34	23

Conclusion: From the analysis above Alternative 1 is more environmentally favorable. However, using this alternative will not achieve the main objective of the project which is to spur economic activities and social growth within the area. It is important to note that most of the impacts are social and related to acquisition of the RoW. Decision on the best option should therefore consider all other factors including socio-economic benefits, engineering and transport economic considerations. Taken together, alternative 2: Angugo - Got Kochola - Matoso - Othoch Rakuom would remain very viable if, as is expected, the project will be implemented with strict adherence to the mitigation measures.

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### CONSULTATIVE PUBLIC PARTICIPATION 8

### 8.1 Overview

The Public Roads and roads of Access Act, CAP 399, 2010 Section 10 and 11 allows for notices to be served on adjacent land owners seeking permission to construct the respective roads. In this case, public meetings should be held for purposes of public consultations and notifications before implementing a road project. On basis of this requirement, that beneficiaries and members of the public living near new or improvement project sites (both public and private) are consulted to seek their views and opinions regarding the projects before they are implemented. Consultative Public Participation is therefore an important process in ESIA studies. Through this process, stakeholders have an opportunity to internalize and contribute to the overall project design by making recommendations and raising concerns. In addition, the process creates a sense of responsibility, commitment and local ownership for smooth implementation of the project.

### 8.2 Stakeholder engagement plan

A Stakeholder engagement plan was prepared to obtain and retain broad based stakeholder participation. The broad based stakeholder participation was aimed at building and strengthening beneficial relationships among all project stakeholders, improved understanding and decision making and identifying and managing project impacts. Broad participation is also a requirement under the Kenya constitution and World Bank policy requirement. The engagement plan involved the following:

- Rapid interviews with communities along the proposed project road;
- Indepth interviews and discussions with national and county governments for data collection, the civil society (faith based organisations, activist groups, NGOS and CBOs among others), international and regional agencies (UNEP, East African Commission and LVEMP among others). This also involved detailed stakeholder identification including the national and county governments, roads authorities (KeNHA, KURA and KERRA), transporters, industrialists, the civil societies including NGOs and major CBOs. Others consulted included the National land Commission; commercial establishments, water (WASREB and Lake Victoria South Water services Board), electricity and communication agencies and key opinion leaders among others.
- Conducting five county stakeholder consultation meetings, one for each county traversed by the project road. A list of participants during these stakeholder meeting is Annex 6;
- Indepth interviews and discussions with county gender personnel, group discussions with gender based organisations, men/women/youth focused groups as well as household interviews with female/male/child headed households;
- Consultative public meetings with residents along the full road stretch. These meetings were highly publicized, through the news media (newspapers and radio stations) to maximize on information sharing and participation. Details of the consultative public meetings including venues, schedules and levels of participation are presented Annex 5 and 6. Minutes of all consultative meetings are annexed to this report.

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Detailed and indepth census survey of all households affected by the proposed project as well as focused group discussion of clusters of the affected persons.

### 8.3 High level stakeholder engagements

Stakeholder consultations for the proposed Lake Victoria Ring Road has been undertaken where the national and county governments as well as residents along the project road were contacted (see Annex 6). These consultations generated various concerns / fears including displacements and delays in construction of the road.

The stakeholders also made several suggestions and recommendations including prompt and adequate compensation for those affected by the road, continuous involvement of all stakeholders and the general public as well as provision of employment to the locals during project construction.

#### 8.3.1 Indepth interviews and discussions

Indepth interviews and discussions were held with national and county governments during which official data on population, agriculture, security, education, health, trade and transport were obtained. Preliminary design of the project has been shared with the participants and anticipated project impacts generated.

#### County stakeholder consultative meetings 8.3.2

Five (5 No.) county stakeholder consultative meetings were held, one for each county traversed by the project road. These forums were used to share on the project design and allowed participants to propose and thereby contribute to the draft final road design.

### 8.4 Gender assessment

Gender analysis study was undertaken inorder to understand the gender dimensions of road infrastructure development among communities living along the Lake Victoria Ring road corridor through identification of barriers to women's full participation in economic development. It was carried out using the rapid assessment procedures (RAP) methodology. The RAP methodology adopted qualitative and quantitative data collection tools including semi-structured questionnaires, observations and focused group discussions.

A total of 780 individuals operating and living along the full road length corridor were randomly selected and interviewed and nine focus group discussions were conducted with men, women, elders, business persons, and mixed youth.









Plate 9-1: Views during focus group discussions for men and women

# Source: ESIA Field data, 2016

The main concerns under gender assessment exercise were that the contractor may source casuals and materials from outside, road construction activities may lead to destruction of house structures and the road may interfere with continuous supply of services especially water.

It was recommended that a lane for boda boda be constructed in major urban centres, the road design should provide for adequate width, bumps should be erected near schools and employment of local casuals should be ensured,

#### 8.4.1.1 **Public meetings**

Public consultation meetings were scheduled in various venues as identified by locational leaders. These meetings announced to the public through the local radio stations and newspapers, public meetings, churches, and through official government communication channels. The topics to be covered during public consultation meetings among others included road design, land acquisition procedures, discussions on HIV/AIDS and anticipated project impacts. These forums were major avenues for communities along the project corridor to propose and thereby contribute to improvement of the final road design.

In total, 28 consultative public meetings were held along the project road between 22nd November and 9th December 2016. The venues of these meetings including dates and levels of participation is presented in the Table below. In addition, detailed minutes of the proceedings are annexed to this report.

	Sub-				Numbe	er of Partici	ipants
County	County	Location	Venue	Date	Male	Female	Total
		Usonga	Sidondo market	22.11.2016	23	4	27
		South west					
		Alego	Hawinga dispensary	22.11.2016	35	10	45
		South					
		Central					
Siaya	Usonga	Alego	Gendro primary school	23.11.2016	43	49	92

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		East					
		Yimbo/North					
		Yimbo	Nyamonye market	23.11.2016	69	52	121
		Central					
		Sakwa	Nango chiefs camp	24.11.2016	42	4	46
		Central					
	Bondo	Sakwa	Wangusu market	24.11.2016	49	3	52
		South west					
	Seme	seme	Akado market	25.11.2016	67	22	89
		South					
		central seme	Bodi Market	25.11.2016	52	9	61
		East seme	Kaloka market	28.11.2016	48	5	53
	Kisumu	South West	Lisuka market	28.11.2016	62	25	87
Kisumu	West	Kisumu	Ogal market	28.11.2016	24	22	46
		Central	Nyakongo youth				
		karachuony	polytechnic	29.11.2016	51	0	51
		Kokoth					
		Kataa/Kanjir					
		а	Pala constituency office	30.11.2016	84	9	93
	Karachu	Kanam A	Nyangwete chiefs office	30.11.2016	114	21	135
	onyo	Koyugi	Kandiege market	01.12.2016	110	13	123
	Homa	Homa Bay					
	Bay	town and					
	Central	Arujo	Shauri yako primary	03.12.2016	55	6	61
		Gembe East	Kitare Chiefs camp	03.12.2016	49	31	80
	Mbita	Labwe	Kipasi market	01.12.2016	110	31	141
		Kaksigri					
		Central	Nyakiamo stadium-Sindo	02.12.2016	67	3	70
		Gwassi					
		North	Nyangwethe market	05.12.2016	40	0	40
Homa		Gwassi					
bay	Suba	Central	Nyandiwa chiefs camp	05.12.2016	47	1	48
		Sori	Sori chiefs camp	06.12.2016	66	10	76
		Aneko	Aneko dispensary	06.12.2016	44	5	49
		Muhuru					
Migori	Nyatike	Central	Kikongo market	07.12.2017	80	11	91
		Agega	Mulukhoni market	08.12.2016	117	14	131
	Samia	Naguba	Sio Port market	08.12.2016	98	17	115
		Magombe					
		Central	Mubwayo market	09.12.2016	150	17	167
Busia	Bunyala	Bwiri	Bumbe Beach	09.12.2016	93	14	107

Source: ESIA Field data, 2016

The public consultative meetings were attended by a total of 2,297 participants composed of 1,889 (82%) males and 408 (18%) females. Farmers dominated the meetings accounting for 49% of the participants followed by business persons (25%) as presented in the following figure:





# Figure 9-1: Participants' economic occupation

# Source: ESIA Field data, 2016

The CPP meetings were held under trees, in buildings such as churches and BMU social halls. A photo parade, one for each county is portrayed in the following plates.



Plate 9-2: Sample photos of CPP meetings

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### 8.5 Summary outcome of stakeholder and public consultations

#### 8.5.1 Concerns and fears

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Participants consulted raised several issues regarding the proposed construction of LVRR which were responded to by the consultant team. Below is a summary of repeatedly social issues raised in almost every meeting and recommendations:

- Increased child labour and rise in social vices including prostitution, crime and spread of HIV/AIDS leading to conflicts, early pregnancies and broken families as well as abuse of girl child. It is therefore important to ensure involvement of civil societies and government agencies in mobilizing and educating people before start of actual work while at the same time conducting more consultations at the village level. There is need to ensure protection of women and children in that money will be available
- ii. Increased insecurity within the region as a result of influx of people, increased traffic, socioeconomic crime like drug abuse/prostitution, security of the displaced beneficiaries and families and risk during construction phase. There is therefore need to consider constructing police posts in strategic areas along the road corridor
- iii. There may be damages of existing water pipelines, deforestation, degradation of the environment by quarrying for murrum on hills and sand on rivers whose competition may result to displacement of people leading to conflicts as a result of the shared resources. It may also lead to Destruction of flora and fauna habitant ecosystems in lakes Kanyaboli and Victoria as well as socio-cultural sensitive areas. Opening of the road may precipitate encroachment in to existing wetlands and lake riparian areas. Other fears related to environment were:
  - a. The location of the road's alignment in sections of with swamp may be compromised;
  - b. There may be inadequate control of the effects of air and noise pollution during construction
  - c. Health and safety of expectant mothers who will be affected by air and noise pollution like that of blasting which can lead to miscarriage
- iv. Due to expected increase in demand for land as a result of opening up the area, there will be increased illegal land transactions (land grabbing) without the owners' knowledge
- v. It is possible that there will be increase in number of accidents among children, women and livestock along the road corridor as they cross heading to the lake for water and incidences of drowning occurring in material borrow pits/quarries.
- vi. There were fears of decline in morals and increase in prostitution leading to unwarranted pregnancies and spread of communicable diseases during construction resulting from contractors luring young girls.
- vii. The land requirements by the road will lead to relocation of schools, loss of fertile land and destruction of property. The process of compensation may be compounded by misunderstanding within community due to lack of processed documents. It is necessary to Put peaceful mechanism in compensation
- viii. In regards to compensation the following concerns were raised:
  - a. The land title belongs to the father and crops, structures and trees belong to children.
  - b. How equitable compensation will be achieved yet land subdivision has not been done,
  - c. Land has a different owner who claims to possess the land
  - d. Loans have been used to build structures that are being acquired

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- e. Beneficiary whereby people have exchanged land and names in title deed not changed,
- f. Disputes over boundaries between land owner and neighbor
- g. Whether graves will be compensated
- h. Who is to be compensated in a case where the title deed is possessing name of a deceased person
- i. Channels used to create awareness on valuation exercise for some property owners who live in different places may be inadequate
- j. There may be inadequate time accorded to PAPs to vacate the acquired land once paid.
- ix. On labour and employment, there were fears that the contractor may come with casual labourers from outside the area and thereby deprive the inhabitants of incomes from road construction. Further the contractor may pay a low daily wage inform of exploiting the locals

## 8.5.2 Suggestions and recommendations

- The road technology adopted should address the needs for people living with disability and accessibility for wheel chairs at trading centres to avoid movement obstruction. As such the design should accommodate side way passage to accommodate PLWD s to enhance social economic status In addition; strategies should be put in place to cater for the orphaned and vulnerable members of the society.
- Strategies adopted in the project should address issues of community involvement in the project to enhance community ownership and therefore sustainability. After construction, involvement of the locals in the maintenance of the road should be ensured. In quest for broad based participation, it was recommended that there is need for more open access to all job opportunities from the project. This includes advertising through posters and recruitment done amicably and transparently.
- Provide comprehensive compensation and resettlement action plans that address all pertinent issues pertaining to land and property. In addition, compensation should be done promptly, effectively and equivalent to loss incurred. Compensation should be paid in kind since people may misuse the money and measures to curb loss of livelihoods put in place. This should be the case in resettlement of poor families to avoid misuse of compensation funds.
- Accessibility to public facilities, business establishments and homesteads should be provided during and after completion of the road
- The contractor should go through the national government, office of chief, to come on ground
- The road should connect to all roads leading to the beaches, ensure preservation of cultural historic sites and provide roadside lighting system in all urban centers and markets it serves. The requests put forward during stakeholder and public meetings for provision of additional roads and support to public (health and education) institutions were enormous.
- Concerning HIV, a series of awareness-creation initiative and public events to educate citizens on spread of HIV/AIDS and supply of condoms to workers during construction. Additionally, there is need for more careful research on what has been contributing to increased spread of HIV/AIDS in support of preventing further spread.

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- The road design should be given into simplest form to the residents to enhance understanding hence avoid duplication;
- The contractor should prioritise to employ Women and subcontract local CBOs and SHGs in job opportunities. He should pay fair wages of 500-600 per day for local casual workers. Local people should be given opportunities to benefit with skills from job opportunities in the road construction
- Youth have problems when it comes to employments; contractor comes with imported labour from other areas. There is need to establish procedures to ensure locals get casual jobs
- Community road linkage committees should be established at ward level to manage road issues.

### 8.6 Conclusions

The project road should be constructed owing to the enormous benefits accruing from the Lake Victoria ring Road including easing transportation of products, enhancing accessibility to potentially productive zones to exploit resources besides improving fishing activities in the area as well as promoting trade along the lake region spurring local economic growth and standards of living. In addition, the project has unanimous approval for construction from all cross sections of the population in the area as it was considered to be viable, valuable and needs to have been started. As such, implementation of the project should observe set timelines for delay may be expensive in the long run. As such, keeping the project time frame is critical to manage expectations of the public.





### **Gender Analysis** 9

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### 9.1 Rationale for Gender Analysis

The Feasibility Study, Environmental and Social Impact Assessment and Detailed Engineering Design of the Lake Victoria Ring Roads is financed by International Development Assistance (IDA)/World Bank. One of the principles of World Bank is to ensure gender mainstreaming in project under its financing. This is clearly stated in the Bank's Operational Policy 4.20 (Gender Dimensions of Development).

The Bank recognizes the need to reduce gender disparities and enhance women's participation in the economic development of the country by integrating gender considerations in the Bank's work. This policy addresses the different socioeconomic roles of females and males, male-female disparities in access to, control over, and use of assets and productive resources; male-female disparities in human development indicators; the relative participation of females and males in development decision making; and laws, institutional frameworks, norms, and other societal practices that lead (implicitly or explicitly) to gender discrimination and/or gender inequality. This policy deals with ensuring that before a development is financed by the bank, the gender disparities and inequalities that are a barrier to the development are addressed inorder to ensure the effectiveness of the project.

At the national level the Kenya constitution Part 5. 59. (1) establishes the mandate to promote gender equality and equity generally and to coordinate and facilitate gender mainstreaming in national development. A gender assessment for the Lake Victoria Ring Roads has therefore been undertaken in line with the Bank's policy.

### 9.2 Methodology

Gender analysis was aimed at understanding the gender dimensions of road infrastructure development among communities living along the road corridor through identification of barriers to women's full participation in economic development. It was carried out using the rapid assessment procedures (RAP) methodology. The methodology adopted gualitative and guantitative data collection tools including semi-structured questionnaires, observations and focused group discussions.

A total of 790 individuals operating and living along the full road length corridor were randomly selected and interviewed and ten focus group discussions were conducted with men, women and mixed youth.

### 9.3 Demographic data

The socio-economic data for this gender analysis from an interview of 790 (84 female headed and 138 male headed) household heads carried out from 7nd to 22nd September 2016. Of the interviewed, 93% resided in the rural and 7% in the urban (Kisumu and Homa Bay towns). 3% of the households were Child headed, 31% were Female headed and the rest (66%) were Male headed. 52% of the children were males and 48% were females. The households had between one and twelve members. 69% of the respondents were married, 9% were single, 2% were divorced and 19.6% were

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widowed while 0.4% were separated. The average age for all household head respondents was 40.3%.

### Education and health 9.4

9% of the population had no education, 54% had attained primary education and 25% of both genders had attained secondary school education. 3% had attained technical and 9\$ university education

County	HIV prevalence (%)	
	Male	Female
Busia	5.0	8.3
Siaya	22.8	26.4
Kisumu	18.3	21.2
Homa Bay	24.0	27.8
Migori	13.1	15.2
Average	16.6	19.8

The average HIV/AIDS prevalence in the counties is 18.2%. The overall prevalence of HIV/AIDS among men is 16.6% and 19.8% among women. This indicates that women are more vulnerable to HIV infection than men in all the project counties. The following figures presents summary of HIV/AIDS status by gender in the project counties.



# Figure 10-1: Project area HIV/AIDS Profile

Source: Kenya HIV & AIDS County Profiles, 2016

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### 9.5 Ownership and access to resources

Resources identified and useful to both genders along the road corridor included land, forestry, water, stones sand human resources. Land and forestry is controlled and owned by men but accessed by both gender. Human resources/children are owned, controlled and accessed by both gender. The Lake Victoria, a source of fish and water, is owned by the government but mainly accessed by males while stones and sand are owned, controlled and accessed by both gender.

Women don't possess ownership documents and in most cases the land is considered as family land while men have both access and control over land through buying or inheritance from their parents

### Livelihoods and income levels 9.6

The women are involved in various activities including selling of chicken, fruits and vegetables, table banking, fetching wood, religious meetings and on/off farm work at payment of 100 shillings per day. Men keep livestock.

### 9.7 Transport

The main modes of transport in the project area are private vehicles, bicycles, matatus, motorbikes donkey and animal drawn carts and tractors. Children, youth, women, men, the elderly and people with disabilities use the roads for basic transportation of goods and people. The commonest mode of transport used is motorcycle (23%) followed by bicycle (19%). Both gender use same transport but in varying levels where in Busia and Kisumu counties, both gender can own, access, control and cycle motorbikes and bicycle. However, in Siaya, Homa Bay and Migori, except in rare cases, women can only access but not control or cycle motorbikes and bicycles. Overall, men are the ones who have control and ownership of most transport means in the project area.

### Anticipated Impacts 9.8

According to women, easing transport and travel ranked the most notable impact of the road construction seconded by business improvement and economic development compared to men who ranked reducing cost of production and easing transport and travel as the first and second impact respectively.

Women may face restriction to work by spouses, house responsibilities, taking care of the young and sickly, diseases and the wages provided may hinder women from participating in the roles mentioned above. Men may be limited from participating by their age, diseases and daily wages level.

### 9.9 Conclusions and recommendations

Construction of the proposed Lake Victoria Ring Roads has unanimous approval from both genders. Women felt the need for the road to be built was high despite the given disadvantages. The men generally were of the opinion that construction should be implemented within the shortest possible time and locals should be used as much as possible, prompt payment of affected properties needs to be done and adequate time for relocation is allowed. The youth were of the opinion that they would be absorbed and get permanent jobs.

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# **ANALYSIS OF ENVIRONMENTAL & SOCIAL** 10 **IMPACTS**

# 10.1 Definition and classification of impacts

An impact in this context refers to any change that is likely to cause change in the environmental or socio - economic setting. The impacts can be either negative or positive. The impacts may also be direct or indirect, localised dispersed or cumulative if they add to the already existing impacts. They may also occur immediately or may be delayed in their timing. Another description used is if the impacts are permanent in their persistence or temporary. The impacts are also described using the phase that they occur in i.e. planning, operation or construction. In this study the Leopold matrix was used for the evaluation of the impacts.

# 10.2 The Leopold matrix

A matrix is a grid that is used to identify the interaction between project activities, which are displayed along one axis, and environmental characteristics, which are displayed along the other axis. For the identification of impacts, a breakdown of the environment into elements or factors that may be affected and a breakdown of the various actions or activities of the project under study will be done.

# 10.3 Impact identification and evaluation

The Leopold matrix is an effective method of predicting impacts quantitatively. Quantification means using numbers to indicate the impact. It is helpful in presenting information in summary form to give readers an overview of the impact characteristics of the Project and the alternatives to it.

Once the list of impacts or changes on the different elements of the medium has been established they are characterized using the following features and criteria:

- Sign (Nature)
- Type
- Intensity.
- Extension.
- Time.
- Reversibility
- Recoverability
- Persistence.

# 10.4 Description of the terms used

Sign /Nature of the impact: Alludes to the beneficial nature (+), bad (-)

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- Intensity: It refers to the degree of impact on the factor, in the specific area in which it operates. Ranked from 1 to 3. The three expressed an almost total destruction of the factor in the area in which the effect occurs.
- Type: Refers to the nature of the impact, direct (3) indirect (2) or cumulative (1)
- Extension/Location: An area of influence covered by the impact in relation to the project environment. In this sense, if the action produces a much localized effect within the space, it is considered that the impact is low (1). If, however, the effect does not support a precise location within the project environment, having a pervasive influence beyond the project footprint, the impact will be large (3). Intermediate situations are considered as partial (2).
- Timing: Refers to the moment of occurrence, the time lag between the onset of action and effect on the appearance of the corresponding factor. We consider three categories according to this time period is zero, up to 2 years, or more than two years, which are called respectively as immediately (3), medium term (2), and long term (1).
- Reversibility: It refers to the possibility of reconstructing the initial conditions once the effect. Can be characterized as short-term (1), medium term (2) and impossible (3).
- Recoverability: It refers to the possibility of providing or not the corrective measures to avoid or minimize impact. For impacts with positive sign will not express their recoverability.
- Duration/ Persistence: Refers to the time that supposedly stays the effect, from the onset of the action in question. Two situations are considered, depending on whether the action produces a temporary effect (1) or permanent (3). It is therefore this generic characterization because spaces are not discrete time course associated with these categories and because in any case, it is very difficult, in the limit, to discern on temporary or permanent effects.

A logical and systematic approach was taken for impact identification. The aim was to take into account all the important environmental/project impacts and interactions, making sure that indirect and cumulative effects, which may be potentially significant, are not inadvertently omitted. Individual environmental issue were also viewed in respect to the different facets of the project.

The rating evaluation will be as follows:

EVALUATION PARAMETER	RATING	RATING
Nature of impact (NI)	-Positive	+
	-Negative	-
	-Uncertain	-/+
Type of impact (TI)	-Direct	3
	-Indirect	2
	-Cumulative	1
Extent(EXT)	-Disperse	3
	-Medium	2
	-Localized	1

#### Table 11-1: Key of the rating parameters

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Intensity (IT)	-Major	3
	-Medium	2
	-Minor	1
Reversibility (R)	-Short term, easily reversible	1
	-Long term, partially reversible	2
	-Not reversible	3
Timing (TM)	-Immediate	3
	-Medium	2
	-Delayed, long term	1
Persistence (PI)	-Temporary effect	1
	-Permanent effect	3
Phase	-0	Operational period
	-C	Construction period

# 10.5 Impact magnitude Indicators

As pointed in LEGAL NOTICE No. 101 THE ENVIRONMENTAL (IMPACT AND AUDIT) REGULATIONS, 2003 ARRANGEMENT OF REGULATIONS, SECOND SCHEDULE the following issues may, among others, be considered in the making of environmental impact assessments.

- Impacts on the Physical Environment
- Impact on the Biological Environment
- Impact on socio-economic environment

The Magnitude or Importance impact represents the entity or significance of the effect, includes the degree of incidence and the "form" of that effect, represented by other attributes. Its value is clear from taking the attributes described by the following formula.

Imp = Sign (3lij + 2Eij + Tmij + Pij + Rij),

Where:

Imp Importance or magnitude of the impact generated by the action on the project I j element of the medium

*li*: Intensity of the impact generated by the action on the project I j element of the medium.

Ei: Extent of the impact generated by the action on the project I j element of the medium.

*Tmi:* Timing, the moment of impact generated by the action on the project I j element of the medium.

Pi: persistence of effect, from the onset of the action in question.

Ri: Possibility of reversibility.

In this study only two impact characterization parameters included in the matrix are not considered in the impact magnitude valuation formula, these are the "type" and "recoverability" (WB methodology, 1995).

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#### Table 11-2 : Environmental Impacts Matrix

Торіс	Element	Action	Impacts	NI	TI	EX	IT	R	ТМ	PI	Phase	MG
Vegetation	Ground cover	Project foot print	Extent of vegetation clearance required		3	1	2	2	3	1	C/O	14
	Plant species	Clearance to create space	Loss of mature indigenous species		2	2	2	1	1	1	C/O	13
	Ecologically sensitive areas	Location requirements for the project	Activities likely to interfere with sensitive/protected areas		2	1	1	2	2	3	С	12
Soil Resources	Soil Physical properties	Civil and general works	Loss of top soil hence alterations of soil profile		3	1	2	2	3	1	C/O	14
	Soil Erosion	Civil and general works	Exposure to erosion agents		2	2	2	1	2	1	C/O	14
Water Resources	Water Quality	Civil and general works	Contamination of downstream surface water		2	1	2	1	3	1	С	13
	Water Quantity	Water channelling	Increased surface runoff and resulting soil erosion from channelled water		2	2	2	1	2	1	C/O	14
	Water Quantity	Water abstraction for construction	Water abstraction		2	1	1	1	3	1	С	10
Air Quality	Air pollution	Civil and general works	Dust and/or smoke generation during works		3	1	1	1	3	1	С	10
	Air pollution	Traffic during operation	Increased CO2 emission from use of fossil fuel		3	1	1	2	1	3	0	11
Aesthetics	Land use compatibility	Urban park creation/ establishment	Potential to blend into the area/neighbourhood		3	1	1	3	1	3	0	12
	Impact on the landscape	Civil and general works	Change of visual of visual impacts (features, vegetation removal)		2	1	1	2	2	1	С	10

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Wetlands	Wetland destruction	Civil and general works	Draining of wetland to facilitate works	3	1	2	1	3	2	C/O	14
Noise and Vibrations	Excessive vibration above ambient	Civil and general works and operation	Consider machine type and extent of vibration during construction	3	1	2	1	3	1	C/O	13
Fish Resources	Fish diversity	operation	Potential overfishing	3	2	2	1	1	2	0	14
	Fish habitat pollution and destruction	Civil and general works	Surface water pollution resulting from works / Lake Kanyaboli	3	2	2	1	3	1	С	15
Mammalian Resources	Mammalian Habitat Disturbance	Project foot print	Extent of vegetation clearance required	3	1	1	1	3	1	С	10
	Alteration of mammalian population	Location requirements for infrastructure	Likely effect on wildlife number, diversity, breeding and eating habits	2	2	1	1	2	1	C/O	11
Avifauna	Avifauna Habitat Disturbance	Project foot print	Extent of vegetation clearance required	3	1	1	1	3	1	C/O	10
	Alteration of avifauna population	Civil and general works	Likely effect on bird number, diversity, breeding and eating habits	2	1	1	1	2	1	C/O	9
Reptilia and Others	Reptilia and invertebrate Habitat Disturbance	Project foot print	Extent of vegetation clearance required	3	1	1	1	1	1	C/O	8
	Alteration of reptilia and invertebrates population	Location requirements for infrastructure	Likely effect on species number, diversity, breeding and eating habits	2	1	1	1	1	1	C/O	8
Protected / Conservation	Conservation areas Ecological	Project foot print and construction	Encroachment	2	1	1	1	2	1	C/O	9

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areas	Integrity										
Topography	Geology and Hotsprings	Project footprint	Geological sensitivity	3	1	1	2	3	1	С	11
	Hills and mountains	Civil and general works and project footprint	Extent of vegetation clearance associated with quarries	3	1	2	2	3	1	С	14
	Hills and mountains	Improved accessibility to isolated hills	Exposure to potential exploitation of Gwassi hills forest	2	2	2	1	1	3	0	15
Social disruption / displacement	Works across trading centres	Civil works	Impacts on trade and movements	2	1	2	1	1	1	С	11
	Resettlement	Civil works	Family disruptions and relocation of business premises	3	1	3	2	3	3	С	19

From the Table 11-2 above the impacts significance ranges from a quantitative figure of 11 – 19. These are further classified into;

(C) Low: 8 – 10; Medium: 12 – 15; High: 16 and above

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The Table below ranks the potential impacts according to their severity as computed above:

	Element	Impacts			
HIGH	Resettlement	Family disruptions and relocation of business premises	19		
MEDIUM	Fish diversity, habitat pollution and disturbance	Surface water pollution resulting from works especially Lake Kanyaboli, Potential overfishing during operation	15		
	Hills and mountain ecosystems	<ul> <li>Extent of vegetation clearance associated with quarries</li> <li>Exposure to potential exploitation of Gwassi hills forest</li> </ul>	15		
	Ground cover and vegetation loss	<ul> <li>Extent of vegetation clearance required for project foot print</li> <li>Loss of mature indigenous tree species</li> </ul>	14		
	Soil resources	<ul> <li>Loss of top soil hence alterations of soil profile</li> <li>Land clearance leading to exposure to erosion agents</li> </ul>	14		
	<ul> <li>Increased surface runoff and resulting soil erosion from channelled water</li> <li>Contamination of downstream surface water</li> <li>Water abstraction for construction</li> </ul>		14		
	Wetland destruction	Draining of wetland to facilitate works	14		
	Noise and excessive vibration above ambient	Consider machine type and extent of vibration during construction	13		
	Ecologically sensitive areas	<ul> <li>Activities likely to interfere with sensitive / protected areas</li> <li>Encroachment – Yala Swamp</li> </ul>	12		
	Land use compatibility and aesthetics	<ul> <li>Potential to blend into the area / neighbourhood</li> <li>Change of visual quality (features, vegetation removal)</li> <li>Impact associated with material sites especially quarries</li> </ul>	12		
	Air pollution	<ul> <li>Increased CO<sub>2</sub> emission from use of fossil fuel</li> <li>Dust and/or smoke generation during works</li> </ul>	11		
МОЛ	Alteration of mammalian, avifauna, reptilian and other invertebrate population	<ul> <li>Likely effect on wildlife number, diversity, breeding and eating habits</li> <li>Extent of vegetation clearance required</li> </ul>	11		
	Geology and Hotsprings	Geological sensitivity	11		
	Social disturbance	Impacts on trade and movements	11		

As indicated in the matrix above the impact relating to resettlement is the only element rated high. This is because of the new alignments that will necessitate land acquisition. Impacts on fish resources is anticipated to be medium, however it will be demonstrated that the impacts will be indirect, avoidable and

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reversible. Impact on vegetation, soil, wetlands, water resources, noise and vibration and aesthetics are anticipated to be medium. Impacts on air quality, wildlife, avifauna, reptilia and others and protected / conservation areas expected to be low. The impact on conservation areas is also anticipated to be medium because the project directly passes through Lake Kanyaboli which is a gazetted National Reserve and a recognized International Bird Areas. A concise description of the impacts is found in the chapter.

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#### **POSITIVE IMPACTS** 11

# 11.1 Improved drainage

Construction of the road will improve the drainage infrastructure along the existing roads. This will reduce soil erosion in the project area and especially in the erosion prone areas such as Sango Rota loop and Gwassi area. More information on the erosion prone areas is provided under Soil erosion which is discussed in the next chapter.

# 11.2 Aesthetics

The Lake Victoria ring road project environment is generally a beautiful area. The area is endowed with beautiful scenes of hills which include the Homa hills, Gembe hills and Gwassi hills. The hills may be degraded but they are still beautiful. The view of the Lake also enhances the appearance of the area creating a picturesque environment in the area.



Plate 12-1: Picturesque Homa Hills (L) and View of Gembe Hills from Sindo centre (R)

The proposed alignment comprises both paved (tarmacked), unpaved (gravel) sections and new alignment sections where roads do not exist. The impact on aesthetics along the unpaved sections will be positive since the road will be more visually appealing as opposed to a narrow or wide dusty road. The dust settling on roadside vegetation will also be completely eliminated or greatly reduced hence improvement in the appearance of the area.

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Plate 12-2: Dust settled on roadside vegetation

In these unpaved sections there is already compatibility since there is already a road.

The proposed road may enhance tourism through enhanced access to viewpoints for the beautiful features in the area. These include the hills and forests, the wild animals in the forest especially the ones in Gwassi forest and Ruma National park by extension, the Homa lime hotsprings among others.

# 11.3 Spurring socio-economic development and reducing poverty

Overall, the road will be an economic pillar for realization of the Kenya Vision 2030 and the Lake Victoria region blue print by enhancing efficient transportation and movement of people and goods. The project will spur economic and social development by providing vital links between centers of production and markets for agriculture, tourism, industry and mining. The road will lead to growth of towns and establishment of new ones. In addition, heavy businesses including wholesale and industries will be established.

Poverty will be reduced as a result of increased disposable incomes realized from employment of the skilled and unskilled locals, spending by the road contractor as well as road users on purchase of supplies (food and materials - murram, etc) and accommodation. There will also be savings arising from transport and travel costs, funds which when saved can be used on alternative expenditures

# 11.4 Efficient transportation and access to social and business facilities

The road will ease and facilitate rapid access to social facilities (education, recreation and health among others). This will improve the welfare of the population by improving literacy levels and chances of survival for those who require urgent medical attention.

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Further, the road wil reduce costs of routine maintenance and vehicle operating costs as many sections of the road are currently graveled or in very poor conditions. This negates the overall objective of Kenya's road network vision for "expanded and well maintained"

# 11.5 Improvement of tourism

It will precipitate an increased number of both domestic and foreign tourism. Domestic tourism will increase because the road will easen movements along the lake. Similarly, tourists can undertake lake boating as well as exploiting the rather dormant Ndere and Ruma National parks. In addition, considering that Kenya offers some of the most spectacular sceneries and can only be compared to South Africa, the ring road could be a major boost to lake film shooting.

# 11.6 Commercialization and value addition for real estate

With improved speed and access, there will be increased demand for and competition over land and commercial as well as residential buildings. Increased demand will increase real property values, which otherwise currently lie idle, thereby increasing disposable incomes for the owners.

# 11.7 Precipitate provision of complementary infrastructures

It will precipitate the provision of other infrastructural facilities including electricity and water supply. These infrastructures will in effect have multiplier effects on the well being of the residents in the area.

# 11.8 Other positive impacts

Other benefits of the road will include time saving, improved security by improving rapid response for the security personnel and enhancing equity and balance by facilitating the flow of goods and services from the surplus zones to deficit ones and thereby enhancing equitable distribution which will in effect reduce, stabilize and levelise the prices of goods and services.

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# 12 POTENTIAL ADVERSE ENVIRONMENTAL AND SOCIAL IMPACTS - CONSTRUCTION

The Project is expected to follow an existing roads and also open up new alignment where no roads exist. The implication is that there will be impact differential in type and intensity depending on whether the alignment is along existing roads or not. Most direct impacts relate to opening up new roads while long term impacts relate to potential over exploitation of some natural resources within the region.

# 12.1 Displacements, land acquisition and relocations

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	There is land acquisition, displacement and disruptions especially in contract 2 where the road follows a new alignment.
Type of impact (TI)	Direct	Disruption of livelihoods and lifestyle.
Intensity (I)	High	A fairly large number of people will be affected but they will be compensated to a near original state of their previous lifestyles.
Extent	Dispersed	Displacement results into disruption of social life of more people than the displaced.
Reversibility	Long term and partially reversible	Permanent displacement for the people on the road reserve but compensation will be done to take the people affected to an original or near original economic state.
Persistence	Permanent effect	Some of the people affected will never go back to their original premises. Impacts are mainly expected during the pre- construction phase but could have some residual effect lasting much longer

In most cases, the road reserve has inadequate corridor and therefore there is need to acquire more land which will lead to displacement of structures, crops and social facilities among others. In addition, some areas notably urban centers are highly encroached with commercial structures and activities including small scale shops, kiosks and open air yards.

There are also legitimate linear settlements along the project corridor but notably in market centers along which businesses compete to lie along the road which enhances customer success. Most homesteads are also along the road corridor since most land buyers prefer proximity to roads. The implication is that road sections that will require re-alignement will necessitate acquisition of land and may also involve demolition of property and business premises. This is expected to affect a large number of people. The exact numbers could not be established at the time of preparing this report, however a comprehensive Resettlement Action Plan will be undertaken to value the affected properties and commensurate compensation will be proposed.

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Furthermore there will be potential disruptions during road construction to public facilities, businesses and residential accesses leading to temporary closures. Other disturbances will occur inform of interference with infrastructure including electricity lines and water pipes affecting services.

#### Mitigation Measures

- A full Resettlement Action Plan (RAP) should be prepared prior to commencement of the road; •
- There is need to keep to the current road alignment and corridor as much as possible to limit the extent of displacement and distruption;
- Institute legal provisions for acquisition of encroached road reserve. In addition, all those who have illegally encroached the road reserves should be given advance notice to vacate and this should be done with a humane face;
- Where land is acquired, those affected should be appropriately compensated in advance, • assisted to relocate and their means of livelihoods restored and;
- Ensure livelihoods restorations where disrupted. •
- Access routes as well as foot bridges, especially to social facilities and residential areas • should be provided, based on recommendations from the local population
- Restoration of services and access roads should be done within the shortest period possible.
- Advance notice should be given the population/persons/institutions likely to be affected about these possible distruption

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Involves habitat disturbance and water pollution during construction.
Type of impact (TI)	Direct	Disturbance and in some cases destruction to the fish habitats.
Intensity (I)	Medium	Impacts restricted to habitats and not individual fish populations at specific sites.
Extent	Localized	To the fish habitat areas which include Lakes Kanyaboli, wetlands, riparian areas along Rivers Nzoia, Yala, Kuja, Migori and other small and perennial rivers within the area, ponds and dams.
Reversibility	Short term and easily reversible	Habitats can naturally recreate because they are mainly characterised by emergent and submerged macrophytes which easily regenerate.

# 12.2 Fish Resources





Persistence	Temporary effect	Restriction to construction phase without residual effect

Potential impacts on fish resources are rated medium and long-term but are considered reversible if mitigation measures are implemented. The most important source of commercial fish is Lake Victoria. Other areas where fish is found include wetlands, riparian areas along River Nzoia, River Yala, River Kuja, River Migori and other small and perennial rivers within the area, ponds and dams.

During construction of the road there may be disturbance of fish habitats especially the wetlands e.g Yala Swamp where the road passes through the swamp thereby affecting the wetland fish community. This is especially so where the road will be newly constructed most significantly Kuja area and Yala swamp.

Lake Kanyaboli is considered a gene bank for Lake Victoria fish and a bridge is proposed across a small part of the lake that is currently covered by a causeway. During the removal of the causeway a lot of debris will be removed. This may fall into the lake and may result in sedimentation.

During bridge construction scouring and excavation of the riverbed is inevitable to allow piling and construction of coffer dams. This may cause injury or death of the juvenile fishes and other fish species that live under the rocks and feed or nest on the river bed.

During river training and associated works the river channel is diverted away from its natural course. This may result in reduced reproductive success due to inability of the fish to migrate during their breeding time and hence not be able to find a conducive environment to spawn. As a result, there may be alteration of the fish population and diversity in the river.

During construction, spillage of fuel and oil from the machineries may occur. This may result in contamination of the water in the rivers. The oil and fuel spills may mask the odour that some fishes use to identify home stream. The contaminants may also reduce the swimming performance of the fish by limiting the uptake of oxygen.

Scouring and excavation of the riverbed also increases the turbidity of the water due to increased sedimentation. This may affect the visibility of the fish and significantly affect their reproductive successes due to inability to identify their mates.

The impacts will be more pronounced during the rainy season when the fish breed and migrate for spawning.

#### Mitigation measures

- The contractor should cease bridge construction activities between the months of April and May which concide with the rainy season and fish breeding season.
- The contractor should report any incidences of accidental fuel or oil spills on the river bed immediately they occur.
- Prior to returning flows to the river channel the contractor should replace and restore the river bottom with suitable rock material.
- Dredging should be done at the area where the causeway shall be removed to minimize the effects of sedimentation.
- Best management practices should be enforced to avoid accidental spill of bitumen, concrete leachate and sediments and spill of petrochemicals through proper storage, use and clean up of construction related materials

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# 12.3 Vegetation Resources

Impact characteristics	Rating	Description		
Nature of impact (NI)	Negative	The project footprint will require, in a number of places, clearance of vegetation. This will lead to loss of ground cover and possible loss of biodiversity. The process may also cause loss of mature indigenous species as well as interference with the ecologically sensitive areas such as Yala swamp.		
Type of impact (TI)	Direct	Loss of ground cover and mature indigenous trees, as well as wetla flora.		
Intensity (I)	Medium	Whereas in extent the vegetation clearance may be high in areas where there is no road completely, there will be little to no clearance of vegetation that is of conservation value.		
Extent	Localised	To the areas that will be cleared for the project foot print.		
Reversibility Long term and partially reversible		Permanent loss of vegetation on the paved carriageway. Regeneration of individual tree species may take time but is possible over a period of time in the non-paved part of the corridor.		
Persistence Mostly temporary		Mainly construction phase, but road maintenance implies routine clearance along the corridor.		

#### 12.3.1 Loss of ground cover

An approximation of how much land will be cleared to pave way for the project can be provided. The project footprint comprising of the road section that will be tarmacked and the road shoulders is proposed to cover approximately 550km in length. This is assuming the proposed 'main' alignment and its associated spurs as our project area.

Taking the (paved) road width as 7.0m and shoulders of 2.0m on both sides (giving 4.0m), the combined width that will experience permanent vegetation loss is approximately 11.0m. Out of the approximate road length of 550km, about 150km can be said to be already paved, leaving about 450km that will require clearance. We therefore compute the area (A) as 350,000m (L) \* 11.0m (W) = 3,850,000m<sup>2</sup>. This is equivalent to about 385 Ha of vegetation cover that will be lost. Included in the category are the indigenous floral tree and shrub species, exotic species of commercial value and landmarks or sacred landscapes. To a lesser extent, the project footprint may also have some direct impact on the wetland vegetation through clearing to pave way for works.

However, the exact area that will be cleared will be much higher than the approximated figures because the project will also include other roadside amenities and corporate social responsibility (CSR) projects that will require their own footprints. In addition, a number of material sites have been proposed, meaning the material sourcing will also contribute substantially to vegetation loss.





Out of the many hectares which will be cleared, some livestock grazing grounds will be lost since the road traverses a number of seasonally flooded areas or riparian areas that serve as grazing fields. With a predominantly rural population that has a 70-80% dependency on wood fuel, vegetation clearance of that scale will definitely have an impact on the livelihoods of the affected people.



Plate 13-1: A narrow section of the road in Asembo area, showing the extent of expected vegetation loss

#### 12.3.2 Impact on old, landmark indigenous tree species

A number of relatively old indigenous tree species were observed on isolated locations throughout the project length. Most of these trees occur as single trees. The very old and unique trees are sometimes used as landmarks or sacred landscapes by the local community. There are also certain tree species such as *Kigelia africana* that have cultural values and/or have historical significance to the local communities, and they may not wish that such trees are cut. Again given the fact that most indigenous tree species grow very slowly and may take decades to reach the observed maturity, cutting down such trees may lead to unintended disappearance of such tree from the area, hence loss of biodiversity and social functions. Indiscriminate clearing of such trees should therefore be avoided as much as possible.

#### 12.3.3 Possible loss of biodiversity

Road reserve acquisition, clearance and earthworks could trigger some degree of ecological imbalance at a micro-scale and at localized points. This imbalance could lead, directly or indirectly, to the degradation of these ecosystem and possible shift in population of some specialized species. This is especially so where natural habitats will be degraded. As already noted, certain sections of the road will pass through bushland and shrublands with very narrow openings. Other sections will also pass through wetlands and nature reserve. Works along these sections including ground clearance, will inevitably lead to loss of some natural habitats. Potential for biodiversity loss in the wetland areas may, therefore, generate potential conflicts between road projects and biodiversity conservation advocates if the works are not carefully executed.

#### Mitigation measures

 Compensatory tree planting at a ratio of 1:2 shall be adopted where two trees are planted for one lost. We propose that KENHA partners with the KFS to promote compensatory tree planting equivalent of double the 385 Ha that will be lost or planting of about 500,000 seedlings in both public and private land. KENHA could support KFS nursery operations from where some seedlings could be given to the public at subsidized cost.

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- Except to the extent necessary for establishing the construction site and carrying out the construction works, vegetation shall not be removed, damaged or disturbed nor should any unauthorised planting of vegetation take place;
- The contractor shall develop a tree planting sub plan which shall clearly indicate the number of tree seedlings that shall be given to each county
- The clearance of the site for construction purposes shall be kept to a minimum. The use of existing cleared or disturbed areas for the Contractor's Camp, stockpiling of materials etc shall be encouraged;
- Areas to be cleared should be agreed and demarcated before the start of the clearing operations;
- Clearing and removal of vegetation, especially at borrow sites must be carried out in such a way that damage to adjacent areas is prevented or minimised;
- Areas with dense indigenous vegetation are not to be disturbed unless required for construction purposes, nor shall new access routes be cut through such areas;
- Trees should be trimmed rather than removed wherever possible;
- Collaboration between KeNHA, KFS and the counties along the project road should be done so that forests such as Gwassi forest can be selected for afforestation programmes where planting of indigenous tree species can be promoted.
- The project should support KFS in nursery establishment to raise seedlings for road-side planting and identified off-site locations. The number of trees to be planted and the planting sites should be jointly determined by KFS, County Government, NEMA and KENHA
- Environmental rules for contractors, including transparent penalties for noncompliance, need to be incorporated in bidding documents and contracts.
- The community will need to be compensated for lost grazing and any other communal grounds. This compensation can be in the form of cash equivalent or in the form of a CSR project.
- There may be need to consult with the local community early in the planning process to help identify and inventorize those tree species that are considered of cultural or sacred landscapes and the issues and concerns local community members may have concerning the road impact on these tree. To the extent permissible, the road design should be such that most of these trees are avoided by compensating for the road space on the opposite side of the road

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Involves potential colonisation of newly cleared or excavated sites within the project area by weeds especially <i>Prosopis juliflora, Parthenium hysterophorus</i> and <i>Opuntia opuntia</i> .
Type of impact (TI)	Indirect	New sites colonization may occur through material transfer from source to those sites.

# 12.4 Invasive plant species

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Intensity (I)	Medium	Transfer of construction and/or spoil materials from one point to the next is inevitable, with the possibility of weeds seed dispersal.
Extent	Dispersed	Considering principle mode of dispersal is through material transfer which will facilitate the transfer of the seeds from one place to another.
Reversibility	Long term and partially reversible	Total elimination of the weed may not be possible, however spread can be controlled if detected in good time.
Persistence	Permanent effect	Invasive weeds tend to persist once established in an area.

There are six main invasive weeds in the project area with varying degrees of colonization. The most well-known is the water hyacinth, Eichornia crassipes, which is purely aquatic. The other important aquatic weeds are the Echinocloa stagnina or hippo grass and Salvinia molesta or water fern. Both hippo grass and water hyacinth have extensively invaded the waters of Winam Gulf and parts of the waters of Homa Bay County. The project is, however, not expected to lead to enhanced colonization of the aquatic weeds and therefore no impact is expected.

Prickly pear, Opuntia opuntia, a weedy herb was identified in Seme area. Whereas this species is potentially invasive, analysis points low potential for enhancement of invasion as a result of the road project either during construction. The principal spread will be through vehicles transporting materials or spoil materials for disposal.

Parthenium hysterophorus or raqueed parthenium is an annual herb that aggressively colonises disturbed sites. The species have been positively identified in Homa Bay County and probably occurs in parts of Migori County. The principle mode of dispersal is through road vehicles and on animals. The new road could catalyze its dispersal along the lake fringe, thereby degrading agricultural fields and natural ecosystems. This impact could be important mainly during operation phase of the road and will be particularly difficult to mitigate. The magnitude of the impact is expected to be medium and is a long-term impact.

The most important weedy species of concern is Proposis juliflora. There was a Prospois juliflora bush identified within the Sango Rota section of Kadianga, a possible indicator of the existence of many other bushes within the Sango Rota loop. Prosopis juliflora is an introduced tree species that is rapidly gaining the status of an invasive weed in a large swathe of the East and Horn of Africa drylands. In Kenya, the Prosopis species were introduced from mid 1970s and early 1980s, mainly in arid and semi-arid areas to mitigate the impacts of drought and famine and to safeguard the existing natural vegetation from over exploitation due to rising human population. However, due to its prolific invasive nature, the species has spread to many areas, mainly on disturbed sites and in some places replacing the indigenous vegetation. The highest Prosopis invasion in Kenya has been reported in Tana River, Garissa, Baringo and Turkana counties, where pasturelands, farmlands and wetlands have been invaded.







#### Plate 13-2: Thick bush of Prosopis juliflora along Kadiang'a loop

Enhanced Prosopis juliflora invasion is a potential long term impact and this relates to its advancement. Prosopis is a very prolific seeder whose seeds are dispersed through the gut of livestock and other physical means with a preference to invade freshly disturbed sites. Road construction works will disturb ground cover within the road corridor and this will provide suitable grounds for the establishment of the weed. Furthermore, the area has relatively high population of domestic ruminants that aide in the seed dispersal of the plant. In addition, the paved road will act as an impervious layer channeling run-off to the roadside which will readily support proliferation of Prosopis on the road embankments and side-drains. Such proliferation will spread and pose visibility challenges to motorists as well as suppressing other native species. The impact of prosopis will be rampant at all disturbed sites, roadsides and borrow areas if not checked. The impact is likely to be medium to high and will manifest during both construction and operational phases.

#### Mitigation measures

- A plan for control of noxious weeds and invasive plants that could occur as a result of new • surface-disturbing activities at the site should be developed. The plan should address monitoring, weed identification, the manner in which weeds spread, and methods for treating infestations.
- The use of fill materials from areas with known invasive vegetation problems should be prohibited
- The spread of invasive plants should be avoided by keeping vehicles and equipment used to remove them clean. A controlled inspection and cleaning area should also be established to visually inspect arriving construction equipment in order to remove and collect noxious weed seeds that may be adhering to tires and other equipment surfaces
- The project site should be regularly monitored for invasive plant species establishment and control measures initiated immediately upon evidence of invasive species introduction or spread

# 12.5 Soil Resources

Impacts to soils and geological resources will be related to the project activities within the corridor and during the extraction of raw materials for project use. The most important impacts are soil erosion and

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soil pollution. These impacts however can be reduced or avoided when taken into account during the construction phase.

Impact characteristics	Rating	Description
Nature of impact	Negative	Alteration of soil physical properties as well as exposure to erosion agents may result from the civil and general works within the road corridor. Effects of soil pollution may also result from accidental oil
		spills.
Type of impact (TI)	Direct	Soil excavation and accidental spillage.
Intensity (I)	Medium	Considering the length of the road and the multiple erosion prone areas this impact can be rated medium
Extent	Localised	To the affected areas where there is clearance, exposure and excavation of the top soil.
Reversibility	Long term partially reversible	Soils can recover from erosion and pollution over a period of time when proper intervention and remediation measures are implemented.
Persistence	Temporary effect	Largely restricted to the construction but newly created slopes and embankment could experience sustained erosion beyond construction phase.

#### 12.5.1 Soil erosion

Soil erosion can occur during and after removal of vegetation cover during site clearance, exposing the soil to water and wind erosion. Excavation and ground clearance works will also have the direct effect of loosening the soils making them easier to be transported by water and wind. Soil erosion will be more pronounced if the project works coincide with the rainy season since runoff will enhance soil erosion.

There are already sections of the project that are prone to or already experiencing heightened soil erosion. This is either because the dominant soils within these areas are susceptible to erosion, or the terrain is steep thus enhancing runoff. For example, erosion is evident at the Sondu-Miriu mouth and also the larger part of Karachuonyo sub-county in Homa Bay County. In general soils in these areas are susceptible to erosion as the silt content is high relative to the clay content. As a result, deep gullies occasioned by years of soil erosion is evident in various sections of the project corridor.

There are also other sections that run across hilly terrain and steep slopes, and have shallow or sandy soils, examples being Homa Lime areas and sections between Sindo and Nyandiwa in Homa Bay County. Additional clearing and excavation works on such areas will result in accelerated erosion.

Certain sections of the alignment also interact with the wetlands or water resources within the project area. These are sections where the proposed road either runs very close and parallel to the lake fringes, or crossing the rivers, springs and dry riverbeds, or where it crosses wetlands and seasonally

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flooded areas. Soil erosion occurring within such environment will have a higher probability of reaching the water resources and adversely effecting water quality. This is because the loosened and eroded soils will either enter the rivers and wetlands directly, or cover a very short distance before interacting with the water resources. The cumulative effects of eroded soils on water resources are discussed under the impacts on water section.

The Table 12-1 below gives a summary of the key areas, and the factors that contribute to their erosion vulnerability or factors that may enhance the impacts of soil erosion in such places.

Contract	Chainage	Area Description	Main issue of concern	
	Km 27+000	Sio Port area	Lake fringes	
	Km 34+250 – 40+725	Nzalagobe Pass	Cut and fill / soil erosion	
ct 1	Km 41 +000 – 42+000	Munzojo	Cut and fill / soil erosion	
Contra	Km 42+000-43+000	Across R. Nzoia	Bridgeworks and soil disturbance close to a river	
	Km 62+800-63+600	Across L. Kanyaboli	Bridgeworks and soil disturbance close to the lake	
	Km 71+000-72+000	River Yala	Bridgeworks and soil disturbance/erosion close to a river	
	Km 7+800 - 8+475	Between Sinyanaya and Wambara area	Wetland area- issue of soils with poor drainage	
Contract 2	Spur road of Km 12+775	Spur to Sirongo Beach past Serawongo Hill	Undulating landscape, road at foot slopes of Serawongo hill, hence enhanced runoff.	
	Km 20+800- 21+300	River Ndate	Bridgeworks and soil disturbance/erosion close to a river	
	Km 0+550-1+550	Aduyo hill (km 150+000) past Asembo	Potential runoff on the steep/hilly terrain. Cut and fill issue on Aduyo hill	
Contract 3	Km 11+000-13+000	Mboha wetland area, and riber Mboha (Luanda) just before Bodi	Poorly drained wetland soils, and bridgeworks and soil disturbance/erosion close to a river	
	Km 35+000 -38+000	Usare area and river Muguru	Coarse-grained soil types, easily eroded. Bridgeworks and soil disturbance/erosion close to a river	

#### Table 13-1: Identified areas with soil erosion issues



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Contract 4	Kadianga loop off at km 19+000 and rejoining at km 25+825	Loop (km 0+000- 12+000) covering Sangorota, Sangoburu and Osodo area) and river Sondu at km 8+000 on the spur	High-silt soil types, easily eroded. Bridgeworks and soil disturbance/erosion close to banks of river Sondu.
	Km 99+000- 106+050	Homa Hills area	Easily eroded soils on a hilly terrain, hillside incision and cut-and-fill issues
	Olambwe option off at km 6 + 325 and rejoining at km 20+ 700	Through Nyamaji hill	Poorly drained black cotton soils. There is a pass through Nyamaji hill hence cut- and-fill issues
act 5	Km 54+400 – 57+700	Past Mbita town	Road runs on the footslopes of Ndonyu hills, hence possibility of accelerated runoffs from the hill
Contr	Km 60+525 – 61+400	Lake fringes towards Sindo	Works close to the lake. Sediments from soil erosion could reach the water faster.
	Km 61+600 – 67+200	Foot of Gera and Rangwa hills	On a steep-sloped terrain that also runs parallel to lake fringes. Cut-and-fill and accelerated runoff issues
	Km 70+000 – 84+000	Unga hills, Ragwe, Nyagwethe areas	On a steep-sloped terrain. Cut-and-fill and accelerated runoff issues.
	Km 15+325 – 16+100	Towards Nyandiwa	A hilly/steep-sloped terrain. Alignment runs very close to lake.
	Km 17+600	God Bura hill	A hilly/steep-sloped terrain. Alignment runs very close to lake. Cut-and-fill issues
۲۰۵ Km 23+000 -28+000 ده دې دې		Nyatambe, Okuodo and Nyamange hills	A series of hilly terrains with Nyatambe (km 413-414), Okuodo (km 415-417) and Nyamange (km 419). Runoff and cut-and-fill issues
0	Km 45+800-56+000	Anungo area towards R. Kuja	Sandy soils easily eroded, and within R. Kuja floodplains. Bridgeworks and soil disturbance/erosion close to a river Kuja.
	Km 52+900-62+000	Aneko and Got Kachola area	Cut and fill issues on Aneko (km 444- 445) and Kachola (km 446-447), and within R. Kuja floodplains.





Plate 13-3: Steep-sloped section of the road, prone to erosion (L) and road section that runs dangerously close to the lake around Gwassi area

#### Mitigation measures

- Practice sound road engineering by maintaining good drainage and natural water flows. However, the drainage ditches should only be constructed where necessary.
- To minimize potential soil erosion along embankments, back slope, other cleared areas, road verges, etc. immediate landscaping will be required. The contractor should consider planting of appropriate grass such as couch grass.
- Develop an erosion control and revegetation plan to delineate measures to minimize soil loss and reduce sedimentation to protect water quality especially for sections that will interact with water resources.
- Design runoff control features especially on the roadside drainages channels to minimize soil erosion.
- Limit cleared areas to project footprint to avoid unnecessary exposure of soil to agents of erosion.
- Line side-drains with concrete or by stone pitching in erosion prone soils to avoid gully formation

#### 12.5.2 Soil physical properties

It is anticipated that the implementation of this project will have both direct and indirect impacts on the physical integrity of soils within the project foot print and at material sites. Two major activities likely to cause direct impact and physical degradation of soil are (i) excavation and ground clearance, and (ii) material sourcing. Since large sections of the alignment will require excavation to pave way for the necessary civil works, to expand the width of the road or to remove the topsoil, physical disturbance on soil is therefore expected to be a major impact. Specifically, areas with black cotton soils which are considered structurally unstable will require massive excavation to remove overburden.

A number of sites have also been identified that will be used as borrow pits and quarry sites for road construction materials (gravel, hardcore and sand). Borrow pits that will be identified in Homa Hill area and the areas between Hom-Bay and Sindo also have the potential of disturbing a geologically active system and a region with potential paleontological resources, respectively. The project will also require

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large volumes of sand that would be used for concrete works. This sand will most likely be sourced from within the area. This impact, though indirect in nature, will have cumulative effects on areas already experiencing massive sand harvesting like Kuja and Sondu-Miriu mouths.

More information on material sourcing has been provided in a separate detailed study report, Volume 2 of the ESIA report.

#### Mitigation measures

- Exercise care in the siting and design of borrow pits so that those that are located close to certain hills or areas where massive erosion is likely to occur can be avoided.
- Contracts between the material site owners and the contractors should be looked at or verified by the RE before signing. If possible, the local environmental officers and the area chiefs should be included as witnesses to the deal. This will ensure that any future conflicts between the parties are resolved amicably and ensure that the sites are rehabilitated.
- Save topsoil removed during construction and use it to reclaim disturbed areas as well as to rehabilitate the quarries and borrow pits used, as soon as it is possible to do so.
- Rehabilitation of the material sites should be done as soon as extraction of materials from the sites is complete.
- During material sourcing avoid creating excessive slopes during excavation and blasting operations and only obtain borrow materials from authorized and permitted sites

#### 12.5.3 Soil pollution

During the implementation of this project, large volumes of oil and other petroleum products will be required in the operation of machines, vehicles and other construction equipments. Soil pollution is therefore likely to occur in the event of accidental oil spills, or release of petroleum products and bitumen (among other liquids and solvents). This impact is anticipated to be localized in nature and will occur in and around machinery and plant yards, base camps and areas of concentrated activities. These may infiltrate into the soil and cause soil pollution.

#### Mitigation measures

The following mitigation measures have been proposed:

- Proper maintenance of machinery and equipment to avoid or minimize leakages from such machines
- Spill prevention practices and response actions should be applied in refueling and vehicle-use areas to minimize accidental contamination of soil.
- Spills should be immediately addressed per the appropriate spill management plan, and initiate soil cleanup and soil removal if needed.
- Construction of a retaining wall around the garage, fuel storage and stations so that these potentially polluting substances can be properly handled so that any unintended escape of material from that area can be contained until such time as remedial action can be taken.
- Proper handling of the materials through use of drip trays, directing spills to an oil sump which should be emptied into a designated disposal site.



Refuel in a designated fueling area that includes a temporary berm to limit the spread of any spill.

# 12.6 Water Resources

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Impacts relate to both point and non-point contamination and pollution of water sources. Major concerns will be water abstraction, soil erosion and chemical pollutants
Type of impact (TI)	Direct	Pollution, abstraction and river diversions at bridges
Intensity (I)	Low	Most water sources are affected by sedimentation, especially as a result of soil erosion, incremental impacts are nonetheless expected. Furthermore, the project area is not a water scarce area, hence abstraction may not affect the resource.
Extent	Disperse	Polluted water can flow downstream, or be drawn by humans and used away from the point of pollution.
Reversibility	Short term and easily reversible	Most of the water sources are self regulating and can clean or purify themselves. Polluted water can also be treated to make it usable again.
Persistence	Temporary effect	Limited to construction phase.

#### 12.6.1 Water Pollution

Lake Victoria is the main water body in the project area. However, there are several other water resources as well, these include lakes Kanyaboli, Sare, Namboyo and Simbi; rivers Nzoia, Yala, Sondu Miriu, Kuja and and their numerous tributaries. Other water resources include dams such as Munana and Dokiko, community pans and springs spread across the landscape. Swampy areas and other seasonal wetlands also serve as seasonal sources of water and water-based resources for the local communities. There are numerous shallow wells, boreholes and springs spread across the entire project area.







Plate 13-4: Spring at Nyandiwa, a critical source of domestic water for the local community

The project crosses several permanent and seasonal or perennial rivers. Some of these rivers do not have bridges at the intersections with the new alignment and thus there will be need to construct them. The major rivers that require bridges are R. Nzoia, Yala and R. Kuja. There are also sections where the road runs within metres of the Lake Victoria shore. These areas appear in the Table 12-2 below:

Contract	Chainage	Area
Contract 1	26 + 000 - 34 + 000	Past Sio port
Contract 2	17 + 000 - 18+000	Wagusu area
	26 + 000 - 28 + 000	Kaloka
Contract 4	45 + 000 - 54 + 000	Gingo – Sindo
	47+900 - 49 + 000	Past Sindo
Contract 5	70 + 000 - 72 + 000	Unga hill
Contract 6	24 + 400 - 28 + 100	Rangwe hill
	16 + 600 - 28 + 100	Nyandiwa – Kisegi - Gunga
	36 + 000 - 37 + 000	Karungu

Table 13-2: Areas	where the	road runs	close to the lake
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During the construction phase, activities associated with construction of drainage structures such as bridges and culverts and the camp site have the potential of polluting the water bodies. The potential sources of pollution will include sediments accruing from soil erosion, oil spillages as well as sewage and grey water from the camp sites. The main potential source of pollution however is sediments and soil based nutrients from soil erosion. Specific project activities such as bridge construction across the major rivers like Nzoia, Lake Kanyaboli and Kuja and other proposed works across water channels could have impacts on water quality. Medium impacts are also expected for works that will be undertaken for road sections within the isolated wetlands and seasonally flooded areas, as well as road sections that run close and parallel to the lake fringes, or riparian zones. This is because the



loosened and eroded soils will either enter the rivers and wetlands directly, or cover a very short distance before interacting with the water resources resulting in increased turbidity and sedimentation.

Other causes of pollution are accidental spillages of fuels and oils as well as discharge of grey or sewage water to the environment, of which due to surface run off, find their way to water bodies. This could result in pollution of these water sources, affecting the aquatic life as well as causing diseases to downstream domestic users.

Impacts on water sources may be rated as medium to low considering the numerous water sources within the project area and the area population.

#### Mitigation measures

- The impacts associated with sedimentation will be sufficiently mitigated by the ones proposed under soil erosion control. Besides soil erosion.
- Where the proponent implements a CSR PROJECT especially at the beach (such as a fish cooling facility / banda) properly constructed septic tanks should be provided to avoid direct discharge of waste (grey and black waters) into the lake.
- Uncontrolled water discharges should not be allowed to be channeled into water sources •
- Camp sites, waste disposal and soil dumping areas should be located away from the surface • water sources
- Grey water should be channeled to a soak pit to prevent mixing with run off that would eventually find their way to nearby water sources.
- All stockpiles should be covered especially during the rainy season
- Upon completion of the bridge construction the contractor shall ensure that all cofferdams and settling ponds are disassembled and any residual or waste concrete removed. The work site should also be cleaned.
- The contractor should ensure that the river banks of the rivers where bridge construction will be done is protected from erosion by installing concrete wingwalls, gabions, riprap or other suitable controls at or near the bridge structure.
- Rehabilitation of the existing water points, use of soak pits, stone pitching and check dams as velocity and siltation reducing measures of this water sources and springs The Contractor shall ensure that the footprint of construction activities is minimised at river and stream crossings;
- No construction materials shall be stockpiled within areas that are at risk of flooding;
- The Contractor shall ensure that all construction activities at the seasonal river crossings are commenced and completed during the dry seasons;
- All temporary and permanent fill used adjacent to, or within, the perennial river bed shall be of • clean and or larger particles. Silts and clays shall not be permitted in the fill;
- Plastic sheeting, sandbags or geofabric approved by the RE shall be used to prevent the migration of fines through the edges of the fill into the river;





- The Contractor shall not modify the banks or bed of a watercourse other than necessary to complete the specified works. If such unapproved modification occurs, the Contractor shall restore the affected areas to their original profile;
- The Contractor shall preserve all riparian vegetation;
- The Contractor shall not pollute the watercourse or sources through any construction activities.

#### 12.6.2 Pressure on water resources

The project area is not a water scarce area and therefore conflicts with the locals are not anticipated. During construction water will be required for mixing of various construction material on site, as well as suppressing dust from crushers and deviations and access roads' surfaces. Water will also be needed for use at the the contractor's camp. The construction water demands will be competing with domestic use use by the local people. Consultation with the local communities shall be required before commencement of water abstraction.

#### Mitigation measures

- Water permits for the abstraction of water shall be obtained from WARMA to ensure that existing water rights and uses will not be affected by the road project for its diverse water needs.
- Consultations with the Water Resoource Users' Association (WRUAs) should be done prior to abstraction to gain their support.

# 12.7 Ecologically Sensitive Areas

#### 12.7.1 Wetlands

Impact characteristics	Rating	Description
Nature of impact	Negative	Involves largely disturbance and in some instances destruction of parts of Yala wetlands for the project footprint, reduction of the area under wetland as well potential fragmentation of the wetland. Impact may also include pollution of the wetlands through accidental fuel and oil spills.
Type of impact (TI)	Direct	Disturbance and in some cases destruction of small parts of Yala swamp to create corridor
Intensity (I)	Medium	Since wetlands are ecologically sensitive areas and support a large number of aquatic organisms.
Extent	Localised	To the wetland areas listed above.
Reversibility	Long term and partially reversible	The wetlands are self regulating therefore are, in case of pollution, able to purify themselves with little residual effects.







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Persistence	Temporary	Are restricted to the construction phase of the project

Wetlands are ecologically sensitive areas. They perform a variety of ecological functions as well as provide habitats for various species of aquatic and semi-aquatic plants, mammals, fishes, birds, reptiles and other lower classes of animals. The project area has several wetlands which range from pristine, riverine to lake fringing wetlands. The area also has seasonally flooded zones.

During construction storm water may pick up pollutants such as fuel and oils as well as other hydrocarbons from the road works into the wetlands. During rains, and if excavated materials and spoils are not handled properly, the soils may be transported to the wetlands feeding silt into the wetland and thus altering the integrity of the receiving wetland.

Changes such as reduction of the area under wetlands and reduction of habitats may occur as wetland vegetation is cleared for the project. Another impact may be fragmentation of the wetland and some species may not be able to adjust well resulting in migration of some species and consequently biodiversity loss.

#### Mitigation measures

- To the extent practicable the contractor should rehabilitate the disturbed sections of the wetland by ensuring that the vegetative community and habitat are restored to a close approximation of the original natural condition that existed prior to disturbance.
- Wetland disturbance during construction should be reduced by keeping vehicles on established access roads and by minimizing foot traffic by workers in undisturbed areas.
- The contractor shall develop subplans for construction across environmentall sensitive areas such as wetlands.
- Construction works involving heavy equipment and machinery should be scheduled during the dry season to minimize soil compaction.
- Construction debris and bitumen should be properly handled to avoid contamination of the wetlands
- Incase of spillages a reporting mechanism should be adhered to as specified in the • **Environmental Management Plan**
- Avoid equipment entry into wetlands unless equipment entry into wetlands is unavoidable;
- Minimize the area disturbed as well as the number of repeated passes over the same trail. •
- The contractor shall ensure that the construction workers do not fish or harvest reeds from the wetlands.
- The contractor shall ensure that no material is stored within the wetlands.
- Proper sanitation facilities should be constructed for the crew working within the wetland.
- The contractor shall ensure that littering or construction related debris such as concrete, steel, • etc. is prohibited. The contractor shall develop a wetland monitoring plan.
- 12.8 Fauna



#### 12.8.1 Avifauna

Impact characteristics	Rating	Description
Nature of impact	Negative	Project will involve bird habitat disturbance associated with vegetation clearance of the project footprint. It may also lead to disruption of the food chain, migration of birds and potential subsequent biodiversity loss.
Type of impact (TI)	Indirect	Impact on the birds' habitats and not on the birds themselves.
Intensity (I)	Low	When comparison is made at the project level, the project area has few bird sanctuaries therefore the impact can be rated low overally.
Extent	Localised	To the bird habitats such as Yala swamp, dunga wetland and on mature trees found within the road corridor.
Reversibility	Long term partially reversible	Can be reversed with proper mitigation measures
Persistence	Temporary effect	Restricted to the construction phase with no residual effect thereafter

Whereas most of the original vegetation that provide habitat for the birds has been lost, there is still a wide variety of birds within the project area. Indeed, there are internationally recognized Bird Areas (IBAs), namely Dunga and Yala swamps. However, there are also healthy bird populations and varieties outside these IBAs. Currently the threats facing birds include destruction of habitats as well as encroachment of their habitats for farming or settlements. During the construction phase there will be clearing of some wetland areas to provide space for the project. This may lead to degradation of wetland dependent bird habitats. Vegetation clearance may also destroy some nests that are perched on remnant mature trees along the roads.

Another impact that may result from habitat destruction as a consequence of wetland reclamation for the road corridor is that the fragile food chain may be interrupted, e.g. interference with the ecology of insects that the birds feed on. This could lead to migration of the birds elsewhere in search of food and subsequently biodiversity disruption but at a much localized level.

Noise and vibrations from vehicles and machinery coupled with smoke produced may scare the birds besides polluting their habitats. These may cause them to migrate to other areas and could result in ecological imbalance.

Since the IBA areas are already served by roads, only that they are not paved, this impact is expected to be low. The only potential threat is the projected increased human activity across these areas.

#### Mitigation measures

- Keep site clearance to the project footprint and avoid or minimize clearance beyond the project corridor
- Time spent around the sensitive bird areas should be minimized by adequately planning for the works and avoiding equipment idling time.



Construction activities within Yala swamp and around Dunga wetland should cease between April to June which concide with the breeding and nesting seasons of the birds.

#### 12.8.2 Mammalian resources

Impact characteristics	Rating	Description
Nature of impact	Negative	Impacts relate to habitat disturbance and interference with the feeding and breeding habits at specific spots.
Type of impact (TI)	Indirect	Disturbance to the mammals' habitats where vegetation clearance will be done for the project footprint especially in areas like Mboha in Seme.
Intensity (I)	Low	The project area is generally low in wildlife except for those in the protected or conservation areas. Construction therefore will only affect the few wildlife outside the conservation areas and the wildlife in yala swamp – Lake Kanyaboli
Extent	Localised	To specific wildlife habitat and dispersal areas like Mboha in Seme
Reversibility	Short term and partially reversible	Mammalian habitats can easily regenerate and revert to their undisturbed state with proper mitigation
Persistence	Temporary effect	Impacts restricted to the construction phase

The entire project area is generally considered low in wildlife. This is because most of the natural habitats have been cleared to pave way for human activities like farming, settlements and urbanization. Most wildlife is in conservation and/or protected areas. Relatively high concentration of wildlife is found in sensitive ecosystems such as Yala swamp and Lake Kanyaboli ecosystem. Although there are efforts to gazette Yala swamp, the process is yet to be completed. However, the Environmental Management plan is in the final stages of completion.

Construction of the road may however result in habitat degradation for the mammals that are outside the conservation areas.

Contract	Area	Chainage
Contract 1	Yala swamp	60 + 000 - 65 + 000
Contract 2	Mboha and Bodi area in Seme	12 + 000 - 16 + 000
	Dunga swamp	Spur road
Contract 5	Gwassi forest	68 + 000 - 83 + 000

#### Table 13-3: Important wildlife areas outside conservation areas

However, the impact to wildlife is expected to be insignificant because the number of wildlife outside protected areas is low.





#### Mitigation measures

- Collaboration between KENHA and KWS should be initiated to formulate suitable approaches that would ensure the road is not a factor in any threat to wildlife. Such actions include erection of informative billboards.
- The contractor should ensure that no construction worker kills any wild animal and that • construction workers should report any cases of wildlife poaching to the contractor who will report to the RE.

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Impact involves pollution of the environment caused by both construction generated solid and liquid waste which include waste water, fuels, oils, hazardous substances and other liquid pollutants.
Type of impact (TI)	Direct	Pollution of the project environment.
Intensity (I)	Medium	Large volume of waste is normally generated from excavation of the material sites and carriageway including debris, spoil, general waste (wrapping materials and food waste).
Extent	Localized	To the project area.
Reversibility	Short term and easily reversible	Short term and will only occur during the construction phase and is easily reversible if the appropriate mitigation measures are implemented.
Persistence	Temporary effect	Certain type of waste will only be experienced during the construction phase.

#### Waste Management 12.8.2.1

# 12.9 Solid Waste

During the construction phase there will be generation of solid waste from the project activities. The waste will include unusable soil, mainly overburden and topsoil excavated from material sites and road carriageway, wrapping materials discarded by the workers on site, food waste from the kitchens, waste from the workshops and offices including waste papers, toners and cartridges, broken equipment, material containers e.g. the paint containers. These solid wastes will require proper disposal to minimize pollution and abate the visual intrusion caused by improperly disposed waste.

#### Mitigation measures

The contractor shall develop a comprehensive waste management plan;

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- Properly labelled and strategically placed waste disposal containers shall be provided at all the places of work
- Construction workers shall be sensitized on the need for proper waste disposal
- No burying or dumping of any waste materials, vegetation, litter or refuse shall be permitted
- Provision for responsible management of any hazardous waste generated during the construction works shall be done
- Where feasible construction materials shall be recycled especially containers and cartons.
- Involve the local residents on the removal and disposal of the spoil and solid wastes to • approved dumping areas.
- For the spoil generated, disposal shall be done on pre identified sites more than 20 meters from watercourses and in a position that will facilitate the prevention of stormwater runoff from the site from entering the watercourse

# 12.10Liquid Waste

During the construction phase, various liquid wastes including grey and black water (respectively washing water and sewage), concrete washings, runoff from camp and workshop areas, and various liquid waste streams from washing construction vehicle and equipment washing will be generated. These wastes pose real toxicity and quality threats to the soil and ground water, and the existing wetlands within the area.

### Mitigation Measures

- No grey water runoff or uncontrolled discharges from the site/working areas (including washdown areas) to adjacent watercourses and/or water bodies shall be permitted;
- Water containing such pollutants as cements, concrete, lime, chemicals and fuels shall be discharged into a conservancy tank for removal from site. This particularly applies to water emanating from concrete batching plants and concrete swills;
- The Contractor shall also prevent runoff loaded with sediment and other suspended materials from the site/working areas from discharging to adjacent watercourses and/or water bodies;
- Potential pollutants of any kind and in any form shall be kept, stored and used in such a manner that any escape can be contained and the water table not endangered;
- Wash areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas (including groundwater) are not polluted;
- The Contractor shall notify the RE of any pollution incidents on site.

## 12.11Noise and vibration

Impact Rating characteristics	Description
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Nature of impact (NI)	Negative	These refer to noise pollution (noise levels above 60dB(A)) in relation to the sensitive receptors such as learning centres, places of worship, health facilities, offices and market centres.
Type of impact (TI)	Direct	Direct impact on the occupants of the sensitive receptors and buildings located in close proximity to the road.
Intensity (I)	Low	Despite the high number of sensitive receptors within the project area incremental noise impacts are rated medium.
Extent	Localized	To the sensitive receptors.
Reversibility	Short term and easily reversible	Impact restricted to construction phase and can be easily reversed with appropriate measures.
Persistence	Temporary effect	Associated with construction traffic and blasting at hardstone quarries.

The current ambient noise and vibration conditions within the project corridor can be described as low with the exception of urban centres where typical urban noise is experienced and the paved sections where vehicular noise is dominant. Table 13-4 below provides a summary of noise and vibration conditions along the corridor.

Table 13-4: Noise and vibration	conditions along the alignment
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Section	Chainage	Ambient Noise Rating	Most critical phase	Remarks
Bumala to Turn-off to Sio Port	0+000 -13+400	Medium	Construction	Rural, moderate settlement
Sio – Port turn-off to re- joining Bumala road to River Nzoia	13+400 – 42+000	Low	Operation	Rural, low settlements
River Nzoia to Kagwa	42+000 – 103+000	Low	Operation	Rural, low settlement
Kagwa to Asembo Bay	103+000 - 148 + 000	Medium	Construction	Paved highway but low traffic
Asembo Bay to Otonglo Kisumu	148+000 – 192+000 –	Low	Construction	
Kisumu section	192+000 – 202+000	High	Insignificant	Urban, high traffic volume, aeroplane noise
Kisumu to Katito	202+000 – 236+000	High	Insignificant	International Highway





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Katito to turn off to Sango Rota	236+000 – 254+500	High	Insignificant	Highway
Sango Rota loop	254+500 – 261+000 (Loop of 12 km)	Low	Construction	Rural, moderate settlement
End of Sango Rota loop to turn off to Homa Hills	261+000 – 277+000	High	Insignificant	Highway, several market centres, Kendu Bay town
Homa Hills loop to Got Bondo	277+000 – 319+000	Low		Rural, moderate settlement
Got Bondo to Homa Bay	319+000 – 327+000	High	Insignificant	Highway, Homa Bay Town
Homa Bay to Waondo Including Olambwe loop	327+000 – 346+000	Natural	Construction / Operation	Low settlement rural
Waondo to Mbita	346+000 – 359+000	High	Insignificant	Highway
Mbita to Muhuru	359+000	Low	Construction	Low settlement rural

From the Table 13-4 above it can be gleaned that large sections of the alignment have low ambient noise levels indicating that construction noise could be of significant impact along these sections. However, the sections of low ambient noise levels are also mostly less populated so the impacts will mostly be manifested in potential noise irritations within the sensitive noise receptors, i.e. schools, places of worship and health facilities as opposed to the general public. The noise sensitive receptors are presented in Table 13-5 below.

#### Table 13-5: List of Noise Receptors

Major Receptors	Number
Schools	284
Places of worship	215
Town / Market centres / Adminsitrative centres	127
Health facilities	51
Total	677



In sum the impacts of noise during both construction and operational phases will be mostly felt at markets, across urban centers where there is substantial settlements and high population density. Other critical areas that are considered sensitive receptors to noise and vibrations include health centers, dispensaries and worship centers. The levels of impacts, however, are confined within 500m of the carriageway. On the cited receptors, the impacts also vary depending on the distance from the road alignment and also from quarries and batching plants.

Based on the absolute figures tabulated above, noise and vibration impacts are likely to be of concern to learning institutions being the most widespread and highest in absolute numbers at 284. Built up urban areas, trading centres, market centers and administrative institutions host large numbers of people at any given time and therefore potential noise impacts could be considerable. However, ambient noise within these areas is already high and therefore incremental impacts are rated low to insignificant.

Whereas health centers are fewer in absolute numbers, they are the most sensitive receptors. For this reason, potential impact could be rated medium to high. Public facilities that are least affected by noise are the places of worship despite the high absolute number. This is because they are more often used only once a week. Not all places of worship, however, are sensitive to noise, some of them generate noise above ambient levels during worship sessions.



Plate 13-5: Noise generating activities at a trading centre along a paved road (left picture), more serene environment along unpaved rural country except occasional traffic noise

Construction phase noise impacts will be attributable to construction traffic, plant and machinery, and vibrations from blasting at guarries and even noise from the sites of works, workshops and batching plant. Construction phase impacts will be most felt along stretches that are currently experiencing low ambient noise and vibration levels. These are along unpaved sections and rural areas. Again these are the same areas where initial noise impacts during operation will be significant at the initial stages but later diminishing progressively as people get used to traffic noise. For the sections that are already paved and across urban areas, these impacts are projected to be insignificant.

#### Mitigation measures

Mitigating noise impacts will be heavily dependent on the practices by the contractor. Normally best engineering practice (BEP) if well deployed should mitigate virtually all noise related impacts during construction. However, at a minimum and in addition to the BEP, the contractor should ensure the following:


- Exploit quarries that are located in isolated areas away from settlements or human made structures. Employ careful blasting methods and warn nearest residents of your intention to blast one week to scheduled blasting. Follow National Guidelines on use of explosives.
- Carefully select batching plant locations that are at least 200m away from any sensitive institutions or settlements
- Hoard the batching plant area with at least 5 m tall buffer barrier that will limit noise transmission from the site.
- Restrict working hours to daytime when ambient noise levels are generally high and avoiding work at night
- Inform potentially affected people or institutions located within 200 m of a potentially noisy activity at least one week in advance - of the intention to undertake noisy operations and advice on the timing. Information should also advice the potentially affected people of actions they are required to take to avoid or minimize noise or vibration impacts on themselves.

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Impacts relate to the receptors such as schools, health facilities, market centres / towns, offices and places of worship. Anticipated impacts may originate from vehicles (dust and CO <sub>2</sub> ) from machinery and vehicles during the construction phase.
Type of impact (TI)	Direct	Is direct to occupants in the sensitive receptors.
Intensity (I)	Low - Medium	Incremental pollution due to dust and incremental pollution due to emissions are rated low.
Extent	Localized	Relative to the receptor prone areas.
Reversibility	Short term and easily reversible	Impacts are restricted to the construction phase and can be reversed once the works are completed.
Persistence	Temporary effect	For the construction phase.

## 12.12Air Quality

Being mainly rural country, air quality along project corridor is mainly influenced by emissions from vehicular sources and attendant generation of particulate matter mainly in the form of dust. There are also minor sources of air quality pollutants related to agricultural activities such as burning agricultural fields; and biomass energy production and use, especially charcoal burning and domestic use of fuelwood. With the anticipated high traffic volumes comprising different categories of vehicles that will be on the road upon completion, emissions above the ambient will be expected. The main air quality pollutants will be the components of emissions, principally carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), Nitrogen Oxides (NO<sub>x</sub>), Sulphur Oxides (SOx) and Particulate Matter (PM<sub>2.5</sub>, PM<sub>5</sub> and PM<sub>10</sub>). There are also hydrocarbons, fuel aerosols and soot.



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The most important air quality receptors are sensitive institutions along the project road. These institutions include learning centres, health facilities and urban centres, the latter being sites of concentrated settlements. In total, there are 284 learning institutions and 51 health facilities, see Annex 4 for a list of receptors within 200m of the road alignment. These receptors are evenly distributed all along the project road with learning institutions forming the bulk of the sensitive receptors. The potential impacts on the receptors vary depending on their locations relative to the road and whether along the paved sections or unpaved and even through sections that have no existing roads. Anneex 1, 2 and 3 present the relative severity of estimated air quality impacts associated with each institution.



#### Plate 13-6: A typical air quality receptor by the road

The current condition of the project varies considerably from paved sections, unpaved classified roads, unpaved non-classified roads and in some cases the corridor follows terrain with no existing roads e.g. farmlands. The paved sections are majorly in the urban areas and where the road runs through A1 and some class C roads. Unpaved sections typically cut through rural areas adjacent to the lake shore. During the construction phase, the impacts will vary depending on the condition of the section.

For the paved sections across urban and sub urban centers, the air quality impacts will relate more strongly with particulate matter than with emissions since emissions are already relatively high. Dust will be generated by construction traffic and earth moving equipment especially during excavations and other forms of earth works. If not well managed, the high temperature within the project area especially in the dry season means dust suppressants, mainly sprinkled water on exposed areas can quickly dry out creating conditions of persistent fugitive dust. Considering the current high levels of fugitive dust along unpaved sections, incremental dust will be much lower and therefore the impact relating to dust is adjudged minor.

Other sources of air pollution are borrowing activities for gravel, quarrying and batching plant operations. These are highly localized and their impacts will be influenced by management practices.

#### Mitigation measures

During construction phase, the most important air quality parameter is fugitive dust. The most effective management of fugitive dust is to ensure that excavated sites are not exposed to wind and that the

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surfaces are wetted at all times. To achieve minimal generation of fugitive dust, the contractor should observe the following:

- Restrict excavations to the project foot-print to minimize surfaces exposed to wind erosion
- Manage stockpiles by covering those that are not of immediate use
- Carefully control works close to the listed sensitive receptors such that minimal dust is generated and whenever earthworks are being undertaken, then dust suppression should be implemented continuously
- Ensure contractor's staff working at high dust generating sites are provided with appropriate PPEs to include dust masks and / or suitable aspirators
- The contractor should inform the management of sensitive institutions on the days that excess dust is likely to be generated so they can be prepared. The same applies to works along the urban centres.

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Impacts will relate to the borrow pits and quarries used for material sourcing. When not properly rehabilitated remain of poor quality and unproductive besides being visually intrusive. Furthermore, they may be a source of accidents
Type of impact (TI)	Direct	Direct to the specific material sites within the project area
Intensity (I)	Medium	With proper mitigation measures the impacts can be averted
Extent	Localized	To the material sites
Reversibility	Short term and easily reversible	The impacts are short term during construction and can be reversed by proper rehabilitation of the material sites
Persistence	Temporary effect	Will be experienced during the construction phase when material is being sourced

## 12.13Construction material sourcing

There are material sites (borrow pits and quarries) that have been identified and proposed, from where construction materials will be sourced. These borrow pits and quarries, if not rehabilitated, form pits and badlands that are visually intrusive. The pits that are left when filled with pools of water may be hazardous and create potential accidents. They can also form breeding grounds for disease vectors. More information on the material sites has been provided in detailed assessments report Volume 2 of the ESIA series.

#### Mitigation measures

• Environmental Impact assessment study shall be carried out by the contractor prior to the extraction of materials from these sites.

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- The material sites should be fenced off to minimize incidents of accident occurring for borrow pits and quarries.
- Rehabilitation of the material sites should be done as soon as extraction of materials from the sites is complete.
- Signs that warn about the hazardous nature of these material sites shall be put up in strategic areas in the appropriate local languages to minimize the accidents.
- Contracts with the material site owners and the contractors should be looked at or verified by the RE, local administrators etc before signing.
- The contractor should avoid exploiting material sites that are on scenic hills and mountains
- The contractor should prepare a borrow pit and quarry rehabilitation and management plan to be used during the construction phase of the project.
- The contractor should keep vegetation clearance to a minimum to reduce interference with the scenic appearance of these areas.
- The contractor should ensure that the detours and access roads to the borrow pits and quarries are marked with warning signs.

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Impacts relate to accidents, occupational diseases, ill health and damage to property which can occur if precautionary measures are not taken.
		Predisposing factors include bridge works, dusty areas and working on cliffs.
Type of impact (TI)	Direct	Accidents, poor and dangerous working environments and disease spread directly affect humans.
Intensity (I)	Medium	Possibility of occurrence can both be minimized and eliminated.
Extent	Localized	To the working environment.
Reversibility	Long term and partially reversible	Irreversible injuries and deaths can occur in the working environment but precautionary measures can help in mitigating the impacts.
Persistence	Temporary effect	Impacts restricted to construction phase.

## 12.14Occupational Safety and Health

During construction phase, accidents, occupational diseases, ill health and damage to property can occur if precautionary measures are not taken. Increased movement of vehicles may lead to increased accidents among local communities, construction workers and vehicles operators. Small centres within the project area also experienced safety issues. Increased traffic due to the improved road may

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only make this situation worse and result in more accident cases. However, this impact can be rated medium to low if appropriate mitigation measures are implemented.

#### Mitigation Measures

- The contractor should comply with all the Occupational Safety and Health regulations outlined in the Occupational Safety and Health Act 2007 (OSHA) and ILO Guidelines on Safety and Public Health in the construction activities
- The contractor should provide the appropriate personal protective equipment to all workers in the construction site at all times
- The contractor should ensure there are warning signs on the construction site and on the road to protect from accidents.
- Road construction sections with running machines should be protected from general public to avoid accidents or unnecessary interference with the working procedures
- The contractor should provide standard first aid kit at the site.
- A safety officer who has safety training and knowledge of safety procedures should be present on site to ensure that all the workers have guidance on the safety procedures.
- The contractor must have an insurance cover for all workers
- Speed calming features should be provided in affected centres to help in slowing down traffic across these centres.
- Speed limits appropriate to the vehicles driven should be observed at all times.
- Adequate road signage and, where very necessary, speed bumps and flyovers should be provided close to school for use by the kids who need to cross the roads
- In areas where the road will intersect the communal watering points, bumps and proper warning signage should be erected

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Impacts involves spread of HIV/AIDS due to influx of construction workforce into the project environment and possible irresponsible behaviour between them and the locals.
Type of impact (TI)	Direct	Affects the construction workers and the locals.
Intensity (I)	Medium	Despite contracting the disease, it can be managed using ARVs.
Extent	Dispersed	If the infected people have other sexual partners the disease can easily spread beyond the project area.

## 12.15Health and HIV/AIDS

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Reversibility	Long term and partially reversible	The disease is incurable, but can be managed using ARVs.
Persistence	Permanent	The disease is incurable.

Since the project counties have high HIV/AIDS prevalence, the eased movement and interaction in the rest of the country and beyond could lead to increase in sexually transmitted infectious including HIV/AIDS. In addition, construction of the road will be accompanied with influx of population from many areas including possible prostitution increase. Cases of HIV/AIDS specially and other social diseases may also increase.

#### Mitigation Measures

- Initiate an awareness creation, prevention and training programmes on HIV/AIDS upon commencement of works
- Establish wellness centers including VCT and ARV centers at strategic location of the project corridor,
- Incorporate HIV/AIDS control program as part of the construction deliverables
- Other negative impacts will include:
- The opportunity cost of government funds invested on the road in terms of foregone consumption of other goods and services
- Conflicts over land whose demand and value will significantly increase may arise
- Possible increase in road accident cases resulting from increased vehicular traffic within the areas

## 12.16Public disruption

There will be potential disruptions during road construction to public facilities, businesses and residential accesses leading to temporary closures. Other disturbances will occur inform of interference with infrastructure including electricity lines and water pipes affecting services.



Plate 13-7: Example of public places where activities would be disrupted during construction

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#### Mitigation Measures

- Access routes as well as foot bridges, especially to social facilities and residential areas should be provided, based on recommendations from the local population
- Restoration of services and access roads should be done within the shortest period possible.
- Advance notice should bé given the population/persons/institutions likely to be affected about these possible disruptions

## 12.17Archeological, Paleontological or Cultural sites

A number of areas and locations that will be traversed by the LVRR have the potential of being geologically active or regions with potential paleontological and archeological resources. Majority of these potential areas fall within Homa-Bay County and include areas covering Homa hill and Bala hotspring, the areas that are under the influence of Lambwe valley, covering Mbita into Sindo. There are also sites in Siaya and Kisumu counties.

#### Mitigation measures

- Develop a paleontological resource management plan for both the borrow pits and road excavation works in areas between Homa Bay and Sindo and Kanjira areas with a history of significant fossils of scientific value or paleontological resources. This is because this zone covers the Lambwe valley ecosystem where records of previous archeological findings exist. The plan should also include a mitigation plan for avoiding, removing fossils, or monitoring construction activities.
- Should a chance find occur, the contractor should immediately inform the National Museums of Kenya

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#### POTENTIAL ADVERSE IMPACTS - OPERATIONAL 13 PHASE

Not all construction phase impacts will be manifested in the operational phase. Most of the operational phase impacts revolve around access to resources such as fish resources and forest products. Howevere there are also impacts that relate to drainage, noise and air quality.

## 13.1 Fish Resources

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Involves overfishing which may lead to loss of fish population and diversity during the operation phase. This is because the new road will bring in more people to the region, meaning possibly more demand for fish.
Type of impact (TI)	Indirect	Increased exploitation will impact directly on fish population and diversity.
Intensity (I)	High	Impacts relating to increased exploitation of fish resources in Lake Victoria and other fish breeding areas.
Extent	Dispersed	Impact on the fish diversity and numbers in one area, for example in Lake Kanyaboli, may impact diversity and numbers in other places i.e. Lake Victoria.
Reversibility	Long term and partially reversible	The effects that result from pressure due to increased accessibility are considered long term but reversible if properly mitigated, for example through regulated fishing or restocking.
Persistence	Partially Permanent	Resulting from pressure on fish resources due to increased accessibility.

Poverty levels within the project area are generally high with fishing as the main economic activity. During operation of the road, overfishing may occur as a result of increased fish demand due to improved accessibility to the various beaches around Lake Victoria as well as the associated water bodies. Areas that were previously inaccessible will now be easily accessible thus creating high demand for fish which may lead to overfishing to satisfy the demand. Unscrupulous fishermen are also employing sub-standard fish nets. This is a worrying trend because fish is a fairly inelastic resource. Pressure on this resource is likely to increase.

Lake Sare, Kanyaboli and Namboyo are gene banks for the various fish species most of which have disappeared from Lake Victoria. When the road will be completed there will be accessibility to these areas and thus may encourage exploitation of the vulnerable species in the gene banks. This could further create pressure on their survival.

#### Mitigation measures





• Collaboration with the Fisheries Departments in the respective counties shall be done to facilitate strong enforcement of fishing regulations that include regulations on fishing nets, durations of fishing as well as denying permits for fishing in gene bank areas such as Lake Kanyaboli, Lake Sare and Lake Namboyo.Promotion of cage fishing as an alternative source of fish to meet the continuous increasing demand for fish. This is a method of fish farming where fingerlings are put in cages to protect them from predators, providing them with a controlled diet and harvesting the stock once it is ready for consumption. This can be done in collaboration with the county governments and as part of CSR by having one demonstration site per county



- Appropriate cross drainage structures should be constructed where the road crosses wetlands to maintain ecological health of the wetlands and encourage fish breeding.
- KENHA shall collaborate with CBOs dealing with wetland conservation to facilitate community sensitization on the wise use and maintenance of wetlands.

## 13.2 Wetlands Ecology

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Impact involves accelerated exploitation of the wetland resources such as <i>Cyperus papyrus</i> and the fish resources in the wetlands within the project area. It will also involve possible invasion of the remaining wetlands by human beings for expansion of agriculture.
Type of impact (TI)	Indirect	To the wetlands such as Yala swamp, Dunga wetland and the lake fringing wetlands on the riparian of Lake Victoria.
Intensity (I)	Low	Pressure on the wetlands in the area still exists regardless of the proposed road. Incremental impacts are therefore rated

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		low.
Extent	Localized	To the wetlands and wetland resources in the area.
Reversibility	Long term and partially reversible	Controlled use like the proposed gazettement of Kanyaboli and Yala swamp as can moderate the degradation of the wetlands.
Persistence	Partially Permanent	Demand for wetland and wetland products/resources will always persist.

Construction of the road through wetlands may also form a barrier which could hamper movement of terrestrial biota along the riparian corridor, and even other flying invertebrates such as butterflies. In Lake Kanyaboli and the associated Yala Swamp there is a causeway that is operational at the moment. Raising the vertical profile of the road across Yala without creating multiple cross-drainages or a bridge will permanently cut off communication between the upper and lower areas of Lake Kanyaboli, the associated Yala Swamp and Lake Victoria.



Figure 14-1: Ecological linkages between Lake Kanyaboli and yala swamp

Historically there was unimpeded ecological interaction between Lake Kanyaboli, Yala Swamp and Lake Victoria - as shown by the large blue arrow in Figure 14-1. However, in the early 2000, part of the

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area represented by the red rectangle was hived off, reclaimed and laid to rice paddies, fish ponds and livestock production. This has effectively blocked this ecological linkage. However, there is a small corridor to the north east of the lake (small green arrow) that can potentially establish a long-term link. Currently this link is also effectively compromised by the causeway across the eastern tip of the lake – see the Figure 14-2 and Figure 14-3 below.



Figure 14-2: Satellite image showing Dominion farms as a barrier to ecological linkage between Lake Kanyaboli and Lake Victoria

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Figure 14-3: The effects of the current causeway across a section of Lake Kanyaboli



Plate 14-1: Heavy vegetation cover on the edges of the causeway

As is clearly demonstrated in the figures and images above, the current causeway has effectively segmented the lake. This is evident from the thick cyperus and sedges that are well established on either side of the causeway (Plate 14-1), a clear indication of an effective barrier. Reinforcement of this barrier by increasing the vertical profile of the road without adequate cross drainage will make this segmentation permanent. However, a bridge has been designed across this section and therefore this impact can be considered properly mitigated in the design.

Improving accessibility to these wetlands may also make the wetlands susceptible to exploitation as more reclamation will be done for settlements and agriculture since they are fertile.



The wetlands are gene banks and fish that have otherwise disappeared from Lake Victoria are found therein. Improving the accessibility by construction of the road may also encourage intensive fishing within these areas resulting in over exploitation of the fish resources.

Moreover, there are wetland woody species that are exploited for commercial products like mats and baskets. It is possible that operation phase of the project will bring in more buyers of these products, hence more demand for and exploitation of the raw materials.

Currently some wetlands especially Yala, Kanyaboli, Dunga, and on rivers Nzoia, Yala and Kuja ecosystems are accessible to the public and certain floral species within them such as Papyrus and Phragmatis are being exploited for mat making and as building materials, respectively. The degree of access to these areas, nonetheless, is not uniform but patchy across the wetlands. It is therefore possible that having an access road in proximity or through these wetlands will further expose them to increased exploitation. Similarly, burning of wetland vegetation and direct clearing to reclaim land for agricultural production that was witnessed in a number of these wetlands will likely go up. Dry season horticultural farming activities are likely to upscale with the new road leading to enhanced wetland vegetation clearance and burning.

#### Mitigation measures

- The road design has already provided for a bridge across Lake Kanyaboli which will facilitate the ecological health of the aquatic ecosystem. This is a positive impact.
- Fast-track the gazettement of Lake Kanyaboli ecosystem management plans that is already developed
- KENHA shall collaborate with the county government and CBOs for community sensitization on the wise use and maintenance of wetlands. In addition, appropriate informative billboards on wise use of resources should be designed and erected across the wetlands.

## 13.3 The swarming lake flies

The lake flies, *Chaoborus* spp (locally known as *sam*), tend to be plenty during the onset of rains, with peak abundance reported in the month of April. Considering that the lake flies swarming peaks with peak rainfall and the fact that the flies mostly swarm at dawn or dusk when visibility is naturally low, their potential contribution to public (motorist) safety concerns cannot be ignored. When vehicle lights attract the insect to a moving car, they are like to block the windscreen thereby compromising the drivers' visibility.

The flies are likely to be of concern to motorists especially at night or dusk when the LVRR becomes fully operational because of their synchronised swarming nature during breeding. The males form a swarm above the water and the females flying into the swarm to mate. In many species and subspecies, the emergence is synchronised with dawn or dusk, and light intensity seems to be an important cue for emergence. That implies that the flies will be attracted to car beams which can cloud vision especially at dusk.

#### Mitigation measures

• Erect clear road sign cautioning motorists about the behaviour of the insects and potential safety risks they pose at dusk during the rainy season.

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## 13.4 Soil Resources

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Concentrated runoff along side drains can cause accelerated erosion and could affect farms on the lower catchment
Type of impact (TI)	Direct	Erosion impacts prone areas directly.
Intensity (I)	Low	This impact can be sufficiently mitigated in the design and through prudent construction practice.
Extent	Localized	To the immediate surrounding, especially in the erosion prone areas and off-site downstream catchment.
Reversibility	Short term and partially reversible	Soils can recover after a period of time when this impact is mitigated by appropriate measures.
Persistence	Temporary effect but can be permanent	Resulting from improper management of storm water and runoff from the road especially in the steep sloped sections.

During operation, the road cross-drainage structures and side-drains that will be provided for management of runoff and storm water, but these could also inadvertently cause soil erosion. Directing the storm water into nearby farms and fields may result into unintended soil erosion on those farms. This is more so for the steep-sloped section of the road where the storm water will quickly gain momentum due to gravity. Similarly, side drains in erosion prone sections could lead to enhanced scouring thereby triggering gully erosion.

The project crosses some unstable sandy soils especially across lower Nyakach where there is extensive sand mining especially along road embankments. Sand mining is likely to escalate as a consequence of paved all weather road offering easy access to the area. This escalation could enhance land degradation and could specifically undermine the road embankments. This could be mitigated by more stringent regulation of sand harvesting and lining certain sections of the embankment with concrete or riprap. Other impacts on soil resources relate to enhanced soil erosion along sections with rugged terrain, mostly south of Mbita i.e. contract 5.

#### Mitigation measures

- Erosion control measures are already proposed in the design whereby all side ditches susceptible to scour or erosion will be lined with rip rap and a schedule is provided in the book of drawings.
- Line side-drains with concrete or by stone pitching in erosion prone soils to avoid gully formation
- Conduct sustainability training to sand harvesters and transporters within Sango Rota loop to understand the perils of undermining road embankments and mining within the road reserve



• KENHA could develop and gazette road reserve regulations that prohibits soil, gravel and sand mining within any road reserve unless for road works.

## 13.5 Noise Pollution

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Impact relates to noise pollution occassioned by increased traffic in the project area in relation to the sensitive receptor areas.
Type of impact (TI)	Direct	On the occupants in the sensitive receptors in the areas.
Intensity (I)	Low	Incidents of traffic noise beyond the ambient levels will be isolated depending on the proximity of the receptor to the road.
Extent	Localized	To the specific receptors.
Reversibility	Long term and partially reversible	For as long as the road will be operational, the noise associated with road use will always be there. Regulation can be enforced to limit impact to the sensitive receptors.
Persistence	Longterm effect	Traffic noise will last the lifetime of the road project.

Noise associated with the proposed road development in the area will be permanent and dependent on the traffic volumes along various sections. The noise will originate from the four main sources discussed below:

#### a. Vehicle Noise

Vehicle noise will come from the engine, transmission, exhaust, and suspension, and is greatest during acceleration, during engine braking, on rough roads, and in stop-and-go traffic conditions. Poor vehicle maintenance is a contributing factor to this noise source.

#### b. Road Noise

Frictional noise from the engine reving, contact between tyres and pavement contributes significantly to overall traffic noise. The level depends on the type and condition of tyres and pavement. Frictional noise is generally greatest at high speed and during quick braking.

#### c. Driver and Crew Behaviour

Drivers and public service vehicle (PSV) crew contribute to road noise by blarring their vehicles' horns, by playing loud music, by shouting at each other, and by causing touting. This is common in populated market centres and urban areas especially at the bus stops.

#### d. Road Maintenance

Road maintenance generally requires the use of heavy machinery, and although these activities may be intermittent and localized, they nevertheless contribute tremendous amounts of sustained noise during equipment operation. These can degrade the human welfare and disrupt noise sensitive areas like schools and hospitals.

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#### Mitigation Measures

- The road should be maintained regularly
- Encourage sensitive institutions such as schools and health centres to plant trees along their • boundary with the new road to act as a noise buffer
- Where possible the bus stops should be sited at a reasonable distance (>200m) from the sensitive receptors

### 13.6 Forested Hills

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Impacts relate to increased exploitation and possible degradation of the forested hills within the project area. Such areas include Gwassi hills and forest, Nzalagobe, Samia, Funyula, Homa, Ruri and Gembe Hills.
Type of impact (TI)	Indirect	To the hills and forest ecosystems that may be exploited and degraded.
Intensity (I)	Low - Medium	The impacts on the hills and forests will be low on already degraded hills such as Nzalagobe hills and medium on the hills that still have pockets of natural vegetation and have ecological significance such as Gwassi and Gembe hills.
Extent	Localised	Localised to the hills and forests.
Reversibility	Long term and partially reversible	The mature species that are susceptible to exploitation take long to regenerate and thus loss of biodiversity may occur. However, reafforestation may be done to mitigate the impact.
Persistence	Partially permanent effect	Demand for forest products will last through the project lifespan.

Although natural vegetation in the forests have been exploited, pockets of natural vegetation are still available in the Gwassi forest. These hills are biodiversity hotspots which contain indigenous species. However major degradation has been reported to occur in the Gwassi hills and consequently to the Gwassi forest.

Gwassi hills for instance contain some rare and threatened species which are only found in Uganda's Sese Island. Construction of the road through this area may improve accessibility to this forest and result in the degradation of the forest further. There are species that can be exploited for charcoal and timber like Acacia polycantha, Acacia lahai, Prunus africana, Olea africana and Tamarindus indica may be heavily exploited considering that there will be access to the forest and the hills.

Accelerated degradation of the hill may affect the streams and rivers that originate from the hills thereby affecting the water economy of the area. Dysfunctional catchment may also affect the ecology of Ruma National Park.

Other hills within the project environment like Nzalagobe, Samia, Funyula, Homa, Ruri and Gembe Hills although currently degraded may also experience accelerated degradation as a result of improved accessibility allowing more people to access the resources therein.

It is possible that the low levels of exploitation of natural vegetation in hilly areas and other sections of the project that run through rough undulating terrain could be attributed to access challenges to these areas due to poor roads. Increased access to hills like Gwassi will therefore expose them to exploitation beyond the present scale. With attention of tree poachers and timber merchants shifting to these ecosystems there are possibilities of accelerated degradation due to ease of access for people to harvest trees for timber, poles, charcoal or to create room for settlement or agricultural production.

The road is also expected to cause substantial increase in commercial fishing activities within the area. With a good road serving the region it is anticipated that more people accessing the beaches will cause marginal increase in fish demand and increased fish prices. Increased demand and price will result in an increase in fishing intensity, accompanied by an increase in fish processing activities such as fish smoking. Since fish smoking primarily depend on use of firewood, the process will have a direct implication on tree species like *Rhus nutalensis* which are preferred in fish smoking.

On the other hand, the construction of the road may boost tourism in the area by making the area more accessible therefore generating revenue within the local economy. Creation of employment for the locals in the area as well as improved monitoring and patrolling of the area by the Kenya Wildlife service are also potential beneficial impacts. The negative impacts will be low to medium and restricted to the operational phase of the project.

#### Mitigation measures

Since this will be an indirect impact on vegetation, the responsibility of mitigating it may not lie with the client. However, other concerned institution like respective departments of the County Governments (environment, fisheries) and KFS can initiate the following measures:

- The community should be educated on the need to conserve the environment in order to • reduce cases of overexploitation
- Control, restrict and/or regulate access to and harvesting of forest products from Gwassi forest • and other pockets of forests
- Vehicle checks should be introduced to monitor movement of forest products to discourage illegal exploitation of forest resources within the area
- For long term strategy the institutions concerned could propose gazettement of Gwasi Forest as gene banks to preserve them for future generation.
- Fishing community members should be informed of the need to explore alternative tree species for fish smoking to reduce potential threat to Rhus nutalensis

## 13.7 Air Quality

Impact characteristics	Rating	Description
Nature of impact (NI)	Negative	Impact relates to air pollution as a result of vehicular emissions such as $CO_2$ during the operation phase of the project. The emissions will be widespread, but will be of concern to the

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Type of impact (TI)

Intensity (I)

Indirect

Low

sensitive receptors (schools, health facilities, market centres and offices) within the project areas. The emissions will also contribute to the greenhouse gases in the atmosphere.
Increased emission in the atmosphere will have an incremental contribution to the atmospheric degradation and climate change effects.
Incremental traffic is expected, however, the overall contribution of new emissions to changes in air quality is not expected to be significant.
Besides, the project area is mostly open country with moderate to strong winds that could facilitate rapid dispersal of air pollutants.

		to strong winds that could facilitate rapid dispersal of air pollutants.
Extent	Disperse	Typically emissions and the greenhouse gases can only be of significant impact if it is dispersed to the atmosphere or could affect locally if concentrations are high.
Reversibility	Long term and partially reversible	The effects from the operation phase are long term through the life span of the project and can be partially reversed by proper mitigation measures, including eliminating unroadworthy vehicles that have slightly higher emissions.
Persistence	Long term effect	Through the project lifespan but low and almost insignificant.

Whereas air quality is expected to slightly increase along the entire alignment during the operation phase, this increase will be restricted to within 200m of the corridor and is estimated to be very low. This low impact rating is because of the mostly open country with moderate to strong winds that will facilitate rapid dispersal of air pollutants. Conversely the medium to large urban centres, notably Port Victoria, Nyamonye (Kadimu), Usenge, Asembo Bay, Kisumu, Katito, Kendu Bay, Homa Bay and Mbita are all served by paved roads so incremental traffic is expected to be minor. We would rate air quality related impacts to be insignificant. On the other hand, the urban centres that are currently served by unpaved roads namely, Sio Port, Nyandiwa, Sindo, Sori and Muhuru Bay are expected to experience significantly increased traffic hence higher incremental air quality pollutants. This air quality impact is rated low in the immediate future to medium in the long term.

#### Mitigation measures

Mitigating impacts during the operation phase is challenging. This is because increase in traffic volumes across all the project roads is inevitable and dependent on extraneous factors such as the overall performance of the economy. This impact is therefore considered permanent within the context of the current fuel sources for the internal combustion engines that are still the dominant types of motor vehicles on Kenyan roads. This state of affairs is likely to persist in the medium term.

## 13.8 DECOMMISSIONING PHASE

The LVRR project is expected to be in operation for several years and therefore decommissioning is not anticipated to happen in the near future but should this happen all the positive impacts mentioned in this report would be reversed to be negative. Other negative impacts during decommissioning may include:





- Waste generation
- Noise pollution
- Dust and exhaust emissions
- Occupational hazards .

Positive impacts may be realised during decommissioning phase. They may include :

- Rehabilitation of the whole area •
- **Employment opportunities** •

#### 13.8.1 Camp Site and Asphalt Plant

The Environmental impact assessment reports that will be produced for the camps, asphalt plants, quarries and all other facilities that falls in the second category of the EMCA regulations are expected to spell out in details the proposed decommissioning plan for each facility. KENHA is expected to review these EIA reports to ensure the minimum standards are met.





#### CLIMATE CHANGE AND POTENTIAL IMPACTS 14 **ON PROJECT AND PROJECT ADAPTATIONS**

### 14.1 Climate change scenario

#### 14.1.1 Temperature

According to the Kenya National Climate Change Response Strategy, climate change is already being experienced in Kenya. For example From the early 1960s, Kenya has experienced generally increasing temperature trends over vast areas. Over the inland areas, the trends in both minimum (night/early morning) and maximum (daytime) temperatures depict a general warming (increasing) trend with time. However, the increase in the minimum temperatures is steeper than in maximum temperatures. The result of the steeper increase in minimum temperature and a less steep increase maximum temperature is a reduction in the diurnal temperature range (difference between the maximum and minimum temperatures (Table 15-1 & Table 15-2).

#### Table 15-1: Minimum Temperature trend from 1960 – 2010

Region	Trend	Magnitude (0)
Western	Increase	0.8-2.9
Northern & North- Eastern	Increase	0.7-1.8
Central	Increase	0.8-2.0
South Eastern Districts	Increase	0.7-1.0
Coastal Strip	Decrease	0.3-1.0

#### Table 15-2: Maximum Temperature trend from 1960 – 2010

Region	Trend	Magnitude (0)
Western	Increase	0.5-2.1
Northern & North- Eastern	Increase	0.1-1.3





of

Central	Increase	0.1-0.7
South Eastern Districts	Increase	0.2-0.6
Coastal Strip	Increase	0.2-2.0

The Table above clearly indicates that the Western region of Kenya has the highest mean increments of minimum and maximum temperatures compared to the rest of Kenya over the past 50 years. With continued emission of greenhouse gasses (GHGs) the trend may continue into the future.

#### 14.1.2 Rainfall

Neutral to slightly decreasing trends are manifested in the annual rainfall series over most areas of Kenya. This is mainly due to an associated general decline with time of rainfall in the main rainfall season of March-May (the 'Long Rains') over most areas.

There is a general positive trend (increase) in rainfall events of September to February period suggesting a tendency for the 'Short Rains' (October-December) season to be extending into what is normally hot and dry period of January and February over most areas. This may be attributed to possibly more frequent occurrences of El-Niño events occasionally coupled with relatively warmer sea surface temperatures over the western Indian ocean (along the coast of east Africa) and relatively cooler than average sea surface temperatures (SSTs) to the east of the Indian Ocean. This sea surface temperature pattern is conducive for enhancing rainfall over the country. Even in the absence of El-Niño conditions, this pattern over the Indian Ocean results into heavy rainfall during the 'Short Rains' season as was the case in 1961-62 and the recent 2006-07 rainfall events.







#### Figure 4: Predicted precipitation changes with climate change

The figure above provides predictions in changes that are expected in precipitation to year 2025. The predictions indicate that the western region could experience a reduction in rainfall by upto 50mm or an increase of similar magnitude.

Furthermore, and in general, annual highest rainfall events indicate the 24-hour intense rainfall amounts observed in the recent years are relatively lower than those in the early 1960s. Effectively, these values have been reducing (negative trend) with time.

To assess all possibilities of climate change impacting on the project we conducted a screening procedure on all relevant climate related factors to assess climate related risks. The initial screening has been done by filling in a checklist (Table 15-4). Risks considered are those resulting from temperature increase, precipitation change, wind speed change, sea level rise, solar radiation change, water availability, flooding, tropical storms, wildfire and landslide.

Environmental Factors	Risk To Project
Temperature increase	Low
Wildfire	Low
Precipitation increase	medium - high

#### Table 15-3: Climate Risk Screening



of

Flood	medium - high		
Landslide	Low		
Precipitation decrease	insignificant		
Wind speed increase	Insignificant		
Sea level rise	-		
Solar radiation change	Insignificant		

The project scores low to insignificant on all accounts except with regards to precipitation and flooding which are projected to be medium to high.

## 14.2 Potential Impacts

As can be seen from the preceding sections, climate change could lead to increase in temeperature of up to 2 °C and either an increase or decrease in annual rainfall of about 50mm. Whereas these changes appear small, what are critical are the extreme weather events that will accompany climate change. These extreme events could manifest in heavy rainfall similar to the el nino rains. Potentially therefore impacts associated with drainage could be significant. The risk from landslides is also likely to increase especially along sections such as Kadianga loop which are susceptible to damage by flooding/ landslides due to the dominant fragile sandy soil. These changes could impact the road directly through erosion of the road embankments, enhanced erosion, over-topping bridges and culverts.

Nonetheless the design has adopted drainage structures capacity that should accommodate any changes in flows expected with 50mm increase in precipitation over 50 years within the lake basin The following section presents details of climate change adaptation as contained in design.

## 14.3 Climate Change Adaptation Measures

The project drainage catchment lies in the Lake Victoria catchment that includes the western highlands of the rift valley, the Mt. Elgon ecosystem, Kisii highlands and local catchments within the lake basin. The relief is sharp along the highland slopes with numerous perennial streams descending in deeply incised valleys separated by long narrow ridges that later give way to plains on the downstream approach to the lake.

The flood frequencies used in the design of road drainage structures are as follows:

Туре	Return Period (years)
All bridges in the main alignment (only exceptional interruption of service allowed)	1 in 100 years checked against 1 in 200 years
Box culverts	1 in 50 years flood, checked for overtopping



	against 1 in 100 year flood. Invert to be a minimum of 1.5D below the road surface.
Pipe culverts and side drains	1 in 10 year flood, check for overtopping against 1 in 25 year flood

It is our opinion that with the prediction of slight reduction or increase of rainfall in the lake region, the design factors are sufficient to accommodate future changes in flows. As mentioned earlier a 24 hour intense rainfall appear to be still lower that those recorded in the 1960s but even if they exceed the design was for 1 in 100 years flood for both bridges and culverts. In this regard we do not expect that the drainage structures would be inadequate within the design life of the road. However it is critical that KENHA monitors the rainfall patterns in the areas and where necessary adjust the capacity of the structures accordingly.





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#### CONCLUSIONS AND RECOMMENDATIONS 15

The findings of this Environmental and Social Impact Assessment indicate that the overall impact of the Lake Victoria Ring Road project is positive on the socio - economics of the project. However as expected for such large scale projects, land acquisition is inevitable in some sections especially along Contract 3. In some cases land acquisition involves relocating families and businesses and hence social consequences tend to be high. This is the only potential impact that is rated high. There are some potential negative impacts on the bio – physical environment with the impacts on fish resources, vegetation, soil resources, and wetlands all rated moderate. The other potential impacts are expected are considered low both during the construction and operational phases of the project. However, all the impacts rated moderate to low can be sufficiently mitigated using the measures that have been proposed in this report.

There are also positive environmental impacts of the road as well. The most significant is the proposed bridge across Lake Kanyaboli. For years the current crossing has been, to some extent, a barrier to ecological interactions between a section of the swamp and Lake Victoria. The bridge will replace the existing causeway and this is expected to improve the ecological health of Lake Kanyaboli. On the other hand the road may open up the wetland to potential over exploitation of the resources therein such as papyrus reeds and fish. In the same light the wide array of fish found in the lake could also be subjected to overfishing thus compromising on the lake's role as refugia of fish diversity. The other positive environmental impact is the overall drainage design that has used 100 year design period for bridges and box culverts. This design is even an adaptive mechanism to climate change in the event that the projected climate change will increase precipitation by 50 mm by year 2050 as predicted for the region.

The project crosses some unstable sandy soils especially across lower Nyakach contract 4, where extensive sand mining occurs along road embankments. Sand mining is likely to escalate as a consequence of the paved all weather road offering easy access to the area. This escalation could enhance land degradation and could specifically undermine the road embankments. This can be mitigated in the short term by lining certain sections of the embankment with concrete or riprap. However, as a long term measure, KENHA should gazette regulations that expressly prohibit all mining activities within all road reserves unless for use in road maintenance. Other impacts on soil resources relate to enhanced soil erosion along sections with rugged terrain, mostly south of Mbita i.e. Contracts 5 and 6.

It is estimated that about 384 ha of vegetation cover will be permanently lost to road pavement. This excludes sections that are have existing roads that will only require upgrade. We have proposed compensatory tree cover to be undertaken in conjunction with the Kenya Forst Service. Impacts on faunal resources are expected to be low but there could be impacts on the threatened sitatunga antelope in Yala Swamp if the road will encourage poaching. The seasonal emergence of the swarming insect Chaoborus spp (locally called sam) can be a road safety concern to motorists once the road is completed. It is recommended that KENHA designs a suitable cautionary road sign for motorists.

Indirect off-site impacts relate to vegetation resources that are presently in remote hard-to-access highlands in Migori County. Access to these vegetation resources will be improved and this could lead to enhanced exploitation. Similarly enhanced access to beaches especially in Migori county has the potential to encourage over-fishing in the long term. A pro-active harvesting control of these resources should be seriously considered by relevant agencies.

#### Draft Feasibility Study and Preliminary Design



Rapid environmental screening was done for material sites namely Borrow Pits, Sand Pits and Quarries. The project area is a densely populated rural country hence adverse social impacts consistently rank high for nearly all sites. Volume 2 of this report provides a rapid environmental and social appraisal of all material sites identified during design. From environmental considerations, 62 borrow areas appear suitable while 13 were not recommended while one sand pit out of 10 was not considered suitable. The contractor is expected to undertake a comprehensive ESIA study for each quarry.

Resettlement Action Plan (RAP) for the project that has been developed alongside this ESIA proposes measures and actions that will sufficiently address land acquisition and relocation issues. The overall conclusion is that the mitigation measures proposed for the various potential negative impacts should be implemented at all stages of of the project namely design, construction and operational phases. Bespoke Environmental and Social Management Plan (ESMP) that aims to ensure mitigation measures are taken up during construction is presented in Volume 2 of the ESIA report. Implementation of the safeguard measures proposed therein should be strictly enforced during construction.





## 16 REFERENCES

- Abila, R. Marta Barluenga, Johanness Engelken, Axel Meyer and Walter Salzburger (2004): Population – Structure and Genetic Diversity in a Haplochromine Cichlid of a Satellite Lake of Lake Victoria. In: Molecular Ecology. 13. Pp. 2589–2602.
- Abila, R.O. (2003): A Socio Economic Study of the Yala Swamp Fisheries. Paper presented at ECOTOOLS Scientific Workshop on Yala Swamp. Switel Hotel, Bondo, Kenya. 9th–10th December, 2003.
- Aloo, P.A. (2003): Biological Diversity of the Yala Swamp Lakes, with Special Emphasis On Fish Species Composition, in relation to changes in the Lake Victoria Basin (Kenya): threats and conservation measures. Biodiversity and Conservation, 12. Pp. 905 – 920.
- Crafter, S.A., S.G. Njuguna and G.W. Howard (eds) (1992): Wetlands of Kenya. Proceedings of the KWWG Seminar on Wetlands of Kenya. National Museums of Kenya. Nairobi, Kenya, 3–5 July, 1991. Pp. viii and 183.
- 5. Froese, R. and Pauly, D. (eds). 2003. FishBase. World Wide Web electronic publication. Search
- 6. IUCN. 2006. *IUCN Red List of Threatened Species*Kenya County Fact Sheets Commission on Revenue Allocation, June 2013;
- 7. KNBS, Socio Economic Atlas of Kenya;
- 8. KNBS, Kenya population census, 2009.
- 9. EGIS, Preliminary Design of Lake Victoria Ring Roads
- 10. Republic of Kenya, Homa Bay County Integrated Development Plan; 2013 2017
- 11. Republic of Kenya, Kisumu County Integrated Development Plan; 2013 2017
- 12. Republic of Kenya, Siaya County Integrated Development Plan; 2013 2017
- 13. Republic of Kenya, Busia County Integrated Development Plan; 2013 2017
- 14. The Lake Region Economic Blueprint, A better life
- 15. A preliminary Plan for Integration of the Lakefront in the City of Kisumu Kenya, 2013.
- 16. A review of existing Knowledge on Policy Gaps, Priorities of the fishing Communities and Resource Management Challenges of Lake Victoria.
- 17. A survey into the Management and Use of Wetlands in Kenya, Kenya Land Alliance, 2006.
- 18. Appropriate Rural Development Agriculture Program (ARDAP) Strategic Plan 2011-2016.
- 19. Busia County Department of Community Development, Sports, Culture and Social Services; Strategic Plan (2014-2018).
- 20. Busia County Integrated Development Plan (2013-2017)
- 21. Community Based Approach to the Management of Nyando Wetland, Lake Victoria basin Kenya, 2012.
- 22. County Stakeholders Consultative Workshop on the Development of the National Climate Change Response Strategy's Action Plan, 2012.
- 23. Journal of Wetlands Ecology- Dunga Swamp and its Conservation in Kenya.

#### Draft Feasibility Study and Preliminary Design



- 24. Kenya Vision 2030 Gorvernors Tool Kit- Migori County, 2013.
- Kenya Vision 2030 Governors Toolkit; Kisumu County ,2013
- 26. Lakes, Reservoirs and Ponds; Lake Victoria and the Common Property Debate: Is the Trgaedy of the Commons a Threat to its Future? 2013.
- 27. Population Dynamics, Environment and Sustainable Development in Siaya County- Population Action International.
- 28. Population Dynamics, Environmental and Sustainable Development in Homabay County-Population Action International.
- 29. Population Dynamics, Environmental and Sustainable Development in Kisumu County- Population Action International.
- 30. Program for Agriculture and Livelihoods in Western Communities; Busia County, 2012.
- 31. Rapid Assessment of the Yala Swamp Wetlands, 2006.
- 32. Republic of Kenya, Ministry of Environment and Mineral Resources, National Environment Management Authority;
- 33. Busia District Environment Action Plan (2009-2013).
- 34. Siaya County Integrated Development Plan 2013/2017.
- 35. Strategic Urban Development Plan for Homabay Municipality (2008-2030);
- 36. Strategic Planning for Environmental Governance and Poverty Alleviation.
- 37. The Dying National Wetland- Case Study of Yala Swamp Beyond 2020.
- 38. The Open Environmental Engineering Journal- The Impact of Land use Activities on Vegetation Cover and Water Quality in the Lake Victoria Watershed, 2011.
- Yala Swamp Important Bird Area: Conservation Management Plan, 2009
- 40. GoK (2010c): The Constitution of Kenya, 2010.
- 41. The National Poverty Eradication Plan (NPEP)
- 42. Kenya National Aids Strategic Plan (KNASP III)
- 43. The National Policy on Gender and Development
- 44. Kenya County Fact Sheets June 2013
- 45. National Land Policy (2009)
- 46. National Gender and Development Policy, 2000
- 47. National HIV Policy (GoK, 1997)
- 48. Draft National Policy on Peace Building and Conflict Management (2006)
- 49. Employment Act
- 50. Vision 2030 Second Medium Term Plan (2013-2017)
- Kisumu County Second Medium Term Plan (2013-2017)
- Kisumu Millennium City Strategic Plan



- 53. GoK (2008b): Vision 2030: A Globally Competitive and Prosperous Kenya, Ministry of State for Planning, National Development and Vision 2030.
- 54. GoK (2000): National Gender and Development Policy
- 55. GOK, Kenya National Housing Survey 2012/2013
- 56. Homa Bay County Integrated Development Plan 2013 2017
- 57. Kisumu County Integrated Development Plan
- 58. Migori County Integrated Development Plan 2013 2017
- 59. Siaya County Integrated Development Plan 2013 2017
- Republic of Kenya (1999). The Environmental Management and Co-ordination Act, No. 8 of 1999. Government Printer, Nairobi.
- 61. Republic of Kenya (2003). Legislative Supplement No. 31, Legal Notice No. 101: The Environmental (Impact Assessment and Audit) Regulations, 2003. Government Printer, Nairobi.
- 62. Republic of Kenya. Laws of Kenya: Employment Act No 11 of 2007. Government Printer, Nairobi.
- 63. Republic of Kenya. Laws of Kenya: Labour Institutions Act No 12 of 2007. Government Printer, Nairobi.
- 64. Republic of Keya. Laws of Kenya: Land acquisition Act, Cap 295. Government Printer, Nairobi.
- 65. Republic of Kenya. Laws of Kenya: Public Health Act, Cap 242. Government Printer, Nairobi.
- Republic of Kenya. Laws of Kenya: Public Roads and Roads of Access Act, Cap 399. Government Printer, Nairobi
- 67. Republic of Kenya. Laws of Kenya: Traffic Act, Cap 403. Government Printer, Nairobi.
- 68. Republic of Kenya. Physical Planning Act, CAP 286. Government Printer, Nairobi.
- 69. Republic of Kenya. The Occupational Health and Safety Act 2007.
- 70. Kenya gazette supplement Acts Water Act, 2002. Government printer Nairobi
- 71. Kenya gazette supplement no 56. Environment Impact Assessment and Audit Regulations 2003.
- 72. Kenya gazette supplement Acts Land Planning Act (Cap 53), Government printer Nairobi
- 73. Kenya gazette supplement Acts Penal Code Act (Cap 63), Government printer Nairobi
- 74. Kenya gazette supplement Acts Physical Planning Act, 1999, Government printer Nairobi
- 75. Kenya gazette supplement Acts Public Health Act (Cap 242), Government printer Nairobi

# **ANNEX 1** FISH CONSERVATION STATUS

# ANNEXE 1: CONSERVATION STATUS, FEEDING AND EATING HABITS AND THREATS TO SELECTED FISH SPECIES

Species	Common name	IUCN Conservatio n Status	Habitat	Food	Threat	Breeding
Oreochromis esculentus	Singida Tilapia	Critically Endangered	Confined to water less than 20 m deep and was most abundant in sheltered gulfs and bays where the bottom is composed of soft algaceous mud	Plankton	Predation, competitive exclusion and ecological displacement by introduced fishes	Reproduction often triggered by the onset of rain with the time of maximum spawning activity coinciding with the wettest months of the year. Breeding fish are found throughout the year. Females brooding eggs often move off to the shelter of macrophyte beds or swampy area
Haplochromis (xystichromis)	Christmas Fulu	Endangered	Over sandy substrate in the littoral zone	Plants phytophagus	Hybridization due to decreased water transparency interfering with mate recognition visual cues. An additional threat is predation by Nile Perch.	Mouth brooders
Brycinus jacksonii	Victoria robber (soga)	Endangered	Inhabit quiet parts of rivers	Feeds on small fishes and invertebrates including snails and chironomid (lake fly) pupae and plants.	Water turbidity and siltation as a consequence of erosion and farming extension on the watersheds	Breeding biology not well known

Species	Common name	IUCN Conservatio n Status	Habitat	Food	Threat	Breeding
Paralabidochr omis dichrourus	_	May now be Extinct	Littoral zone, the sub-littoral zone and off shore, over sand and mud.	Fish	Predation by Nile Perch (a potentially reversible threat). It is also potentially threatened by hybridization due to decreased water transparency (on account of eutrophication and erosion leading to increased sedimentation and runoff) interfering with mate recognition visual cues	Peaks at the end of rainy season
Oreochromis variabilis		Critically endangered	Exposed and sandy shores where there is considerable water movement. It also occurs in the calm waters of water lily swamps.	Young fish feed on planktonic algae and may ingest small copepods. Adults feed predominantly on bottom algae but they also feed directly on plankton and may graze algae from rocks and aquatic plants	Predation, competitive aggression and ecological displacement by introduced fish species. Its current distribution is highly fragmented and its remaining habitat continues to be degraded and it is subject to heavy fishing pressure.	Brooding females have been caught in rushes and among vegetation at the edge of the lake. It spawns on firm sand habitat. Breeds during the rainy seasons

Species	Common name	IUCN Conservatio n Status	Habitat	Food	Threat	Breeding
Synodontis victoriae	Lake Victoria Squeaker	Near threatened	It occurs in shallow river over both hard and soft substrates, but is more common over soft bottoms	It feeds mainly on small gastropod molluscs (snails and slugs), as it is able to extract the flesh of the snails without crushing their shells. It also feeds on insects, among which chironomid (lake fly) larvae predominate	Regression of marginal reeds around rivers and lakes due to extension of agriculture; undersized fishing nets; siltation and water pollution; and predation and competition in Lake Victoria.	Spawning frequency is two seasonal peaks per year and distinct pairing during breeding. They are nonguarders (do not protect their eggs and offspring after spawning) and breeds in open water/substratum
Chuloglanis cf. somereni	Upside down catfish, synolace catfish, suckermo uth catlet,squ aker	Endangered	Live in small groups near the bottom of moderately fast flowing muddy or rocky bottomed rivers	Algal grazer	Sedimentation from forestry and agricultural activities, water extraction resulting in reduced or no flows, introduced alien fish	Breeds during the rainy season and site not specified

Species	Common name	IUCN Conservatio n Status	Habitat	Food	Threat	Breeding
Haplochromis maxilaris	Victoria tilapia	Vulnerable	Over sand and mud in the littoral and sub-littoral zone	Peadophage (consumes the young of other species).	Predation by Nile Perch (a potentially reversible threat). It is also potentially threatened by hybridization due to decreased water transparency (on account of eutrophication and erosion leading to increased sedimentation and runoff) interfering with mate recognition visual cues	Breeds during the rainy season
Paralabidochr omis chilotes	_	Least Concern	Littoral and sub- littoral zone where the substrate is firm (sand, rock)	Insects	Hybridization due to decreased water transparency (on account of eutrophication and erosion leading to increased sedimentation and runoff) interfering with mate recognition visual cues. An additional threat is capture as bait for long line fishery	Two peak rainy seasons of March to August and October to December
Species	Common name	IUCN Conservatio n Status	Habitat	Food	Threat	Breeding

Astatoreochro mis allaudi	Alluaud's haplo	Least concern	Over all substrates in the littoral zone (along rocky shores, over sand and over mud	Molluscs	Hybridization due to decreased water transparency (on account of eutrophication and erosion leading to increased sedimentation and runoff) interfering with mate recognition visual cues. An additional threat is predation by Nile Perch.	-
Oreochromis Niloticus	Nile tilapia	Not evaluated	Freshwater and brackish (where fresh water meets sea water e.g. estuaries) habitats	Phytoplankton, periphyton, aquatic plants, small invertebrates,	_	Breeding fish more frequent twice a year: main peak occurred during January–March and a secondary one occurred during July– September.
Clarias gariepinus	African Catfish	Least Concern	Quiet waters, lakes and pools and prefer rather shallow and swampy areas with a soft muddy substrate and calm water.	Insects, plankton, invertebrates and fish but also take in young birds, rotting flesh and plants.	_	Reproductive activity occurred during the rainy months of March – June

Species	Common name	IUCN Conservatio n Status	Habitat	Food	Threat	Breeding
Protopterus aeopithecus	Marbled Lungfish	Status not established	River and lake fringes, swamps and floodplains. Juveniles are found in the matted roots of papyrus	Molluscs, small fishes and insects	_	Breeding generally occurs during flood season
Aplocheilichth ys pumilis	Tanganyik a Lampeye)	Least concern	River mouths, coastal swamps, estuaries and other shallow parts of the lake	algae, fish scales, termites, chironomid larvae, prawns and copepods	_	
# **ANNEX 2** BIRD CONSERVATION STATUS

# ANNEXE 2 : CONSERVATION STATUS, FEEDING AND EATING HABITS AND THREATS TO SELECTED BIRD SPECIES

Species	Common name	IUCN Conservation Status	Habitat	Food	Threat	Breeding
Chloropeta gracilirostris	Papyrus Yellow Warbler	Globally Threatened/ vulnerable	Papyrus swamps, marshy areas	Tiny insects	Drainage and human exploitation of its papyrus swamp habitat	Breeding condition between April and June
Anthus cinnamome us	Grassveld Pipit	Vulnerable	Grassland, including fallow fields and other agricultural land	Small invertebrates, also seeds and other vegetable matter	Poisoning and habitat degradation	May- June
Ardeola idae	Madagascar pond- heron	Endangered	Freshwater wetlands, particularly shallow water bodies fringed with vegetation and adjacent trees	Fish, insects and small invertebrates	Habitat loss as a result of clearing, drainage and conversion of wetland habitats to rice fields	At the start of rains on trees and bushes in or near to marshes, lakes or ponds
Balearica regulorum	Grey-crowned Crane	Endangered	Wetlands such as marshes, pans and dams with tall emergent vegetation, riverbanks, open riverine woodland, shallowly flooded	Seed heads (e.g. of sedges <i>Cyperus</i> spp. ), new tips of grasses, agricultural pulses, nuts and grain, insects ( <i>Orthoptera</i> , larval	Loss and degradation of wetland breeding areas through drought-related changes in land-use, drainage and	Year round with peaks in the wet periods (Aprl-May; Nov-Dec) in tall emergent vegetation

Species	Common name	IUCN Conservation Status	Habitat	Food	Threat	Breeding
			plains and temporary pools with adjacent grasslands, open savannahs, croplands, pastures, fallow fields and irrigated areas	<i>Lepidoptera</i> ), frogs, lizards and crabs	overgrazing	
Lophaetus occipitalis	Long crested eagle	Least concern Globally but is Threatened in L. Kanyaboli	Wooded areas, particularly in the vicinity of marshes, wetlands, and rivers, and they also occur in exotic tree plantations and agricultural areas	Rodents, small birds, lizards, arthropods, fish, wild figs and mulberries	Degradation of wetlands. As a rodent eating species it is regarded locally as beneficial and therefore is little persecuted (Ferguson-Lees and Christie 2001).	Breeding season is year-round peaking from July to November, but it is probably related to changes in rodent populations, which is in turn linked to rainfall
Polemaetus bellicosus	Martial eagle	Vulnerable	Bushy grassland, thorn bush	Sizeable mammals, birds and reptiles	Shooting and trapping by farmers and indirect poisoning	Nests are built invariably in trees, at any height from 6 to 24m above ground and during both wet and dry seasons
Laniarius mufumbiri	Papyrus gonolek	Near threatened	Papyrus swamps and beds, in meandering river valleys and along lake-shores	Ants, beetles, weevils, small flies, bees, caterpillars, snails	Drainage, burning and the over- exploitation of wetlands	February in Kenya

Species	Common name	IUCN Conservation Status	Habitat	Food	Threat	Breeding
Limosa limosa	Black-tailed godwit	Near threatened	Lowland wet grasslands, grassy marshland	Adult and larval insects (especially beetles), annelid and polychaete worms, molluscs, ragworms, crustaceans, spiders, fish eggs, and the spawn and tadpoles of frogs	Loss of nesting habitat owing to wetland drainage and agricultural intensification, poisoning	April to mid-June. Nest is placed on the ground in short, often luxurious vegetation
Calidris ferruginea	Curlew Sandpiper	Near threatened	Muddy edges of marshes, large rivers and lakes (both saline and freshwater), irrigated land, flooded areas	Worms, molluscs, crustaceans (such as amphipods, brine shrimps and copepods), and occasionally insects and seeds	Habitat degradation	Muddy edges of marshes, large rivers and lakes, irrigated land, flooded areas
Glareola nordmanni	Black-winged pranticole	Near threatened	Seasonally wet grasslands, savannahs, and sandbanks along large rivers	Epigeic (crawling) and airborne insects, particularly swarming species (Hockey <i>et</i> <i>al.</i> 2005). It takes locusts, orthopterans and coleopterans as well as wasps, bees, dragonflies, ants, termites, flies, and cockroaches	Changing land-use practices	Open ground, usually near water

Species	Common name	IUCN Conservation Status	Habitat	Food	Threat	Breeding
Cosmerodius albus	Great Egret	Regionally threatened	Freshwater, brackish, and marine wetlands. During the breeding season they live in colonies in trees or shrubs with other waterbirds.	Fish, amphibians, reptiles, birds, small mammals and invertebrates such as crayfish, prawns, shrimp, polychaete worms, isopods, dragonflies and damselflies, whirligig beetles, giant water bugs, and grasshoppers	_	Breeding season begins in mid-April. Average time to hatching 23-24 days
Turdoides sharpei	Sharpes pied babbler	Least Concern	Forest-edge thickets and scrub, wooded plains and acacia savannah, dense bushland, riverine woodland	Mainly invertebrates, also small reptiles and small fruits	The population is suspected to be in decline owing to ongoing habitat destruction and fragmentation	March–December in Kenya. Co-operative breeder.
Nectarinia erythrocerca	Red chested sunbird	Least Concern	Edges of rivers	Nectar, insects, and spiders (Araneae)	Reclamation of their habitat for farming and settlement, burning for fishing lungfish and paving access roads for sand harvesting, overharvesting of papyrus for crafts making and	Breeds in the wet season This timing reflects the increased availability of insect prey for the growing young.

Species	Common name	IUCN Conservation Status	Habitat	Food	Threat	Breeding
					overgrazing	
Ploceus castanops	Northern brown throated weaver	Least Concern	Waterside vegetation along lakes and rivers, particularly papyrus and ambatch	Seeds, including millet; also insects	Wetland reclamation for agriculture	Breeds in all months, with peak egg-laying March–May and September
Serinus koliensis	Papyrus canary	Least Concern	Almost entirely restricted to papyrus at 900–1600 m	Mostly seeds of papyrus and small seeds from adjacent cultivations	Habitat destruction	March–August
Cisticola carruthersi	Carruthers's Cisticola	Least concern	Tall papyrus swamps	Small insects	_	Breeds April–July ,during rains
Alcedo atthis.	Kingfisher	Least concern	Flooded grassland and savannah	Feeds on aquatic insects e.g. .dragonfly larvae and water beetles, small fish(stickle backs, minnows, small roach and trout		Mating begin from early April to early October
Bradypterus carpalis	White-winged Scrub-warbler	Least concern	Interior of dense papyrus swamps	Insects	_	Probably nests in April–June in Kenya
Scopus umbretta	Hamerkop	Least concern	Wetland habitats, including irrigated land such as rice paddies, banks of large rivers and lakes	Amphibians. They also eat fish, shrimp, insects and rodents.	The species is potentially threatened by a deterioration in wetland water quality caused by	All year round

Species	Common name	IUCN Conservation Status	Habitat	Food	Threat	Breeding
					the excessive use of pesticides	
Vanellus crassirostris	Long toed plover/ lapwing	Least concern	Lakes, pools, ponds and canals with floating vegetation. They also forage on marshes, in swamps, and in slow-flowing rivers, grass-covered floodplains, water meadows and on flooded rice fields.	Aquatic insects (dragonfly nymphs, ants, beetles), seeds	Not threatened, as it is naturally rare due to its specialised habitat requirements and has benefited from the spread of alien weeds, such as Kariba weed ( <i>Salvinia molesta</i> )	Egg-laying season starts at or just after peak flooding, lasting from April-October (mainly July- September)
Leptoptilos crumeniferus	Marabou stork	Least concern	Savannahs to riverbanks or lakeshores	Fish, bugs, frogs, snakes, mice and rats		Breeds during the dry season when water levels is low which makes it easier for them to catch frogs and fishes feed the young ones
Pelecanus onocrotalus	Great white pelican	Least concern		Fish, amphibians, turtles and crustaceans and occasionally birds	Fishing injuries, pollution by DDT,DDE etc	Breeding season commences in April or May Breeding ground is exclusively in scrapes on the ground lined with grass, sticks, feathers and other

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Species	Common name	IUCN Conservation Status	Habitat	Food	Threat	Breeding
						material
Ploceus cucullatus	Village weaver	Least concern	Savannahs, fields and gardens, open woodlands and nest in reed beds along rivers and streams			Egg-laying season is from August-April, peaking twice from September-October and from January- February
Phalacrocorax africanus	Longtailed cormorants	Least concern	Colonial nesters (using trees, rocky islets or cliffs)	Feed on fish, small eels, water snakes	Pollution, agriculture	Lays eggs on trees or grounds(always covered by long grass to hide the eggs) near water bodies during rainy seasons

# ANNEX 3 PROJECT LOCATION PLAN



# **ANNEX 4** LIST OF CENTRES ALONG THE ALIGNMENT



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# ANNEXE 4 : LIST OF CENTRES AND INSTITUTIONS ALONG THE ROAD

# LIST OF LEARNING CENTRES

of

Institution	State of the road
Bumala AC Secondary	Paved
Women's Academy	Paved
Victorine Education Centre	Paved
School	Paved
St. Lukes Odiado Secondary School	Paved
Odiado Primary School	Paved
Nangina Girls Boarding Primary School	Paved
Nangina Girls Secondary	Paved
Nanagina Mixed Primary	Paved
Namasali Primary School	Paved
Bridge International Academy	Paved
St. Stephen's Bujwang'a Mixed Secondary School	Paved
Busembe Primary School	Paved
Creamland Academy	Paved
BumbeTechnical Training Institute	Paved
Sisenye Primary School	Paved
School	Paved
St. Andrews Mundere Primary School	Paved
St. Peters Bubango Primary School	unpaved
John Osongo Primary & Secondary	unpaved
Lindi Education Centre	unpaved
ECD School	unpaved
Bunyala Institute of Technology	unpaved
Makunda Secondary school	unpaved
Makunda Primary School	unpaved
Mukhobola Primary School	paved
Mubwayo Primary School	Paved
Grace Education Centre	Paved
Uwasi Primary School	Paved
Uwasi Secondary School	Paved
Uhembo Primary School	Paved
Gendro Primary School	Paved
St. Williams Gendro Secondary School	Paved
Mago Primary School	Paved
St. Monica Mago Secondary School	Paved
Mago Nursery School	Paved
St. Gloria Nyamonye Junior Academy	Paved
Goma Primary School	Paved
Usire Secondary School	Paved
Usire Primary School	Paved
Nyamonye Girls Secondary School	Paved



Consultancy services for the Feasibility Study, Environmental and Social Impact Assessment, preparation of Resettlement action Plan and the design and tender documentation for the Lake Victoria Ring Roads

Home of the Physically Challenged Children	Paved
Centre for Research and Applied Knowledge	Paved
Majengo Mixed Secondary School	Paved
Majengo primary School	Paved
Gembe Group of Schools Academy	Paved
EMILES Academy	Paved
Nyangera Primary School	Paved
Excel Academy	Paved
Usenge High School	Paved
Usenge Primary School	Paved
Verslo Primary School	Paved
Osieko Secondary School	Paved
Osieko ECD Centre School	Paved
Osieko Primary School	Paved
Pala Primary School	Paved
Laketop Academy	Paved
School	Paved
Serawongo Secondary School	Paved
St. Lawrence Guya Academy	Paved
St. Stephen Nango Complex	Paved
Orengo Secondary School	Paved
Orengo Primary School	Paved
Laura Place Orengo Nyaguda Resource Centre	Paved
Nyaguda Secondary School	Paved
Minya Secondary	Paved
Kagwa Primary School	Paved
Glad Toto School	Paved
Nyakongo Secondary school	Paved
Nyakongo Primary School	Paved
Ndigwa Secondary School	Paved
Kadundo Primary School	Unpaved
Kadundo Church	Unpaved
Ranyala Primary School	Unpaved
Nyaondo Junior Academy	Unpaved



# LIST OF WORSHIP CENTRES

Receptor (Church)	Section of the road
Alpha Christian Church Isongo	Paved
Jehova Witness church	Paved
Church	Paved
Catholic Diocese of Bungoma	Paved
Repentance	Paved
Church	Paved
Church	Unpaved
Church	Unpaved
Worship Centre	Unpaved
Mosque	Unpaved
Church	Unpaved
FPFK Busembe Sanctuary	Unpaved
Bumbe Church	Unpaved
Church	Unpaved
Church	unpaved
Church	Unpaved
Church	Unpaved
Church	unpaved
Church	Paved
Apostolic church	Paved
Church	Paved
Church	Paved
Christco church Chianda	Paved
Langi SDA church	Paved
Revival centre church –Gagra	Paved
Church	Paved
Church	Paved
Church	Paved
Christco church	Unpaved
Church	Unpaved
Church	Unpaved
Church	Unpaved
Church	Unpaved
Church	Uppaved
Church	Uppaved
Church Rodi	Uppaved
Church	Uppaved
Chuich St. Doul's Datundi astholis shursh	Unpaved
Si. Paul S Ratundi Catholic Church	Unpaved
Voice of actuation and healing aburah	Unpaved
Voice of salvation and nealing church	Unpaved
Loiwe SDA church	Unpaved
Church	Unpaved
Church Of Mishaal line aathalia shurah	Unpaved
St. Michael Jina catholic church	Unpaved
	Unpaved
AIC LUSAKA CNUICN	Unpaved
Unurch Dete Opertie shursh	Paved
Rota Coptic church	Paved
Kisumu gospei church	Paved
Kacnok SDA church	Paved
CCA town church	Paved
Kisumu tamily church	Paved
Gospel power centre church	Paved
Kingdom hall Jehova witness	Paved





Christ hope international church	
Church	
ACK Dioces of Maseno, St Marry's church	Paved
Pand pieri catholic church	
Evangelism harvest worship centre	Paved
Dunga church	Unpaved
Worship centre	Unpaved
Withur catholic church	Unpaved
Worship centre	Unpaved
ACK St. Paul catholic church Arombo	Unpaved
Nduru catholic church	Unpaved
Worship centre	Unpaved
Christco church	Paved
Magunga charpel-Katito parish	Paved
Nyambarumbe SDA church	Paved
Lirudi voice of salvation church	Paved
	Paved
Apostolic church	Paved
Kogola catholic church	Paved
Voice of selvation Ban anditi shursh	Paved
Voice of Salvation Pap onditi church	Paved
Marchin control	Paved
Worship centre	Paved
Kings outreach church-Kabodho	Paved
Apostolic church	Paved
Repentance and holiness church	Paved
AIC bad aora local church	Paved
Repentance and holiness church	Paved
Thurdibuoru SDA church	Unpaved
Onego local church	Unpaved
Bolo catholic church	Unpaved
Worship centre	Unpaved
Nyamanyinga AIC church	Unpaved
Obange apostolic church	Unpaved
Worship centre	Unpaved
Worship centre	Unpaved
Nyadina SDA church	
Worship centre	Unpaved
PAG church	Unpaved
Nyandho SDA church	Unpaved
Church	Unpaved
Osodo SDA church	Unpaved
Worship centre	Unpaved
Worship centre	Unpaved
Legio maria(African inland) church	Unpaved
San'goro SDA church	Unpaved
Nomiva church	Unpaved
Worship centre	
Kobuva SDA church	Paved
St. Joseph's Kobuva catholic church	Paved
True Jesus church	Paved
Rakwaro SDA church	Paved
Lorna hope centre	Paved
Karabondi SDA church	Paved
Saka SDA church	Daved
Warshin centra(roha church)	Paved
	Daved
Now life SDA church	Paved
Werebin contro	
	Unpaved
worship centre	Unpaved

## **Draft Detailed Design**

egis International in association with egis Kenya





February 2017

Lwala nyakongo SDA church	Unpaved
Osika SDA church	Unpaved
Kangir SDA church	Unnaved
Worship centre	Uppaved
	Uppeved
	Unpaved
ACK Oyokre church	Unpaved
Ogenya ACK church	Unpaved
Andingo SDA chuch	Unpaved
Worship centre	Unpaved
Worship centre-church	Unpaved
Worship centre-church	Unnaved
God Huma SDA church	Uppaved
Songle esthelie ebureb	Uppeved
	Unpaved
New apostolic church	Unpaved
Worship centre-church	Unpaved
Worship centre-church	Unpaved
Full gospel evangelistic church	Unpaved
Umoja SDA church	Unpaved
Roho isreael church	Unpaved
Worshin centre	Unpaved
Ombuio SDA oburob	Uppoved
	Unpaved
Osakwe SDA church	Unpaved
Omen SDA church	Unpaved
Kandiege central church	
Worship centre-church	Unpaved
Nvarut SDA church	Unpaved
Ondiche Olare SDA church	Unpaved
Odionya SDA church	Uppaved
Maram CDA aburah	Unpaved
Maram SDA church	Unpaved
Gospei church	
SDA church	Paved
Makongeni SDA church	Paved
Nyanginja catholic church	Paved
Kwoyo kochia SDA church	Paved
Odienva SDA church	Paved
Worship centre-church	Paved
Worship centre church	Paved
	Paved
	Paved
Agawo SDA church	Unpaved
Kodhoch central SDA church	Unpaved
Praise Christian centre church	Unpaved
CCA church	Unpaved
SDA church	Unpaved
Wajga SDA church	Unpaved
Warship contro church	Uppaved
	Unpaved
Ngoane SDA church	Unpaved
SDA church	Unpaved
Worship centre-church	Unpaved
Kamsam SDA church	Unpaved
Worship centre-church	Unpaved
Pedo SDA church	Unpaved
Cristco church	Paved
Worship control church	Payed
	Deved
Nisui pililidi y school	Faveu
Kono church	Paved
Repentance and holiness church	Paved
Christco church-Mbita	Paved
Kingdom hall Jehova witness church	Paved
Christco church	Unpaved
St Marry's mbita catholic church	
Milimani SDA church	Uppaved
	UNDAVED
Marchin control oburch	Uppoyed





Worship centre-church	Unpaved
Tabla PEFA church	Unpaved
Worship centre-church	Unpaved
Worship centre	Unpaved
Worship centre	
Church	Unpaved
Suba central SDA church	Unpaved
Sindo SDA church	Unpaved
Sindo SDA church	Unpaved
Rowo SDA church	Unpaved
Worship centre-church	Unpaved
Ngeri catholic church	Unpaved
Kisegi central SDA church	Unpaved
Ruancha SDA church	Unpaved
Kitawa church	Unpaved
Tobua Mosque	Unpaved
Worship cetre-church	Unpaved
Worship centre-church	Unpaved
Worship centre-church	Unpaved
Worship centre-church	Unpaved
Abundant life worship centre	Unpaved
Aloma SDA church	Unpaved
St. John's Lwanda catholic church	Unpaved
Lwanda magwar SDA church	Unpaved
Modi catholic church	Unpaved
Nyahera PEFA church	Unpaved
Worship centre-church	Paved
St. Leo catholic church	Paved
Church	Unpaved
Nyakwere PEFA church	Unpaved
Church	Unpaved
Ong'er SDA church	Unpaved
Nyangaya PEFA church	Unpaved
Sota SDA church	Unpaved
Catholic church	Unpaved
Tagache SDA church	Unpaved
Apostolic church	Paved
New life pentacostal church	Paved
Uhuru central church	Paved
Kathii Mihuru Apostolic church	Unpaved



# Annex 3: LIST OF HEALTH CENTRES

Receptor (Health centres)	Section of the road
Mukhobola Health Centre	Unpaved
Uhembo Dispensary	Unpaved
St. Mary Gorety dispensary	unpaved
Usigu Health Centre	unpaved
Got Agulu sub District Hospital	unpaved
Osieko Dispensarv	paved
Hospital	Paved
Serawongo Dispensary	Paved
Mbeka Health Centre	unpaved
Nyaguda dispensary	unpaved
Kagwa Dispensary	Paved
Kagwa Health Centre	Paved
Manyuanda Hospital	Paved
Ragengni dispensary	Paved
Chianda dispensary	Paved
	Paved
Medical clinic	Paved
Milimani maternity hospital	Paved
Nyalanda haalth contor	Payed
	Faveu
Duriga huising home	Dovod
Raligui uispelisaly	Paved
Si. Ciale's fieldlif center	Paveu
	Unpaved
Sangorota dispensary	Unpaved
	unpaved
	Drived
Kangir community dispensary	Paved
vvagwe nealth centre	Unpaved
Nyaoga community dispensary	Unpaved
Homa nealth center	Unpaved
Kodula dispensary	Unpaved
Nyangweso community medical laboratory	Unpaved
Nyarut health centre	Unpaved
Nyalkinye health center	Unpaved
Ngegu dispensary	Unpaved
ABBA community health center	Unpaved
Waondo community health centre	Paved
Usao health center	Paved
St.Marry's Mbita health centre	Paved
Suba district hospital	Unpaved
Nyamrisra health centre	unpaved
Ministry of medical services-Kisegi sub district	Unpaved
Makuyu health center	Unpaved
St. Camillus mission hospital	Paved
VCT centre	Paved
Luanda magwar dispensary	Unpaved
Onger dispensary	Unpaved
Kachola health center	Unpaved
Othoch Rakuom dispensary	Unpaved
Mihuru health center	Paved
Mama maria hospital	Paved



# LIST OF ADMINISTRATIVE AND MARKET CENTRES

	CENTRE / TOWN	State of the road
	Sig port	
	Centre	
	Madiaba center	
	Mubwaya Contro	Uppaved
		Unpaved
	Sidundo Contro	Unpaved
		Unpaved
	Nyamanya	Unpaved
		Unpaved
	Majanga Cantor	Unpaved
		Unpaved
		Unpaved
	Nenge Centre	Unpaved
		Unpaved
		Unpaved
	Wagusu Centre	Unpaved
		Paved
	Amoyo / Kagwa centre	Paved
	Kuwasa centre	Paved
LHS	Chamakwaru Centre	Paved
	Kawota Centre	Paved
		Paved
	Naya Centre	Paved
LHS	Nyamonye AP post	Paved
RHS	Usigu Ap Headquarter	Paved
RHS	AP camp Usenge	Paved
RHS	Chief's camp	Paved
LHS	Access Aid Challenge Africa Paved	
	Assistant Chief's Office Kagwa sublocation Paved	
	Chief's camp	Paved
	Chief's camp West Uyoma	Paved
	Ndigwa center	Paved
RHS	Ndigwa chiefs camp	Paved
	Center Kopiata	Paved
LHS	Shopping centre	Paved
	Chianda shopping center	Paved
	Aram market	Paved
	Asembo market	Paved
	Kopondo centre	Unpaved
	Ndere market	Unpaved
	Bodi market Unpaved	
RHS	Lolwe center	Unpaved
LHS	Gongo market	Unpaved
	Ochiko ite center	Unpaved
LHS	Nyanginja center	Unpaved
	Lisuka center	Unpaved
	Kisumu town center	Paved
	Dunga beach center	Unpaved
	Korowe center	Paved
RHS	Shopping center	Unpaved
RHS	Nyangande market	Unpaved
	Amboo complex center	Unpaved
	Katito center	Paved
	Urudi center	Paved
	Harambee center	Paved
RHS	Ragen center	Paved
RHS	Konvuro center	Paved
	Bugo center	Paved
	Kusa shopping center	Paved
RHS	Nyadero center	Paved
		1 4704





RHS

of

Kondego shopping center

Sangorota shopping center

West Nyakach ward office

Nyakwere kobuya center

Kongou center

Koballa center

Lorna hope center

Paved Paved

Paved

Paved Paved

Paved

Unpaved

Ochot odong center Paved Apida center Paved Kendu-bay town Paved RHS Central karachuonyo chiefs camp Unpaved Oyuma market Unpaved LHS Marcenter Unpaved Sijeny center Unpaved LHS Chiefs camp Unpaved Nyangwete center Unpaved Homa limes center Unpaved Olare center Unpaved God bondo center Paved Paved Homabay town Police post LHS Unpaved RHS Chiefs camp Unpaved LHS Chiefs camp Unpaved Unpaved Thethre center RHS Bala center Unpaved LHS Kadel police post Unpaved LHS Wandaji chiefs camp Unpaved Ngodhe centre Unpaved Luanda market center Unpaved Kirindo center Unpaved Mbita town Unpaved Gingo center Unpaved LHS Suba CDF office Unpaved Kalogo center Sindo town center Unpaved LHS D.Os office Unpaved Unpaved Rowo center Ngeri center Unpaved Nyagwethe center Unpaved Uterere center Unpaved LHS Uterere chiefs camp Unpaved Kisegi center Unpaved RHS Kiriro shopping center Unpaved Osiri center Unpaved Kitawa center Upaved Kithiso center Unpaved Paved Nyandiwa center Kinda center Unpaved Unpaved Kagoro center Osoi center Unpaved Ombugwa center Unpaved Unpaved Orore center Oodi center Unpaved Okiro center Unpaved Paved Sori-Karungu center Paved Aloma center Lwanda magwar center Unpaved Unpaved Center Nyakwere center Unpaved LHS Irrigation board offices Unpaved Onger center Unpaved LHS Nyatike CDF offices Unpaved Nyakore center Unpaved





LHS	Othoo center	Unpaved
	Serena center	Unpaved
	Sota center	Unpaved
	Ratieny center	Unpaved
	Tagache center	Unpaved
	Mihuru town	Paved



# ANNEX 5 LVRR CPP MINUTES

# ANNEXE 5 : MINUTES OF CONSULTATIVE PUBLIC PARTICIPATION MEETINGS

# 1. BUSIA COUNTY

SUB-COUNTY	SAMIA	ADMINISTRATIVE LOCATION	AGEGA
CPP VENUE	MULOKHONI MARKET	DATE	8/12/2016

### Minute 1: Opening Remarks

The area chief welcomed participants and consultants to the public participation meeting. He then invited Mr. Wilberforce Muchanyi, one of the local participants to lead in prayer. The chief then introduced assistant chiefs from his sub locations before introducing the consultants whom he then welcomed to present the agenda of the meeting and describe the project road.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

#### Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

# Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

#### 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

# 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

The environmentalist explained that in respect of the Lake Victoria Ring Roads, environmental impact assessment report will be done where the following will be assessed accurately and effectively;

- i. Air pollution like dust
- ii. Water pollution-oil spillage in water
- iii. Noise pollution near schools and hospitals
- iv. Disorganization of soil structures
- v. Environmental degradation-depleting forests and trees
- vi. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

#### 4.3 Social issues

**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

#### Positive Impacts

- i. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ii. Poverty levels will reduce;
- iii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.

- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

#### Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

## 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- i. Size of the land acquired
- ii. Trees-(indigenous and exotic trees as per the size)
- iii. Crops
- iv. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

# MINUTES 5: OPEN FORUM

#### Participant fears/concerns and suggestions/recommendations

During this session, participants expressed their support for the proposed project. However, they expressed various fears and concerns, each of which was responded to by the consultants. The fears/concerns raised and responses provided as well as recommendations made are presented in the following table:

Name	Fears/concerns	Response	Recommendations
Margret Oloo	For trees along the road, will these be compensated?	If the trees are on road reserve, the owners will be given notice to remove them and no compensation will be offered.	

Walter Lwande			Speed control measures like bumps, road signs and pedestrian crossing paths should be provided near markets, schools and towns to control accidents
Wilberforce Muchangi	The contractor may construct the road to sub- standard levels	A supervising consultant will ensure that the contractor strictly follow the design. Effect liability period (monitoring) one year after construction to ensure the road is of standard	Provide access culverts to every homestead but where possible, some homesteads could share culverts
Zedekiah	In a case where the family has many brothers and only one near the road is affected, will all the brothers be compensated	If the title deed occupy the name of parents, the family should come into agreement on how compensation will be done	
	If murram will be extracted from my land, will compensation be done?	In case of a material site, the contractor will agree with the land owner and sign a contract on terms of payment	
	Will the barrow pit be rehabilitated after extracting murram as open barrow pits are very risk to children?	If the agreement signed was not followed, you can sue the contractor .When signing the agreement ensure there is third party for instance chief, NEMA officer	
Ezekiel Muthui	Why do you dismiss /avoid demolishing large houses?	If the budget goes too high then the road will not be constructed.	
Edward Siuka	Will you educate the contractor not to interfere with our ladies?	Awareness creation through various programmes including HIV/AIDs will be implemented. However, it is residents' responsibility to embrace dignity and sound moral practices.	
Gilbert Wesula	Are we allowed to access the map? Can copies be left to us to understand the road better?	The design of the road is still ongoing and once it's complete, you can have access of the map in the KENHA regional office Busia.	
	What is the timeline of the design?	Engineering design will be completed in April 2017.	
Cristiano Ogutu			Casual labourers should be sourced from the local community and the contractor should not come with imported labour
George Mukoyo	In a case of dispute in court, and land is affected. Will I still be compensated?	Disputes should be settled if possible to enhance compensation. compensation cannot be held until dispute is settled	
Solomon Abdi	How many ministries shall the proposal go through before its completed?	After designing, the government will do procurement then construction will commence	
Emmanuel	Will bumps and road	Signposts and bumps will be erected	

	signs be constructed later or done during construction and will they be permanently maintained?	during construction and they will be maintained	
	If one donated land to an institution like church and the land is affected, who will be compensated?	The land owner will be compensated but the church committee will be given token because of disturbance	
Patrick Odhiambo	If there is diversion in my land, will you compensate?	Provided that it is within 40metres,there will be compensation	Proper systems should be taken to ensure that every affected person is appropriately compensated. The payments should not pass through government
Ojua	What process do you have on graves along the road?	Token will be provided in case of grave relocation. Consultation will be done on grave relocation.	
	During construction, alternative road will pass in peoples land, will they be compensated too?	Yes. Incase of encroachment into private land, compensation will be provided	
Wilberforce , Chairman of developme nt			A market shade in Mulukhoni market should be constructed to enable women conduct business smoothly during road construction.
			Tarmac the Nangina-Luanda spur road and Bukiri-Muramba- Port Victoria-River Suo.
Mark Ogunda	How will you compensate public land?	Government does not compensate public land, but relocation of services.	
James Nyadonde	Is there standard rate for compensation?	Every land acquired will be compensated. Economically unviable land left after acquisition will be compensated whole.	

# MINUTE 6: CLOSING REMARKS

The area MCA, Mr. Levis Majale congratulated participants for attending the forum and encouraged them to participate and co-operate in this project. He told them that the project is not of political influence but it's a government project. He told them of corporate social responsibility and encouraged community to make wishes which may be fulfilled by the project during construction. The area chief encouraged parents to take care of children during this long holiday and discouraged disco (matanga) in order to control early pregnancies and HIV/AIDS. The sociologist thanked participants for their cooperation.

The meeting was closed with a word of prayer by Wilberforce Muchanyi and the area chief called off the meeting at 12.15 pm.

SUB-COUNTY	SAMIA	ADMINISTRATIVE LOCATION	NAGUBA
CPP VENUE	SIO PORT, OPEN AIR MARKET SITE	DATE	8/12/2016

## Minute 1: Opening Remarks

Sio Port public consultation meeting was called to order by the area chief at 2.10 pm during when he also welcomed participants. He then invited Mr. Ibrahim Mugoya, one of the local participants to lead in prayer. After prayer, the chief welcomed consultants to take over the meeting

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

## Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

#### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

#### 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

# 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

The environmentalist explained that in respect of the Lake Victoria Ring Roads, environmental impact assessment report will be done where the following will be assessed accurately and effectively;

- i. Air pollution like dust
- ii. Water pollution-oil spillage in water
- iii. Noise pollution near schools and hospitals
- iv. Disorganization of soil structures
- v. Environmental degradation-depleting forests and trees
- vi. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

## 4.3 Social issues

**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

### Positive Impacts

- i. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ii. Poverty levels will reduce;
- iii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

#### Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;

v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

# 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- i. Size of the land acquired
- ii. Trees-(indigenous and exotic trees as per the size)
- iii. Crops
- iv. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

# MINUTES 5: OPEN FORUM

#### Participant fears/concerns and suggestions/recommendations

Participants fully expressed their support for the proposed project. However, they expressed various fears and concerns led by chief. Each of which was responded to by consultants. Participant fears/concerns and suggestions/recommendations as well as responses given are presented in the following table:

Name	Fears/concerns	Response	Recommendations
Patrick Wafula	If a person has a structure on road reserve. Will s/he be compensated?	The person shall be given notice to move away before construction. No compensation will be offered for property on road reserve.	
Omar Musa	If the owner of the property died and the sons are the heir but with no title deed. How will the land be compensated?	In such a case compensation done if there is availability of documents.	will be legal
		The family should see the chi move to the National Land Co to get a letter showing that the beneficiaries	ef and ommission ey are the
	Is the list of those affected available and can we have access to the map?	The list is not available now b the process and list of the affe be consulted.	ected will
	Will compensation be after or before construction?	Prompt payment will be done that compensation will be bef construction.	meaning ore
Helen	If the drainages waste will be disposed in peoples land, will there be compensation?	In case of waste managemen will be mitigation measures a when proven you are not on r reserve.	t, there pplied oad
	If I have been living on road	Community will be shown wh	ere the

	reserve without knowing. How will I know that I'm on the reserve?	road traverses before construction.	
Aziz Abdul	What measures will you put in place to reduce accidents?	Speed control shall be offered to avoid accidents e.g. road signs, bumps and crossing points.	Provide alternative water source to avoid crossing over the road for the people who live in the upper side of the road. This will reduce accidents for children and cattle's.
	Will you provide culverts in household entries?	Access culverts will be only at necessary points	Provide fish mongers with cold storage facilities.
William	Which type of bumps are you going to put on this road?	The road will have standard bumps	Set aside a lane for boda
Одеко	Will the youth be involved in the construction works?	Community members are going to be involved in the construction	boda operators
Okumu	Where will you direct storm waters increasing along the road?	Water will be controlled to the necessary points	Storm water to be directed to water pans to avoid floods which leads to damage of the road
	Will you provide diversions?	The supervising consultant will make sure that diversions are properly maintained	Provide shelters in each stage
Ouma	In a case where there is interruption of services like water pipes and water tanks, will the damages be compensated?	The interrupted services will be replaced after construction	
Vincent	Will the road have round about at towns?	A service road will be provided instead of a round about	
Ojiambo	If a person will be affected and has no title deed. Will he be compensated?	The compensation will be done after valuation by National Land Commission to ensure the owner gets compensation. Note that Title deed is very important in compensation.	Consider providing a spur
	Will the road have road signs?	Road signs will be provided to this road and maintenance done after one year of construction works, then handed over to the government.	
	Will surveyors show where the road will pass?	Valuers will show where the road will pass through.	
Nicodemus	Will compensation be before or after construction?	Prompt payment will be done, this means that compensation will be before construction according to the Kenyan constitution.	
	Is the same consultant doing Matayos-Muramba road.?	No ,we are not doing the road (Matayos-Muramba)	
Chief	Will the structures in Matayos be affected?	Some structures may be affected, but trying to avoid massive damages which may lead to high compensation cost.	
Pamela	If compensation is delayed, what will happen to the	If compensation delays, you can report to chief who will take legal measures.	

	affected?		
David Wafula	Will graves be compensated?	No value for graves but only a token to enable the relatives to relocate them.	
Halbert	There is a sharp corner near mosque, how will it be dealt with?	Diversion will be within the 40 meters and if not possible to divert in the road reserve, the existing one will be used and again if not possible, land will be acquired.	Provide access road to the lake.
	Can you sent someone to represent you during compensation?	Compensation will be done to the person whose name appears in the title deed,	Assist in removing water hyacinth in the lake.

The Samia Eco System Conservation CBO was concerned with the construction and implementation of Lake Victoria Ring Roads and made the following recommendations:

- 1. Create awareness of effects of materials used to the environment
- 2. Greening of the road to mitigate climate change
- 3. Preservation of local/indigenous resources/heritage e.g. stones used for writing at MUNANA
- 4. For local labour during road construction, the youth should be involved so as to build the local capacity
- 5. Fish coolant plant should be provided at Sio-port.

#### Minute 4: Closing Remarks

The Sociologist thanked participants for their cooperation after which the area chief called off the meeting following prayers offered by Sylvester at 4.00 pm.

SUB-COUNTY	BUNYALA	ADMINISTRATIVE LOCATION	BWIRI
CPP VENUE	BUMBE BEACH HALL	DATE	09/12/2016

#### Minute 1: Opening Remarks

The assistant chief, Busembe location, opened the meeting before inviting a participant to lead in prayer. He then welcomed participants and invited consultants to take over the meeting.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

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#### Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

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In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

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- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

## Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

#### 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

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For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

# MINUTES 5: OPEN FORUM

#### Participant fears/concerns and suggestions/recommendations

Participants fully expressed their support for the proposed project. However, they expressed various fears and concerns led by chief, each of which was responded to by the consultants. Participant fears/concerns and suggestions/recommendations as well as responses given are presented in the following table:

Name	Fears/concerns	Response	Recommendations	
Boniface Auma	My house will be demolished and I have no title deed. Will I be compensated?	Succession should be done to get title deed to enhance compensation which will be before construction.		
	Will our children be given jobs?	Casual labour will be sourced from locals though some jobs will need specific qualification for instance drivers. The community should compose a committee to enable job advertisement. It's good for community to be ready to participate.		
Peter	Why will you do spur roads in Nyanza but not here in Bumbe?	The road in Bumbe is nearer the lake and the CDF can do the spur roads in Bumbe.		
Benson Lunde	Will you provide access roads to public institutions?	Public facilities will be given access roads for instance, schools within 100 meters from the road. E.g. Busembe primary, Busembe dispensary and Bumbe primary.	Bumbe beach is a busy beach in the area, and should be provided with a spur road.	
			Try to put road signs and access roads near schools	
Wilson Oduori	Will the barrow pits be rehabilitated after extracting murram?	Mitigation measures of rehabilitation will be applied in material sites to ensure environmental safety. However, the time land owner agrees to give material site, a contract should be signed for rehabilitation .For instance trees can be planted.	Issues of compensation is likely to be a problem for many people have no title deeds	
			Many families are polygamist so consider compensating all wives.	
	When will the project commence?	For now, we are not sure how soon it will be There is process of building the road, right now is design and its after design then the government will be given the estimate budget and source for a contractor		
	How will we know the 20 meters width set for the road?	Surveyors will do markings and cadastral maps will clearly show where exactly the road will pass. All should be ready to participate during the RAP.		
Dominic	What is the meaning of the times sign (x) put along the road?	The sign marked on structures shows that the structure is on road reserve and you should relocate your property and salvage the materials	The width of the road should be reduced to avoid too many Can it be sooner, it will really help	
	In Bumala-Ganga homesteads and schools were left without culverts? In your design, will you built culverts?	Culverts will be constructed where necessary while those destroyed will be replaced during construction.	and will increase interaction	

Fredrick	How will you compensate demolished houses that have no plans?	The houses with plan or without will be compensated after valuation is done.	The four beaches to be given priority in spur roads
Michael Oduori	I may have several children and are using the affected land, who will you consider in compensation?	Compensation will be done to who is entitled to the property damaged. Family should agree on compensation.	
Olani David	How will you handle a person who has leased land and land owner?	If there is lease agreement (in terms of years), valuation will consider it a valuation will operate according to the law.	
Susan Angira	Sometimes compensation is not done adequately as a person may be compensated very little like six thousand.	Compensation will be 100 per cent plus 15 per cent disturbance fee as required by the law	
Okello Boniface	I am planning to construct a house on January, should I proceed?	After project is advertised, in a spun of two years no development is supposed to be carried out.	
Juma Alfred	What guarantee is given to ensure that you will do what you have presented to the community?	We have not come to cheat citizens as the law guides and guarantees the issues discussed will be so.	
Juma Okello	Will you consider every beach along the project area?	It is not possible to do access roads in all beaches, assessment will be done to know priority beaches before construction	
Okumu Henry	How is compensation of temporally structures yet no title deed?	Short notice is given to owners of temporally structures to vacate.	
	How will you ensure that set design is followed?	There is quality assurance that KeNHA does what is contained in the design.	
	Will compensation be according to current value or past value?	Compensation will be according to current market value.	
Ojanja David	What do you do in a case the land left after acquisition is not economically viable?	Where the land left is not economically viable, compensation will be done for the whole land.	
	If the children after land acquisition neglects the old Mzee and he is left stranded, where does he go?	There are institutions known as (Nyumba ya Wazee), the old man can be taken there by the local administration if it is proved that the family has neglected him.	
Chrispunus	Which CSR community projects will you partake? E.g. chiefs' camp?	CSR is in the budget allowing provision of road side amenities and will be done according to priority of every community.	

# Minute 4: Closing Remarks

The area chief lamented that failure to rehabilitate barrow pits is common due to lack of involving other parties. He encouraged participants to involve local administration in issues of land and before signing any agreement. He quoted that there are people who gave land for electricity line and up to date no compensation was done. He told participants to know their rights and respect other people's rights for example those who are using road reserve to relocate. He encouraged participants to undertake search through local surveyors who could help interpret the road.
Participants thanked consultants for presentations and insisted that their requests should be considered. The Sociologist thanked all participants for co-operation after which the BMU chairman Mr. Patrick gave vote of thanks. The meeting was closed with a word of prayer at 2.00 pm.

SUB-COUNTY	BUNYALA	ADMINISTRATIVE LOCATION	BWIRI
CPP VENUE	MUBWAYO MARKET	DATE	09/12/2016

#### Minute 1: Opening Remarks

The meeting was opened with a word of prayer and the area chief welcomed participants and consultants to the meeting. He followed this by welcoming the consultants to make his presentations.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

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Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

### Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

#### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

### 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

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services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

# 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

The environmentalist explained that in respect of the Lake Victoria Ring Roads, environmental impact assessment report will be done where the following will be assessed accurately and effectively;

- i. Air pollution like dust
- ii. Water pollution-oil spillage in water
- iii. Noise pollution near schools and hospitals
- iv. Disorganization of soil structures
- v. Environmental degradation-depleting forests and trees
- vi. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

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She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

### Positive Impacts

- i. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ii. Poverty levels will reduce;
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- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

### Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

# 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- i. Size of the land acquired
- ii. Trees-(indigenous and exotic trees as per the size)
- iii. Crops
- iv. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

### MINUTES 5: OPEN FORUM

### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Recommendations
Business lady	Clarify the measurement of the road reserve	The road measurement is 4ometres (20 meters right and 20m left).	A spur road should be built from Mau Mau –Bwaba beach.
	There are churches along the road. How will they be dealt with?	For churches, disturbance fee is done to committees while, compensation is guaranteed to the land owner.	Culverts should be constructed in all homesteads.
			In material site like murram and stones, a contract signed privately will cause problems, land owners should sign contracts in presence of third party like lawyers or local administration
Bony Mala	Will graves be relocated?	A token is given for graves relocation in religion or community culture. Graves are not paid.	We request compensation not to take long so that people can benefit

	Will water be sourced from our area?	It is a law not to exploit resident's resources. Thus the contractor will agree with residents the duration and limits of extraction.	The road to be raised for this area is flat thereby ensuring no water logging
	From Bumala to port	It is too expensive to move the road	Alignment to be pushed to Yala swamp
	there is already existing road; will the road be rebuild again?	to Yala swamp.	The contractor should listen to residents and provide culverts to homesteads
Charles Odongo	What type of culverts will you use?	Hydrologist has done a study on soil and advised on the type of culverts to be used. In some rivers, box culverts can be used and others pipe culverts.	For available employment opportunities, PAPs are given the first priority, followed by vulnerable for example widows, child headed households, PLWDs, the youth and women
	In case there is no title deed, what other legal documents can I use for compensation?	We will be working with elders and community committee in land issues for they know the land owner.	
Pius Ombara	Why can't the road traverse direct to Osieko to ease communication?	Proposals will be included in the tender documents.	Suggests a spur road Maumau-Rikana- Osieko to open development along the area.
	Who will be compensated forp public utilities along the road?	During construction, we usually do reinstatement of services along the road. No compensation but relocation.	from locals
Sebastian Obwire	Will the affected persons be given early notice?	Project affected persons will be notified through local administration	<b>Proposed projects including:</b> Spur roads: Musoma, Mabinju and Nandekhe beaches; Provide for a tourist site at Mau Mau Mau Mau, a stopover for detainees to Majale Island prison during the Mau Mau; Ndekwe beach-Ndekwe is a sacred site river/stream
			Provide classrooms and staff houses for Mubwayo primary and Makunda secondary as well as X-ray facilities-for Mukhobola health center and Chiefs office for Bunyala central location
Morris Nekeso	How will the compensation be done?	Compensation will be done 100 per cent plus 15 per cent disturbance fee. During relocation, explain everything to be affected during valuation inquiring	Try to compensate well to mitigate suffering of affected.
Joyce Nabwire			Notice of compensation and relocation should be issued early to enable discussion at family level.

# Minute 4: Closing Remarks

The Sociologist thanked all participants for coming and cooperating. **The area c**hief thanked the participants and consultants and called off the meeting following which it was closed with a word of prayer at 5.20 pm.

### 2. SIAYA COUNTY

SUB-COUNTY	ALENGO	ADMINISTRATIVE LOCATION	SOUTH WEST ALEGO
CPP VENUE	HAWINGA DISPENSARY	DATE	22/11/2016

#### Minute 1: Opening Remarks

The area chief welcomed all participants and explained that the guests are consultants from Egis-Kenya and are working for KENHA. .He then invited a participant who opened the meeting with a word of prayer. The chief explained that the community heard invitation through radio Ramogi and also through local newspapers. The chief said that the meeting is combines two sub-locations. This was followed by self introductions for the elders and participants. The chief then welcomed consultants to take over the meeting.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

### Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

#### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

### 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road

services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

# 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

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- i. Air pollution like dust
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Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

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- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
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# 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

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# MINUTES 5: Open Discussion

### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Recommenda tions
Cleopas Otieno	In the swamp, where will the road pass?	the lake is very sensitive area environmentally and realignment will be done	
William	Will the road be tarmacked or	The road will be tarmacked	
Omondi	murram? What is the road width?	The width of the road is 40 meters	
	Will compensation be done to damages and how?	Any property affected which is not on road reserve will be compensated	
Paul Mandudos	In case of dispute, how do you pay?	Compensation money is taken to court until dispute is settled	
	Is there stipulated amount of payment	No stipulated amount set but casual workers	

	to casual labourers?	will agree with contractor on what to be paid.	
Erick	For any development started as from today, will it be compensated?	Yes it will be compensated so long it's not along the road reserve	
William Omondi	Elaborate on the nature of compensation, who will pay and how much?	Compensation of land will be paid by the NLC who will agree with the PAP on compensation. Prompt payment is done before land owners move	
	In a case whereby people have exchanged land and names in title deed not changed, who will be paid?	It's important you agree on who to benefit	
James	To those who will be affected by air and noise pollution like that of blasting which can lead to miscarriage among expectant mothers, will they be compensated?	There are mitigation measures recommended for combating air and noise pollution for instance construction. Always interact with resident Engineer to ensure the measures are implemented	

# Minute 4: Closing Remarks

The Sociologist thanked all participants for coming. The area chief gave vote of thanks to consultants for consulting the community. The meeting was closed with a word of prayer at 12.40 pm.

SUB-COUNTY	USONGA	ADMINISTRATIVE LOCATION	USONGA
CPP VENUE	SIDUNDO OPEN AIR MARKET	DATE	22/11/2016

### Minute 1: Opening Remarks

The Assistant chief welcomed all for the meeting following which prayers were said by a pastor. The Chief introduced all to the meeting. The sociologist introduced consultants and said that they are from Egis-Kenya contracted by KENHA to undertake a design study of the proposed construction of Lake Victoria Ring Roads. The sociologist explained that part of the study is to involve the public to create awareness that a road will be constructed and it will affect their lives in a way and it's important to hear their views, comments and questions which will be responded to by the team of consultants. She asked participants whether they heard the advertisement which was done through Ramogi radio, Ramogi TV and publicized in newspaper of 15/11/2016. Participants responded, yes following which she welcomed the engineer to take over the meeting.

# Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

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- iv. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

# MINUTES 5: OPEN DISCUSSIONS

# Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Recommendations
Name	Fears/concerns	Response	<b>Comments /Requests</b>
Chief/Geor ge Kinoti	After public consultation, the project may take long to be implemented hence residents lose hope. Will the implementation take long?	Such like projects follow different stages which includes: i. Looking for donor ii. Bidding for design consultants iii. Design studies iv. Tender documents v. Supervising consultant vi. Bidding contractor	
		Now is design studies	
Lukas Omondi	In case there is a boundary dispute between land owner and neighbor, how will compensation be done?	Compensation will not be done where there is land dispute. The money will be kept in court until dispute is settled. People should settle disputes the earliest possible	
Charles Otieno	Will the road be tarmacked?	The road will be tarmacked according to the current design	
John Ochonda	Will the affected persons be given time to relocate?	According to land Act 2012, compensation should be prompt before relocation	
Lukas Owino	If I have boundary disputes hence title deed problems, how will you compensate?	In case of dispute, there is a problem in compensation for the money will be taken to court until agreement is reached	
Omondi Jacob	The road was to be done by KERRA on June, now its World Bank. Is the money from government?	KENHA and KERRA work together	
Meshack	What standard do you use to compensate structures?	No standard rates applied in compensation. In public works, there are rates showing valuation. The rates may be applied or not	The locals should form community road linkage committee to address issues of jobs
		For trees, ministry of agriculture has list of all trees and the value.	
		Compensation will be open and of the same range, property will be compensated according to its value	
Jarred Ocholo	Will you compensate for graves?	No compensation for graves but only a token for relocation	Design to be given into simplest form to the
	Will locals benefit from job opportunities?	Greater percentage of skilled and semi- skilled labour will go for locals and PAP are given the first priority	residents to enhance understanding hence avoid duplication
Ochieng Odongo			Contractor to pay 500- 600 per day

# Minute 4: Closing Remarks

The sociologist gave vote of thanks and an assistant chief called off the meeting following which it was closed with a word of prayer at 5.30pm.

SUB-COUNTY	BONDO	ADMINISTRATIVE LOCATION	EAST/NORTH YIMBO
CPP VENUE	NYAMONYE OPEN AIR MARKET SITE	DATE	23/11/2016

### Minute 1: Opening Remarks

The chief welcomed all participants and consultants. The meeting was opened with a word of prayer by a pastor. The Chief introduced assistant chiefs, elders and invited consultants to take over the meeting.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

### Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

#### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

### 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then

proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

# 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

The environmentalist explained that in respect of the Lake Victoria Ring Roads, environmental impact assessment report will be done where the following will be assessed accurately and effectively;

- i. Air pollution like dust
- ii. Water pollution-oil spillage in water
- iii. Noise pollution near schools and hospitals
- iv. Disorganization of soil structures
- v. Environmental degradation-depleting forests and trees
- vi. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

### 4.3 Social issues

**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

### Positive Impacts

- i. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ii. Poverty levels will reduce;
- iii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- iv. Tourist attraction;

- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

### Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

# 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- i. Size of the land acquired
- ii. Trees-(indigenous and exotic trees as per the size)
- iii. Crops
- iv. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

### MINUTES 5: OPEN DISCUSSION

### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Comments /Requests
Martin Magina			Mau Mau-Usenge section should be tamacked
Richard Obondo	How long will compensation take?	Compensation will be done according to the Kenyan constitution before start of construction works	

		Youth have problems when it comes to employments; the contractor comes with imported labour from other areas. Is there a procedure set to ensure locals get casual jobs?	Job opportunities may be few. Thus the community should form road linkage committees to oversee job issues which will be directed to regional engineer by the committee chairperson.	
E	Elisha Ogutu	When is the time of construction works?	Such projects undertakes different stages, right now is design studies which will be completed on April 2017. The consultants will hand over the tender documents to KeNHA to review whether there is enough money, then do bidding and get a contractor for implementation.	
		What is the rate of payment per acre for the land which will be acquired	Currently we cannot approximate compensation per acre; NLC will be the final determiner of compensation according to estimate value given. Compensation will depend on size and type of property affected.	
		What will happen where the land title belongs to the father and either crops, structures and trees belongs to children?	Compensation of the land will be done to the father in case he owns the title deed. Then property affected will be compensated to the children if they own the property.	
	Wenda	In case the land will be acquired and subdivision has not been done, how will be compensation be undertaken?	The family should agree on compensation and if possible enhance sub-division early.	
		What procedure will you use to ensure you compensate the right person?	Compensation will be in cash. The list of PAPs will be availed, publicized in newspaper and there will be no involvement of middlemen	
	Joel Otieno Omondi	If I have used loan to build structures, how will I be compensated?	Valuation of the structures affected will be done and if satisfied with valuation you sign award as a sign of accepting the compensation	
	Ochieng Daniel	Will the 497 km be done by one contractor?	Construction works will be done into sections by different contractors.	Before compensation, bring a surveyor to ensure compensation is legal
		Will you compensate structures on road reserve?	Road reserve users are not compensated Therefore, when given notice, they should relocate property from the road reserve.	
÷		How is the compensation in a case where land has a different owner who claims to possess the it?	Issues of land ownership will be cleared by the chief. The person with legal land documents is the one entitled for compensation	
	Ajulu John	During construction, how will you compensate noise and air pollution?	Air and noise pollution is inevitable during construction. Mitigation measures such as	

		road irrigation during dry season will be implemented. No compensation of such pollution.	
Steven Aluara	There is possibility of increment of HIV/AIDS during construction. What measures are put aside to control the same?	There will be a program of awareness on HIV/AIDS presentation during construction.	
	Will you compensate graves?	No valuation of graves but only a token for relocation ceremony	
Monica Otieno			Gender analysis exercise has been undertaken and there is a report showing the roles women can participate during construction. Kindly consider women in job opportunities
Peter Obendo	In a case where succession exercise may take long period, can the chief prepare a letter to prove land ownership to enhance compensation?	World Bank recognizes minute's letter produced by chief. The letter will be filed and compensation enhanced.	Suggests the community road linkage committee to be of ward level for it to be manageable
Chief			Some people have disputes, we would appreciate surveyors to lead first for disputes may slow construction process
George Ombalo			Access roads to cover Bondo Teachers Training College, Barkanyango secondary, Got Ramongi tourist resort and Bakanyango market

### Minute 6: Closing Remarks

The sociologist gave vote of thanks. The chief then thanked all participants for coming and the meeting was closed with a word of prayer at 12.30pm.

SUB-COUNTY	USONGA	ADMINISTRATIVE LOCATION	SOUTH CENTRAL ALEGO
CPP VENUE	GENTRO PRIMARY SCHOOL	DATE	23/11/2016

# Minute 1: Opening Remarks

The chief welcomed all participants and consultants. The meeting was opened with a word of prayer by a pastor. Chief introduced assistant chiefs and elders. He welcomed consultants to take over the meeting.

### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

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Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

### Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

# Minute 4: project presentations

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He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

### 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

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- i. Air pollution like dust
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Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

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**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

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- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

### Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

# 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

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one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

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## Minute 5: Open Discussion

#### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Comments /Requests
Fred Akula	When the construction is works commencing?	Such projects undertake different stages, right now is design studies which will be completed on April 2017. The consultants will hand over the tender documents to KeNHA to review whether there is enough money, then do bidding and get a contractor for implementation.	
	In a case where the title deed bears names of a deceased person, how is compensation enhanced to child left when young?	If the relatives and chiefs support the child who was left young that the land is his/hers, then compensation will be processed for him/her	
Edward Ochieng	Will compensation be done before or after construction?	According to the law, compensation should be prompt before relocation	
	Is there standard rate of compensation?	Every property affected has its valuation. For instance land, structures, trees, crops and personal developments.	
Francisca Otieno	Will people without skills benefit from job opportunities?	Great percentage of casual labour should come from locals and more so the PAPs.	
	How much will you compensate?	NLC will determine the final compensation. It will do meetings with PAPs to disclose the intended compensation and issue an award for PAPs to sign if satisfied with compensation figures indicated thereof.	
Michael	If property affected is not economically viable, how will it be dealt with?	If property affected is uneconomically viable, it is compensated whole. For instance, if the piece of land left is agriculturally uneconomical, then the governments acquires the whole piece and compensates the same.	
Peter Lisipito	If by the time of land acquisition the farm is empty because crops are planted seasonally, how will you compensate?	Valuation is done to what is currently found in the farm and that is what is compensated.	

Okech Desmass			Construct the spur road to Kadienge beach and provide a cooling plant there.
John Okungu	What accident limitation measures have you put in place for safety of children, women and livestock crossing the road to the lake for water purposes?	Road safety measures will be highly considered .Bumps will be erected where necessary.	
Rose Andero			A alternative ways to enhance title deeds processing in Kadienge sub- location should be put in place.
Moses Ogutu	Will local materials be used to benefit locals?	Material testing is ongoing and if proven worthy will be sourced from the area	
	Is there any benefit targeted to the local CBOs and Self Help Groups?	Community groups are in the report and review will be done to see how to incorporate them in the project	Access road to Kadienge Ratuor hospital should be tarmacked.
	How will you compensate public land like markets?	Public land is not compensated and if at affected, county government is compensated.	
Alfred Otieno	Will the culverts damaged by heavy overloaded lorries. be reconstructed?	Yes	A cooling plant should be provided in Ojulu beach
Alfred Otieno Oduor Paul	Will the culverts damaged by heavy overloaded lorries. be reconstructed?	Yes	A cooling plant should be provided in Ojulu beach Provide access road and class roams to St. William primary and Gendro secondary
Alfred Otieno Oduor Paul Paul Alendo	Will the culverts damaged by heavy overloaded lorries. be reconstructed? How will you prevent soil erosion caused due by poor drainage systems?	Yes Good drainage system will be designed	A cooling plant should be provided in Ojulu beach Provide access road and class roams to St. William primary and Gendro secondary
Alfred Otieno Oduor Paul Paul Alendo Youth	Will the culverts damaged by heavy overloaded lorries. be reconstructed? How will you prevent soil erosion caused due by poor drainage systems? Do you have measures to control run off water /waste from entering Lake Kanyaboli during construction?	Yes Good drainage system will be designed Mitigation measures have been proposed e.g providing good drainage systems in the area.	A cooling plant should be provided in Ojulu beach Provide access road and class roams to St. William primary and Gendro secondary
Alfred Otieno Oduor Paul Paul Alendo Youth Otieno	<ul> <li>Will the culverts damaged by heavy overloaded lorries. be reconstructed?</li> <li>How will you prevent soil erosion caused due by poor drainage systems?</li> <li>Do you have measures to control run off water /waste from entering Lake Kanyaboli during construction?</li> <li>Which channel will you use to create awareness on valuation exercise for some property owners live in different places?</li> </ul>	Yes Good drainage system will be designed Mitigation measures have been proposed e.g providing good drainage systems in the area. Valuation exercise will be publicized on newspaper and advertised on local radio stations.	A cooling plant should be provided in Ojulu beach Provide access road and class roams to St. William primary and Gendro secondary
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Minute 6: Closing Remarks

The sociologist gave a vote of thanks to all participants acknowledging that they had found time to attend despite the busy schedule. The chief thanked participants for coming after which the meeting was closed with a word of prayer at 4.10 pm.

SUB-COUNTY	BONDO	ADMINISTRATIVE LOCATION	CENTRAL SAKWA
CPP VENUE	NANGO CHIEF'S CAMP	DATE	24/11/2016

### Minute 1: Opening Remarks

The chief welcomed all participants and consultants. The meeting was opened with a word of prayer by a pastor. Chief introduced assistant chiefs and elders and welcomed consultants to take over the meeting.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

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Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

### Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

## 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles

like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

# 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

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- ii. Water pollution-oil spillage in water
- iii. Noise pollution near schools and hospitals
- iv. Disorganization of soil structures
- v. Environmental degradation-depleting forests and trees
- vi. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

### 4.3 Social issues

**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

### Positive Impacts

- i. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ii. Poverty levels will reduce;
- iii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

### Negative Impacts

i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;

- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

# 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- i. Size of the land acquired
- ii. Trees-(indigenous and exotic trees as per the size)
- iii. Crops
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She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

### MINUTE 5: OPEN DISUCSSION

### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Comments /Requests
George Otiato	How will the project affected persons know that they are affected?	PAPs will be notified during the valuation exercise and also through barazas.	
	Will the project support local community initiatives?	Road site amenities like schools and hospitals will benefit though the budget restricts doing all road site amenities	
Saul Omondi	Will you do spur roads to all beaches in Nango?	The spur roads are just proposed ones; there is possibility of adding or reducing the numbers.	
Pelicona Juma	Will you improve the existing ring roads?	The existing ring roads are under is a KERRA who will choose what to do.	
Jarred Achieng	How far is the road from the lake?	In many cases, the road will be 500 meters to one kilometre from the lake.	
Joseph Oyoo	Will compensation be done before or it's after construction?	According to the law, compensation should be prompt before relocation though sometimes there may be delay.	
Stephen	What is the size of spur roads?	Right of way for spur roads for class C road is 40	

Ng'ombe		meters.	
John Ondelo	How will you compensate where the land owner has no title deed?	Adjudication will determine who to be compensated in a case where there is no title deed.	
Kennedy Ouma	What mechanisms are put in place to enable the contractor to know that the land has been compensated before acquisition or damage of property?	There will be PAPs meetings during when an all inclusive committees chaired by the chief will be formed to address grievances to be forwarded to thye resident engineer.	

# Minute 6: Closing Remarks

The sociologist gave a vote of thanks. The chief requested one participant to give vote of thanks to consultants for coming and creating awareness. Chief thanked all participants following which the meeting closed with a word of prayer by a pastor at 1.10 pm.

SUB-COUNTY	BONDO	ADMINISTRATIVE LOCATION	CENTRAL SAKWA
CPP VENUE	WANGUSU OPEN AIR MARKET SITE	DATE	24/11/2016

### Minute 1: Opening Remarks

The area chief welcomed participants and consultants to the public participation meeting. He then invited a pastor to lead in prayers. The chief then introduced assistant chiefs from his sub locations as well as elders before introducing the consultants whom he then welcomed to present the agenda of the meeting and describe the project road

# Minute 2: Introduction

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It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

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Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

# Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

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### Minute 5: Open Discussion Forum

### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Comments /Requests
Nickson	If the existing road cuts my land into two, is it possible that it be	There is possibility of moving the road to one side if gradient allows to do so.	I

	realigned?		
Morris Tabu	Will the road traverse through market centers?	The road will traverse through market centres. However, where compensation cost is high, the road may be realigned to reduce the high cost of compensation.	
Joseph Hugari	How will you ensure livestock are safe from accidents?	Road safety measures will be considered for instance road signs and speed bumps where necessary.	
James Onyango	In case I refuse to sign award form of compensation due to discounted valuation figures of my property, what will happen?	You have the right to report the case to land tribunal and valuation will be redone depending on the size of land acquired. Before project implementation, meetings will be held with PAPs to educate them on issues of compensation.	
Adhiambo George	What will you do to open borrow pits where materials have been picked?	The contractor should sign a contract inclusive of rehabilitation of barrow pits .	

# Minute 6: Closing Remarks

On behalf of Wangusu residents, the chief proposed that the project should start soon. He then thanked all participants for coming and the meeting was closed with a word of prayer by a pastor at 3.50 pm.

# 3. KISUMU COUNTY

SUB-COUNTY	SEME	ADMINISTRATIVE LOCATION	SOUTH WEST SEME
CPP VENUE	AKADO OPEN AIR MARKET SITE	DATE	25/11/2016

#### Minute 1: Opening Remarks

The area chief welcomed participants and consultants to the public participation meeting. He then invited one of the participants to lead in prayer. The chief then introduced his assistant chiefs before inviting consultants to present the meeting agenda.

#### Minute 2: Introduction

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### Minute 5: Open Discussion Forum

### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Suggestions and recommendations
Wilson Odiere	Will the affected old structures be compensated?	Valuation of structures will be based on current mode of construction.	
	If materials are taken from my land, will there be compensation	The land owner and contractor should agree and do contraction of material.	
George Magata	According to the way of alignment presentation that the road will be close to the lake, will you leave the existing road?	The proposed road will follow existing roads to the extend possible	
Moses Were	If the land affected was leased for a period of time like ten years, how will you compensate?	For the leased property, compensation will stand for the duration leased and the land.	
	Will private developments be compensated for instance boreholes?	If the borehole is along the road, it will be compensated.	

	If there is a structure within the required 40 meters, will it be compensated?	If the structure is on the road reserve, then no compensation will be paid.	
Jackson Mbuya	Will barrow pits rehabilitee for it has been a habit that contractors leave barrow pits open.	Land owners where materials are extracted should ensure that they sign a contract inclusive of rehabilitation of borrow pits.	
Leonard Otieno	If my home is affected, can I relocate or I wait to be notified to relocate?	Relocation will be after compensation.	
James Osare	During construction, will you consider locals for casual labour?	Great percentage of casual labour should come from locals and more so the PAPs.	
	Am I supposed to move before or it's after compensation?	According to the law, compensation should be before construction.	
	Will culverts be constructed to every home and school?	Access culverts will be done where necessary	
Ongala – Department	How will you address access culverts to people's homes?	Access culverts will be done where necessary only.	The county government of Kisumu should
Kisumu county	When is the actual implementation?	This design phase does not determine when works start as these depend on the governments' ability to provide funds for construction.	be given a detailed design report of the project.
Wilson	How will you mitigate noise pollution near hospitals, schools and to old people?	Air and noise pollution is inevitable during construction. Mitigation measures such as working only during the day will be implemented.	
	In a case where there is resistance of giving out land for the road, will the project stop?	Where instances of resistance arise, the government has power to acquire the land and therefore one person cannot stop the project.	
John Ombiero	Currently ongoing road projects have left behind the traditional alignments and diverted into people's land. Will this project do the same?	At times re-alignment is done to reduce the cost of compensation probably in institutions which may be very costly.	
	What will happen if a person refuses to sign the award form of compensation due to dissatisfaction?	If not satisfied with final valuation of NLC, there is tribunal to take complains and get it redone.	
	Will you follow right procedure in compensation?	We will follow laws applied in compensation.	

# Minute 6: Closing Remarks

The sociologist gave a vote of thanks. The chief requested one participant to give vote of thanks to consultants for coming and creating awareness. Chief thanked all participants following which the meeting closed with a word of prayer by a pastor at 2.10 pm.

SUB-COUNTY	SEME	ADMINISTRATIVE LOCATION	SOUTH CENTRAL SEME
CPP VENUE	BODI OPEN AIR MARKET SITE	DATE	25/11/2016

# Minute 1: Opening Remarks

The area chief welcomed participants and consultants to the public participation meeting. He then invited one of the participants to lead in prayer. The chief then introduced the assistant chiefs from his sub locations before introducing the consultants whom he also welcomed to present the agenda of the meeting and describe the project road.

### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

# Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

### 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

# 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

The environmentalist explained that in respect of the Lake Victoria Ring Roads, environmental impact assessment report will be done where the following will be assessed accurately and effectively;

- i. Air pollution like dust
- ii. Water pollution-oil spillage in water
- iii. Noise pollution near schools and hospitals
- iv. Disorganization of soil structures
- v. Environmental degradation-depleting forests and trees
- vi. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

# 4.3 Social issues

**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

# Positive Impacts

- i. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ii. Poverty levels will reduce;
- iii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

### Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;

v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

# 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- i. Size of the land acquired
- ii. Trees-(indigenous and exotic trees as per the size)
- iii. Crops
- iv. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

# Minute 5: Open Discussion Forum

### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Suggestions and recommendations
Jarred Ouma	If I refuse to give land, will you realign to neighbors land?	If one person resists giving the right of way, the government will invoke the law of compulsory acquisition.	The contractor should use local material which will ensure that
	Will you offer extra amount for those who will be relocated?	For any property acquired, there is a 15% for disturbance.	money circulates in the area.
	Do you have standard rate of compensation?	Compensation is done based on the market value	
Charles Juma	When is the actual implementation?	Construction of the project road will commence after approval of the design and availability of funds.	The contractor should employ local youth in the area
Daniel Owino	If the project is purposing to ease economic activity which is fishing, why can't you do spur roads in all beaches?	A number of spur roads are targeted for construction. However, the County government can do other spur roads not in the list.	
	Why was the public not consulted before the road design?	Consultations should be based on road design concepts.	
Joshua	Why is the road starting in Busia?		

Ochieng	Is there compensation for graves?	There is no compensation for graves, However we give a token for grave relocation.	
	If I get a job in the site and see a good girl, should I not take her for a second wife? Our culture encourages polygamist family	sensitization and awareness will be done for the locals but the final choice of behaviour rests with the individual	
Ali Buto	Does the project have corporate social responsibility?	In every government project, there is lump sum for road site amenities like schools and hospitals to uplift life of the community.	
	How will you compensate trees?	The Ministry of agriculture has value of all trees and these values will be adopted	
George Otieno	What documents (e.g if i have no title deeds but parcel numbers), are required to facilitate compensation?	We will work with chiefs and village elders to ease land valuation.	-
	Will compensation be before or it's after construction?	Compensation is done before relocation and construction. It is important to have committees that can address grievances for instance delays of compensation.	
	Who will be compensated where the deceased has left wife and children?	According to World bank law, if the wife is alive, compensation should be done to her	
Stephen Oyungi	The road is how many meters from the lake?	The road alignment ranges from 500 meters to one kilometre in many areas	Avail copies of the final design to the public
John Opesi	During land acquisition, will you compensate property inside the structure for instance electricity and household items?	No compensation of household items like TVs, however 15% disturbance fee is guaranteed to cater for that. Any development outside the house will be compensated	
Ogunda Michael	Is there any way this project is connected with politics? for politicians confuse people to win votes.	The project is funded by World Bank which is not connected with politics. It's a professional project to help lake shore residents in collaboration with central government.	
Asman Onyango	You talked of forming committees to handle PAPs grievances. Can we work with existing development committees?	The right committee should be strictly composed of PAPs.	
	Will the contractor hire where he will construct his material yard?	If a contractor intends to get material from your land, ensure that you involve a lawyer or chief in signing the contract.	
	Is the road a two way traffic?	The road is a two way traffic with widths of 3.5 meters right and left carriageway	_
	We have lost many people in the lake through crocodile attacks. Can you assist with a fence to prevent more deaths?	Request of fencing the lake to avoid crocodile attacks will be considered	
Odhiambo			Provide a shed in Bodi market
Engineer Owiti			Provide a lab and

	dormitory in Abol girls secondary.

### Minute 6: Closing Remarks

The chief requested one of participants to thank consultants for informing them what is required. The sociologist gave vote of thanks and the meeting was closed with a word of prayer at 6.10 pm.

SUB-COUNTY	KISUMU WEST	ADMINISTRATIVE LOCATION	EAST SEME
CPP VENUE	KALOKA OPEN AIR MARKET SITE	DATE	28/11/2016

# Minute 1: Opening Remarks

The area chief welcomed participants and consultants to the public participation meeting. He then invited a member to lead in prayers. The chief then introduced his assistant chiefs and elders and BMU officials before introducing the consultants whom he welcomed to present the agenda of the meeting and describe the project road.

### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

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Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

# Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

### 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including
454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

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# 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

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In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

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- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

## Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

## 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

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She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

#### Minute 5: Open Discussion

#### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Suggestions and recommendations
Ronald Odongo	When will the project start and end?	Such projects take a process to begin and end. This being the design stage, the approval and sourcing of construction funds may take time.	
Hesbon	If the road traverses through institutions like schools will you relocate them?	During design, we restrict affecting public institutions and in case they are affected, we look for alternative routes because relocating such institutions is socially expensive.	
	Can we form committees to handle community grievances?	We will have other meetings after identifying PAPs, then in the meetings	

		PAPs will be advised on committee formation.	
	How will people know that they are affected?	During valuation, it will be shown where exactly the road will pass.	
Walter Wilberforce	Will compensation be done before or after construction?	Compensation is done before construction (prompt payment).	
Ogutu	Will you compensate the affected land?	Every affected property will be compensated.	
Odijo	Do you have procedures in place to ensure locals get jobs?	Great percentage of casual labour should come from locals and more so the PAPs. As such, the locals should form road linkage committees to handle employment grievances which will be shared by the resident engineer.	
Joseph	Incase succession has not been enhanced for it may take a long process, will you consider a letter from the chief to enhance compensation?	Word Bank recognizes documents produced by chiefs such as minutes and letters to facilitate succession.	

# Minute 6: Closing Remarks.

The sociologist gave vote of thanks and the area chief called the MCA representative to give vote of thanks. The meeting was closed with a word of prayer at 12.30 pm.

SUB-COUNTY	KISUMU WEST	ADMINISTRATIVE LOCATION	SOUTH WEST KISUMU
CPP VENUE	LISUKA OPEN AIR MARKET SITE	DATE	28/11/2016

#### Minute 1: Opening Remarks

The area chief welcomed participants and consultants to the public participation meeting. He then invited one of the local participants to lead in prayer. The chief then introduced assistant chiefs from his sub locations as well as the consultants. He invited the consultants to to present the agenda of the meeting and describe the project road.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

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- iii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

## Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

#### 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- v. Size of the land acquired
- vi. Trees-(indigenous and exotic trees as per the size)
- vii. Crops
- viii. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

# Minute 5: Open Discussion Forum

### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Suggestions and recommendations
Leonard Aketch	The road traverses through St. Allouis primary school. Will the school be relocated?	During design, we restrict affecting public institutions and in any case these are affected, they may be rebuilt on another site.	
Jackline Obaje	Why was the public not consulted before designing the road?	The road design is ongoing and comments made in this meeting will contribute to the final alignment.	
Mary Raatuole	The title deed is under her deceased husband name, will she be compensated?	According to law, if a husband is not alive, compensation will be made to the wife.	
	The road will cross her husband's grave. Will this grave be compensated?	There is no value for graves, but a token is given to facilitate its relocation.	
Jeconiah	How far is the road from the lake?	Around 500 meters depending on the photography of the land.	
Jannes Omendo	What will happen for land purchased without a title deed?	Succession should be enhanced the early the better to enable compensation.	
Omollo	If one objects to passage of the road through his/her land what will happen?	According to constitution, the government is allowed to do compulsory acquisition for public interest. It is good for PAPs to cooperate to be on safe side.	
	If ones shop is affected by the road, will it be relocated or reconstructed?	Valuation will be done to every property affected and compensation done of the same equivalent to loss.	
	Will semi- skilled people benefit from job opportunities?	It's a privilege now people to take advantage of enrolling for training to acquire skills which will increase chances of employment.	
Charles Ongada	Will you do a bridge in Muguruk river?	Bridges will be done to all rivers.	
	How will you value trees and land?	NLC will do final valuation of properties affected and this valuation will determine compensation.	
	If land left after acquisition is not agriculturally uneconomical, how do you deal with such cases?	The government will acquire the land and compensate fully.	
	Human wildlife conflict is a major problem in this area. Such as attacks by hippos, crocodiles, hyena's from Kisian hill killing	Human wildlife conflict can be sorted by Kenya Wildlife Service.	

	people and animals and destroying crops. How will the community be helped from this menace?		
Otieno	What is the timeframe of the project?	Such projects take a long process to complete. Now its design, followed by budget estimate then KeNHA will review if money is available and plan when to start. This will be followed by advertisement for supervising consultant, bidding of contractor then construction works will begin.	
Judith	Which procedure will be used to advertise for jobs?	Community road linkage committee may be used to advertise for jobs.	
	Bill of right states that no one has a right to take away someone's property. How comes it will not be applied in this project?	The constitution states that the state shall not deprive a personal property of any interest unless the deprivation is of public interest according to land Act 2012.	
	Why do you impose this project to people yet people did not ask for it?	The project is needed to spur development in the area and should have even been done earlier.	
	When are PAPs supposed to relocate?	Relocation will be after compensation and notice from NLC	

# Minute 6: Closing Remarks

The sociologist gave vote of thanks. The chief appreciated participants for corporation and encouraged them to corporate with government to have smooth operation. He also encouraged them to call his 24/7 open phone incase of any inquiries about the project. The meeting was closed with a word of prayer by a pastor at 3.20 pm.

SUB-COUNTY	KISUMU WEST	ADMINISTRATIVE LOCATION	SOUTH WEST KISUMU
CPP VENUE	OGAL OPEN AIR MARKET SITE	DATE	28/11/2016

#### Minute 1: Opening Remarks

The area chief welcomed participants and consultants to the public participation meeting. He then invited the pastor to lead in prayer. The chief then introduced assistant chiefs from his sub locations before introducing the consultants whom he then welcomed to present the agenda of the meeting and describe the project road.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

## Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

#### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

## 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

# 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

The environmentalist explained that in respect of the Lake Victoria Ring Roads, environmental impact assessment report will be done where the following will be assessed accurately and effectively;

- i. Air pollution like dust
- ii. Water pollution-oil spillage in water
- iii. Noise pollution near schools and hospitals
- iv. Disorganization of soil structures
- v. Environmental degradation-depleting forests and trees
- vi. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

## 4.3 Social issues

**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

#### Positive Impacts

- i. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ii. Poverty levels will reduce;
- iii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

## Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

#### 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- i. Size of the land acquired
- ii. Trees-(indigenous and exotic trees as per the size)
- iii. Crops
- iv. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property

will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

## Minute 5: Open Discussion Forum

### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Comments /Requests
Conel Oyieko	Water from the culverts to the lake will destroy our farms. How will this be sorted?	Culverts will be constructed within the outlet which will direct water to surface areas.	
Patrick	Incase of diversion, will there be compensation also?	Diversion will be within the road reserve to avoid destruction of other properties and if at all diversion consumes your land, there will be negotiations between the land owner and the contractor for compensation.	
	Incase no succession after death and the land is sold to someone, who will be compensated?	If there is a sale agreement and there was witness of village elders, then there is no problem.	_
	What will happen if the contractor leaves a barrow pit open after extracting materials?	For barrow pits, the contractor and land owner must sign a contract for rehabilitation with the presence of residence engineer and if possible local administration.	
Moses Omondi	If houses are destroyed and no prompt compensation, how will people relocate?	Prompt payment should be done as soon as possible	A spur road should be done to Ogal beach
	For joint title deeds, how will you compensate?	For joint title deeds, compensation will be done according to the shares on ground and according to the land taken. When compensation is done, then shares holders will agree on how to split the compensation.	
	Why are some beaches left out of provision for spur roads?	According to the budget, we will consider the importance or the need of the beach for a spur road.	
Orinda Ongalo	For land affected on both sides, how will they be compensated?	Land will be compensated according to the value of portion acquired.	-
	Will those on road reserve be compensated?	Property on road reserve will not be compensated only notice will be given to the tenants to relocate.	
	Will the contractor pay for water sourced during construction?	Water sources like Mugruk river which is a government property will not be paid for but a personal water source like wells will be paid to the owner.	

Jane Okello	During construction, water and electricity services will be interfered with. Will they be repaired first or afterwards?	Bodies owning those services will be given early notice to relocate the services.	
John	Will graves be compensated?	There is no standard valuation for graves but a token is given for relocation.	
Priscah	In most cases, the contractor comes with his people to do casual labour and this may spur conflicts. How will you ensure that the contractor employ locals from this area to do casual jobs?	Road linkage committees will be formed to address issues of jobs which will be directed to the resident engineer. In these committees, people will discuss how they will get their local casuals employed.	There is need to construct water pans for the community.
	If the title deed is under names of in laws and the husband is deceased, who will be compensated?	If the wife is there, she is the one entitled for compensation.	
	What is the time frame of the project?	Such projects take a long process to complete. Now its design, followed by budget estimate then KeNHA will review if money is available and plan when to start. This will be followed by advertisement for supervising consultant, bidding of contractor then construction works will begin	
Moses	Are there more meetings or this is the last one?	There will be other meetings for project affected persons.	
Hesbon	During construction, erosion to the lake may increase. How will this be controlled?	We will follow terrain during construction to control soil erosion, however drainage system will be highly considered.	
	What are terms and conditions of compensation?	Payment issues will be handled by NLC	
	In case of realignment, can one continue using the land?	There is no permission to continue using land acquired by the government.	
	Will you strictly follow the old alignment?	There may nay be realignments especially where there are corners.	
	After construction, will the contractor remove the structures on the camp or he will leave them to the community?	The camp is contractors' expense and he cannot be forced to render it to the community.	
	Will there be standard payment for casuals by the contractor?	In community road linkage committee, issues of how you will charge for casual labour should be discussed there.	
	Who is entitled for compensation in a case where the husband is deceased leaving wife and children?	If the wife is there, she is the one entitled for compensation.	

The public meeting requested if various projects can be undertaken under KeNHA's CSR:

- i. Nyanginja polytechnic
- ii. Nyatiende hospital
- iii. Police post
- iv. Fish banda at Rare beach
- v. Public toilet

- vi. Nyanginja secondary
- vii. Bore hole at Kanyamony,Kanyauga
- viii. Fish banda at Kete beach

# Minute 6: Closing Remarks

The sociologist gave a vote of thanks and the chief thanked participants for cooperating. The meeting was closed with a word of prayer at 6.20 pm.

### 4. HOMA BAY COUNTY

SUB-COUNTY	KARACHUONYO	ADMINISTRATIVE LOCATION	CENTRAL KARACHUONYO
CPP VENUE	NYAKONGO YOUTH POLYTECHNIC, OYUMA MARKET	DATE	29/11/2016

#### Minute 1: Opening Remarks

The chief welcomed all participants and consultants. The meeting was opened with a word of prayer by a pastor. The Chief introduced assistant chiefs and elders, Homa Bay county government representatives and welcomed consultants to take over the meeting.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

#### Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

#### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

#### 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians,

motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

## 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

The environmentalist explained that in respect of the Lake Victoria Ring Roads, environmental impact assessment report will be done where the following will be assessed accurately and effectively;

- vii. Air pollution like dust
- viii. Water pollution-oil spillage in water
- ix. Noise pollution near schools and hospitals
- x. Disorganization of soil structures
- xi. Environmental degradation-depleting forests and trees
- xii. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

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#### Positive Impacts

- viii. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ix. Poverty levels will reduce;
- x. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- xi. Tourist attraction;
- xii. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- xiii. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- xiv. Appreciation of land values among others.

#### Negative Impacts

- vi. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- vii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- viii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- ix. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- x. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

## 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- v. Size of the land acquired
- vi. Trees-(indigenous and exotic trees as per the size)
- vii. Crops
- viii. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

#### Minute 5: Open Discussion Forum

#### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Comments /Requests
Jonathan Ongaso			Provide spur road to be extended to Lake Simbi.
William Ogumba	How much land will be needed for the project?	During valuation, people will be shown the size of land to be acquired.	Provide access culverts to homesteads.
	Can the locals have small committee to lease with the contractor on employment issues?	Road linkage committees will be formed to address grievances and issues of employment among others.	
Shem	If water canals will be affected during construction, what measures will you take?	After construction, water canals will be reconstructed	When doing bumps, put road signs indicating bumps ahead to control accidents.
			Chiefs and elders should be allowed

			to assist in land disputes during valuation.
Samuel	If the road is poorly done in that pot holes come up after construction, what will be done?	Supervision is done during and one year after construction to ensure contractor follows design given and quality work was done.	Put signs of animals crossing near grazing areas.
Benjamin			Empower hopeless youth who are wasted in the beach due to lack of activities after fishing. Engage them in sports to enable them have a great future.
Obuya	Will you compensate properties on road reserve?	No compensation of properties on road reserve. Owners of such properties should relocate the property when given notice.	<b>Provide a</b> ccess road to Pala beach and Ogal primary and secondary, housing unit for staff in Oyuma and Nyakango dispensaries
	How will you value trees?	Ministry of agriculture has value of all trees. The list will be used in compensation exercise.	

# Minute 6: Closing Remarks

The sociologist gave vote of thanks and the chief thanked participants for corporating. The meeting was closed with a word of prayer at 2.00 pm.

SUB-COUNTY	KARACHUONYO	ADMINISTRATIVE LOCATION	KOKOTH KATAR/KANJIRA
CPP VENUE	PALA CONSTITUENCY OFFICE	DATE	30/11/2016

#### Minute 1: Opening Remarks

The chief welcomed all participants and consultants. The meeting was opened with a word of prayer by a pastor. Chief introduced assistant chiefs, MCA representative, elders, representatives from Homa Bay county government and welcomed consultants to take over the meeting.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

#### Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

## Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

# 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

# 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

The environmentalist explained that in respect of the Lake Victoria Ring Roads, environmental impact assessment report will be done where the following will be assessed accurately and effectively;

- xiii. Air pollution like dust
- xiv. Water pollution-oil spillage in water
- xv. Noise pollution near schools and hospitals
- xvi. Disorganization of soil structures
- xvii. Environmental degradation-depleting forests and trees
- xviii. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

## 4.3 Social issues

**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

#### Positive Impacts

- xv. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- xvi. Poverty levels will reduce;
- xvii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- xviii. Tourist attraction;
- xix. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- xx. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- xxi. Appreciation of land values among others.

#### Negative Impacts

- xi. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
  - xii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- xiii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- xiv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- xv. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

#### 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- ix. Size of the land acquired
- x. Trees-(indigenous and exotic trees as per the size)
- xi. Crops
- xii. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

#### Minute 5: Open Discussion Forum

# Participant fears/concerns and suggestions/recommendations

Participants fully expressed their support for the proposed project. However, they expressed various fears and concerns led by chief. Each of which was responded to by consultants. Participant fears/concerns and suggestions/recommendations as well as responses given are presented in the following table:

Name	Fears/concerns	Response	Comments /Requests
Tom Mboya	How will jobs be distributed?	Community road linkage committees may be used to advertise jobs and also through local administration offices.	Borrow pits should be rehabilitated with richly agricultural soil or enced and left ope as water pans.
			Compensation to be commensurate with its use and projected to 30-40 years.
Ben Oseto	Graves may be affected. What will happen?	No value for graves, but a token is given to enhance relocation of graves.	Contractor may be unfriendly to locals when it comes to employment
	Will compensation be the same or according to the land size affected?	National Land Commission is the final determiner of amount to be compensated. Compensation will be done according to the size of land affected.	Do spur roads connecting Pala - Miti Mbili-Kodula-Asakwe –Kadel Rakwaro- Sikri to be tarmacked; Kasbisos- Signboard-Abundu hot spring; Kabiero- Nam Onyando and; Aros market-Lwasi beach
Salim			Provide culverts and put score fetches to control soil erosion
Onditi	Will compensation be done after or it's before construction?	Prompt payment should be done before construction.	A committee should be formed at location level to facilitate compensation
	Will people on road reserve be compensated?	People who have been using the road reserve will not be compensated	road should be given access roads
Daktari	Can the affected know early in advance?	There will be meetings with the affected persons and they will choose a committee to be representing them	The PAPs committee should be at ward level
	If a tree which was not compensated is destroyed during construction, how will it be dealt with?	The contractor will pay for the damage	When construction are ongoing, give water pumps to every ward or location to avoid accidents among children and animals crossing over the road to the lake.
Oyugi	If land is affected will it be compensated?	Compensation will be done to every affected property	Ensure that sub-contractors in the area are given work to benefit.
			Those on the road reserve to be compensated since they are using the reserve because of poverty.

# Minute 6: Closing Remarks

The meeting was closed with a word of prayer at 2.00 pm.

SUB-COUNTY	KARACHUONYO	ADMINISTRATIVE LOCATION	KANAM A
CPP VENUE	NYANGWETE, CHIEF'S OFFICE	DATE	30/11/2016

## Minute 1: Opening Remarks

The area chief welcomed participants and consultants. The meeting was opened with a word of prayer by a pastor. The chief introduced assistant chiefs, elders, representatives Homa Bay county government. (Transport and Communication Minister and Homa Bay county Engineer) and welcomed consultants to take over the meeting.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

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Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

## Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

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Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

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The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

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## Minute 5: Open Discussion Forum

#### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Comments /Requests
George Opande	If diversions will be directed on people's farms, will they be compensated?	If diversion is outside the road reserve or outside 40 metres, the owner of the land will be compensated	
Abel Based on environmental impact assessment, there are problems of gulley's leading to soil erosion. Can you do water pans to control soil erosion?		Drainage will be put into consideration. Culverts will be constructed within the outlet which will direct water to surface area.	
	Have you designed access to homes along the road?	Access culverts will be put where necessary. Homesteads may share culverts to avoid building too many culverts which may attract people crossing anywhere on the road thus causing accidents	
	Will natural trees be compensated?	Compensation will be done to both indigenous and exotic trees	
	Will local people be given job opportunities?	Both semi-skilled and unskilled labour will come from locals.	

Nitallis	The road traverses through five counties. will you have a contractor per county and labourers from all locations?	The construction works will be broken into seven sections which will be done by several contractors.	
Samuel Orio	How long will it take to start?	Such projects takes a process after design when KeNHA will source for funds, then advertise for supervising consultant, bidding of contractor then construction works will begin.	Instead of tarmacking all spur roads, can you do murram road so that all benefit.
	On materials, who do we negotiate with? The contractor or who?	The contractor should agree with land owners on terms of material extraction and sign a contract after agreement.	
	Can you divert the road to avoid affecting public institutions?	During design, we restrict affecting public institutions and in case they are affected, we look for alternative routes because relocating such institutions is very expensive	
Obala	Will public utilities like water lines and power lines be interfered with?	Affected public utilities like power lines, will be relocated	
George Wange	Most of the land does not have title deeds. Which mode will you use in compensation?	The National Land Commission will do compensation after valuation.	

## Minute 6: Closing Remarks

The sociologist gave vote of thanks and the chief thanked participants for cooporating. The meeting was closed with a word of prayer at 6.30 pm.

SUB-COUNTY	MBITA	ADMINISTRATIVE LOCATION	LAMBWE
CPP VENUE	CHIEFS OFFICE, KIPASI MARKET	DATE	1/12/2016

# Minute 1: Opening Remarks

Madam chief welcomed all participants and consultants. The meeting was opened with a word of prayer by a pastor after which the chief introduced assistant chiefs and elders and welcomed consultants to take over the meeting.

#### Minute 2: Introduction

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# Minute 5: Open Discussion Forum

## Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Comments /Requests	
Koweja Ochieng	There are beacons put sometimes back. Is that the extent of the road?	The beacons are just sketch or preliminary survey to show that the road will pass through there.		
Daniel Were	There are schools 2km off the road. Will they be provided with access roads?	The schools which are 200 metres from the proposed road may have		
	Will you compensate for land and fence affected separately?	access roads and others access culverts.		
	If the contractor wants to take material and pay without signing a contract, how shall we deal with it?			
Paul Kowili	If your land has no title deed and is affected, what do you do?	If there is a letter showing the land owner, then compensation will be done.		
	Those who bought land and succession are not yet done, what will happen?	if you bought land and succession is yet to be completed, the agreement form will be used		
	Is the value of land with and that without title deed the same?	For those who do not have title deeds, identification shall be done to know the correct owner of the land		
Koweji	How will you go about the graves?	There is no compensation for graves but a token is given to relocate the grave.		
Kennedy Obado	Will locals benefit from job opportunities?	A few will benefit from employment both skilled and semi-skilled labour		
David Otieno Opiyo	I heard a spur mentioned but not those spur roads in Kipasi?	Mentioned spur roads are just proposal. Others may be covered with access roads.		
Joseph Owiti	Is there possibility of building a dam for the people?	Under the CSR, there is allocation for such projects depending on the suggestion of the community.	Consinder constructing a branch road from Kipasi via Waiga	
	Will the project be given one contractor or various contractors?	The road will be contracted in at least six sections each section with a different contractor	polytechnic and primary to Ndhuru beach fish banda; Kipasi via Otieno Kaiwang	
	Where is the project starting from?	The project starts in Bumala – Busia county.	Secondary School, Nyamaji School to Kizaha beach fish banda and connecting Ndhuru beach, Kizaha beach, Uwii beach.	

			Ndago beach, Ng'ou beach, Ngodhe beach and Theru beach to the main road
Samuel Ooko	Will compensation be done before or after?	Compensation will be done according to Kenyan constitution	Let us avoid corruption in this project
Ojwang		that is prompt payment before relocation	Make a spur road to Nduru,Kisaka,Ondago., Alli,Ngou beaches
Susan Owino	Who will pay the workers?	It is the contractor who will pay the workers.	
Benson Osare	If the title deed bears the name of a deceased person and has left behind sons, is it a must that succession be done or the sons can agree on compensation?	It will be good to do succession before the project starts.	
Benard Ogunda			Let's avoid politics in the project for we are nearing elections
			Employment should be be in sections so that many can benefit.
Samuel Odongo Obongo	During extraction of murram, crushers will be hazardous due to noise pollution; will there be compensation to affected persons?	Environmental impact assessments has been done and mitigation measures will be implemented before putting a crusher.	
Benard Amuka Onyango	The grievance redress committee you have talked about, will it be done at location level?	The committee will be for those affected by the road and will be as per location.	
Benard Odhiambo Obato	The conflicts in employment is caused by who know who in employment	Amicable procedures will be followed in sourcing out skilled and semi-skilled labour.	
Margret Owako	Will you rebuilt the house demolished or I will rebuild with money given for compensation?	We shall compensate you and not built the house.	

### Minute 6: Closing Remarks

The sociologist gave vote of thanks and madam chief thanked participants for cooporating. The meeting was closed with a word of prayer at 12.55 Pm.

SUB-COUNTY	KARACHUONYO	ADMINISTRATIVE LOCATION	KOYUNGI
CPP VENUE	KADIEGE MARKET	DATE	1/12/2016

## Minute 1: Opening Remarks

The chief Mr. Moses Odhiambo, welcomed all participants and consultants. The meeting was opened with a word of prayer by a pastor. The chief gave brief introduction of the location and introduced assistant chiefs from different sub-locations and elders and welcomed consultants to take over the meeting.

# Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the

Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

## Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

#### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

#### 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, and Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

#### 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

The environmentalist explained that in respect of the Lake Victoria Ring Roads, environmental impact assessment report will be done where the following will be assessed accurately and effectively;

i. Air pollution like dust

- ii. Water pollution-oil spillage in water
- iii. Noise pollution near schools and hospitals
- iv. Disorganization of soil structures
- v. Environmental degradation-depleting forests and trees
- vi. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

## 4.3 Social issues

**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

## Positive Impacts

- i. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ii. Poverty levels will reduce;
- iii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

#### Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

# 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

v. Size of the land acquired

- vi. Trees-(indigenous and exotic trees as per the size)
- vii. Crops
- viii. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

## Minute 5: Open Discussion Forum

#### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Comments /Requests
Tom Kibogo Ouya	Why the proposed road is not passing Kadel?	The road will not traverse through Kandiege, it will divert to Got Bondo through Osakwe primary school	
	How will you ensure that PAPs are adequately compensated?	Compensation will be different depending on the agreement with land owner.	
Walter Odhiambo Ochola	When is the project taking off?	Construction work has not started currently its feasibility studies which have not ended	
	Is there spur roads in Koyugi location?	Spur roads mentioned are still proposals.	
	In case there will be addition of other meters, will it be compensated?	National Land Commission will do the final valuation.	
	How will trees be compensated?	Compensation of trees will depend on size and type of tree affected.	
	What mitigation measures do you have for social problems?	Social mitigation measures will be incooperated within the ESMP	
	Will proposed road follow the existing road?	The road will follow existing roads	
	How will public land be compensated?	Public land is not compensated by government	
	Will contractor come with his own workers?	Jobs will be availed if they will be available.	
George Ongaro	How will the community benefit from the construction?	The community will benefit with better infrastructure, and employment among others.	
	How will you deal with land owners where spill ways have	If spill ways are outside the road reserve, there will be	

	been directed?	compensation.	
Phares Oganda Aguo	How many stages up to completion of the project?	The project will undergo several stages including design, approval, sourcing of funds, advertising, construction and thereafter maintenance	This is a new road and it should give hope of employment to young ones.
Thomas Ochieng Ojwanda	How will the community cope with disturbances of public utilities like water pipes during construction?	Water pipes relocation will be discussed during project implementation.	
James Aoko Oyieke	In public land where murram will be extracted, can a Dam/water pans be constructed for community?	Now ,we have come to prepare community of the project	
Billy Aluko			Consider connecting Kandiege- Osakwe which is 2kilometers from the proposed road
Moses Ombee			Youths should enrol in technical institutions to enhance them benefit from semi-skilled jobs during construction.
Silvester Nyatado			Environmental impact assessment should be strictly followed to avoid leaving behind anyopen borrow pits which are risky.
Ochieng Mboya	How the compensation for business related premises?	Compensation for business related premises will be decided by the government.	

# Minute 6: Closing Remarks

The sociologist gave vote of thanks and chief thanked participants for cooperating and wished the community a good future for prosperity. The meeting was closed with a word of prayer at 6.00 Pm.

SUB-COUNTY	SUBA	ADMINISTRATIVE LOCATION	KAKSIGIRI CENTRAL
CPP VENUE	NYAKIAMO STADIUM, SINDO MARKET	DATE	02/12/2016

#### Minute 1: Opening Remarks

The area chief welcomed participants and consultants to the public participation meeting. The meeting was opened with a word of prayer by a member. Chief introduced assistant chiefs and elders and welcomed the consultants to take over the meeting.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

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Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

## Minute 3: Agenda presentation

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The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

# 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

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- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

#### 4.4 Land Acquisition and compensation

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agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

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## Minute 5: Open Discussion Forum

### Participant fears/concerns and suggestions/recommendations

Name	Fears/concerns	Response	Comments /Requests
Michael Ogallo	How much will you compensate for the affected land?	Compensation will depend on the market price and 15% for disturbance.	
Dancun Ogutu	Will you give relocation	Notice will be given through Kenya gazette then National Land Commission will come to do final valuation	Undertake to do a spur road in Sindo and cold storage facility.
	advance?	Spur roads will be considered and community will sit down and decide on the project they would want by the priority.	
Nathaniel	Where there is existing road, will you do another road?	We will check if the existing road has the capacity of class C road, and if not, it will be expanded to fit class C.	Support construction of Sindo bay dam in Suba as a corporate social responsibility
Okech	How will jobs be distributed to locals?	Jobs will be availed to locals as part of poverty reduction but those employed should avoid drunkenness.	Spur roads in the lake to have access of fish.
	Will you make culverts to allow access to homes?	Access culverts will be put where necessary. Homesteads may share culverts to avoid building too many culverts which may attract people crossing anywhere on the road thus causing accidents.	Construct toilets in beaches to enhance hygiene in the lake thus preventing lake pollution.
	Where spill ways will be directed, will you compensate?	Spill ways will be compensated if it is outside the road reserve.	Opening beach access roads joining the main road network
Suba security and peace committee			Support construction of Bus stages and fish landing sites across the lake region beaches
			Consider hiring local community members for unskilled labour
			Built a bridge at Sindo bay seasonal river.

The sociologist gave vote of thanks and chief thanked participants for cooperating and encouraged the public to embrace the project. The meeting was closed with a word of prayer at 2.30 Pm.

SUB-COUNTY	HOMA BAY CENTRAL	ADMINISTRATIVE LOCATION	HOMA BAY TOWN & ARUJO
CPP VENUE	SHAURI YAKO PRIMARY SCHOOL, HOMA BAY TOWN	DATE	03/12/2016

#### Minute 1: Opening Remarks

The senior chief, Homa Bay Township, welcomed all participants and consultants. The meeting was opened with a word of prayer by a member. The chief introduced assistant chiefs and elders and encouraged participants to cooperate in the meeting towards the success of the project, and welcomed consultants to take over the meeting.

#### Minute 2: Introduction

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Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

# 4.3 Social issues

**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

### Positive Impacts

- i. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ii. Poverty levels will reduce;
- iii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.
#### Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

#### 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- i. Size of the land acquired
- ii. Trees-(indigenous and exotic trees as per the size)
- iii. Crops
- iv. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

#### Minute 5: Open Discussion Forum

#### Participant fears/concerns and suggestions/recommendations

Participants fully expressed their support for the proposed project. However, they expressed various fears and concerns led by chief. Each of which was responded to by consultants. Participant fears/concerns and suggestions/recommendations as well as responses given are presented in the following table:

Name	Fears/concerns	Response	Comments /Requests
Richard Otieno Osodo	Where is the road exactly passing in Shauri yako estate?	This is just a proposal, detailed design will show exactly where the road will pass.	Shauri yako resident requires water and toilets.
Walter Opiyo	If the barrow pits are left unfilled, what can we do?	The barrow pits are left open because land owners and the contractor do not follow the right procedure of signing the contract, that is, indication of rehabilitation after extracting material. The contract document can be developed through a lawyer of the chief to ensure that the agreement is done.	A dispensary should be built in Shauri yako estate.
	How will you control spread of	There will be a programme of educating the	

	HIV/AIDS from those coming to construct the road?	public on HIV control and prevention.	
	How will properties be valued?	The National Land Commission will do the final valuation.	
Elizabeth Apunda	Will compensation be done to the person reflected in the title deed even if its a child or to the person living in the land?	If the child is above 18 years, compensation will be done to him/her and if not, a legal letter should be produced to show who deserves compensation	
Tom	When will the project begin?	The commemement date will be communicated to the public once the roads authorities are ready.	
Ezra Ongolo	There are areas set aside for roads but the public used the sites and provided other areas. Which ones will be used, the current ones or old ones?	Any road donated to government becomes a public land. If you have built on the proposed road reserve, then you will be given notice to vacate. If the road reserve is 6km and it's there, the additional 34km will be compensated.	
	Does it mean mean that two valuers are involved?	The first valuation gives a cost estimate to the National Land Commission who does the final valuation which determines compensation	
Elisha Nyotenga	Will you give financial support of replanting trees destroyed along the road reserve?	No money will be given for replanting trees which will be damaged along the road. The maintenance will be left to KeNHA	We would like you next time to come with a surveyor and a map of the area to identify PAPs.
Kennedy Onyago	What is the duration of relocation notice?	Once compensated, the PAPs are given one month to relcate	Avoid corruption
Peter Oginga	What is the size of Road spurs?	There spur roads have a minimum widht of 40 meters.	

#### Minute 6: Closing Remarks

The sociologist gave a vote of thanks and the chief thanked participants for cooperating and encouraged the public to embrace the project. The meeting was closed with a word of prayer at 2.15 Pm.

SUB-COUNTY	MBITA	ADMINISTRATIVE LOCATION	NGEMBE EAST
CPP VENUE	KITARE CHIEF'S CAMP	DATE	03/12/2016

#### Minute 1: Opening Remarks

The assistant chief welcomed all participants and the consultants. The meeting was opened with a word of prayer by a member. The assistant chief introduced other assistant chiefs from various locations and elders and encouraged participants to feel free to cooperate in the meeting and welcomed consultants to take over the meeting.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

#### Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

#### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

#### 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, and Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

#### 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

The environmentalist explained that in respect of the Lake Victoria Ring Roads, environmental impact assessment report will be done where the following will be assessed accurately and effectively;

- i. Air pollution like dust
- ii. Water pollution-oil spillage in water
- iii. Noise pollution near schools and hospitals
- iv. Disorganization of soil structures
- v. Environmental degradation-depleting forests and trees
- vi. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

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#### 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- i. Size of the land acquired
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will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

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#### Minute 5: Open Discussion Forum

#### Participant fears/concerns and suggestions/recommendations

Participants fully expressed their support for the proposed project. However, they expressed various fears and concerns led by chief. Each of which was responded to by consultants. Participant fears/concerns and suggestions/recommendations as well as responses given are presented in the following table:

Name	Fears/concerns	Comments /Requests	Response
Benard Otieno	In a case where both parents have died and the title deed bears the name of the father, how will compensation be done to?	Succession can be done.	
Isaiah	There are some forms which were filled. Does it mean the people who filled are the affected?	Those were questionnaires for gender analysis and were filled randomly not necessarily by people affected. People will know that they are affected when valuer will come.	
Samuel Odogo	Who will be paid between the person who has leased land and land owner?	Land will be compensated to the owner and the crops to who has planted them.	
Elly Ouma Sawo	What will you do to the graves along the road?	Graves are not compensated, but a token is given to enhance relocation.	
Jared Otieno Musia	How will you balance for all the four sub-locations to benefit because they have different interests?	For CSR we will focus on the project that will benefit many people.	
Paul Okira Osana	Consider market connectivity that are away from project road?	Spur roads will depend on the budget allocated for this project.	
Pamela Wambure	After murram extraction, will these borrow pits be refilled?	The barrow pits are left open because land owners and the contractor fail to follow the right procedures of signing the contract, that is, indication of rehabilitation after extracting the material.	
	Sometimes the contractor comes with his workers. What procedures do you have to ensure locals get jobs?	Jobs will be availed to locals based on the requirement that 65% of the casuals are sourced from the local area.	

Ann Okeyo	In a polygamist family where there are three wives and the husband is deceased, who deserves compensation?	With the help of chiefs and elders, it will be easy to know among the wives who is using the affected land and she will be compensated.	
Kutema Bob	When the road passes through public land and a development had started, who will be compensated?	Government does not pay itself; the affected project will be rebuilt.	County communal units chaired by security organs to be involved in the project
	The proposed road is passing near the lake and there are farmers using irrigation pipes. Can the engineer provide bridges through which pipes can be passed?	Bridges will not be built to allow pipes to pass through, but we can make concrete stone to ease piping of irrigation water.	to discuss issues of community and to curb insecurity
George Osiko	Is it a must that one should have a title deed to be compensated?	Compensation can be done if there is availability of legal document of the land.	
	When compensating houses, will you consider type and material used in construction?	Compensation of structures will be according to materials used and size of buildings.	
Elijah	Will jobs be given to locals? How will you solve problems of contractor coming with workers from other areas?	If jobs will be available, they will be availed to locals.	There is need for the national government to partner with county government to enhance community linkage in the project.

#### Minute 6: Closing Remarks

The sociologist gave vote of thanks and chief apologized to consultants for the postponement of the meeting which could have taken place the previous day. He thanked participants for attending and cooperating. The meeting was closed with a word of prayer at 6.20 Pm.

SUB-COUNTY	SUBA	ADMINISTRATIVE LOCATION	GWASI CENTRAL
CPP VENUE	CHIEFS OFFICE, NYANDIWA MARKET	DATE	05/12/2016

#### Minute 1: Opening Remarks

The master of ceremony, (Ward administrator) welcomed all participants and the consultants. The meeting was opened with a word of prayer by a member. The Ward administrator welcomed the chief who introduced other assistant chiefs from various locations and elders. Inspector of police, Nyandiwa greeted the congregation and encouraged them to ask questions where necessary. The chief welcomed consultants to take over the meeting.

#### Minute 2: Introduction

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valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

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#### Minute 5: Open Discussion Forum

#### Participant fears/concerns and suggestions/recommendations

Participants fully expressed their support for the proposed project. However, they expressed various fears and concerns led by chief. Each of which was responded to by consultants. Participant fears/concerns and suggestions/recommendations as well as responses given are presented in the following table:

Name	Fears/concerns	Response	Comments /Requests
Samuel Odindo	Farmers are getting mixed up for we are seeing people putting beacons. Should we stop them for the project has not started	Surveyors are going on with their exercise, please give them time to complete the exercise.	
	We have seen a contractor come with his workers to jobs. Will locals get jobs?	Available jobs will be given to locals as 65% of the casuals should be sourced from the local area.	
William Ologi	The road passes through two markets, will the markets be destroyed?	The engineers will determine the cost of realigning the road outside the market.	
	What will happen to the people who have structures along the road?	They will not be compensated if structures are on the road reserve	
Olugi Ogandi	Nyadiwa market does not have a plan. For those who constructed before the road design, will they be compensated?	Any structure affected and is outside the road reserve will be compensated.	
Thomas Odedi Owili	Tell us where exactly the road is passing through?	Valuers will come during valuation and people will get to know where the road is passing.	
Pius Okech	will the road be connected to Rusinga and Mfangano Islands?	The Ring road will be done to the lake shore, but your proposals will be considered.	
Philip Oyuma	You have explained social disadvantages. Suppose a Chinese contractor comes and gives birth with our girls or wives, what do we do with the Chinese babies?	It's a challenge which is often faced in communities where infrastructure projects are being undertaken. It is advisable you to talk with your girls and advise them to take care and use family planning methods if need be.	
Harrison Okoth	Already there are beacons put along the road. Is this an indication of the road Centre?	Don't be worried about the beacons. People will be shown where the road will pass.	
Paul Odhiambo	Will the road be done into sections and at the same time?	It will depend on availability of funds. If there will be enough funds all the seven sections will be done at the same time.	

#### Minute 6: Closing Remarks

The sociologist gave a vote of thanks as the ward administrator called one of the members to give vote of thanks. Nyadiwa police inspector encouraged participants to pass information to those who did not manage to come. The meeting was closed with a word of prayer at 2.40 Pm.

SUB-COUNTY	SUBA	ADMINISTRATIVE LOCATION	GWASI NORTH
CPP VENUE	NYANGWETHI MARKET	DATE	05/12/2016

#### Minute 1: Opening Remarks

The chief welcomed all participants and the consultants. The meeting was opened with a word of prayer by a member. The chief introduced assistant chiefs and elders and welcomed consultants to take over the meeting.

#### Minute 2: Introduction

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The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

#### 4.2 Environmental Issues

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- i. Air pollution like dust
- ii. Water pollution-oil spillage in water
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- iv. Disorganization of soil structures
- v. Environmental degradation-depleting forests and trees
- vi. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

#### 4.3 Social issues

**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

#### Positive Impacts

- i. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ii. Poverty levels will reduce;
- iii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

#### Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;

- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

#### 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- i. Size of the land acquired
- ii. Trees-(indigenous and exotic trees as per the size)
- iii. Crops
- iv. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

#### Minute 5: Open Discussion Forum

#### Participant fears/concerns and suggestions/recommendations

Participants fully expressed their support for the proposed project. However, they expressed various fears and concerns led by chief. Each of which was responded to by consultants. Participant fears/concerns and suggestions/recommendations as well as responses given are presented in the following table.

Name	Fears/concerns	Response	Comments /Requests
Bella Akonya	Will the road deviate towards the lake shore or there will be changes in some sections?	According to the design, the road should be near the lake but in some sections there is realignment due to some reasons.	
	Why can't NEMA be involved in compensation during material picking?	This is a local agreement and that's why you need to understand and agree with the contractor before signing the contract.	
Mr.Manyauki	Is there possibility of doing spur roads connecting to social amenities like schools, hospitals and churches?	Spur roads will be done where necessary but not for every social institution along the road.	
Ochieng Francis	What factors are considered in choosing spur roads?	Consideration is the importance of the site like fish landing base.	
	If after land acquisition the piece left is not agriculturally economical, will I be compensated for the whole piece of	If the remaining part is not of economic value, then you will be compensated for the whole piece of land.	

	land?		
Peterlis Obel	What's the indication of the beacons already put?	Don't be worried about the beacons. People will be shown where the road will pass.	
Peter Kamanyaji	When you talk of realignment, do you mean you will avoid all corners?	Sharp corners will be avoided to control accidents.	

#### Minute 6: Closing Remarks

The sociologist gave vote of thanks and chief thanked participants for cooperating and encouraged the public to embrace the project. The meeting was closed with a word of prayer at 6.30 Pm.

#### 5. MIGORI COUNTY

SUB-COUNTY	NYATIKE	ADMINISTRATIVE LOCATION	SORI
CPP VENUE	SORI STADIUM, SORI MARKET	DATE	06/12/2016

#### Minute 1: Opening Remarks

Madam Chief welcomed all participants and the consultants. The meeting was opened with a word of prayer by a member. The chief introduced other assistant chiefs from various locations and elders and welcomed consultants to take over the meeting.

#### Minute 2: Introduction

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Hesbon Gou	What is the timeframe of the project?	How long the project will last will be determined by KeNHA and not Egis(K).	
Zachaeous Ogutu	How will you deal with graves interfered with during construction?	Graves have no value, only a token is given to enhance relocation.	
Silvester Inda	This is a World Bank funded project, is it a loan or grant?	It is a loan from the World Bank	
David Asembo	How will social amenities like schools be cushioned?	During design, we avoid affecting public institutions and in case they are affected, we look for alternative routes because relocating such institutions is very expensive	

Martin Njangu	When the road passes between electricity pole and a building which one will be easy to remove?	We consider not affecting big houses to ease compensation cost and if people build expensive houses on road reserve, there will be no compensation.	
Andrew Onyango	From Nyandiwa – Muhuru, will the road follow the existing alignment?	From Nyadiwa, it will follow the current road to Mukuyu (class E)-Nyamangai then join class D at Nyamanga-Sori.	
Samson Baraza	What rate of compensation should we expect from environmental pollution?	We are going to compile a report on EIA for the contractor who will come later to use the document and own the report.	
Charles Odongo	Contractors spoil school children. What mitigation measures do you have towards this?	Have a talk amongst children, youth and adults on how to conduct themselves during construction to avoid school children getting spoilt.	
	Will there be distance from the lake shore to where the road is?	No exact measure form the lake, what we look into is putting the road not quite far from the lake shore.	

#### Minute 6: Closing Remarks

The sociologist expressed thanks and gratitude for cooperation. The ward administrator Kachieng ward expressed gratitude for the project and asked residents and stakeholders to disseminate more about the ring road at the household level. Madam Chief thanked participants for cooperating. The meeting was closed with a word of prayer at 2.35 Pm.

SUB-COUNTY	NYATIKE	ADMINISTRATIVE LOCATION	ANEKO
CPP VENUE	CHIEF'S CAMP, ANEKO MARKET	DATE	06/12/2016

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Benard Kasam			Resources like stones in the area should be used to benefit the locals.
Peter	Can the chief help in succession for the process in court may be costly?	Succession should be done early.	
Samson Owino	If we are five in our family and we agree on compensation on our fathers land, can we be compensated?	If you agree and show an agreement letter, compensation will be done.	
	During construction, will the locals be employed?	If jobs will be available, it will be availed to locals.	
Jarred	Will the affected be consulted before construction?	There will be meetings for PAPs only during when they will be given more details and direction on what to do.	

#### Minute 6: Closing Remarks

The sociologist expressed thanks and gratitude for cooperation to participants. The area chief called a member to give vote of thanks and the meeting was closed with a word of prayer at 6.00 pm.

SUB-COUNTY	NYATIKE	ADMINISTRATIVE LOCATION	MUHURU BAY
CPP VENUE	MUHURU BAY, MARKET AREA	DATE	07/12/2016

#### Minute 1: Opening Remarks

The area chief welcomed participants and consultants to the public participation meeting. He then invited Mr. Wilberforce Muchanyi, one of the local participants to lead in prayer. The chief then introduced assistant chiefs from his sub locations before introducing the consultants whom he then welcomed to present the agenda of the meeting and describe the project road.

#### Minute 2: Introduction

The project engineer introduced the other consultants present including the environmentalist, the sociologist and the environmentalist. He also explained that Egis international and Egis Kenya consulting Engineers, had been contracted by Kenya National Highways (KeNHA) to design of the Lake Victoria Ring Roads and also undertake the Environmental and Social Impact Assessment, as well as well as preparing a Resettlement action Plan and tender documents. It was explained that the design study is funded by World Bank through IDA (International Development Agency) in liaison with National government (KeNHA) via Kenya Transport Sector. The contract is for two years from May 2015 up to April 2017.

It was explained that KeNHA oversees construction and maintenance classes A, B and C roads in the country. Some examples of class A roads were given as national trunk roads which connects countries such as Mombasa – Nairobi – Nakuru – Eldoret – Bugoma – Malaba – Uganda; Nairobi-Isiolo-Marsabit-Moyale-Ethiopia and Isabenia-Kisii-Kisumu-Kakamenga-Kitale-Lodwar-Turkana-South Sudan roads.

Some examples of class B roads were given as roads which connects main cities such as Eldoret-Kitale-Nakuru-Nyahururu-Nyeri and Nakuru-Kericho-Busia raods among others.

Class C roads which connect counties including the proposed lake Victoria Ring Roads that will run from Busia through Siaya, Kisumu, Homa Bay and Migori counties.

#### Minute 3: Agenda presentation

The project sociologist presented the meeting agenda as to bring public awareness as well as soliciting the residents' fears/concerns and suggestions/recommendations in addition to preparing the communities in readiness for preparation of the Resettlement Action Plan activities.

#### Minute 4: project presentations

Presentations on the study of Lake Victoria Ring Roads were undertaken by the engineer, environmentalist, sociologist and valuer. Presentations by each professional are explained under the following paragraphs:

#### 4.1 Design

The project engineer explained alignment of the project road that it will start in Bumala in Busia County and proceed to Muhuru Bay in Migori county traversing through five counties (Busia, Siaya, Kisumu, Homa Bay and Migori). He presented that the road start point is Bumala and it will pass through Sio port before proceeding to Port Victoria, Lake Kanyaboli, Nyamonye, Owimbi beach-Luanda Kotieno, Asembo and Otogolo in Kisumu county. The road will then proceed through Katito, Kendu Bay, Oyuma, Pap Onditi, Pala, Nyangwete, God Bondo and Homa Bay. From Homabay, the road will go through Shauri Yako, Kipasi, Kitare, Mbita, Sindo, Nyangwethe, Nyadiwa, Karungu, Sori, Nyatike and terminate at Muhuru Bay.

He explained that the design is inclusive of proposed spur roads which include: Port Victoria, Osieko, Uhanya beach, Luanda Kotieno, Kaloreni and Karungu beach. The proposed road covering approximately 500 kilometers including 454 kilometers in length and 43 kilometers for spur will be a class C road whose full length will be built to bitumen standard. The right of way will be 40 meters wide (20 meters right and left) to provide reserves specifically for road services like water lines, data cables, power lines, for expansion, diversions and also for road safety purposes. The road carriage way will be 7 meters (3.5 right and left) and road shoulders 2 meters (right and left) for pedestrians, motorcyclists and drainages. In steep areas, 3 meters will be needed for climbing lanes specifically for heavy vehicles like Lorries. The road will require land due to expansion of existing road and realignment in areas where there are sharp corners. In addition, the project road will provide funds for development of road side amenities like schools, markets and hospitals along the alignment.

The road has been divided into five sections for ease of construction which include: Bumala – Asembo; Asembo-Otonglo; Katito–Homa Bay; Homa Bay-Nyangwethe and Nyangwethe-Muhuru Bay. It was explained that the project now is at design stage after which the report will be handed over to KeNHA to look for funds for construction.

#### 4.2 Environmental Issues

The environmentalist explained that environmental concerns are highly stressed and put into consideration to ensure that the area is left better than it was found or as it was. In addition, according to Kenyan constitution, every citizen is entitled to clean and healthy environment therefore concerted efforts should be put in place conserve the environment.

The environmentalist explained that in respect of the Lake Victoria Ring Roads, environmental impact assessment report will be done where the following will be assessed accurately and effectively;

- i. Air pollution like dust
- ii. Water pollution-oil spillage in water
- iii. Noise pollution near schools and hospitals
- iv. Disorganization of soil structures
- v. Environmental degradation-depleting forests and trees
- vi. Material sites-stones and murram

Mitigation measures to the expected will include construction of barriers to reduce air pollution and watering the road during dry season. To control noise near schools and hospitals, the contractor can opt to work during the night or early in the morning as well as dust netting to control dust near schools and hospitals. The consultant in cooperation with NEMA will ensure that the project does not deplete forests and trees.

In this connection, the environmentalist sought to know from the participants' the anticipated environmental impacts of the road as well as material sites for murrum and stones. She explained that the consultants' concern is to ensure that barrow pits left behind which are not environmentally hazardous for instance mosquitoes can breed there after the holes fills with water. In such, the land owner should sign an agreement with the contract indicating rehabilitation of the site after extracting the material. The barrow pits should be refilled with soil or trees planted to leave it the way it was. In case the barrow pits is left for water purposes, it should be fenced to avoid cases of accidents.

#### 4.3 Social issues

**The s**ociologist explained that the project will interfere with people's lives, services and activities. However, she allayed fears since the social impact assessment carried out also integrates the necessary mitigation measures.

She presented the possible anticipated positive and negative impacts for which residents should be made aware of to psychologically prepare the cope with the impacts. She discussed the anticipated project impacts as follows:

#### Positive Impacts

- i. Will spur social -economic activities along Lake Region as there will be good connectivity, mobility and accessibility of goods and services;
- ii. Poverty levels will reduce;
- iii. There will be improved and better means of transport as the road will attract many means of transport on the road thereby reducing transport costs and people will enjoy quick and cheap means of transport;
- iv. Tourist attraction;
- v. Since this area has poor infrastructure, the proposed project will increase mobility, connectivity and accessibility and will also improve tourism activities along the lake shore.
- vi. Creation of job opportunities such as direct employment for people who will avail skilled and semi-skilled labour and indirect employment where people will start business like food kiosk, selling of commodities like water and airtime along the road during construction and;
- vii. Appreciation of land values among others.

#### Negative Impacts

- i. People are likely to be displaced which will be mitigated through the preparation and implementation of a resettlement action plan;
- ii. Disturbance of services like electricity lines, water pipes, among others. After the construction, all disrupted services will be replaced back;
- iii. Increase of HIV/AIDs due to increased interaction of people working on site- in this case, the residents were advised to educate one another even at family level on how to conduct themselves with dignity to avoid regrets after the construction;
- iv. Increased accidents due to improved road network-Bumps and road signs will be initiated to reduce accidents but its responsibility of road users to use the road responsibly and;
- v. Population increase along lake shores as good roads will attract many people who may decide to start business along the lake. This is likely to cause congestion in social institutions like, schools, health institutions, churches etc.

#### 4.4 Land Acquisition and compensation

The valuer explained that there will be land acquisition due to road expansion and realignment and that is where the work of valuation comes to address compensation of the affected people. She outlined the Kenyan constitution which states that when a project affects a property, the affected must be given a just compensation as per the land Act. The following are valued and compensated:

- i. Size of the land acquired
- ii. Trees-(indigenous and exotic trees as per the size)
- iii. Crops
- iv. Structures (material used in construction)

She explained that the valuation exercise will be done in 2017 to enable the government of Kenya plan on the approximate estimates based on number to be affected. During this exercise, measurement of the affected property will be undertaken and photos showing the land owner. Compensation value of trees will be given by the ministry of agriculture according to importance and size of the tree. After the first valuation, people are encouraged to continue with their normal activities and duties until compensation award is given. National Land Commission will do the final valuation and present an award to be signed by the property owner if he/she is satisfied with the valuation sum. When

one is not satisfied, he/she has a right to write a refusal note and take it to the land tribunal and valuation will be redone.

For compensation, title deed must be produced and should reflect the name of claimant and where succession needs to be done, this is the time to start. In land which has disputes, the money will be taken to court until the dispute is settled. Those who are undertaking activities on road reserve were notified that they cannot be compensated.

#### Minute 5: Open Discussion Forum

#### Participant fears/concerns and suggestions/recommendations

Participants fully expressed their support for the proposed project. However, they expressed various fears and concerns led by chief. Each of which was responded to by consultants. Participant fears/concerns and suggestions/recommendations as well as responses given are presented in the following table:

Name	Fears/concerns	Response	Comments /Requests
Tobias Mumbuko	Will the road traverse through the existing C13 road or its Tangatia?	The project road will follow the existing road from Sori-Muhuru Bay	
Tobias Muganda	Some contractors weirdly temper with social amenities without mercy.	Contractors will follow design given. We are trying to avoid affecting public institutions.	
Chief	Can the construction begin	The road is in several sections:	
	from Muhuru to Bumala?	Bumala-Nyamonye	
		Asembo-Otonglo	
		Katito-Homa Bay	
		Homa Bay-Nyangwethe	
		Nyagwethe-Muhuru Bay	
John Okello	Some contractors come with workers and this contributes to conflicts. Do you have procedures to ensure locals get jobs?	Casuals will be sourced from the local area but they must conduct themselves well during construction.	
Salim Juma	Do you have mitigation measures to curb noise and air pollution during construction?	The noise and air pollution mitigation measures will be contained in the environmental and social management plan.	
	At what stage is the project as per now?	The project is in stage two - design.	
	Will you compensate trees damaged during construction?	All trees will be compensated based on size and type of the tree.	
Jarred Migina	When is the project kicking off?	Such project undertakes a process which takes time to completion. Now its design, then estimate project budget then KeNHA will review if money is available then plan when to	Recommended that a spur road be extended to Kowet beach (boarder)
		start, then advertise for supervising consultant, bidding of contractor then construction works will begin.	Local materials like stones and murram should be used during construction.

Wange Warenge	Disagreement due to land disputes. How do you carry compensation?	Succession should b done where there are land disputes otherwise the money will be taken to court until dispute is settled.	Community to be given a chance to form a team to lead valuers.
			Valuers should walk with chief and elders to give direction.
Kennedy	Chinese undermine Africans a lot. If they do sub-standard job, where will complains be taken to?	Cases of sub-standard work should be reorte to KeNHA regional office in Migori.	Locals should be allowed to benefit from employment.
	Is the project funded by World Bank and National government?	The project is funded by World Bank and some percentage by the National government.	

#### Minute 6: Closing Remarks

The sociologist expressed thanks and gratitude for cooperation. The area chief thanked all participants for attending. The meeting was closed with a word of prayer at 2.15 pm.

# ANNEX 6 LIST OF PARTICIPANTS

# ANNEXE 6: SIGNED LIST OF PARTCIPANTS AT STAKEHOLDER CONSULTATIVE FORA

## SIGNED LIST OF PARTICIPANTS AT KEY STAKEHOLDER FORA HELD IN JUNE 2016

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of Kenya Consultancy services for the Feasibility Study, Environmental and Social Impact Assessment, preparation of Resettlement action Plan and the design and tender documentation for the Lake Victoria Ring Roads

April/May 2018

List of persons consulted Mobile No. Designation Orgnaisation unty CLAC da BULLALA 0920 592747 Oumangin ( 9 mailon FOUCKTON GABRIEL O. HIGIAN LARGUE & SOCIAL 07726782633 Burnala DASORD & GODTASY 00 gentingen aguer an 300 PASCAL D. GODA COMMIN DEV. C.D.O 736415598 acriculia 40 Osci BUNHALA S.L.P.O. JACK . M. WANDER LIVERTOCK OTATEST 229 Jac And Com BUT YALA NPS DAPS BUNYALA NICCO A. MUSUNIA 0721362140 necemu N. N. TAKACH ROBGERS F. AJUMUS COUNTY GONT. CLARK 072357403 WARNORS OFFICE 072541764 rutheleas Equal at KSIL ALOD ADJISOR HOMMABA-1 NICHOLAS KLORIKO TRANSPORT & WERASSAURE CECM 0725 162645 michalas Konika Q-164 HOMOBAT Homabas National administra C Kassim famil C 6)2226421 ferrassing felta Co PHEIP 5- 0300 to fac Elimpin 2 Phileunard 15 NUMEF Ato Hama -BAY LR 0721245204 YISTEHLAMADT LANDS VIOLET LAMJ \*ka HOMABAY Mayende Mary WARDENY 0717672121 Edd ma 2002/D Jahos, Com K. W.S Homabay Knto Ave + E+D Okembo Monra Ba-0728549686 Oktimbe carenge mai) rem Caren TEMA Hondalay Nattal Ekry mille Merry forest Sprile Aect 0728-sq1312 nodite provers low Odife April officer 72/69768 peterojula Cyalar can Nellon LEALA Susia FOULAL SERVICES BUSA 1292A CI. CANON TACCHAE'S MDRAKE TRANSCOM 0722815182 ZMoseke Byshoo com CED BUSIA



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April/May 2018

Bub-county	Name	Organisation	Designation	Mobile No.	Email	Signature
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Republic of Kenyw Consultancy services for the Feasibility Study, Environmental and Social Impact Assessment, preparation of Resettlement action Plan and the design and tender documentation for the Lake Victoria Ring Roads

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Sub-county	Name	Organisation	Designation	Nobile No.	Email	Signature
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April-May 2018

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### **NEWSPAPER PUBLIC NOTICES**



Kenya National Highways Authority

Quality Highways, Better Connections

# PUBLIC NOTICE

#### PROPOSED CONSTRUCTION OF LAKE VICTORIA RING ROAD

CONSULTANCY SERVICES FOR A FEASIBILITY STUDY, ENVIRONMENTAL IMPACT ASSESSMENT, SOCIAL IMPACT ASSESSMENT & PREPARATION OF A RESETTLEMENT ACTION PLAN, PRELIMINARY AND DETAILED DESIGN AND PREPARATION OF THE TENDER DOCUMENTATION FOR THE CONSTRUCTION OF THE LAKE VICTORIA RING ROAD CONSULTATIVE PUBLIC PARTICIPATION

The Government of the Republic of Kenya (GoK) with credit from the International Development Association (IDA) intends to construct a continuous paved ring road along the entire shores of Lake Victoria in Kenya. The proposed project traverses through Busia, Siaya, Kisumu, Homa Bay and Migori Counties.

As an important part of the design process, the Kenya National Highways Authority (KeNHA) in conjunction with the Design Engineering consultants, Egis International, plans to hold public consultation meetings with all interested persons and institutions within the project area. The objective of the meetings will be to raise awareness and seek participation of the public in the project. The Public consultation meetings are sheduled as follows:-

COUNTY	SUB-COUNTY	LOCATION	VENUE	DATE	TIME
Siaya	Usonga	Usonga	Sidundo Market – open market	22/11/2016	2.00 pm
	-	South west Alego	Hawinga- Hawinga Dispensary	22/11/2016	10.00 am
		South Central Alego	Gendro - Gendro primary school	23/11/2016	2.00 pm
	Bondo	East Yimbo/North	Nyamonye Market – open air market	23/11/2016	10.00 am
		Yimbo	site		
		Central sakwa	Nango Market – chiefs camp	24/11/2016	10.00 am
		Central sakwa	Wangusu market - open air market site	24/11/2016	2.00 pm
Kisumu	Seme	South West Seme	Akado Market, open air	25/11/2016	10.00 am
		South Central Seme	Bodi Market, open air	25/11/2016	2.00 pm
	Kisumu West	East Seme	Kaloka Market, open air	26/11/2016	10.00 am
		South west Kisumu	Bridge/Lisuka market, Lisuka Primary	28/11/2016	11.00 am
			Ogalo Market, Ogalo Primary school	29/11/2016	2.00 pm
Homa Bay	Karachuonyo	Central Karachuonyo	rachuonyo Oyuma market, Nyakongo Youth		10.00 pm
		-	Polytechnic		
		Kokoth Katar/Kanjira	Pala, constituency office	30/11/2016	10.00 am
		Kanam A	Nyangwete chief's office	30/11/2016	2.00 pm
		Koyugi	Kandiege	01/12/2016	2.00 pm
	Homa bay	Homa Bay town & Arujo	Shauri Yako Estate	03/12/2016	2.30 pm
	Central				
	Mbita	Gembe East	Kitare market- Kitare Chief's camp	02/12/2016	2.00 pm
		Lambwe	Kipasi market -chiefs office	01/12/2016	10.00 am
	Suba	Kaksingri Central	Sindo Market - Nyakiamo Stadium.	02/12/2016	10.30 am
		Gwasi North	Nyagwethe Market	05/12/2016	2.00 pm
		Gwasi Central	Nyandiwa Market, Chiefs office	05/12/2016	10.30 am
Migori	Nyatike	Sori	Sori stadium	06/12/2016	10.30 am
		Aneko	Aneko market, Chief's camp	06/12/2016	2.00 pm
		Muhuru Bay	Muhuru Bay, Market area	07/12/2016	12.00 pm
Busia	Samia	Agega	Mulukhoni Market - open air market site	8/12/2016	10.00 am
		Naguba	Sio Port - open air market site	8/12/2016	2.00 pm
	Bunyala	Bwiri	Bumbe Market - open air market site	9/12/2016	10.00 am
		Magombe Central	Mubwayo market - Post Office	9/12/2016	2.00 pm

All members of the public are invited to attend and participate in the meetings. Comments on the project can also be sent to:

Egis Kenya P. O. BOX 76672-00508, Nairobi Email: thadeus.oluoch@egis-kenya.com Tel. 020 - 2639896

Eng Peter M. Mundinia DIRECTOR GENERAL

# NUMBER OF PARTICIPANTS IN LVRR PUBLIC CONSULTATIVE MEETINGS HELD IN NOV & DECEMBER 2016

(Please note that the signed list of participants is too large to attach here but the file can be inspected at KENHA or Egis offices)

				N0. of Participants		Economic Activities						
	Sub-											Government Representati
County	County	Location	Venue	Date	Male	Female	Total	Farming	Fishing	Business	Religious	ves
	Usonga	Usonga	Sidondo Market	22.11.2016	23	4	27	11	0	2	4	3
		South West Alego	Hawinga Dispensary	22.11.2016	35	10	45	24	0	3	1	3
		South Central Alego	Gendro Primary School	23.11.2016	43	49	92	37	0	1	0	5
		East Yimbo/North Yimbo	Nyamonye Market	23.11.2016	69	52	121	36	0	18	0	9
		Central Sakwa	Nango Chiefs Camp	24.11.2016	42	4	46	25	2	0	0	5
Siaya	Bondo	Central Sakwa	Wangusu Market	24.11.2016	49	3	52	9	0	17	0	2
	Seme	South West Seme	Akado Market	25.11.2016	67	22	89	12	2	44	1	6
	Kisumu	South Central Seme	Bodi Market	25.11.2016	52	9	61	37	10	6	0	7
		East Seme	Kaloka Market	28.11.2016	48	5	53	5	18	1	0	8
			Lisuka Market	28.11.2016	62	25	87	11	0	3	0	6
Kisum u	West	South West Kisumu	Ogal Market	28.11.2016	24	22	46	5	11	6	1	4
		Central Karachuony	Nyakongo Youth Polytechnic	29.11.2016	51	0	51	28	0	3	1	6
		Kokoth Kataa/Kanjira	Pala Constituency Office	30.11.2016	84	9	93	14	0	19	0	8
Homa	Karachuon	, Kanam A	Nyangwete Chiefs Office	30.11.2016	114	21	135	20	0	24	0	11
Bay	yo	Koyungi	Kandiege	01.12.2016	110	13	123	33	0	7	0	10

			Market									
	Homa Bay Central	Homa Bay Town And Arujo	Shauri Yako Primary	03.12.2016	55	6	61	15	1	23	1	10
		Gembe East	Kitare Chiefs Camp	03.12.2016	49	31	80	0	0	0	0	3
	Mbita	Labwe	Kipasi Market	01.12.2016	110	31	141	82	1	34	0	6
		Kaksigri Central	Nyakiamo Stadium-Sindo	02.12.2016	67	3	70	15	6	22	1	7
		Gwassi North	Nyangwethe Market	05.12.2016	40	0	40	7	7	3	0	8
	Suba	Gwassi Central	Nyandiwa Chiefs Camp	05.12.2016	47	1	48	1	12	4	0	4
		Sori	Sori Chiefs Camp	06.12.2016	66	10	76	24	1	11	1	8
		Aneko	Aneko Dispensary	06.12.2016	44	5	49	23	12	3	0	5
Migori	Nyatike	Muhuru Central	Kikongo Market	07.12.2017	80	11	91	3	11	20	0	5
		Agega	Mulukhoni Market	08.12.2016	117	14	131	30	0	3	0	5
	Samia	Naguba	Sio Port Market	08.12.2016	98	17	115	5	4	11	0	5
		Magombe Central	Mubwayo Market	09.12.2016	150	17	167	83	0	12	0	6
Busia	Bunyala	Bwiri	Bumbe Beach	09.12.2016	93	14	107	14	43	15	0	5