Uganda National Roads Authority

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT OF THE PROPOSED UPGRADING FOR THE GREATER KAMPALA ROADS IMPROVEMENT PROJECT (GKRIP)

Environment Impact Statement

Submitted to:
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List of Acronyms

ADT	Average Daily Traffic
AfDB	African Development Bank
AIDS	Acquired Immune Deficiency Syndrome
APP	Air Pollution Potential
ARAP	Abbreviated Resettlement Action Plan
BAT	Best Available Technologies
BEP	Best Environmental Practices
BOD	Biological Oxygen Demand
BRT	Bus Rapid Transit
CBD	City Business District
CBD	Convention on Biodiversity
CBR	Centre for Basic Research
CHOGM	Commonwealth Heads of Government Meeting
CSO	Civil Society Organizations
CO_2	Carbon Dioxide
dB	Deci bels
DBH	Diameter at Breast Height
DDP	District Development Plan
DRC	Democratic Republic of Congo
DWRM	Directorate of Water Resources Management
EIA	Environmental Impact Assessment
EMP	Environment Management Plan
EMS	Environment management Statement
ESIA	Environmental and Social Impact Assessment
ESMP	Environment and Social management Plan
EU	European Union
GDP	Gross Domestic Product
GHG	Green House Gases
GIS	Geographic Information System
GoU	Government of Uganda
GPS	Global Positioning System
GKRIP	Greater Kampala Roads Improvement Project (GKRIP)
GKMA	Greater Kampala Metropolitan Area
HIV	Human Immune Virus
JI	Joint Implementation
JICA	Japanese International Corporation Agency
KCCA	Kampala Capital City Authority
LA	Lead Agency
LC	Local Councils
MCA	Multi – Criteria Analysis
MATA	Metropolitan Area Transport Authority
MEAs	Multilateral Environment Agreements
MTRA	Multi-Sect oral Transport Regulatory Authority (MTRA).
MLGSD	Ministry of Labour, Gender and Social Development

MoH	Ministry of Health
MoLHUD	Ministry of Lands, Housing and Urban Development
MoWE	Ministry of Water and Environment
MoWT	Ministry of Works and Transport
MoWE	Ministry of Water and Environment
NDP	National Development Plan
NEMA	National Environment Management Authority
NFA	National Forestry Authority
NFTP	National Forest and Tree Planting
NMT	Non Motorized Lanes
NO_X	Nitrous Oxides
NRSC	National Road Safety Council
NWSC	National Water and Sewerage Corporation
UBOS	Uganda Bureau of Statistics
UETCL	Uganda Electricity Transmission Company Limited
OHS	Occupational Health Safety
PAP	Project Affected People
PCRs	Physical Cultural Resources
PEAP	Poverty Eradication Action Plan
RAP	Resettlement Action Plan
RCC	Resident City Commissioner
RF	Road Fund
ROW	Right of Way
RSDP	Road Sector Development Plan
SAICM	Strategic Approach to International Chemicals Management
RSPM	Respirable Suspended Particulate Matter
SPM	Suspended Particulate Matter
TORs	Terms of Reference
ULC	Uganda Land Commission
UMI	Uganda management Institute
UNFCC	United nations Framework Convention on Climate Change
UNRA	Uganda National Roads Authority
UNIDO	United Nations Industrial Development Organization
URC	Uganda Railways Corporation
VES	Visual Encounter Survey
WB	World Bank
ZOI	Zone of Influence

List of Key Personnel

We, the under listed are the Team that has conducted the Environmental and Social Impact Assessment study for the proposed construction of the Flyovers with respect to the Greater Kampala Roads Improvement Project and this Environment and Social Impact Assessment in line the EIA Guidelines of 1997 published by the National Environment Management Authority.

Lead Consultants

Name of consultant	Specialty Area	Signature
1. Stephen A. K. Magezi	ESIA Team Leader	
2. Gertrude Binta Magezi	~~Natural Resources Management~~ RAP Specialist	
3. Edith Birungi Kahubire	Sociologist and Project manager	
4. David Mugisa	Air Quality and Noise Specialist	
5. Denis Byamukama	Water Quality Specialist	
6. Mathias Behangana (D.)	Lead Ecologist	
7. John Diisi	GIS Specialist	
8. Brian Guma	Hydro-geologist	
9. Dismas Ongwen	Archaeologist/Physical Cultural Resources	

Other Contributing Specialists in the ESIA Study

- Dathan Kiwesi Kiwanuka — Land Surveyor
- Sentamu Joshua — Land Surveyor
- Allan Mugisha — Valuation Surveyor

ESIA Environment Impact Statement for the Detailed Engineering Design for the Greater Kampala Roads Improvement Project (GKRIP)

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EXECUTIVE SUMMARY

1 Introductions

This report comprises the Environment Impact Statement for the preparatory study on The Greater Kampala Roads Improvement Project (GKRIP) which covers the congested section from off the Clock Tower Roundabout to off the Hotel Africana Roundab1out along Queensway (3.2km) as well as the extended section from Kibuye Roundabout to Jinja Road after the Cemetery. The Road Project is within the Central Business District (CBD) of Kampala Capital City comprising parts of Queensway, Nsambya Road, Mukwano Road, all the way to Jinja Road off Hotel Africana Roundabout.

This road project is consistent with the description of the projects under section 3 of the Third Schedule of the National Environment Act, Cap 153 that requires a full ESIA. On the other hand, JICA has classified this project as a category B project in line with their own Environmental safeguards. The main objective of the project is to decongest the Centre of Kampala City as well as the congested Roundabouts which are located along the congested section of the project road.

2 Route Choice

In all, the JICA study identified three options which were termed Option 1, Option 2, and Option 3 (Described later under alternatives chapter). Option three (Clock Tower Flyover (FO)) was recommended based on overall evaluation (traffic analysis, social impacts, technical issues, consistency to higher plans, among others). Option 3 is that road section from Queens's way, through to Nsambya, Mukwano roads up to Kitgum House Junction ending beyond the Cemetery along Jinja Road.

Option three was the best option among the considered options because it: -

- It has the minimum of the Social/ Environmental impacts since there will be no properties taken due to the development.

The construction of the flyovers along the Mukwano-Nsambya Roads would be significantly effective to decongest the traffic to and from the City Centre.
It has less numbers of pedestrian traffic as opposed to the case for Ben Kiwanuka Street (Option 2) for example.

This project takes into account the planned and ongoing projects within close proximity of the road / flyover (FO) Project.

3 Description of the Works

Specifically the road project is composed of two Flyovers and a combination of curved and straight sections. In total the road may be divided into nine sections which cover the following: -

- Section A: Straight section on Queensway
- Section B: Curve Section at Clock Tower Junction
- Section C: Straight section along Nsambya Road
- Section D: Straight section on Mukwano Road
- Section E: Curve section on Mukwano Junction
- Section F: Transition section on Access Road
- Section G: Curve section at Kitgum House Junction
- Section H: Transition Curve Section between Kitgum House Junction and Hotel Africana Junction
- Section I: Straight Section above Hotel Africana Junction

In addition there will be 3 Branch Ways which is as follows: -

- Yusuf Lule Road Branch Way: 220m;
- Nsambya Junction – Gaba Road Branch Way: (approx 600m);
- Shoprite - Clock Tower widening Branch Way : 200 m

4 Policy, Legal and Institutional Framework

The Policy, Legal and Institutional Frameworks within which the road project will be managed were reviewed during the ESIA. This was necessary to ensure that implementation and operations of the proposed road project comply with the policies and relevant environmental laws. The framework ensures that major developments such as the road projects are done in line with the law and are sustainable in the long term. The Policy and Legal Framework within which the project will be implemented include:

The Policy Framework:

- The National Development Plan;
- The National Environment Management Policy, 1994;
- The National Water Policy, 1999;
- The Wetlands Policy, 1995;
- The National AIDS Policy and National Strategic Framework for HIV/AIDS activities in Uganda;
- The Ministry of Works & Transport Policy Statements (Gender, HIV/AIDS, OHS) 2008.

The Legal Framework:

- The Constitution of the Republic of Uganda, 1995;
- The National Environment Act, Cap 153;
- The Water Act, Cap 152;
- The Uganda Wildlife Act, Cap 200;
- The Historical Monuments, Act Cap 46;
- The Land Act, Cap 227;
- The Road Act, Cap 358;
- The Access to Roads Act, Cap 350;
- The Employment Act, Cap 219;
- The Workers Compensation Act, Cap 225;
- The Labour Disputes (Arbitration and Settlement) Act, (2006);
- The Labour Unions Act, 2006;
- The Town and Country Planning Act, Cap 246;
- The Public Health Act, Cap 281;
- The National Forestry and Tree Planting Act, 2003;
- The Petroleum Supply Act, 2003;
- The Electricity Act, Cap 145;
- The Occupational Safety and Health Act, 2006;
- The Environmental Impact Assessment Regulations, 1998;
- The Water Resources Regulations, 1998;
- The National Environment (Wetlands, River Banks & Lakeshores Management) Regulations, 2000;
- The National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999;
- The National Environment (Waste Management) Regulations, 1999;
- The National Environment (Noise Standards and Control) Regulations, 2003;
- The Draft National Air Quality Standards, 2006;
- The National Environment (Hilly and Mountainous Areas Management) Regulations, 2000;

- The National Environment (Control of Smoking in Public Places) Regulations, 2004;
- The Environmental Audit Regulations, 2006.

The relevant Multilateral Environmental Agreements (MEAs)/Conventions to which Uganda is party include the following:

- The Convention on Biological Diversity (CBD);
- The Ramsar Convention on Wetlands of International Importance;
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
- The Stockholm Convention on Persistent Organic Pollutants (POPS);
- The Strategic Approach to International Chemicals Management (SAICM).

5 The Existing Environmental and Socio Economic Conditions of the Project Area

Physical Environment

The streams and channels in the studied area all drain runoff, and waste water into L. Victoria. They meander through swamps that have been heavily degraded eventually draining into the lake. The areas around the Clock Tower, fire brigade Centre and Shop Rite-Shell are known to have the greatest threat during rainy periods due to the potential for flooding. It is likely that the upgrade of the road and construction of flyovers will add to the runoff in this area. However the drainage follows some natural drains and channels all leading into the Nakivubo channel and eventually into Lake Victoria.

Regarding the geology, the area is affected by the organic belt in the Precambrian Age named Kibaran orogeny and by the processes of formation of the Rift Valley. The metamorphisms form structures such as fault and foliation in the rock. The Project area is characterized by a number of features including Archean, Proterozoic and Cenozoic all consistent with Buganda formations. On the other hand, the lower ground and swamps are composed of recent quaternary swamp, alluvium and lacustrine deposits.

Most of the soil types are mainly clays, silts and sands overlying completely weathered bedrock (tropical residual soils) which are in turn underlain by the undifferentiated gneisses.

The climate in the project area is tropical, wet with an average max temperature of 27.3^{o}C during the day and average minimum of 18.1^{o} C at night due to the influence of the nearby Lake Victoria with two wet seasons running from April to May and October to November. The most frequent wind directions are the southerly and northerly winds.

The water quality results indicate that the channel at the sampled location is polluted and the concentration and some key parameters are far above the standard. Total Suspended Solids, BOD5 and the bacteriological parameters were above the discharge standard.

Air quality and noise measurements

For most of the monitored times, the particulate matter within the project environment were mostly within the ambient air quality standards. Only on a few occasions during the peak hours was a higher value of particulate matter recorded at Clock Tower location of 520µg/m3.This is higher than the prescribed limit of 500µg/m3. However, the values of SO_2, NO_X, and CO were within the permissible limits.

Regarding noise levels, most of the areas monitored had noise levels below the standard apart from at the clock tower and railway crossing at Entebbe Road where the measured noise levels exceed the Project daytime Standard (of 75 dB(A)). For the night time measurements all the noise levels were

below the Project Standard of 65 dB (A) for operation of facilities and less than 45 dB (A) for mixed residential area.

Biological Environment (ecology)
In all, a total of 63 tree species were recorded, with the spindle palm being the commonest species found in 16 of the 31 plots, followed by Eucalyptus sp (13/31), then Mangifera indinca – the mango tree (10/31) and Terminalia superba (8/31). Plot 68 in Centenary Park had the highest diversity of tree species with 11 species followed by plot 64 near Nakumatt contagious with the Golf Course(10 species), then plots 70 (before reaching the Cemetery near Ministry of Internal Affairs building), 67 (second plot in Centenary Park) and 44 (Kalintusi road near Clock Tower) each with 9 species.

A host of other non-tree species, herbs, shrubs and grasses, including those of agricultural value were also recorded in the project area.

Avifauna
A total of 24 bird species were recorded during the study. The commonest bird was the Marabou stork recorded in 17 out 31 sites, followed by the Black kite and Pied crow each in 14 out of 31 sites, then Hadada (11/31), Cattle egret (9/31) and the Speckled pigeon (8/31).

Other biodiversity
Other biodiversity recorded in the project area included amphibians, reptiles and insects such as butterflies, bees, crickets, wasps and termites. Also some amphibian fauna that are associated with wetlands were also recorded.

Socio-Economic and Cultural Environment
The GKRIP is within the CBD of KCCA within the Divisions of Nakawa, Kampala Central and Makindye with the bulk of the road project falling within Makindye Division. Very little of the road project is within Nakawa division.

It is noted that motorization in Uganda has increased rapidly in the recent years; the number of registered motor vehicles has increased at an annual rate of 10.2% between the years of 2005 and 2009. Motorcycles have increased with the highest rate (28.2% per annum) and followed by minibuses (22.6% per annum) during the same period. Trucks indicated a high increase rate of 15.7% per annum. The accident rate is high with up to 80% of the motor vehicle accidents attributed to Human (Driver) error an indication of the poor driving skills in Uganda.

The most common transport mode for the majority of the lower and middle workforce in Kampala Capital City is walking, yet NMT has no specific provisions such that both bicycles and pedestrians continue to compete for the limited road space amidst undisciplined motor vehicle drivers. The available pedestrian walkways are narrow and in many places have numerous potholes with many manholes broken posing a danger to the pedestrian traffic.

Commerce
The project area of influence is mainly characterized as a Commercial area with shopping malls as well as Institutional facilities including the fire brigade, Post Office and Ministry of Works and Uganda railways Corporation.

Along Mukwano Road, there are several persons that are benefiting from the flower selling business although discussions showed that this was only a partial business for most of them.

Demography
The population statistics of all the divisions as per the 2002 population and housing census reveal that Nakawa division has the highest population in Kampala Capital City Authority followed by Makindye and Rubaga Divisions. There are more females than males in all divisions.

Social Infrastructure and Utilities
The roadside is a channel for various infrastructures particularly those related to water mains, electricity, and telecommunications. Discussions with NWSC indicated that the area along the Centenary Park is the most significant transit region for the water that serves most of Kampala. This is the same for the power distributor, UMEME, which has a key power station in the area. The likely to be impacted Utility providers include the power distribution Company, Water distribution corporation (NWSC), and the various telecommunication companies.

Socio-economic characteristics of affected persons
On location of affected persons, a socio-economic study revealed that majority (84.7%) were from Makindye division of Kampala city while (15.5%) were from Central division. The highest number of respondents from Makindye division was due to the fact that it is a core area where major road construction will take place if compared to the Central division but an overall opinion of people on the proposed Kibuye to Jinja road from both divisions was deemed necessary. The majority (78.3%) of the interviewed people said that they were working as flower attendants, (14.5%) mentioned other jobs like restaurant or hotel attendant and boda-boda riders, (4.8%) said that they were traders, casual laborers and carpenters had equal representations of (1.2%) respectively. The flower attendants, although the majority; said that this was not their main source of livelihood.

Archaeological concerns including PCRs
Although the identified cultural sites do not directly fall within the ROW, they are sufficiently in the vicinity to be of concern. Some of those identified include the following: -

Jinja Road Cemetery/European Cemetery , the Pan African Freedom Park, Cultural Shrine/CHOGM Stone along Queensway, the Uganda Muslim Tabliq Association Mosque, the BAPS Shree Swaminarayan Madir- Hindu Temple and the Clock Tower. Of these only the Clock Tower is likely to be affected and yet it is a very significant national monument. Intensive consultations have been conducted on the possible displacement of the Clock tower.

6 Stakeholder Consultations and Public Consultations

Key stakeholders have been consulted from the Local Government Administration (KCCA), the lead Agencies as well as the community. Key Public consultation meetings are shown in the table below.

S/No	Type of meeting	Venue	Date of meeting	Remarks
1	Intensive Consultations with Local Councilors and leaders	Makindye Divisional Board Room/ Community hall	23rd July 2013	All leaders at LC2 and Councilors
2	Community Sensitisation / Consultative meeting for Stakeholders	Glory Church International , Katwe	20th August 2013	About 100 people attended
3	PAP sensitisation / consultative	Fairway Hotel, Kampala	17th September	About 85 people

S/No	Type of meeting	Venue	Date of meeting	Remarks
	meeting		2013	attended
4	One to one sensitization during census of PAPs	Along the entire stretch of the FO		All PAPs at site were met

7 Disclosure Process

Firstly, the scoping report was initially disclosed at the community level, and will continue to be disclosed by NEMA at the lead agency level. At the community level, the initial salient concerns which had been observed by the consultant were disclosed to the community leaders at the meeting held at Makindye Divisional headquarters on the 23rd July 2013. On 17th September at a community meeting, the Draft ESIA was disclosed as part of the RAP preparation meetings.

The disclosure has been done in the English language which is official language in Uganda. At community meetings, the Local languages have been used intermittently with English to be able to reach out to all stakeholders.

Finally, while taking note of the confidentiality of information of a commercial nature and other concerns of project proponents, JICA discloses information on its website in Japanese, English, and/or local languages, and provides related reports for public reading at its library and at related overseas offices.

8 Anticipated Environmental Impacts

During construction both positive and negative impacts are anticipated with most being social in nature since the project is within an urban environment which has a high population density.

The positive impacts include Job creation and related benefits, Improved Skills for Local Communities as well as Tree Planting and enhanced landscape management.

The negative Impacts have been classified with proposed mitigation measures. These include the following: -

S.No	Impact	Mitigation Measures
	During Construction	
1.	Soil Erosion	• Degraded sites including construction material storage points will be restored to as close to their previous condition as possible after road construction. • All embankments especially where the underpass will be created, trenches and outfalls after construction will be strengthened to limit erosion. • Sediment basins/traps will also be used to trap sediments before they enter the Nakivubo Channel and other storm water drains / watercourses.
2.	Soil Degradation and Pollution	• Construction materials to be stored in approved containers and washing areas for site equipment servicing and repair will be carried out in a defined area with a concrete pad draining to oil traps. • Provide secure stores for hazardous materials and refuse pits that will be demolished on completion. • Abandoned equipment; tyres, batteries, filters, sparkplug etc to be removed and carefully disposed off as required by law. • Routine, systematic sprinkling of the road, work area and crushing site to reduce dust emissions.
3.	Increased Storm Water	• Road drainage to discharge to existing natural water courses.

S.No	Impact	Mitigation Measures
		• Collector systems for cut slopes to be provided to drain to the road drainage system. • Culvert outlets to be protected with reno-mattresses or similar. • Embankment slopes to be planted with **Bahia grass** or similar approved to control erosion. • Burrow pits and quarries to be free draining.
4.	Nakivubo Channel Water quality	• Block the soil from entering the channel. • Sedimentation basins should be created between the channel banks and areas where excavation and pitting is taking place these to be regularly checked. • Continue to monitor the channel from both up and downstream points during construction. • One sample per month during times when there is no rainfall.
5.	Reduction in Air quality	• Exposed parts of the service roads should be paved. • Regular monitoring of air quality in the construction area. • Parameters to be monitored: Dust (PM), CO, NO2, SO2, Oxygen. • Use low sulphur fuels including diesel fuel with a sulphur content, 15 ppm and propane with negligible sulphur content. • Meet applicable criteria with respect to emission quality on all combustion-related equipment and provide maintenance according to manufactures specifications.
6.	Increased Noise levels	• The construction fleet to be kept in good condition well fitted with efficient silencers. Speed controls (speed humps) at specified intervals (specific to each haul road) will be installed and maintained. • House the generators if required on sites in a sound proof structure to reduce noise levels. • Workers to use ear muffs to reduce exposure to noise particularly those working at the quarry and crusher areas to reduce injury to the ears due to prolonged noise pollution. • Self-audits to check on noise level. • Apply dust suppressant such as water spray trucks for dust suppression on unconsolidated working surfaces will mitigate dust generation from construction traffic.
7.	Loss of vegetation and other trees	• Clearance of vegetation will be confined to those areas where it is inevitable (within the road corridor). • Landscape and replant disturbed areas using Bahia grass or approved similar and plant trees where suitable. • All removed tree species have been marked and will be replanted alongside the new road or in other equivalent places as will be advised by the KCCA landscape expert.
8.	Disturbance to fauna and avi-fauna	• Clearance of vegetation will be confined to those areas where it is inevitable (within the road corridor). • The Flyovers should be painted with easily visible colors so that they can be more visible to flying birds. • Employ a delayed approach to removing of trees to enable birds which might be laying eggs in those trees to hatch them.
9.	Loss of flower gardens and agricultural crops	• All flowers to be valued and compensated for. • Ornamental trees will be valued and compensated for, while their number will be included in the trees to be replanted along the road to intensify the planted area and enhance the scenery. • Where there is some additional space, flower gardens will be encouraged to shift a step backwards to allow for road construction.
10	Land take	• Land acquired will be fully compensated for in accordance with the law. • In cases of land away from the FO project (say for Burrow pits etc), agreements for

S.No	Impact	Mitigation Measures
		land compensation or land take between the land lord and the contractor will be made and "copies of all land agreements are to be submitted to UNRA". • For land take for the purposes of BPs, all removed topsoil will be used to restore the BPs after construction. The BPs will be reshaped and re-vegetated by the Contractor. • The Contractor will negotiate with the landlord at BP or quarry areas, and will pay him directly for the materials acquired. • Vegetation will be done using the indigenous existing grasses whose seed are naturally occurring in the stockpiled top soil. Otherwise other suitable species include *Cynodon dactylon, Panicum fulgens, Panicum repens* etc.).
11	Disruption of services and Utilities	• When working with Utilities (communications, Power lines, Water mains, sewer lines), it will be done in collaboration with the service provider and a due notice of at least one month is to be given. The same will be done for the relocation of major sign posts and road furniture where they exist. • The contractor will design ways of working around the utilities so that relocation is minimized. • Light equipment will be used (as well as manual methods) in the initial stages of excavations taking care to see that utilities underground are not disrupted without warning as is always the practice within Cities and Urban Centers. • Due notice to the community will be given (by the service provider) to the public in case short disruptions are envisaged.
12	Waste management	• Demolished road structures to be carefully removed and recycled where possible. • Contractor to balance cut and fill if possible. • Workshop storage facilities to be licensed by NEMA. • Bitumen tanks to be placed away from any drainage, placed on an impermeable surface and surrounded with a bund made from impermeable materials. • Hazardous waste to be disposed of in accordance with the manufactures specifications and stored in sealed drums before transporting to designated disposal points. • Separate bins to be provided for recyclable materials and arrangements for recycling made. • Mobile toilets will be provided at site and garbage bins to be provided at strategic locations. • Separate male and female toilets and washrooms facilities to be provided.
13	Relocation of people	• The design has tried to avoid structures and buildings so as to minimize relocation of PAPs. • A resettlement Action plan has been commissioned to provide resettlement assistance to any other who might be impacted. • Should the RAP identify any vulnerable people, then they treated separately (in line with their vulnerability) from the rest who are not vulnerable.
14	Relocation of Clock Tower	• The first priority is that the clock Tower should not be relocated but can be lifted so as not to be dwarfed by the FO. • Alternatively it may be located at a site where it will be seen from afar such as at the Shoprite pedestrian bridge and such relocation must be done with the cooperation with officials from the Department of Museums and Monuments.
15	Other PCRs	• No ancillary works, burrow areas within 2km of an identified cultural site of importance. • The Cemetery off Jinja Road and other Worship places will not be touched by the road project. • Awareness of Contractors and workers/staff on identification of archaeological/Paleontological resource materials must be promoted. • In line with the General Specification for Road and Bridge and WB Physical Cultural Resource Safeguard Policy Guidebook, the Contractor must stop work

S.No	Impact	Mitigation Measures
		immediately on discovery of evidence of possible scientific, historical, prehistoric, or archaeological data and notify the Resident Engineer giving the location and nature of the finds. • The Resident Engineer must notify DMM of such finds for verification and salvage. In line with the Historical Monument Act 1967, Section 11(1 &4) and section 12b).
16	Occupational Safety and health	• The Contractor must prepare and make available at site on request, a Safety and Health Policy Document. • The Contractor must have in place a risk assessment and Safety & Health management plan. • Prior to commencement of work, the Contractor must register with the Department of Occupational Health and Safety. • The contractor must make an inspection requisition of the Commissioner for site plant and equipment to be certified. • There should be a PPE programme in place such that the following should be recorded: — Type of equipment — The date and time supplied — The person to whom it is given (he/she will sign for it) — Date of next PPE inspection — Replacement schedule for plant and components. • First-Aid kits to be provided at every active working site, in offices in site camps and any other location determined by the Project Manager. A clinic supplied and staffed by the Contractor in accordance with UNRA guidelines, to be provided at the contractor's camp. A list of supplies must be kept and displayed at all times in the clinic. • Working areas should be contained to limit access by unauthorized persons and children. • Explosives will be handled by a qualified person, transported under Police escort in accordance with the Explosives Act, and, stored at a designated place. • Contractor not to *use community water sources* for road use. • Trucks transporting any granular material to be covered.
17	Public health	• To protect the contractor and local communities in case of disease outbreaks among the workforce, a premedical examination for workers should be conducted, followed by routine medical examination during the works and a final post medical examination. • Put a project-specific HIV/AIDS awareness/prevention programme in place as specified in the contract documents. • Adequate sanitation facilities to be provided at site.
18	Land scape	• To improve aesthetics and reduce noise pollution, it is recommended that trees are planted along the Road project at places along the FO and, visibility permitting, on road Islands. • The color of the bridges and flyovers will be chosen in such a way as to blend in with the environment or the sky to enhance aesthetics. • In this case the colors of light blue have been recommended as it is easy to harmonize with the landscape and trees. Sky Blue is also recommended as it gives a more urban image. A combination of these two colors is therefore recommended. • The steel and concrete joints of the FO especially at Kitgum House will be blended in such a way as to provide a continuous joint from the outside. • Walkovers or pedestrian Bridges to be constructed following an appealing shape which will first attract pedestrians and at the same time be pleasing to the eye. • Quarries and burrow areas must be restored in accordance with an approved restoration plan as provided for in the appropriate management plan/project brief approved by NEMA.

S.No	Impact	Mitigation Measures
		• The contractor will work closely with the KCCA landscape expert so as to embrace the overall design concept for the KCCA.
19	Sanitation	• Gender considerations in allocation of sanitation facilities (Toilets and bathrooms) will be observed providing adequate privacy for each gender. • Bins for solid waste collection to be placed at the contractor's camp and worksites to ensure that any hazardous waste (Torch and Radio Batteries, Oils, and polythene papers and plastic bottles etc.) are separately collected and disposed of in accordance with the law; take note that there are recycling plants for plastics and polyethenes. • Separate bins to be provided for recyclable materials and arrangements for recycling done with a suitable recycling facility to be identified. • Mobile / portable plastic toilets will be provided for workers along the project road (FO) and other working areas that are not permanent.
20	**Operational Phase**	
21	Soil Erosion	• Regular and frequent inspection and maintenance is required to ensure roadsides soils are not exposed or removed and that any repairs required are carried out promptly. The following are essential. • Cleaning of drainage channels. • Replanting exposed soils (in case of roadside works) with approved grass seed must be carried out as soon as possible.
22	Storm Water	• Exposed areas to be replanted with appropriate grass. • Drain storm water to natural drainage channels to reduce erosion during road side maintenance or related works. • Ensure self-drainage of burrow areas and quarries used for road maintenance.
23	Climatic change Impacts	• Ensure that Roadside drains continue to discharge to existing natural water courses or existing culverts. • Make use of the seasonal Forecast that is produced by the Department of meteorology to know when to clear the drains and prepare for severe weather events. • Drains to be cleaned regularly especially before the onset of the rains.
24	Air pollution and Noise	• Provide noise barriers along Flyovers. • Regular inspection of Noise barriers to ensure functionality. • Ensuring use of approved fuels in motor vehicles. • Plant road side trees to reduce both pollution and noise due to motor vehicles.
25	Flora and fauna	• Care to be taken during maintenance to ensure that asphalt/Bitumen is not spilled into Nakivubo Channel and other sensitive areas. • The Flyovers should be painted with attractive colors so that they can be more visible to flying birds. • All burrow areas and quarries used for road maintenance to be self-draining.
26	Urban waste	• Provide awareness rising to inform the community about keeping drainage channels clear and protecting road infrastructure. • Use radio broadcasts and public meetings to conduct sensitization. • KCCA should reduce waste at source and encourage reuse and recycling of waste. • Drains should be regularly cleaned and inspected before rain seasons.
27	Safety	• Road furniture must be cleaned and inspected regularly to check its condition. • The traffic code must be enforced by the police. • It is recommended that the FO and the entire road is well lit throughout including in the bypass. • There should be measures to enforce the use of NMT and pedestrian lanes by those supposed to use them.
28	Aesthetic beauty	• Noise barriers should be maintained along the Flyover to reduce noise to the surrounding community. This will be in addition to the existing trees on the roadsides.

S.No	Impact	Mitigation Measures
		• Paint the FO as well as the underpass as often as it fades to maintain the beauty of the structures. • The tunnel and the entire road structure will be well lit to enhance the aesthetic values. • Measures to discourage people from writing graffiti on the pillars as well as in the underpass will be put in place to include.
29	**Cumulative Impacts**	
30		• Most of the planned projects will commence after the FO project apart from the BRT which is expected to commence before. The BRT will coincide with the FO project along Queensway and at the Hotel Africana Junction along Jinja Road where the impacts could be increased. Fortunately the BRT is much smaller in width and passes through the middle of the road project hence minimizing the cumulative impacts. Mitigation measures taken in this FO Project will also address the resultant cumulative impacts due to the BRT. • Meanwhile future proposed projects will be required to take into account of existing activities while conducting their specific project environmental assessment.

Resettlement Action Plan (RAP)

The number of impacted people in this project is less than 200. Nevertheless a RAP has been conducted which shows that a few properties will be taken and some land will be acquired. The Project Impacted people most affected are the Uganda Railways, Kampala Capital City Authority and Uganda Police. Specific measures to reduce resettlement have been taken so as to avoid relocating of people. But due to the high value of land within Kampala city, the actual cost of compensation is high. Subsequently the land take that will be acquired by the road activity was found to be **15.357 Acres valued at Uganda shillings 46,323,650,000/= (Forty Six Billion Three Hundred and twenty Three Million Six Hundred and Fifty thousand). All the land is titled. Otherwise the total cost of crops (including trees) to be compensated was estimated at UGX 9,165,050/= while that of Buildings and structures was UGX 1,553,449,934/=.**

The survey has identified the actual area of land and properties to be taken up by the Fly Over (FO) Project and works. Based on the findings of the study carried out, the total package to meet compensation and resettlement needs is **Fifty Five Billion, Sixty Nine Million, Two Hundred and Four Thousand, Seven Hundred and Thirty one Uganda Shillings (Shs. 55,069,204,731/=).** This amount is inclusive of 15% Disturbance Allowance.

9 Environmental Management and Monitoring Plan

After opening to traffic, the most likely potential hazards identified for the FO, are either an accidental oil spill due to petroleum transporting tankers running off the flyway, or a fire hazard due to possible fires from the power Station at Centenary Park. There is also potential for accidents within the underpass / tunnel which could lead to a fierce fire in case the accident vehicle was carrying petroleum products or other hazardous materials Accidents in tunnels /underpasses are a very specific issue for which a specific emergency management plan is required. Depending on the nature of materials involved, tunnel accidents often involve fire which is dangerous not only for those directly involved in the accident but for rescuers and for the local environment. The transportation of petroleum products and other hazardous materials on the road network of Uganda must be at the top of the country's preparedness agenda. It is recommended therefore that UNRA, working closely with NEMA, the Department of Disaster Preparedness and other security agencies, prepare a flexible contingency plan to handle such emergencies.

Key stakeholders involved for any major hazard would be the following: -

- The Department of Disaster preparedness currently based in the office of the Prime Minister which would be charged as the focal point to lead the operations;
- The Ministry Of Defense (armed forces for rescue and provision of guided support);
- Police (Ministry of Internal Affairs);
- The Polluter in this case the company responsible for transporting hazardous materials on Ugandan roads;
- UNRA to keep the roads open;
- The Local Government Structure;
- The Uganda Red Cross to provide additional logistics.

Although the Department of Disaster Preparedness is the key focal institution for handling major humanitarian disasters, for road accidents however, the Uganda police have been mandated by the national Disaster preparedness Policy as the lead agency to mobilize emergency operations.

The law provides that the polluter should pay for any pollution that he / she makes. However, sometimes a particular hazard may be such that the owner is unable to comply, having neither the technology required nor the human resources to overcome the hazard.

10 Monitoring programme

It is a requirement that Environmental monitoring be carried out to ensure that construction activities comply and adhere to environment requirements (laws and regulations). This will be based on this Statement, the accompanying Certificate of Approval as well as additional certificates of approvals which will be obtained for quarries and large burrow pits. The contractor will prepare a separate Environmental and Social Management and Monitoring Plan (ESMMP) taking into account the terms of the Certificate of Approval (approval Conditions) and this ESIA Statement. This will serve as a reference instrument for monitoring environmental compliance.

The monitoring will cover the following among others:

- Impact on Nakivubo Channel;
- Road safety including accidents along the FO /road and during construction;
- Restoration of BPs and quarries;
- Mitigation of Air pollution including air quality, noise and obnoxious emissions;
- Reduction of land degradation through re-vegetation and tree planting;
- Occupational safety and health;
- Community and individual access during construction;
- Protection of physical cultural resources.

Out of these, the Environmentalist will produce several reports which are;

- A preconstruction report;
- Monthly report; and;
- Final Inspection Report.

The cost of implementing the ESMMP is estimated taking into account restoration of burrow areas, planting of grass and enrichment planting where necessary, supervision costs including the support to a Safety Officer and an Environmental Specialist. After the road design a more comprehensive estimate will be worked out taking into account all the considerations raised in the design.

The table provides a provisional estimate of these costs.

Estimated Implementation Cost of ESMMP

Item	Area or unit	Rate per unit in UGX	Total cost in UGX	Remark
1 hectare of Grass for re-vegetation on roadside and other exposed areas in hectares	Per hectare	*5,000,000*	5,000,000	Estimated cost to be included in the BOQ
Reinstatement of Burrow Pits (2No have been considered)	2 Burrow areas	*15,000,000.00*	30,000,000	Engineers' mean estimate per each to be included in the BOQs
Reinstatement of quarries	1	*40,000,000.00*	40,000,000	Engineers' mean estimate per each to be included in the BOQs
Un specified Social facilities and infrastructure -Lump sum	To be identified	*Lump sum*	20,000,000	Estimated cost to be included in the BOQs
Complimentary Initiatives	Various to be identified	*Lump sum*	100,000,000	Estimated cost to be included in the BOQs
Removal of storage area facilities, campsites and any other temporary structures	Demolition, Transport and removal of waste	*Lump sum*	50,000,000	Estimated cost to be included in the BOQs
Introduction of safety measures (Warning signs, Speed humps etc)	Various	*Lump sum*	10,000,000	Estimated cost to be included in the BOQs
HIV/AIDS sensitization and clinic - Lump sum				
Provision of condoms for three years s for 200 people	1800 Boxes of 25 Packages each	*10,000*	18,000,000	Estimated cost to be included in the BOQs
Radio announcements and Notices (about 2,000 Notices and 2,000 Radio Announcements)	2,000	*5,000*	10,000,000	Estimated cost to be included in the BOQs
First AID Kits	10	*100,000*	1,000,000	Estimated cost to be included in the BOQs
Clinic and relevant drugs	Adequate for four years	*Lump sum*	300,000,000	Estimated cost to be included in the BOQs
Others				
PPE for at most 400 people	400	*400,000*	166,000,000	Estimated cost to be included in the BOQs
Planting of trees along the FO and beautification of the selected areas. About 1.5 hectares estimated at 1,500 trees (NFA)	1,500	*15,000*	22,500,000.00	
Management of Road Committees (Monthly) for initial five years	60 moths	*Lump sum*	60,000,000.00	
ESP Management Including Audits	Estimate	*Lump sum*	20,000,000.00	
Cultural Resources management Plan including relocation of Clock Tower	Estimate	*Lump sum*	100,000,000.00	Estimated cost to be included in the BOQs
Environment Specialist for 24 Person moths	24	*3,000,000.00*	60,000,000	
Monitoring Plan (ESMP) inclusive of institutional collaboration - Lump sum The collaborating Institutions include NEMA, KCCA Environment Offices, as well as the Development partner	Per diem for 1 monitoring officer	*5 days per month for 18 months at 130,000 per day*	11,700,000	
	Fuel costs	*40 liters per day per vehicle*	12,960,000	
	Communication and report production	*Lump sum*	10,000,000	
Total			**197,160,000/=**	**This Total excludes that amount included in the BOQs**

11 Conclusions

This report highlights the potential impacts to the environment particularly as they relate to the construction and operation of the GKRIP FO. In doing this three alternatives were considered. However in proposing the various alternatives, it was imperative to balance the environmental and socio – economic costs of the road. The main consideration was to reduce as far as practicable possible disruptions of communities and limiting damage to structures and buildings. Having considered these views, the Option from Queen's Way through to Nsambya Road, Mukwano road, Kitgum House and ending on Jinja road after the cemetery was selected.

A number of benefits as well as negative impacts have been highlighted and this Environmental Impact Statement proposes measures to enhance these benefits as they affect the stakeholder community. The statement also proposes ways to mitigate the negative environmental impacts which have been identified there in. Mitigation measures and an implementation plan have been proposed to ensure that the development is done within the confines of the law with minimum damage to the Social Environment. Although JICA has classified this project as a Category B project, the NEMA guidelines have classified the project as a Category 1 project. For this reason, a RAP has been recommended and was conducted.

1 INTRODUCTION

1.1 Introduction

This report comprises the Environment Impact Statement for the preparatory study on The Greater Kampala Roads Improvement Project (GKRIP). While the GKRIP is much larger, this Environment Impact Statement covers the urban road segment from the Port Bell Junction, the beginning point of the Kampala - Jinja Highway to the Kibuye Roundabout which is the beginning point of the Mpigi-Busega - Kibuye Expressway. This is about 6 km in length. Out of the 6 km long urban road segment, the congested segment is about 3.2 km from the Hotel Africana Roundabout to the Clock Tower Junction.

The statement identifies potential environmental impacts and proposes appropriate mitigation measures. It is composed of the following chapters: -

- **Introduction** which gives the introductory information including the document set up;
- **Background** which provides the background information on the project location and what has been done by the JICA study team prior to the ESIA study;
- **Project Description** which gives the details of the proposed project including the likely works and equipment to be used;
- **Policy Legal and Institutional Framework** which describes the framework within which the project will operate including observance of the Donor safeguards;
- **Baseline Environment and Social Conditions** which describes the environmental and social set up within the project area of influence;
- **Baseline Study Methodology including Stakeholder Consultations and Public participation which highlights** methods used in documentation of both the biophysical and social economic baseline including the extent of public and community involvement in the study;
- **Analysis of Alternatives** which discusses the different possible alternatives which were studied prior to deciding on the alternative that is under study;
- **Anticipated Environmental Impacts** which brings out the potential impacts of the project to the environment and community;
- **Enhancement / Mitigation measures** which details the different options to mitigate negative environmental impacts due to the construction and operation of the project;
- **Environmental and Social Management Plan** which brings out a framework for the implementation of the project during construction and operational phases; and
- **Conclusion** that summarizes the findings

1.2 Administrative Units within the project area

1.2.1 Greater Kampala Metropolitan Area

It is important to note that the project is located within the Greater Kampala Metropolitan Area which is defined differently by two existing plans:

- National Transport Master Plan including a Transport Master Plan for the Greater Kampala Metropolitan Area (NTMP/GKMA), May 2009;
- Kampala Physical Development Plan (KPDP), September 2012.

NTMP/GKMA defined the area of GKMA including land territories administered by the following local government authorities:

- Kampala City Council
- Entebbe Municipal Council
- Mukono Town Council and Part of Wakiso District

- Kira Town Council, and
- Nansana Town Council.

On the other hand, KPDP established slightly different boundary of GKMA considering the existing urbanization pattern and likely future directions of development based on the GKMA Transport Master Plan. In spite of these different definitions, the project covers a smaller part of the GKMA such that it is not affected by these conflicting definitions.

1.2.2 Kampala Capital City Authority

The GKRIP is within the CBD of KCCA within the Divisions of Nakawa, Kampala Central and Makindye. In all the divisions it covers only a few parishes / Zones. However the bulk of the road project falls within Makindye Division. Very little of the road project is within Nakawa division.

Table 1-1: Administrative Units with the Kampala Capital City Authority in the Project Area

District	Sub County/ Division
Kampala Capital City Authority	Nakawa
	Kampala Central
	Makindye

For successful implementation, the road project will operate closely with the Local Government Units within the KCCA along the project area to ensure smooth operations and a sense of ownership for the road Project by the Local Government and community. This process has already been initiated by the EIA team through briefing sessions as well as consultations to some of the key stakeholders.

2 Background of the Project

2.1 Background

The Greater Kampala Metropolitan Area is defined as the area within 20 km radius, which includes Kampala Capital City, Entebbe Municipal City, Mukono town and a part of Mukono, Wakiso Town, Wakiso District, Kira Town and Nansana Town. The general project area is within Greater Kampala Metropolitan Area as shown in fig 1-1 below. It shows that the proposed road is within the Central Business District of Kampala (CBD) which is the area most affected by traffic congestion.

JICA conducted the "Study on Greater Kampala Road Network and Transport Improvement" (Pre-F/S) in 2010 in response to a request from Government of Uganda. The Pre-feasibility study reviewed the National Transport Master Plan and the Greater Kampala Metropolitan Area and selected priority projects for which this Environmental and Social Impact Assessment Study is being undertaken. These priority projects are shown in the Table 2-1 below.

Table 2-1: Shortlist of Priority Projects for the Pre-feasibility Study

Phase Planned in the Pre-FS	Projects
Phase 1	Flyover Construction • Kitgum House Junction Main Flyover • Kitgum Junction Ramp Flyover Mukwano Road Widening Shoprite and Clock Tower JCTs Traffic Safety Improvement
Phase 2	Flyover Construction • Clock Tower

Source: JICA Progress Report 1

Figure 2-1: Extent of the Greater Kampala Metropolitan Area (JICA Survey Team)

Subsequently the Government of Uganda has received financing from JICA towards the cost of conducting various road improvement projects in Uganda including the **"The Study on Greater Kampala Roads Network and Transport Improvement"**. The initial / preliminary study focused on traffic congestions at the Jinja Road Junction, Shoprite Junction and Clock Tower Junction and along the Mukwano Road. The pre-feasibility study was conducted for construction of flyovers, road widening and intersection improvement.

The project is the "The Greater Kampala Roads Improvement Project – Covering the congested section from off the Clock Tower Roundabout to off the Hotel Africana Roundabout along Queensway (3.2km)" as well as the extended section from Kibuye Roundabout to Jinja Road after the Cemetery. The Road Project is within the Central Business District (CBD) of Kampala Capital City comprising parts of Queensway, Nsambya Road, Mukwano Road, all the way to Jinja Road off Hotel Africana Roundabout.

The general view of the project area from the Google map and is shown in Figures 2-1 below. The Project Road starts from Kibuye and ends along Jinja road just beyond the Jinja road cemetery. This is the urban road segment that is currently under study. The road connects the Mpigi – Busega - Kibuye Expressway and the Kampala Jinja Expressway.

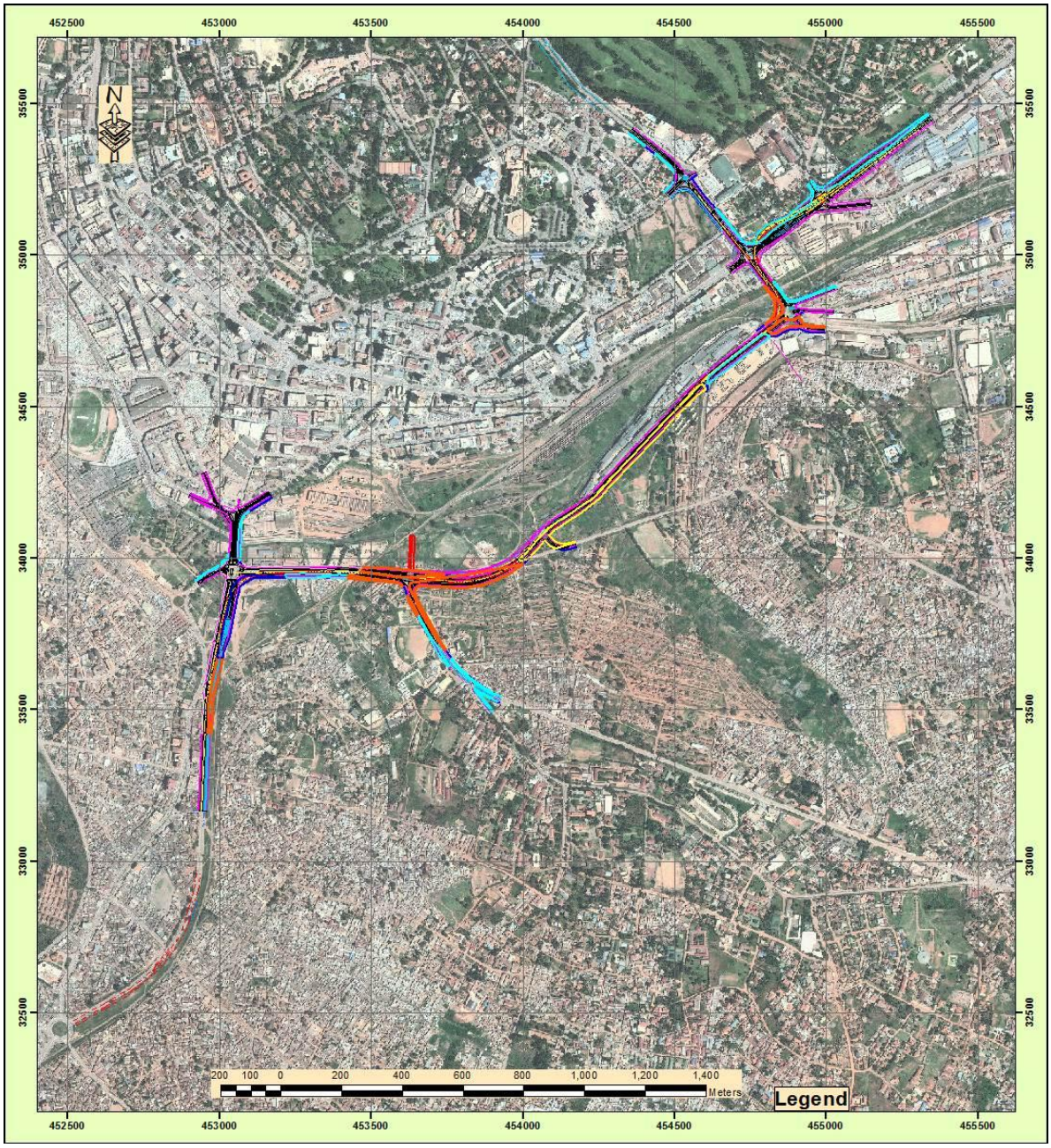


Figure 2-2: Entire Stretch of the Project Area and proposed road alignment

2.1.1 Details of the Developer

The details of the Developer are as follows: -

The Uganda National Roads Authority
Plot 5, Lourdel Road, Nakasero
P.O. Box 28487
KAMPALA - UGANDA

2.1.2 Objectives of the Road project

The overall objective of this project is to improve traffic flow within the Greater Kampala Metropolitan area. This will be done by decongesting Kampala city of transit traffic and at the same time. It is planned that the

Road project decongests the Centre of Kampala City as well as the congested Roundabouts which are located along the congested section of the project road.

2.1.3 Justification for road project

Presently there are increased traffic delays at the Africana Hotel Junction, At Kitgum House area, along Mukwamo and Nsambya roads and at the Clock Tower Junction. There is urgent need therefore to reduce the traffic within the CBD such that transit times and delays at roundabouts and junctions are reduced. Indeed there are other proposed measures to reduce the traffic congestion which will supplement the proposed project. The key one now at design stage is the BRT which will move parallel to the FO (Fly Over) project in some places (along Jinja Road and Queensway). In order to achieve the objective of reducing traffic along the stated junctions and roads, JICA conducted a study to streamline the optimum route, and conducted a traffic demand forecast. Further the expected reduction in travel time was calculated all of which went towards justifying why the proposed road should follow the alignment that was selected.

2.1.3.1 Traffic Demand Forecast

JICA has prepared a Traffic demand forecast during the Prefeasibility study. The demand forecast showed a potential reduction of traffic through the city centre due to introduction of the BRT. This meant that the load would shift to the proposed alignment hence the need to upgrade it to handle more traffic in less time.

Specifically, the traffic demand forecast in the pre-feasibility study that influenced the estimate was introduction of Bus Rapid Transit (BRT) and accompanied changes in traffic management. One of the significant assumptions related to the traffic management was that Kampala Road would no longer carry general traffic after the start of the BRT operation. The pre-feasibility study assumed that passengers of mini-buses and large buses would shift to the BRT substantially after the introduction of the BRT in 2015. The assumption established that the passenger trips generated within the 1 km radius from the BRT will shift to the BRT. In the traffic demand estimate, it was assumed that approximately 91,000 trips were likely to shift from mini-buses and large buses to the BRT by 2023.

Furthermore, the pre-feasibility study took into consideration the decrease in the number of lanes for general traffic in the BRT route and passenger restriction to the general traffic at Kampala/Entebbe Junction. It also concluded that the main traffic flow would shift from Jinja - Kampala roads direction (east-west) to Yusuf Lule – Mukwano roads direction (north-south).

The JICA study team while conducting the traffic demand review established that the traffic demand on the Flyover will be lower in case the BRT is not put in place since the capacity and velocity of Kampala Road will not change much at about / approximately 15,000 pcu on each flyover. Otherwise with the BRT in place, the traffic demand on the flyover will expand dramatically because the BRT will have the tendency to depress capacity and velocity of Kampala Road. Subsequently the study established that the flyover has a high traffic demand regardless of completion of other road and transport projects.

The BRT pilot route was assumed to have been completed by the end of 2013. This will now not be the case since feasibility studies are still ongoing for the BRT. It is beneficial to the FO Project that BRT Project is completed before completion of the FO Project otherwise the effectiveness of the FO Project would be undermined.

The option 3 therefore takes into account the BRT where the two run parallel at Queensway and at the Hotel Africana Junction (Figure 2-2 and 2-3 shows before and after the BRT at Hotel Africana Junction with the BRT lane in Blue). The main complication with this scenario is that for the FO project to be implemented the BRT would have to be done first. However if this is not the case, then

the FO project will have to undertake the construction of the BRT within those areas where the two are together (i.e. at Hotel Africana Junction and Queensway)

This option 3 has the minimum Social/ Environmental impacts since there will be no properties affected by the development.

Figure 2-3: Hotel Africana Roundabout before the project with Capacity of: 2,829 pcu/hour

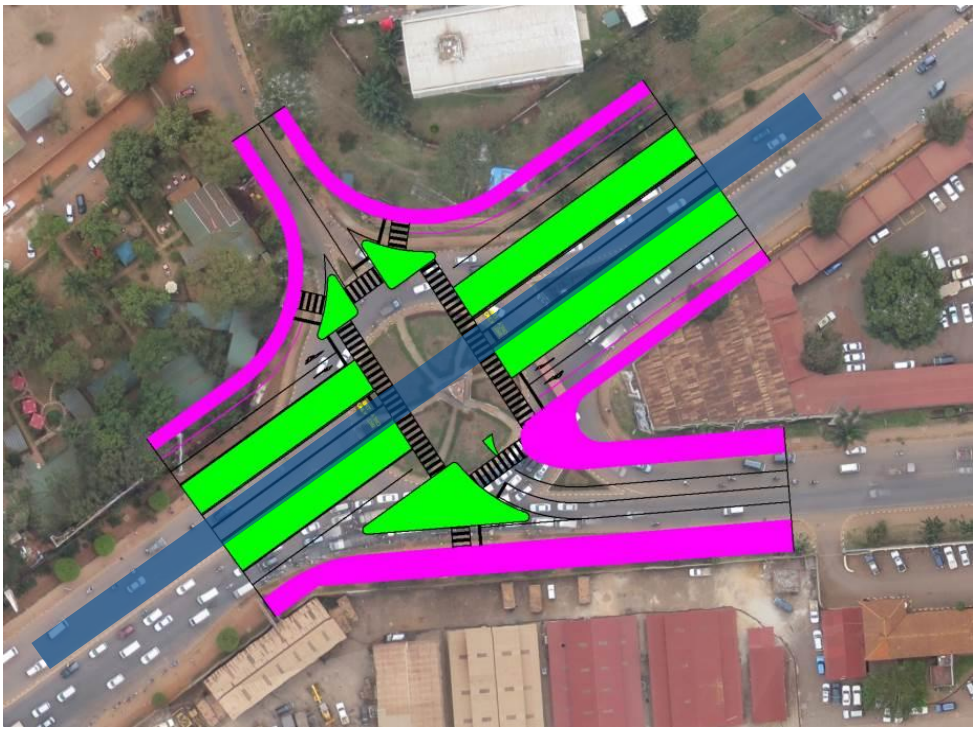


Figure 2-4: Hotel Africana Roundabout after the project with BRT (in Blue) in place with capacity of about 7,422 pcu/hour

2.1.3.2 Expected travel time

In order to justify the FO project alignment further, the preliminary study team estimated the travel time with the project and without the proposed project. It showed a remarkable reduction in travel time if the FO project was in place leading to the choice of the proposed option. To achieve these results, the JICA study team recorded the travel time between the cemetery near Hotel Africana Roundabout on the Kampala-Jinja Road and Clock Tower Junction on the Queensway for the two routes of via Mukwano and Nsambya Roads and via Kampala and Entebbe Roads respectively. The summary of the findings are that:

The most traffic congested days on both roads are Friday and Monday. In all cases the evening travel time is more than morning travel time. The travel time varies from about 18 minutes to over 42 minutes in some cases.

While with the proposed construction of the FO, the travel time is expected to be greatly reduced as shown in the Table 2-2 below:

Table 2-2: Comparison of Travel time before and after the construction of the Flyover.

S/No	Route Section	Current (2013) (Min: Secs)	With FO (Min: Secs)	Improvement (Min: Secs)
Morning Time				
1	Cemetery to Clock Tower	13 min 11 sec	11 min 38 sec	1min 33sec
2	Clock Tower to Cemetery	19 min 27 sec	17 min 11 sec	2min 16sec
3	Average	16 min 19 sec	14 min 24 sec	1min 55sec
Evening Time				
4	Cemetery to Clock Tower	19 min 07 sec	15 min 41 sec	3 min 26 sec
5	Clock Tower to Cemetery	21 min 03 sec	18 min 39 sec	2 min 24 sec
6	Average	20 min 05 sec	17 min 10 sec	2 min 55 sec

Source: Adapted from the JICA survey Study

On the basis of the above, the study concluded that the construction of the flyovers along the Mukwano - Nsambya Roads would be significantly effective to decongest the traffic to and from the City Centre.

2.1.3.3 Other Social and environmental concerns

To further justify the choice of alignment, there was consideration for environmental and social concerns for each of the potential options. The selected alternative was the one with the most likely environmental and social impacts.

While the study team observed that the construction will lead to various physical impacts including potential soil erosion, increased noise and likelihood for the silting of Nakivubo channel, there was a higher potential for disrupting of social infrastructure and communities along the project alignment. The provisional assessment was that the most environmental impacts would be due to social impacts particularly the disruption of the livelihoods, taking up of structures and significant impacts on the

biophysical environment. **Utilities would also be impacted if their service lines are disrupted or relocated during the construction.**

While the Option 3 will lead to the clearance of some trees and a few structures from the built environment, the other options will impact greatly on the built environment leading to compensation of owners or relocation of many buildings and structures. This could lead to loss of livelihood to many people. Secondly there would be no alternative roads / bypasses for traffic during the construction phase. In the case of the Option 3, there is some limited space to divert traffic during the construction. So while traffic management is of concern for all the options, it will be easier to manage with the selected option.

The number of pedestrian traffic was also deemed to be lower on this option as opposed to the case for Ben Kiwanuka Street (Option 2) for example.

2.2 Limits of the project and study areas

Indeed the environmental and social impact of the planned FO project can and will extend beyond the road alignment and will likely influence more areas particularly with respect to the socio-economic impacts. However, assessment for significant impacts of the current project has focused mainly on areas close to the road route and within the 6.2km of the road project on both sides. Some aspects of the ESIA have also looked at the offsite areas such as the source of materials (stone quarry and burrow areas) dumping of waste and related impacts.

The social environmental components that are most likely to be impacted have been identified and feasible mitigation measures that would help to avoid and/or minimize the adverse impacts have been discussed.

2.3 Project Areas of Influence

This ESIA has focused on those areas of the project that are likely to be influenced by its activities during implementation which include; the road construction corridor, the zones and accesses that will be crossed by the road as well as the neighbourhoods which will be the most impacted areas either directly or indirectly. Though the Right of Way (RoW) has normally been 30 metres, in this project the road **corridor will be wider up to 80 metres in places and even wider at Junctions**.

The FO project will remain along the existing alignment save for the necessary expansions along parts of Queensway, Mukwano Road and Jinja Road. From the foot prints of the environmental surveyors, the immediate Zone of Influence (ZOI) was taken to be at most 100 metres on either side of road from its centre line and extending for the entire extent of the FO project. The ZOI was determined based on a combination of considerations but particularly with respect to the likely noise pollution, dust and related air pollution. The other considerations look at those persons who have been conducting different business within the expanded road corridor and are likely to be impacted. There are also some on-going activities like the proposed construction of the BRT and other road projects that have been discussed. That has been taken note of during this ESIA study.

2.4 Other On-going plans and projects that will supplement / impact on the Flyover Project

There are a number of projects that are currently being planned for the project area and therefore likely to have an impact on the proposed project (Table 2-3 below) these are discussed in the following sections.

Table 2-3: Plans and Project that Could Impact on the Selected Priority Projects

S/No	Project	Project type	Funding	Status	Relevance
1	Bus Rapid Transit BRT (pilot Project)	Provides infrastructure for Bus rapid Transit facilities passing through the City Centre	WB and GOU	Feasibility study and Detailed Design ongoing	BRT runs along the Kampala - Jinja road as well as the Entebbe road. Both of these interface with the FO at Clock Tower Junction and Hotel Africana RA respectively
2	MoWT Non Motorised Transport (NMT) Policy and NMT Pilot Project in City Centre	Ministry's Policy on NMT Infrastructure development was advocated, and a Pilot Project for dedicated NMT lines was proposed	KCCA	Draft Document issued	All future road Projects to show how NMT has been catered for
3	Kampala Southern Bypass (KSB)	Constriction of KSB to decongest the City	GoU	FS and DD in progress	This project supplements the FO by decongesting the city centre and removing traffic from the FO to the KSB
4	Northern Bypass widening	Widening of Northern bypass in order to decongest the city	EU and EIB	Procurement in progress	Project supplements the FO Project by decongesting the City
5	Kampala Entebbe Expressway	Construction of an Interurban Expressway connecting Entebbe and Kampala	Exim Bank of China and GoU	Under construction	This project links with the FO by Diverting motorized traffic from the city centre
5	Kampala – Entebbe Expressway	Construction of an Interurban Expressway connecting Jinja and Kampala	AfDB and Infrastructure Fund	Detailed Design completed	This project links with the FO through Nakawa leaving a gap of 3km that will negatively impact on the FO
	Kibuyes- Busega – Mpigi Expressway	Construction of an Interurban Expressway connecting Mpigi and Kampala	N/A	Detailed design ongoing	Links with FO through Kibuye leaving a 2 km gap that will negatively impact on the FO

Source: Adapted from the JICA survey Report 2013

2.4.1 Policies and Plans

In order to understand the cumulative impact of the FO project, it is important to review the existing programs and plans that are yet to be implemented in the same area and their implications on the proposed project.

2.4.1.1 Kampala Transport Master Plan

Road traffic has grown rapidly in recent years, especially in areas around Kampala and along the main Northern Corridor Route from Kenya through Uganda to Rwanda, Burundi and the Democratic Republic of Congo (DRC) which runs in Uganda from the Malaba and Busia border posts with Kenya to Katuna on the Rwanda border, branching also via Bushenyi or via Fort Portal to Mpondwe on the DRC border.

Within Kampala, the Transport Master Plan for the Greater Kampala estimates both the projected population as well as the Traffic growth on the main radial routes from Kampala for up to 2008. This provides a trend of the traffic growth. The trend is supported by the studies which indicate increasing road traffic evidenced by an increase in vehicle population. The numbers of cars, buses and trucks increased from 99,000 in 1997 to 134,200 in 2002 and 201,100 in 2007. The average annual growth rates over ten years (1997 – 2007); were 7.3% per annum for cars, 5.4 % for light vehicles (including 4-wheel drive), 11.4% for minibuses, 4.8 % for buses and 9.0% for trucks. Average rates of increase for all these vehicle types were 6.3% per annum from 1997 to 2002, 8.4% from 2002 to 2007, and 7.3% over the full ten years. Between 2002 and 2007, the individual annual growth rate for trucks was close to that for all cars, buses and trucks. The proportion of trucks in the overall tonne–km performance may be about 14% for 2012 /2013.

The Transport Master Plan for the Greater Kampala notes that among others a lot can be done to alleviate urban congestion problems, including major road improvements such as ring-roads and fly-overs; an effective public transport system; good traffic management measures; an effective parking policy; good pedestrian and cyclist facilities; controls on city centre access of heavy goods vehicles; and effective integration of land use, housing and transport planning.

Implication for the proposed project: this project will contribute to the Kampala Transport Master plan however, from the traffic demand review established that the traffic demand on the Flyover will be lower in case the BRT is not put in place since the capacity and velocity of Kampala Road will not change much at about / approximately 15,000 pcu on each flyover. Otherwise with the BRT in place, the traffic demand on the flyover will expand dramatically because the BRT will have the tendency to depress capacity and velocity of Kampala Road.

2.4.1.2 National Transport Master Plan

In the National Transport Master Plan, the Greater Kampala Metropolitan area was treated as a separate 'transport mode' and investment category. A 15 year Road sector Investment Programme was proposed for the period of 2008 – 2023, including roads and safety improvements. Road improvement comprised of three types namely: dual carriageway with railway viaduct, dual carriageway construction and single carriageway improvement. *The survey team has emphasised that attention should be paid to the "dual carriageway with railway viaduct" proposed in the National Transport Master Plan. Demands of access controlled urban freeway have sharply increased since a couple of inter-urban expressways are progressing for example, the detailed design of Kampala - Jinja Highway has been completed and that of Kibuye – Busega - Mpigi Highway is on-going.*

2.4.1.3 Kampala Physical Development Plan

This structural plan of Kampala emphasised the rapid growth of population in Kampala caused by the combination of natural growth and in-migration and some ideas have been suggested:

- The Southern Frame of Kampala has failed to evolve, the barriers to its development being the rail yards, the Nsambya Police Barracks and Railway housing to the south of the yards, these areas retain significant potential for re-development;
- The South East frame segment, the Industrial Zone, requires upgrading and restructuring particularly access and movement both to and from the zone and within the zone;
- Effectively land is there on scale to meet all the current needs but it is simply unavailable for development and;
- Some Government compounds are distinctly under-utilised and they are clearly candidates for relocation on an economically viable basis.

In the transport development plan, the plan proposed the Quantitative Goals and objectives for KCCA for 2022, some of which include the following:

- At least 80% of the trips will be made with sustainable modes (walking, cycling, modern bus or rail system);

- At least 50% of all trips should be non-motorized (walking, cycling);
- At least 80% of all walking trips should be done on paved walkways that are physically separated from motorized traffic;
- There should be at least 200 km of cycling lanes, networked, separated and protected from general traffic;
- MRT (Mass Rapid Transport) system should be affordable and cost no more than 12% of the available household monthly income of low income people;
- At least 60% of KCCA residents in 2020 should be able to walk to the nearest mass rapid transport stop (i.e. BRT) less than 1 km and 90% should be able to walk less than 3km; and
- At least 80% of all employment and local service opportunities in KCCA region should be located no more than 2 km from the mass rapid stop.

As seen above, the plan proposes Transit and NMT Oriented Development in line with the Greater Kampala Metropolitan Area/National Transport Master Plan. Due to the substantial shortage of road capacity, the plan recommended adding three ring roads, new urban freeways and several new radial roads to the road network.

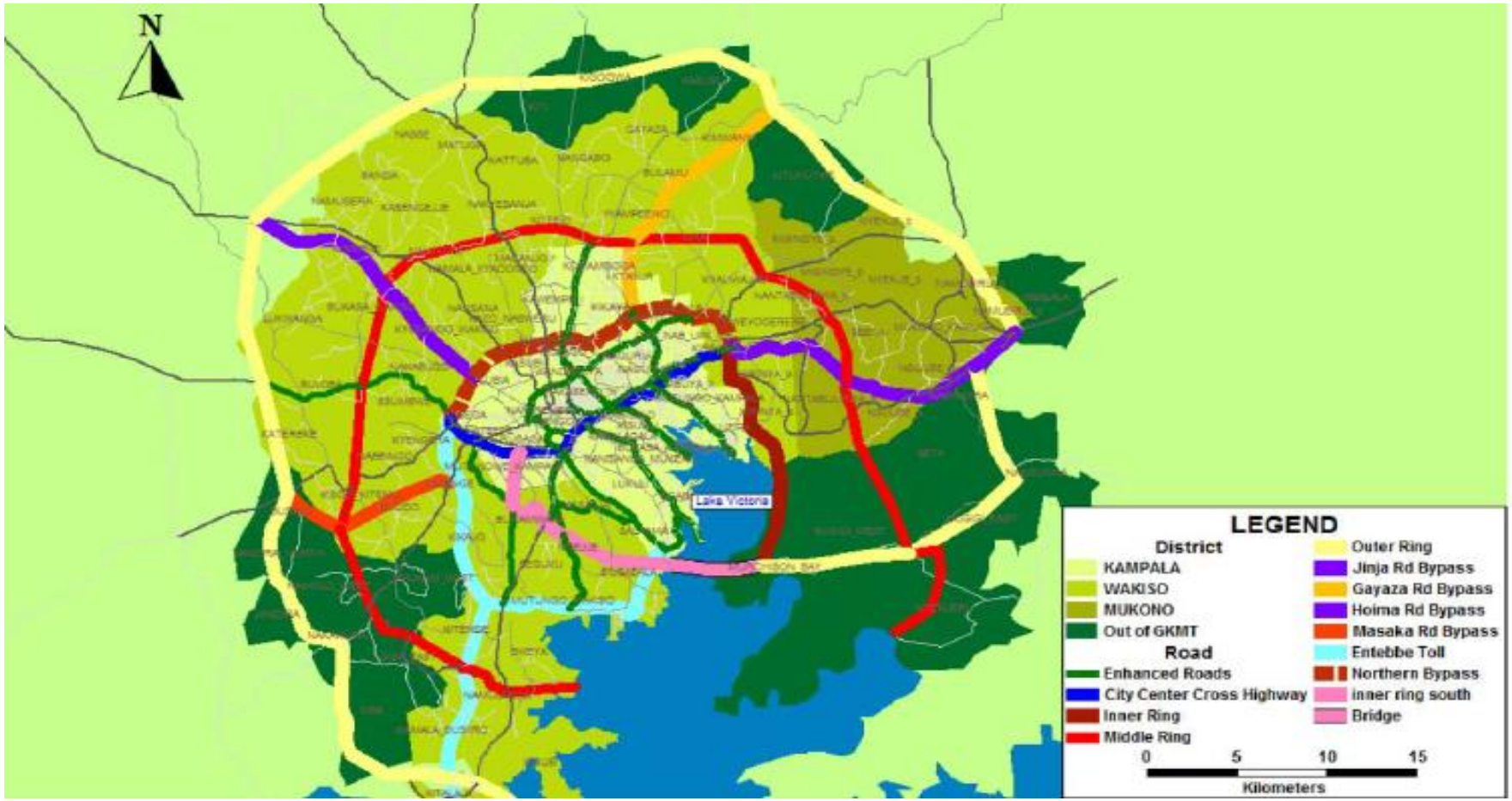


Figure 2-5: Road Network Proposed in the Kampala Physical Development Plan

Source: Adapted from the Kampala Physical Development Plan

2.4.1.4 Non-Motorized Transport (NMT) Policy and NMT Pilot Project in City Centre

Ministry of Works and Transport's (MoWT) NMT Policy intends to raise the profile of non-motorised transport within planning and programming for transport generally; provides guidelines for the inclusion of NMT needs within transport projects and to provide an overarching advocacy document for Government both to consider and approve. The Government plans to ensure that the needs of pedestrians and bicycles will be adequately addressed in planning, implementation, regulation and enforcement of roads and other rural and urban infrastructure.

In connection with this policy, Kampala Capital City Authority (KCCA) has assigned Namirembe Road and part of Luwum Street as a pilot project area to provide dedicated space for Non-Motorised Transport. Both streets are situated in the Central Business District and close to the Old and New Taxi Parks, which are the largest and most important public transport hubs in Kampala.

Figure 2-6: Pedestrian Area for Central Business District Proposed in the Pilot Project (Shown in Blue)
Source: Pilot Project by KCCA

The pilot project was developed based on the planning strategy that is aimed at diverting through-traffic around living environment, including the city centre, to increase their attractiveness and to improve motorized vehicle flow. In this regard a recognition of old and new taxi parks was proposed, further, it is suggested that part of the city centre should be pedestrianized and through traffic should be rerouted as shown in the figure above.

Given that the flyover project will only cater for vehicular traffic, the pedestrian traffic is planned to be handled by using the Namirembe Road and part of Luwum Street as a pilot project area to provide dedicated space for Non-Motorised Transport.

2.4.2 Concerned Projects

2.4.2.1 Bus Rapid Transport (BRT) Pilot Project

Ministry of Works and Transport intends to introduce a Bus Rapid Transit (BRT) system in the Greater Kampala Metropolitan Area to meet the growing demand for mobility. The pilot corridor is served by three lines from Bwaise to Kireka, from Kireka to Zana and from Zana to Bwaise.

Figure 2-7: Bus Rapid Transport (BRT) Pilot Routes
Source: Feasibility Study for BRT Pilot Project

A number of design considerations have been taken into account to cater for the needs of the BRT including the following;

- All roundabout junctions be modified to signal controlled junctions to give priority to the BRT vehicles and traffic flows that run concurrent with BRT manoeuvres;
- Provision of 2 lanes for general traffic along the pilot BRT corridor in lieu of bicycle lanes where space is at a premium. This is intended to facilitate the overtaking of slow - moving vehicles, provide flexibility in respect of occasional incidents where vehicles stop in the middle lane, act as space for bicycles and *boda-boda* to travel safely in mixed traffic, and optimise traffic capacity of junctions (with separate straight ahead and right turn lanes);
- Approval of typical widths for the cross-sections but allowing for departures from standard widths where there are locational pinch points, provided that road safety is not compromised.

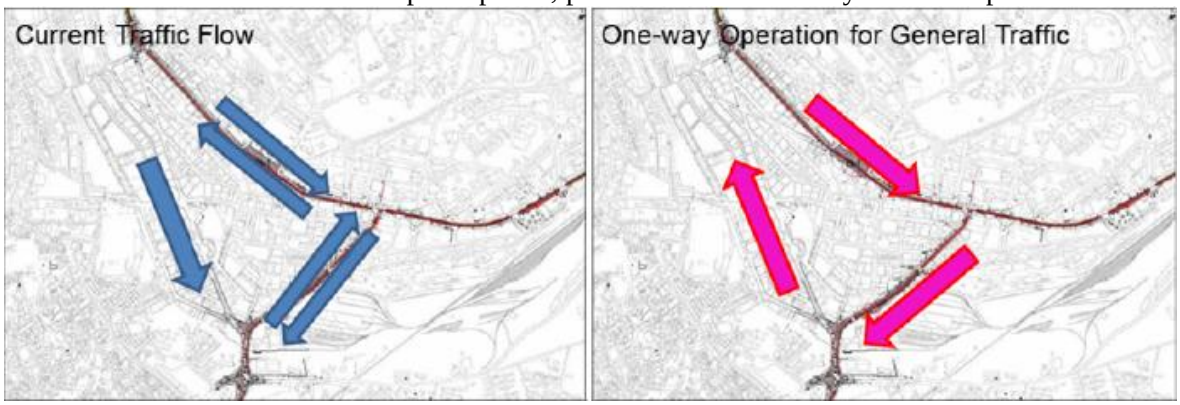


Figure 2-8: Change in Traffic Management in the Central Business District as Proposed by the BRT
Source: JICA Survey Team based on recommendations of BRT

As already highlighted in the previous section, the BRT and GKRIP will reduce the traffic congestion in Kampala considerably.

2.4.2.2 Kampala Institutional and Infrastructure Development Project (KIIDP)

The KIIDP project is divided into three components: institutional development; city wide infrastructure and services improvement; project implementation, monitoring and evaluation. Currently KIIDP 2 is in the process of preparation and as its component of physical interventions for urban traffic improvement include junction improvement, construction of traffic control centre, gravel road upgrading and reconstruction and duelling of the single carriageway roads are to be implemented. In KIIDP, Queensway (Clock Tower – Kibuye) is mentioned as one of the project roads to be widened to dual carriageway. It is assumed that after widening, current southbound one-way operation to be changed to two-way operation.

2.4.2.3 Kampala Southern Bypass

The Kampala Southern Bypass will constitute the ring road system of Kampala along with the existing Northern Bypass. It shall link to Kampala-Jinja corridor to the Kampala-Entebbe corridor and the Southern part of Kampala city by way of the Munyonyo spur.

2.4.2.4 Northern Bypass Widening

Northern Bypass was constructed with the aim of relieving severe traffic congestion in the city by detouring through traffic. The Government of Uganda intends to expand the bypass to create a dual carriage way along its entire length of 21 km from Busega on Mityana Road to Kireka on Jinja Road. Currently, only a 3.5 km section between Hoima Road and Gayaza road has a dual carriageway. After expansion, it is expected for the bypass to carry increasing heavy traffic heading to the northern and western parts of the country. UNRA has started the procurement process for the physical works for widening the Northern Bypass which will include the adding of additional width of 19m to the existing 11m roadway. The proposed carriageway shall consist of 2 lanes each 3.5m wide, 2 hard shoulders each 2m wide, 1 median of 6m and drainage ditches of varying sizes.

2.4.2.5 Kampala – Entebbe Expressway

This is a planned 4-lane toll expressway with a total length of 51km connecting Busega junction on Mityana Road in Kampala and Entebbe International Airport. The project includes a spur diverting at Kajjansi towards Speke Resort Munyoyo. Given that the prior feasibility study identified huge land acquisition costs and large resettlement in the existing road corridor, the project was planned in a way that substantial sections of the new road traverse virgin territory.

2.4.2.6 Kampala – Jinja Expressway

Kampala - Jinja Expressway is proposed to connect Nakawa in Kampala and New Nile Bridge to be constructed in Jinja. A design speed of 120km/hr has been generally adopted for the design (the operable design speed for the urban sections is considered to be 85 km/hr) It was proposed that the main trunk road component of the Kampala - Jinja Highway should be of a status commensurate with expressway/motorway type, and that the same design standard should specifically be examined and adopted since the Uganda Road Design Manual did not cover the expressway/motorway type.

2.4.2.7 Kibuye – Busega - Mpigi Expressway

This is an improvement project of the corridor connecting Kibuye Round about, Busega junction on Masaka Road and Mpigi Town. Technical, economic and environmental studies have concluded that Section 2 (Busega - Mpigi), alignment option 2b (a new carriageway north of the existing alignment from Busega - Katende km 27.5 and then dual carriageway on existing alignment from Katende - Mpigi was recommended for detailed design.

3 PROJECT DESCRIPTION

3.1 Project Summary

The proposed Road /Flyover Project covers a distance of about 6.2 km starting from Queensway , through to Nsambya Road, Mukwano Road, Access Road, Kitgum House Junction towards Jinja Road up to the end of Hotel Africana Junction and beyond as shown in Figure 3-1 below. There will be three extensions / branch ways from the main project road as follows: -

- The extension/branch way from Kitgum House Junction towards Yusuf Lule Road up to the end of Garden City area (Yusuf Lule Road Branch Way: 220 meters)
- The extension/branch way from Clock Tower Junction towards Shoprite along Ben Kiwanuka Road including all that area towards Nakivubo Road (Shoprite - Clock Tower widening : 200 meters): and
- The extension / branch way from Nsambya Junction towards Gaba Road up to the Nsambya Hospital Junction (approx. 550 m).

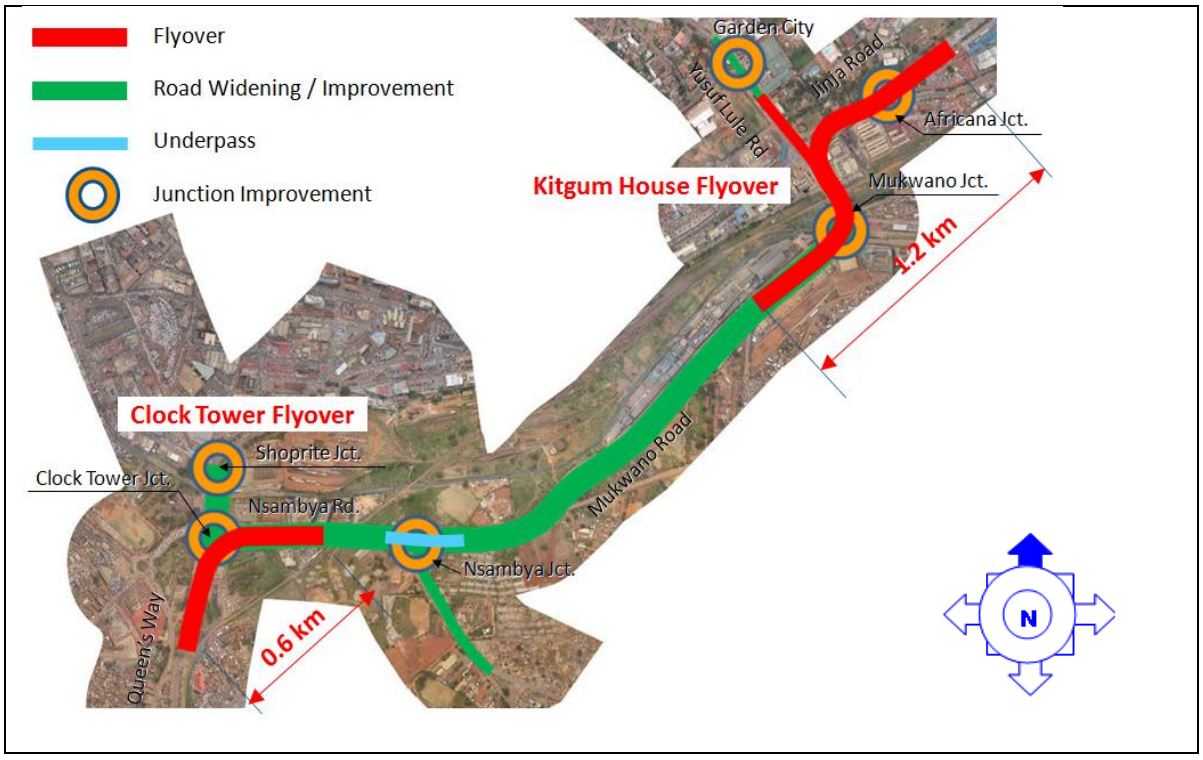


Figure 3-1: Location Map of the Project
Source: JICA Progress Report, October 2013

Specifically the road project is composed of two Flyovers and a combination of curved and straight sections. In total the road may be divided into nine sections which have also been described in the JICA report (Progress Report 2). These are described in more details below.

3.2 Clock Tower Flyover (FO)

Clock Tower FO starts at about 300 m south of Clock Tower Junction on Queensway, turns to Nsambya Road and ends at a location 100 m before the railway crossing. The FO consists of a 50 m long embankment on Queensway approach and a 90 m long embankment on Nsambya Road approach. The Clock Tower FO has been expediently divided into three subsections sections in line with the different characteristics with respect to bridge type and span arrangement studies. These sections are shown in Figure 3-2 below.

Superstructure depths of the FO are designed to be minimized in order for the bridge length to be shorter. In

addition, the FO needs to provide for safe distance from the end of the FO on Nsambya Road to present railway crossing as well as the proposed underpass / tunnel planned in the Project as shown in Figure 3-2.

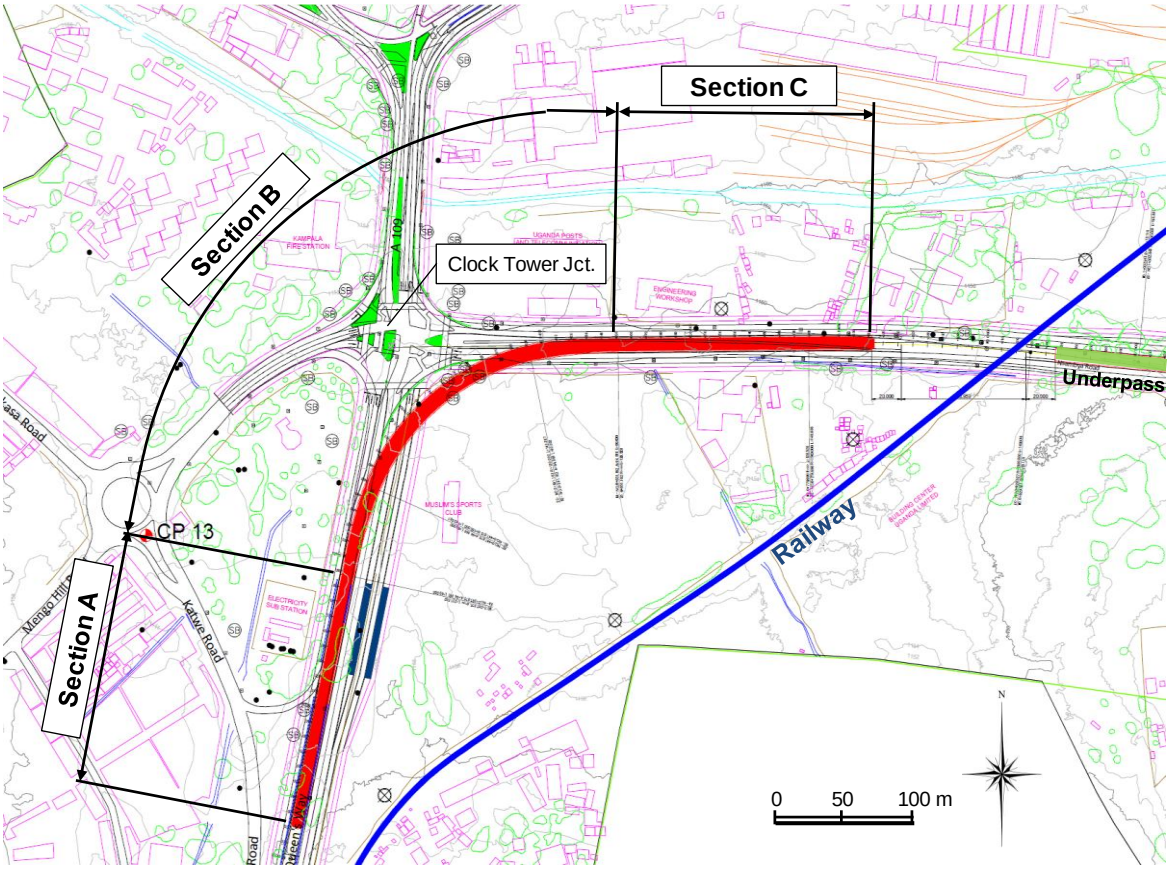


Figure 3-2: Sections of the Clock Tower Fly Over

Source: JICA Survey Team

The JICA Progress Study Report 2 describes each of the sections along the road as follows: -

3.2.1 Section A: Straight section on Queensway

Section A is the straight section consisting of approximately 50 m long embankment and 135 m long bridge. The BRT dedicated lanes will be constructed on eastern side parallel to the FO. An aerial photo with the alignment plan of this section is shown in Figure 3-3.

The bridge construction shall require use of existing road as a construction space. Generally the erection of steel girder can take a few hours (one night) by use of a truck mounted crane. On the other hand, the construction of cast-in-place concrete superstructure takes a few months or more. If there was no temporary diversion required during the construction of cast-in-place concrete structures, long closure of the road would be needed. Since a space for temporary diversion is available for this section in the eastern side of Queensway where the BRT lanes will be constructed, both concrete and steel superstructures can be realized. Since the FO will be constructed over the 10 m wide median strip on Queensway, both concrete and steel piers can be accommodated unrestrainedly within the median strip.

Consequently, any type of superstructure is applicable as long as the cost is reasonable. Considering other sections of the FO, the applicable types are determined to be steel plate girder, steel box girder, PC hollow slab, PCI/T girders, and PC box girder. Economical span length of each type was determined and the total bridge length will be; approximately 25 m for PC slab, 30 m for PC-I girders, and 50 m for steel and PC box girders.

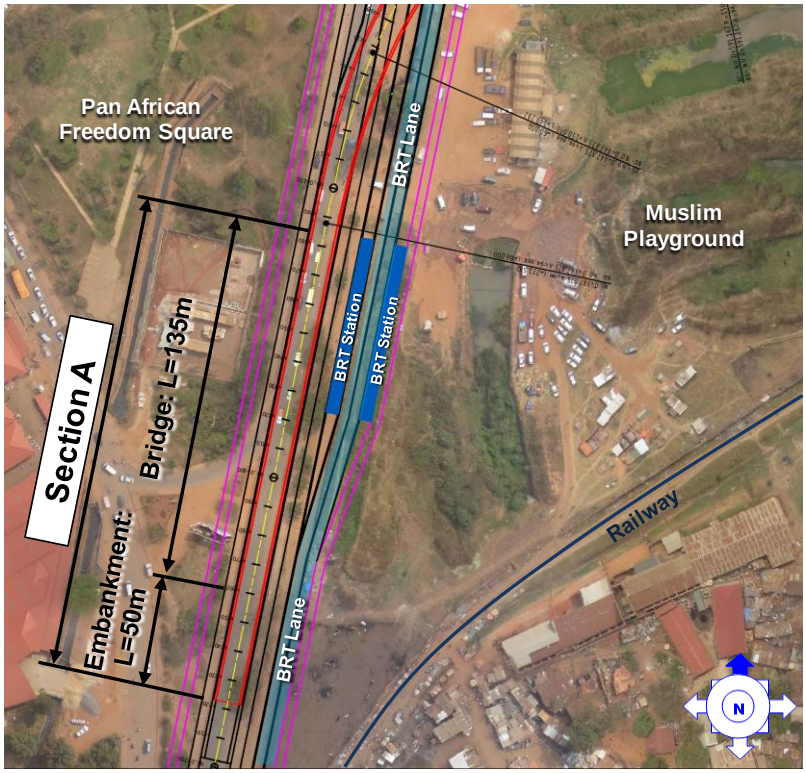


Figure 3-3: Section A showing the Straight section along Queensway
Source: JICA Progress Report 2

3.2.2 Section B: Curve Section at Clock Tower Junction

Section B has approximately a 250 m long curve alignment with a radius of 150 m. An aerial photo with the alignment plan of this section is shown in Figure 3-4. Since space for temporary diversion is available at the Muslim Playground on the southeastern side of Clock Tower Junction, both concrete and steel superstructures can be constructed. The FO passes over the carriageway and pedestrian way on Queensway and Nsambya Road. Above the carriageway, 6 m of headroom shall be secured. Temporary traffic diversion can be realized at the space reserved for road widening and BRT construction in the future. There is space to accommodate either concrete piers at the Muslim Playground or the median strip on Queensway and Nsambya Road. It will be possible to construct either concrete or steel piers in this section.

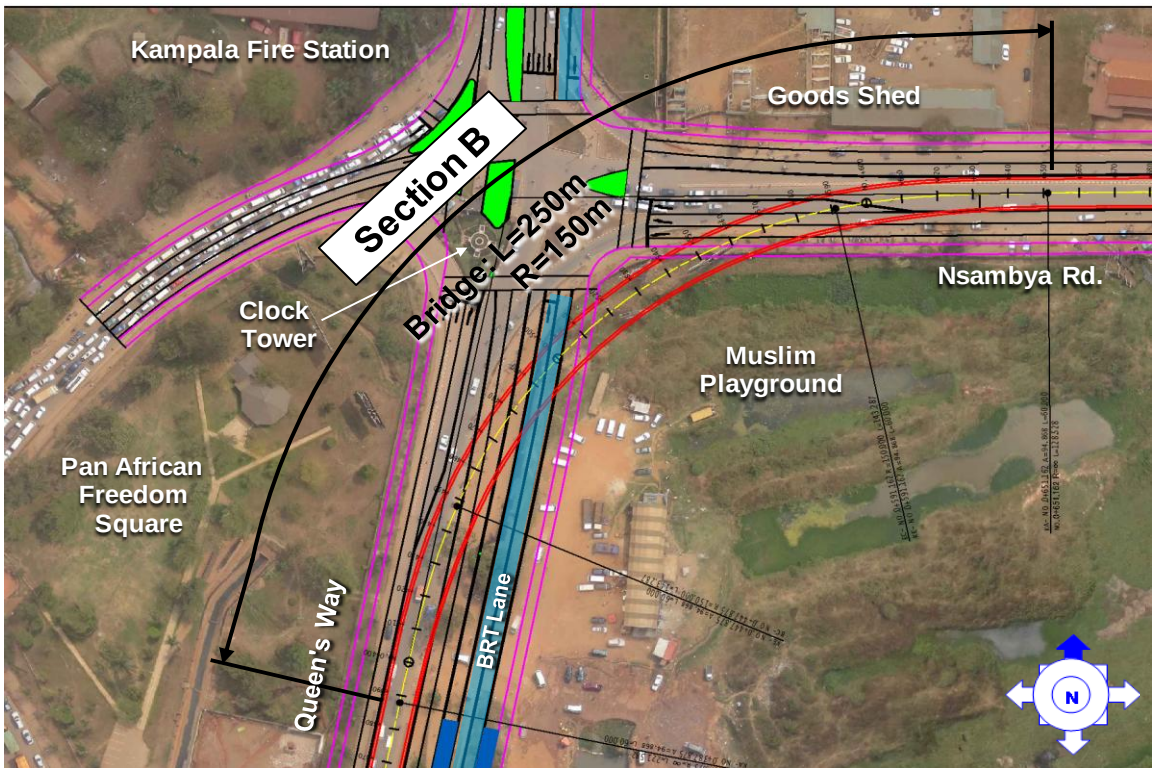


Figure 3-4: Section B: Curved section at Clock Tower Junction
Source: JICA Progress Report 2

Steel and PC box girders are recommended for superstructures with small radius curve in order to secure torsional rigidity. PC slab is also applicable for small radius curve sections but with a shorter spans. At this section, standard span lengths are determined to be approximately 25 m for PC hollow slab and 50 m for steel and PC box girders. In case of span length of 25 m, a portal frame pier will be required over Nsambya Road.

3.2.3 Section C: Straight section along Nsambya Road

Section C is the straight section consisting of approximately an 80 m long bridge and a 90 m long embankment. An aerial photo with the alignment plan of this section is shown in Figure 3-5 below.

Similar to Section A above, since space is available for temporary traffic diversion and a median strip for accommodating any type of piers, any bridge type is applicable for this section. Therefore, span arrangement has been determined to be 25-50 m for steel plate girder, steel box girder, PC hollow slab, PCI/T girder, and PC box girder.

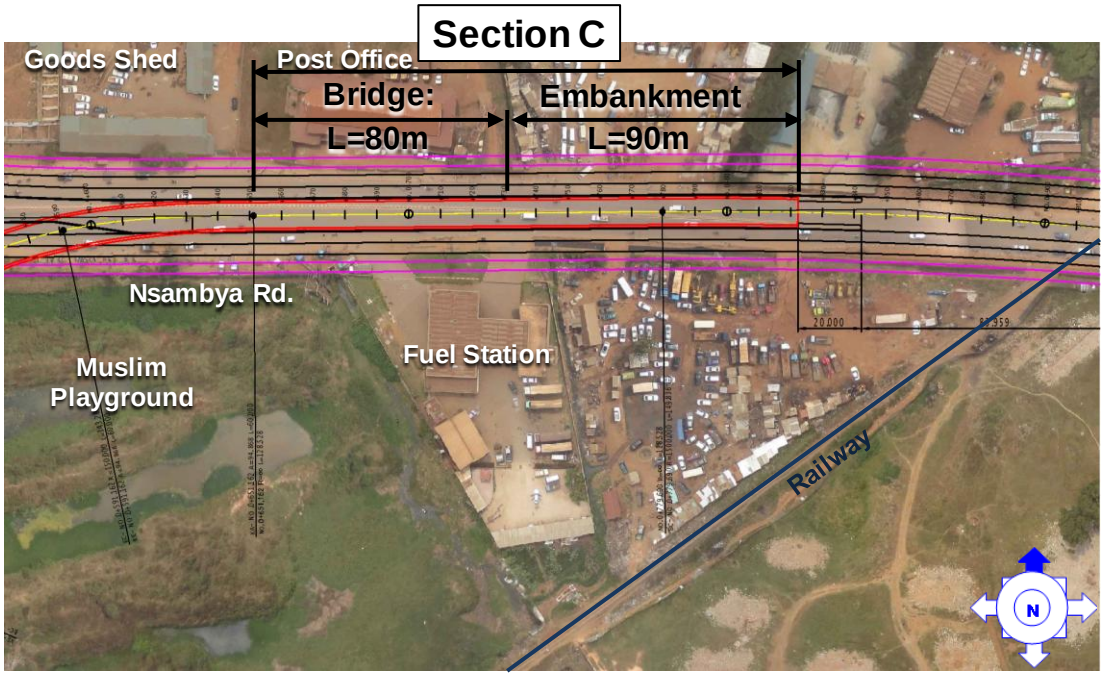


Figure 3-5: Section C: Straight section at Nsambya Road
Source: JICA Progress Report 2

3.3 Kitgum House FO

The three lane FO starts approximately 400 m southwest of Mukwano Junction on Mukwano Road, turns northeast towards Access Road and then passes above Kitgum House Junction, turning northeast towards Jinja Road and ends after Hotel Africana Junction near Jinja Road Cemetery. Embankment sections are provided at the both ends. The two-lane superstructure separates into two independent structures along Jinja Road because the BRT lanes will be occupying the centre of Jinja Road. A single lane branch-way separates from Kitgum House Junction and lands on Yusuf Lule Road before Garden City Junction.

Kitgum House FO has been conveniently divided into three subsections in line with their different characteristics for purposes of bridge type and span arrangement studies. These sections are shown in Figures 3-6 and 3-7 below.

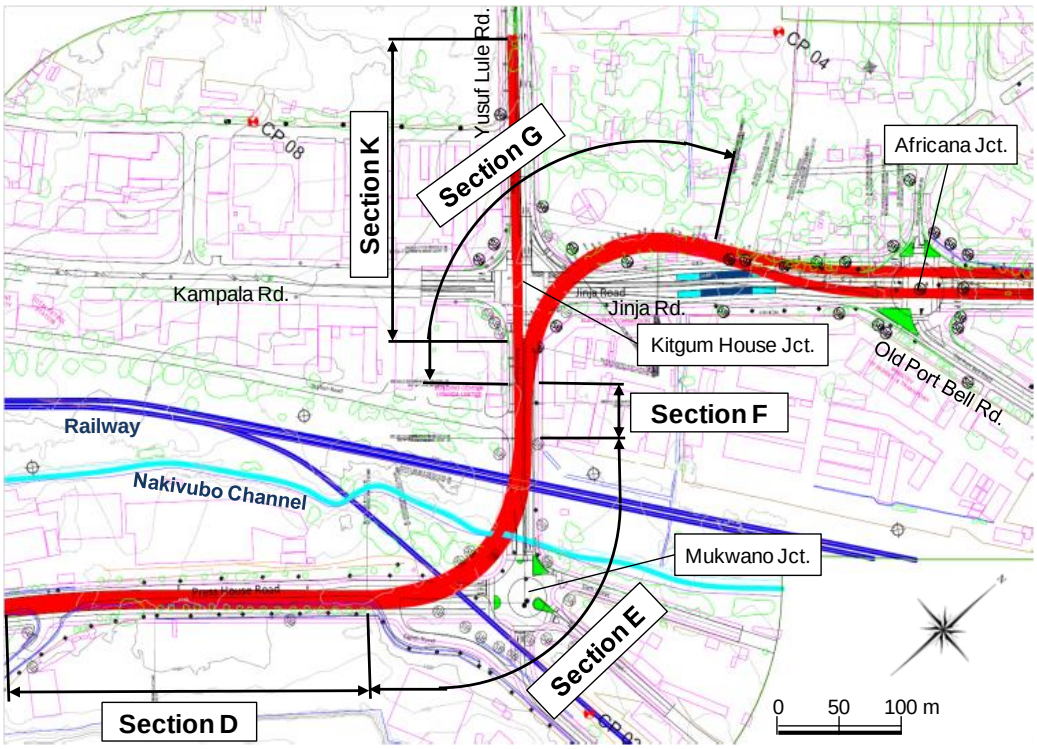


Figure 3-6: Sections of Kitgum House FO (1/2)
Source: JICA Progress Report 2

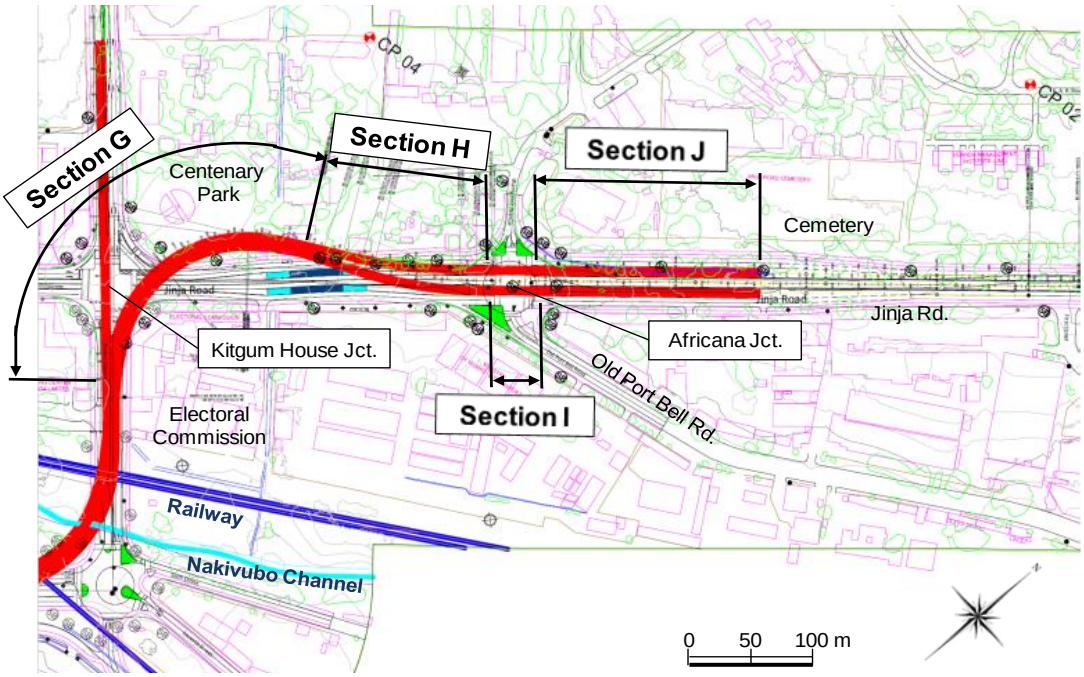


Figure 3-7: Sections of Kitgum House FO (2/2)
Source: JICA Progress Report 2

Conditions and applicable structure types of each section are respectively described as follows.

3.3.1 Section D: Straight section on Mukwano Road

Section D is a straight section consisting of approximately 130 m long embankment and 170 m long bridge. An aerial photo with the alignment plan of this section is shown in Figure 3-8. Since space for temporary diversion is available on both sides of the road secured for the road widening to four lanes, both cast-in-situ concrete and steel superstructures can be constructed. Also, any type of pier can be constructed on the 14 m wide median strip under the structure on Mukwano Road.

Consequently, any type of superstructure is applicable as long as its cost is reasonable. Considering other sections of the FO, the applicable types have been determined to be steel plate girder, steel box girder, PC hollow slab, PCI/T girders, and PC box girder. Economical span length of each type as well as total bridge length have been determined to be approximately 25 m for PC slab, 30 m for PC-I girders, and 40-55 m for steel and PC box girders.

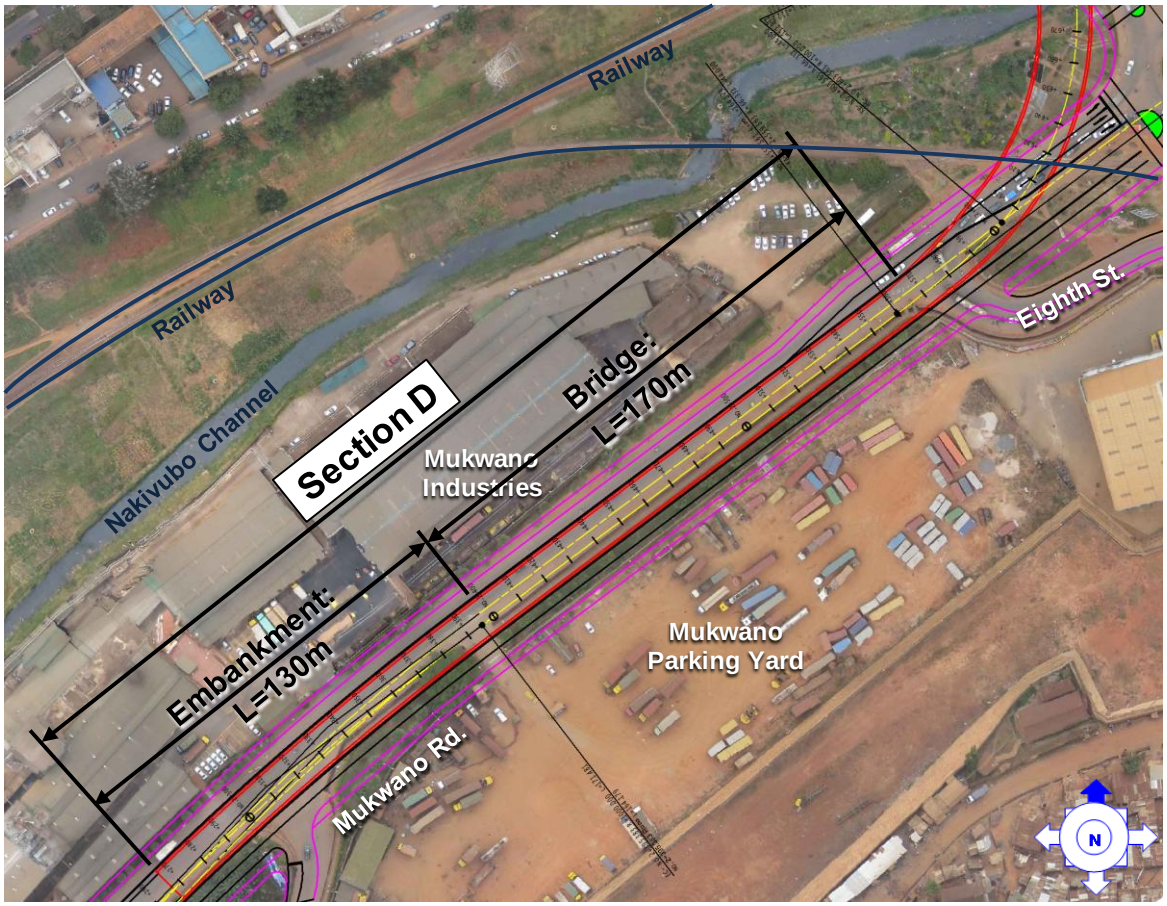


Figure 3-8: Section D: Straight section at Mukwano Road
Source: JICA Progress Report 2

3.3.2 Section E: Curve section on Mukwano Junction

Section E consists of approximately 200 m curved alignment with a radius of 100 m. An aerial photo with the alignment plan of this section is shown in Figure 3-9. Since there is space for temporary diversion on the western side of Mukwano Junction, both concrete and steel superstructures can be constructed.

The FO passes above the carriageway and pedestrian ways of Mukwano and Access Roads and a 6 m headroom above the carriageway shall be secured. Piers must be located avoiding two railways and Nakivubo channel as shown in Figure 2-9. Available spaces for the piers are the railway reserve area at the western side of the junction and the 14 m wide median strip on Mukwano Road and minimum 5 m wide median strip on Access Road. Generally, considering same loading, the cross section areas of steel piers are smaller than that of the concrete piers because of the difference in their material strengths. Widths of the median strips on Mukwano and Access Roads are sufficient for any type of pier.

Considering the small curve radius, it is preferable to apply steel or PC box girders to secure torsional rigidity. Based on these examinations, applicable span length for this section has been determined to be approximately 45 m.

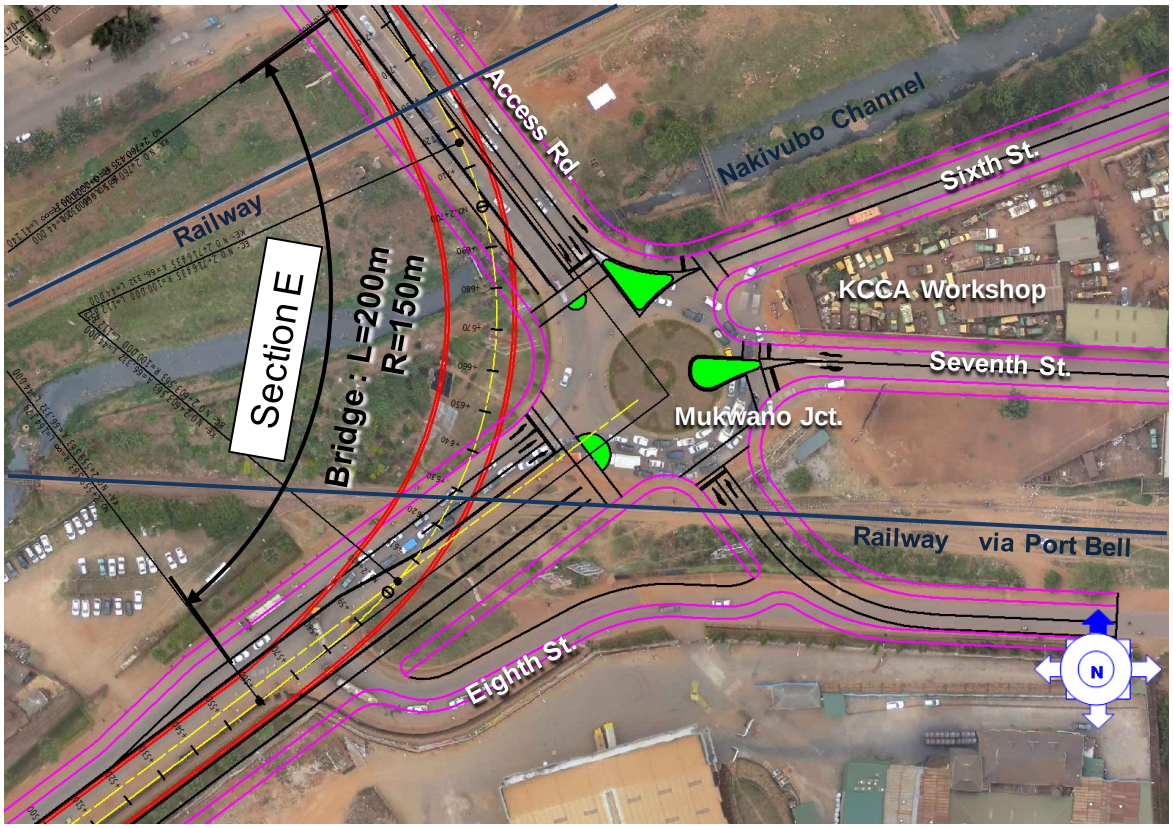


Figure 3-9: Section E: Curved section at Mukwano Junction
Source: JICA Progress Report 2

3.3.3 Section F: Transition section on Access Road

Section F is straight section between two R=100 m curve sections. An aerial photo with the alignment plan of this section is shown in Figure 3-10. Since space for temporary diversion is limited, construction works shall minimize obstruction to traffic. Therefore, steel superstructures such as steel plate and steel box girders are preferable. Steel piers are also recommended because it is located on the median strip of the road with high traffic volume. In this section, the span length is dependent on the bridge type selected for Sections E and G.

Figure 3-10: Section F: Straight section from Mukwano Junction to Kitgum House Junction
Source: JICA Progress Report 2

3.3.4 Section G: Curve section at Kitgum House Junction

Section G is approximately 300 m long curve alignment with a radius of 100 m. An aerial photo with the alignment plan of this section is shown in Figure 3-11. Since it passes over the junction with high traffic volume and space for temporary diversion is limited, the bridge structure shall be selected considering applicable construction method in order to minimize obstruction to traffic flow.

The FO passes above Access and Jinja Roads; therefore, securing 6 m headroom above the carriageway is required. On Jinja Road, there is no median strip because the BRT lanes will be constructed in the centre of Jinja Road. Therefore, available spaces for locating piers are limited to the northern part of the junction, Centenary Park, and the 8.5 m wide median strip on Access Road. As a result, required minimum span length for this section is determined to be 45-50 m.

As for the superstructure type, a steel box girder is the only solution in order to secure torsional rigidity required for small radius curves.

The pier on Jinja Road near Kitgum House Junction will be a portal frame pier because there is no suitable space for other types of pier. The cross beam length of the pier will be approximately 25 m to cross over Jinja Road. The portal pier of this size can only be realized with steel structure.

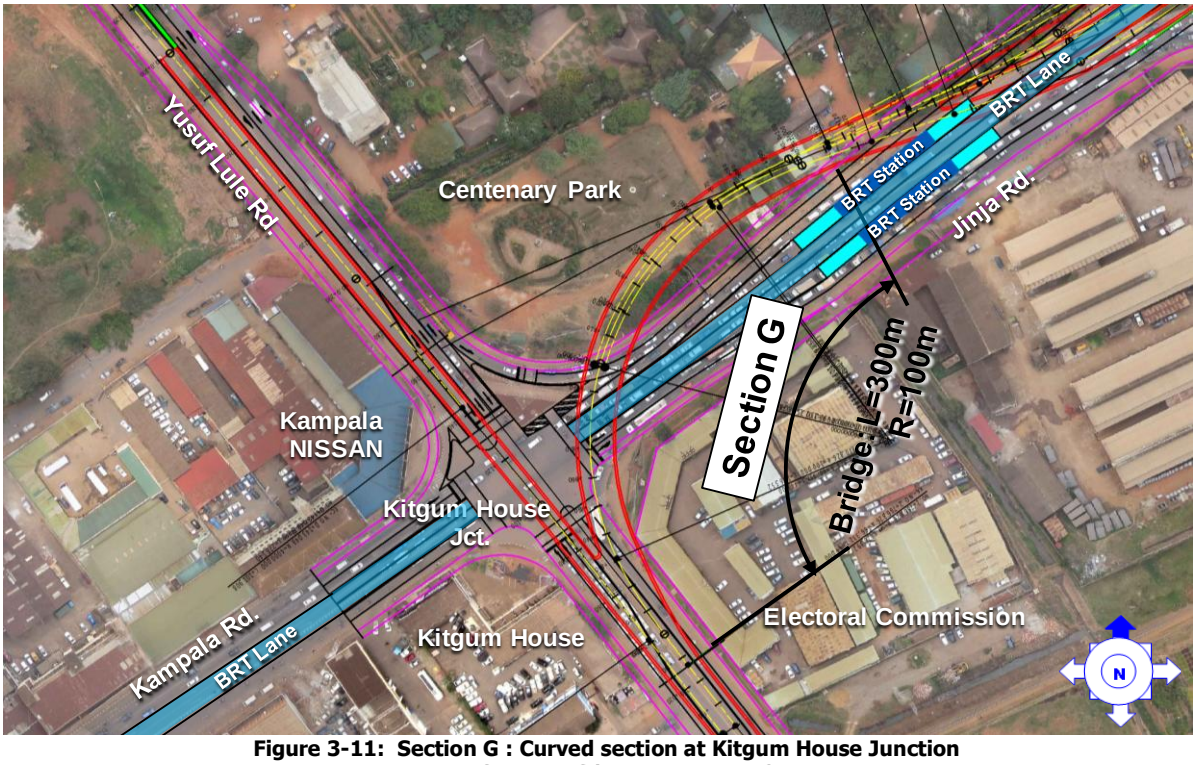


Figure 3-11: Section G : Curved section at Kitgum House Junction
Source: JICA Progress Report 2

3.3.5 Section H : Transition Curve Section between Kitgum House Junction and Hotel Africana Junction

Section H is approximately 80 m long transition curve between Kitgum House Junction and Hotel Africana Junction. The FO separates into two superstructures because of the BRT lanes to be built at the centre of Jinja Road. An aerial photo with the alignment plan of this section is shown in Figure 3-12. Since the space for temporary diversion is limited, the bridge structure shall be selected considering its applicable construction method in order to minimize obstruction to traffic flow. Consequently, only steel superstructures are applicable.

Locations for piers are limited. The FO diagonally crosses over the BRT lanes, carriageways and pedestrian way on Jinja Road. Available spaces for installation of piers are determined to be Centenary Park and the two median strips (dead spaces) created between the BRT stations and Hotel Africana Junction on Jinja Road. Based on these limited pier locations, applicable span length has been determined to be approximately 40 m to 55 m.

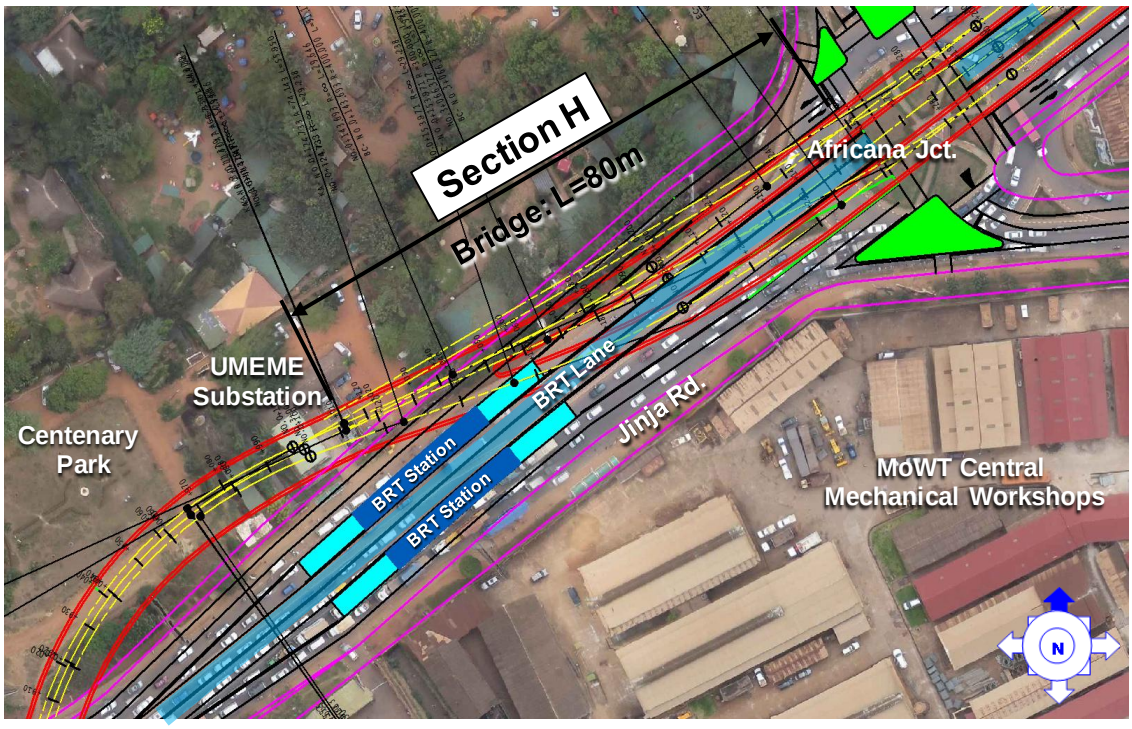


Figure 3-12: Section H: Transition curve section between Kitgum House Junction and Hotel Africana Junction
Source: JICA Progress Report 2

3.3.6 Section I: Straight Section above Hotel Africana Junction

Section I is the straight section passing above Hotel Africana Junction which is currently a roundabout and is to be upgraded to a signalized junction in this project. An aerial photo with the alignment plan of this section is shown in Figure 3-13. Since the bridge passes above a vital junction and the space for temporary diversion is limited, steel bridges should be employed in order to minimize the impact to the existing traffic flow. According to the planned location of stop-line of the new junction, minimum span length will be 40 m (piers shall be located outside of the junction area defined by the stop-lines in order to secure visibility of the junction). The span length of 40 m is also justified by the location of the pier in Section H.

For this section a steel arch bridge is considered as an alternative to create a unique landmark. Considering the FO splits into two separate structures on Jinja Road, mono-chord Lohse arch can be provided at the gap between those two lanes. The superstructure is united again as one unit by the arch and it reinforces the girder.

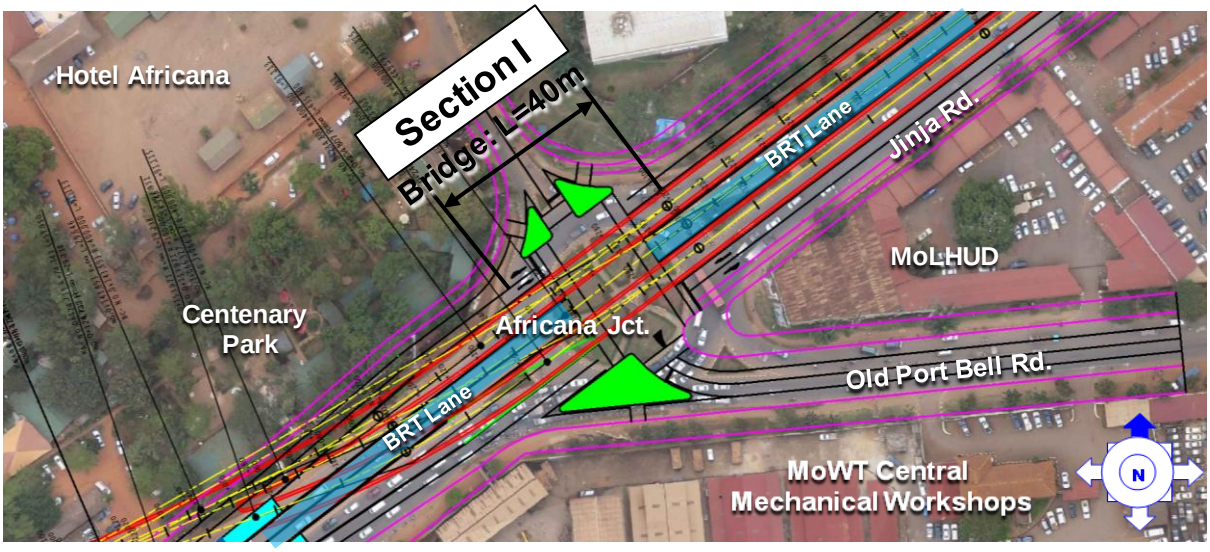


Figure 3-13: Section I: Straight section at Hotel Africana Junction
Source: JICA Progress Report 2

In addition there will be 3 Branch Ways that have been described above which are as follows:

- Yusuf Lule Road Branch Way: 220m
- Nsambya Junction – Gaba Road Branch Way: (approx. 600m);
- Shoprite - Clock Tower widening Branch Way : 200 m

3.4 Nsambya Underpass

The four lane underpass starts approximately 50 m west of crossing point of railway and Mukwano Road to approximately 200m west of Nsambya Junction. The length of the underpass is 415m, and the underpass goes under Nsambya Junction to minimize the impact on traffic jam on Nsambya Junction.

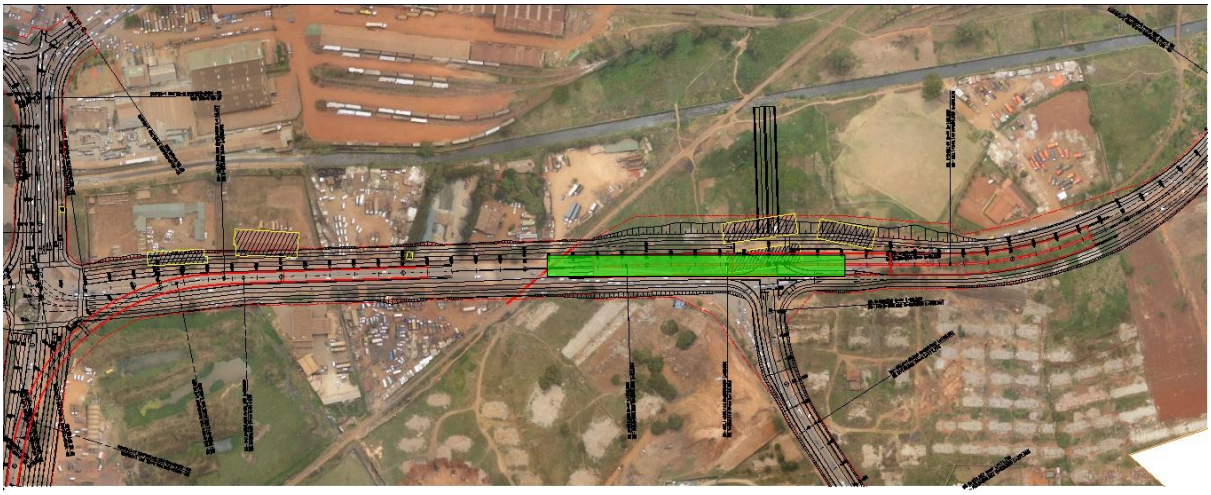


Figure 3-14: Nsambya Underpass

3.5 Project Equipment, Personnel, Activities, Facilities and Installations

3.5.1 Project Equipment

Main equipment for the project will include; excavators, compactors, transport vehicles as well as tunnel and bridge construction machinery. Some of the equipment will be offsite at quarries and workshops. It is important to note here that some of these equipments are Statutory Instruments (e.g. Cranes etc.) where the Contractor is required to ensure that machine Safety Checks are conducted by an Authorized Person at least every six months. There will be no major installations except for water and electricity in campsites and signposts, Street lighting as well traffic signal lights along the new road.

3.5.2 Project personnel and working conditions

The Project will benefit both indigenous workers and migrant workers. Although the number of workers is not yet identified, the maximum number of workers is 12, 000 persons/month covering the whole of project area (total three packages). In addition, number of workers in asphalt plants/quarries is 150 persons/ month. This may translate to about 800 people including professional, skilled, semiskilled and unskilled staff. Staff may be changed with time and place of operation.

3.5.3 Project Activities

The project is in three phases. These are the feasibility and design stage, Valuation of impacted properties and preparation of a brief Resettlement Action Plan (Abbreviated Resettlement Action Plan (ARAP)). Then there will be the construction phase and operational phases of the project. Specifically, the line up of the activities will be as follows: -

- Detailed engineering designs and feasibility studies;
- Survey of the route to finalise and agree on the alignment taking into account, a number of considerations such as utilities, settlements and institutions;
- Valuation of properties if any in the ROW;
- Compensation of Project Affected Persons (PAPs);
- Notification of PAPs to leave the ROW for the start of road works;
- Demolition of properties in the ROW after compensation;
- Relocation of public utilities such as water mains, communication and electricity utilities;
- Removal of the trees along the roads as well as replanting those trees in compensating for the loss of tree cover;
- Drilling to attain tunnelling effect as well as construction of bridges and flyovers;
- Construction of campsites involving construction of temporary shelters, installation of water and electricity, paving or levelling to accommodate equipment and stores etc.;

- Blasting and mining of quarry at areas that have been identified by this study;
- Water abstraction from existing water points;
- Transportation of soil and construction materials;
- Installation of road furniture and associated signage;
- Construction of Non-motorised Transport (NMT) lanes along the project road;
- Landscaping and rehabilitation of degraded sites including burrow pits and detours
- Re-vegetation of restored surfaces at close of works; and
- Decommissioning of project.

Design and Construction

Generally, modern roads are constructed as all-weather roads with a hard surface pavement, usually asphalt or concrete. A paved roadway typically consists of three layers above the sub-grade: the sub-base, base course, and wearing course. Each layer is compacted by a roller before proceeding with the next course.

Sub-grade, Sub-base, and Base layers

The sub-grade is earth that has been graded to the desired elevation. The soil may need to be amended with stabilizing additives (e.g. lime, Portland cement, or fly ash) to provide adequate, uniform support to the overlying road structure.

The sub-base layer is designed to evenly spread the load of the pavement and the traffic to the ground below. Both bound and unbound materials are used for construction of sub-base. Unbound materials consist of aggregates which are loose and do not bind or adhere to neighbouring particles when laid and compacted. The material is typically crushed stone, slag, or concrete. For bound materials, a binder, usually cement, is added to bind the aggregates together, thus allowing heavier loads but also reducing drainage. Crushed stone, slag, and building material can be used as components in bound materials.

The base course is the strengthening layer of the pavement. The material used is similar to that of the sub-base, but the size of particles is more uniform. Asphalt or concrete can be used as a binding medium.

Wearing layer

The wearing course is the top layer of asphalt or concrete. The top layer needs to be even to provide a smooth ride for cars and trucks. Asphalt is the most common material for the wearing course. The basic input materials used in asphalt preparation are hot liquid bitumen and aggregates (e.g. sand and crushed stone).

Asphalt

Hot mix asphalt is a highly technical mixture of strictly specified materials (e.g. the tolerance for the aggregates is often less than 5 percent for the shape, size, hardness, and wear index) The variety of mix types is practically limitless, depending on its position in the road structure (e.g. base or wearing course), on its particular function (e.g. intensity of traffic, anti-skid properties noise reduction), on climatic conditions (e.g. from freezing to high temperatures), and on the nature of raw materials locally available (e.g. limestone or granite quarries, types of bitumen).

Other materials, such as broken asphalt (taken from a road that has been ripped up), sulphur, rubber, and foundry sands can be added to the basic mix without compromising the final asphalt quality. Asphalts are grouped by their content and the size of stones (aggregates). Many types of asphalts have been developed to satisfy desired requirements depending on climate conditions, traffic loads, and other specific parameters. Two types of asphalt that are common in modern road work are stone mastic asphalt (SMA) and porous asphalt. SMA consists of a coarse aggregate skeleton bound with mastic consisting of crushed rock fines, filler, and bitumen. The stone to stone contact of the coarse aggregate ensures a very durable matrix that is resistant to age hardening, and capable of high resistance to deformation. Consequently, it is resistant to cracking, ravelling, and damage by moisture. Increasing traffic volumes, particularly in countries with wet climates, have led to the development of porous asphalt (PA). PA consists primarily of gap-graded aggregates bound together by a polymer modified binder to form a matrix with interconnecting voids through which water can pass.

The main difference between SMA and PA is in the percentage of voids in the mix. PA has a void content of at least 20 percent compared with 3 to 6 percent for SMA. This higher void content means that the PA greatly

improves the rate of surface water drainage, thereby reducing spray and headlight glare in wet weather, improving skid resistance, and reducing the tendency for hydroplaning. PA typically also generates lower tire/pavement noise than other wearing course materials. Asphalt is normally applied within 30-50 km of the mixing plant; however transport up to 100 km may be necessary in some cases.

Concrete

Concrete may be chosen for the wearing course, especially for roads carrying high traffic volume and heavy truck traffic, principally because of its durability, long life (usually 20 – 30 years), and generally lower maintenance needs compared to asphalt paving. Concrete typically generates higher levels of tire / pavement noise and is more expensive to install than asphalt. The sub-grade, sub-base, and base layers supporting concrete paving are similar to those described above for asphalt paving. Because of the rigidity of concrete pavement, loads are spread over a large area and pressures on the sub-grade are relatively low. A sub-base may be omitted when constructing concrete roads designed for light traffic. For large road projects, the concrete slab is usually laid down by slip-form paving equipment, which form and consolidate fresh concrete as they move along the right-of-way. The pavement surface is textured to enhance wet and dry weather traction. Contraction and expansion joints are included at regular intervals to relieve stresses and prevent cracking of the concrete slab.

Pavement Marking

Pavement striping is used for lane stripes and other pavement markings to guide motorists. Other pavement markers are used to supplement traffic signs. Markers may either be surface mounted (raised) or placed in recessed slots in the pavement. Markers are applied using bitumen / epoxy adhesives.

Toll stations

Toll stations may be manually or electronically operated or a mixture of both and to avoid prolonged stops at the tollgates, the roadway expands into a toll plaza with several lanes. The plaza design allows for traffic to safely separate and decelerate to the collection point and then accelerate and merge with the traffic flow again. Manual collection of tolls is relatively slow, and therefore requires more toll booths / lanes than are required for electronic systems to process the same number of vehicles.

Operation and Maintenance

Operation and maintenance activities are numerous but mainly include road repair, bridge maintenance, and vegetation maintenance.

Asphalt pavement is susceptible to cracking and other breakdowns that have to be repaired. Asphalt emulsions are usually used to fill up small cracks. Cutbacks, which are a mixture of asphalt and petroleum solvents, are not used as frequently because of potential environmental effects of the solvents. Repair tasks include equipment operation, sweeping, application of asphalt, and compaction rolling. The most common location for repairs of concrete roadways is at the longitudinal joints, where moisture has the opportunity to enter the pavement system. Repairs are typically conducted by sawing through and removing the deteriorated concrete. The existing base material is compacted, and additional material added if necessary. Load transfer is re-established in the patched area by means of reinforcement (e.g. tie bars and dowels). The new concrete is textured to match the surface of the existing roadway. Diamond grinding is also used to restore surface properties (e.g. reducing bumps and dips and restoring surface roughness).

When the road surface deteriorates to the extent that spot repairs and surface treatments are not useful, resurfacing is necessary. For asphalt pavement, resurfacing is most often accomplished by use of milling machines, which remove the top layer of pavement. The removed pavement can be transported off site and crushed or otherwise processed to make it useable as sub-base or other material.

Often, the removed pavement is ground at the job site, mixed with beneficiating additives (e.g. virgin aggregate, binder, and / or softening or rejuvenating agents to improve binder properties), and then used for re-paving the roadway. Milling and paving of asphalt roads is often completed in a single pass. Resurfacing of a concrete roadway entails breaking and removal of the concrete, compacting and amending the base material as necessary, and then re-paving. Removed concrete is usually crushed and recycled as sub-base material.

Steel bridges are generally painted with a multi-coat paint system to resist corrosion. In order to keep a high-quality protection against deterioration, new paint has to be applied regularly. If the old paint is in good condition it can be over coated, otherwise it has to be removed before the new paint can be applied. Old paints may contain lead.

Vegetation in the rights of way requires periodic maintenance to enhance aesthetics and to prevent potential safety hazards (e.g. reduced visibility, obstruction of signs, and debris in the roadway). Vegetation maintenance typically includes mechanical mowing, trimming, removal of brush, cleanup, and removal of trees when necessary.

Construction Phases
When it comes to Construction, the Project is divided in three packages which are packages 1 to package 3 as shown in the Table below.

Site	Area	Main works
Package 1	Clock Tower Section	Flyover and road expansion
Package 2	Mukwano widening section & Gaba road section	Underpass and road expansion
Package 3	Garden city junction section & Kitgum & Africana section & Mukwano junction section	Flyover and road expansion

3.5.4 Materials Testing/Investigations
At the time of the study, the design team has already conducted soil Investigations along the project road. Further studies to potential sources for supply of the materials as well as establish their quality and quantities alongside their suitability for the road works has been recommended. Such investigations and laboratory tests will be conducted in order to provide the basis for the design of road pavement and structure foundations. In general prior to locating the construction materials the following factors are investigated; performance of the materials that are to be used for the construction, accessibility, quantity and quality, distribution along the route, type and thickness of overburden materials and their suitability as construction materials, availability of ample space for erecting crusher and stockpiling (applicable for rock sources), and environmental aspects. On the other hand, there are already existing sites which have been evaluated for provision of materials for other similar projects. The nearest ones to these projects include the Kampala Northern bypass as well as the Kampala Southern bypass.

3.5.5 Water for the Project
Water will be needed especially to keep the dust levels down during the construction phase where appropriate, and to mix concrete as well as other construction needs as appropriate. In addition, limited amounts of potable water will be needed at campsites and at workplaces/offices. Considering that the road project will be about 6.2 kilometres, based on earlier estimates within the project area, the water demand will be of the order or 200 million litres of water. The Contractor will be required to seek permission from the Directorate of Water resources to access acceptable sources of water. The same directorate will issue the relevant water Abstraction Permit to the Contractor after a source(s) have been agreed on.

4 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

4.1 Introduction

Uganda is a landlocked country, lying astride the equator in east-central Africa, occupying 241,551km^2, 18% of which are inland waters and permanent wetlands. To the north and the west, lies the Sudan and the Democratic Republic of Congo (DRC), respectively, and further southwest lies Rwanda. With an estimated (2012) population of 33.64 million growing at 3.3% (2012 estimate) - http://www.indexmundi.com/uganda/demographics_profile.html, Uganda has one of the highest population growth rates in the world, higher than the Sub-Saharan Africa average of 2.4%. Of this population, 13% was estimated to be living in urban centres with an urbanization rate of 4.8% per annum.

The 2012 GDP - per capita (PPP) estimate for Uganda is US$ 1400 (http://www.indexmundi.com/uganda/economy_profile.html). Since 1990 economic reforms ushered in an era of solid economic growth based on continued investment in infrastructure, improved incentives for production and exports, lower inflation, better domestic security, and the return of exiled Indian-Ugandan entrepreneurs. Since then, Uganda has received over $2 billion in multilateral and bilateral debt relief. In the future it is expected that Oil revenues and taxes will become a larger source of government funding as oil comes on line in the next few years.

To sustain this GDP, Uganda relies on its road network for the movement of over 95% of its goods and passenger traffic. Kampala Capital City is the main centre where all roads from upcountry end leading to severe traffic congestion within the city. Some estimates have indicated that up to 70% of the Uganda's motor vehicles are congested within Kampala and surrounding districts. Subsequently a sound road transport infrastructure for the country in general and around Kampala in particular is crucial to enable the attainment of the national policy objectives of a strong private sector led growth that contributes to economic development and poverty eradication (ref - Uganda Vision 2025 and National Transport Master Plan, 2010-2015).

4.1.1 Uganda Vision 2040

Uganda Vision 2040 provides development paths and strategies to operationalize Uganda's Vision statement which is ***"A Transformed Ugandan Society from a Peasant to a Modern and Prosperous Country within 30 years"*** which aims at transforming Uganda from a predominantly peasant and low-income country to a competitive upper middle-income country. It builds on the progress that has been made in addressing the strategic bottlenecks that have constrained Uganda's socio-economic development since independence, including; ideological disorientation, weak private sector, underdeveloped human resources, inadequate infrastructure, small market, lack of industrialization, underdeveloped services sector, underdevelopment of agriculture, and poor democracy, among others.

4.2 Policy Framework

The Government of Uganda Policy as outlined in the National Environment Management Policy stipulates as follows:

- An Environmental and Social Impact Assessment (ESIA) shall be conducted for planned projects that are likely to or will have significant impacts on the environment so that adverse impacts can be foreseen, eliminated and or minimised;
- EIA/SIA process shall be interdisciplinary;
- EIA/SIA process shall be fully transparent so that all stakeholders will have access to it and that the process will serve to provide a balance between environmental, economic, social and cultural values for sustainable development in the country.

Application: the principles and guidelines within this policy have been used to guide the preparation of this ESIA, a multidisciplinary team was constituted based on the scope of works cover the issues that are likely to be affected during the planning, construction and operation of this project.

4.2.1 The National Water Policy, 1999

The GKRIP traverses many places parallel to wetlands some of which are of national importance. The development of the GKRIP is likely to impact on these water resources. The National Water Policy (NWP) is relevant to the ESIA because it provides guidance on the development and management of Water Resources of Uganda in an integrated and sustainable manner. The policy aims at providing adequate quality and quantity of water for all social and economic needs without compromising the water needs for the future generations and emphasizes full participation of stakeholders in the water sector.

Application: water quality parameters were selected and baseline information to further guide decision making on how best to handle mitigation on aspects like soil erosion and chemical contamination mainly during construction. The area of interest was the Nakivubo channel.

4.2.2 The Policy on the Conservation and Management of Wetlands, 1995

The proposed GKRIP traverses major wetlands surrounding Lake Victoria. The National Policy for the Conservation and Management of Wetlands will be relevant to this ESIA as it aims at curtailing loss of wetland resources and ensuring that benefits from wetlands are equitably distributed to all people of Uganda. The Wetland Policy does among others call for the application of environmental impact assessment procedures on all activities to be carried out in a wetland so as to ensure that wetland development is well planned and managed.

4.2.3 National Gender Policy, 1997

While conducting the Environment Impact Assessment exercise, it is normal to propose that the Contractor provides employment to the local men and women and extend other benefits which will accrue from the GKRIP construction to the communities. Besides, the impacts of the GKRIP project to men and women require a comprehensive gender responsive analysis while conducting the ESIA.

For this reason, the National Gender Policy will be relevant to the GKRIP development efforts since the policy promotes the participation of both men and women at all stages of the project cycle. The policy emphasizes equal access to and equal control over economically significant resources and benefits. Our recommendation in this aspect is that employment opportunities target both genders as well as all planning requirements be it alternative routes during construction, traffic management and compensation.

4.2.4 Environment Health Policy -2005

The Environmental Health Policy concentrates on the importance of environmental sanitation which includes: safe management of human waste and associated personal hygiene; the safe collection, storage, and use of drinking water; solid waste management; drainage; and protection against disease vectors (MOH 2005). Environmental health practices include: safe disposal of human waste, hand washing, adequate water quantity for personal hygiene and protecting water quality, all influence the morbidity and mortality of diarrheal diseases. The policy will guide implementation of Public Health and hygiene intervention measures on the GKRIP project.

Application: the public health aspect has been given adequate attention in preparation of this ESIA, aspects included impact on water and possible contamination identified, traffic impacts and accidents which is the main objective of the GKRIP, occupational health and safety issues at key points for example the flyover at centenary park (Kitante substation) where the design considered impacts of the flyover over an electrical installation and measures proposed to ensure that workers and people are not affected during the works and operation, noise and dust issues around areas of concentrated business as well as key administrative units.

4.2.5 National AIDS Policy and National Strategic Framework for HIV/AIDS activities in Uganda 2004

HIV/AIDS is one of the major concerns within the project area. The prevalence of workers in paid employment increases the potential to transmit HIV/AIDS and other Sexually Transmitted Diseases to the neighbouring communities. The National AIDS Policy is aimed at managing the HIV/AIDS pandemic and provides guidance on how to approach the pandemic. Together with the National Strategic Framework for HIV/AIDS activities in Uganda, it provides overall guidance for activities geared towards preventing the spread of HIV/AIDS.

Application: All civil works are associated with the migrant workers who may not have families or spouses living with them at the time of civil works. Given that the project is located within the Central Business District, it becomes pertinent that these workers are trained on gender awareness, HIV/AIDS so that the money they get should be used effectively at household level with joint planning and decision making with their spouses.

4.2.6 Ministry of Works & Transport Policy Statements (HIV/AIDS, OHS, Gender,) 2008

HIV/AIDS

MoWT developed the HIV/AIDS Policy Statement for the road sector based on the premise that whereas some road-sector activities have been proved to be major conduits for transmission of HIV/AIDS, others directly and indirectly contribute to the fight against the pandemic. For instance, good roads and transport services can be used to enhance access to HIV/AIDS prevention services and care. On the other hand, some sector activities and good road networks have proved to be a good conduit for increased spread of the pandemic and examples include prostitution associated with long-distance truck drivers and road construction works.

The goal of this is to guide mainstreaming of HIV/AIDS activities so as to reduce prevalence of HIV infection, provide care and support to infected and affected persons and to mitigate effects of HIV/AIDS in the sub-sector. Specific objectives of the policy are to:

- Reduce vulnerability and risk of HIV transmission in the roads sub-sector;
- Mitigate effects of HIV/AIDS in the roads sub-sector; and
- Improve road sector's capacity to respond to HIV/AIDS pandemic.

Gender Policy Statement

Overall objective of this Policy Statement is to strengthen contribution of roads to poverty eradication through providing an enabling environment where women and men participate in, and benefit from, developments in the sub-sector in an equitable manner. The purpose of the Policy Statement is to institutionalize a gender perspective in road institutions and their operational and regulatory frameworks.

The specific objectives of the Gender Policy Statement are to:

- promote gender-responsive sub-sector policies, programmes and plans;
- promote gender-responsive service delivery;
- enhance equality of opportunities between women/girls and men/boys in the sub-sector;
- commit adequate resources to gender-responsive activities in the sub-sector; and
- Strengthen capacities of sub-sector institutions, partners and service providers to mainstream gender.

OHS Policy Statement

The policy seeks to:

- Provide and maintain a healthy working environment;
- Institutionalize OHS in the road-sector policies, programmes and plans;
- Promote efficient road safety management practices;
- Contribute towards safeguarding the physical environment.
- The OHS Policy Statement is guided by the Constitution of the Republic of Uganda and other Global, National and Sect oral Laws and Policies. The Policy Statement also takes into recognition the National Development Plan, the Transport Sector Policy and Strategy Paper, and the Health Sector Strategic Plan, all of which aim to improve the quality of life for all Ugandans in their living and work settings.

Application: as already highlighted in this report, there are a number of programmes and projects that are working towards increasing road safety and efficient road practices in Kampala, this ESIA and the generally the feasibility study has taken into consideration all these other projects especially the BRT and the Non-Motorized policy to ensure that the GKRIP is in line with these programmes. Relating to working in a safe environment, other aspects that have been looked at include working above electrical installations and required clearance, working in wetlands, working in areas of high traffic concentration leading to increased noise and air emissions.

4.2.7 UNRA's Resettlement/Land Acquisition Policy Framework, 2002

UNRA Resettlement/Land Acquisition Framework is such that:

- Compensation shall be aimed at minimizing social disruption and assist those who have lost assets as a result of a road project to maintain their livelihoods. In accordance with Ugandan Laws and Standards, a disturbance allowance of 15% (or 30% in lieu of six months' notice) is to be paid to the project affected individual or family to cover costs of moving and re-locating;
- Community infrastructure must be replaced and ideally be improved in situations where it was deficient. This includes installation of sanitary facilities, electricity generation systems, road links and provision of water.

Application: a land use and cadastral survey was undertaken to determine the impact on social disruption and assets along the project area. Aspects that were considered included impact on cultural heritage, the clock tower was an area of discussion that was integrated on the feasibility study as a social consideration; other social considerations include impact on government installations including Electoral Commission, Ministry of Works, Uganda Police, railways and schools. In most cases these were avoided, and impact on structures was left at minimal. For the utilities, these will be addressed during the detailed design since they only require relocation and such costs are agreed at that level, however, in the case of the UMEME substation, a steel structure is proposed along the substation in order to reduce excavation works, electrical installations are more sensitive than telecommunication installations.

4.2.8 EIA Guidelines for Road Sub-Sector, 2008

The EIA Guidelines for the road sector were finalized in 2008. They outline sector specific EIA requirements on a road project. It categorizes the various road projects and the levels of EIA to be undertaken on such road project. Under the project categorization of the Sub-Sector EIA Guidelines, the planned upgrading road project falls under Category IV which are projects that require full and mandatory EIA to be conducted before they are implemented, hence the need to conduct this ESIA.

Others to be considered include the following: -

- The National Development Plan, 2010-2015
- The National Transport Master Plan
- The Kampala Capital City Authority Structural Plan, 2012
- Uganda's Vision 2025
- MoWT Sub-Sector Policy Statements and Guidelines for Mainstreaming Cross-Cutting Issues, 2008

4.2.9 MoWT Sub-Sector Policy Statements and Guidelines for Mainstreaming Cross-Cutting Issues, 2008

MoWT has in place thematic Policy Statements and Guidelines for mainstreaming concerns and interventions for cross-cutting issues into its activities, plans and programmes. The sub-sector cross-cutting issues include: Gender, Occupational Health and Safety, People with Disabilities and the Elderly concerns and HIV/AIDS. These tools are aimed at articulating and ensuring that, the road sub-sector is committed to addressing inherent inequalities and weakness with regard to cross-cutting issues in the development process.

The Guidelines are meant to support the sub-sector in its mainstreaming process of cross-cutting issues. They also serve as reference materials which provide systematic guidance to all road sub-sector stakeholders (such as UNRA) to effectively contribute to the national overall response to Governments' commitment towards the successful and sustained integration of such themes to the development process. In an attempt to ensure that the process is successful, the guidelines provide strategies, methods and responsibility Centres for moving the mainstreaming process on in line with the sub-sectoral political commitments and in tandem with the mainstreaming principles.

4.3 The Legal Framework

Operating Legal Provisions relevant to both road development and mining/quarrying projects in Uganda are examined. The overriding Law in Uganda is the Constitution of the Republic of Uganda. These Regulations described in this Section will be observed by the contractor and prospective road users and they will strictly be enforced by UNRA.

4.3.1 The Constitution of the Republic of Uganda, 1995

The Constitution is the supreme law of Uganda and it provides for protection of the environment. Under the National Objective and Directive Principles of State Policy XXVII on the Environment, the State, among others, is mandated to:-

- Promote sustainable development and public awareness on the need to manage land, air, water resources in a balanced and sustainable manner for the present and future generations;
- Take possible measures to prevent or minimize damage and destruction to land, air and water resources resulting from pollution or other causes;
- Promote the rational use of natural resources so as to safeguard and protect bio-diversity of Uganda.

Under Article 39, the Constitution guarantees the right of every person living in Uganda to a clean and healthy environment. The constitution therefore, requires that the project should to be implemented without endangering human health and the environment.

4.3.2 The National Environment Act, Cap 153

The National Environment Act, Cap 153 established principles for sound environmental management and provides an Institutional Framework for environmental management. The Act establishes the National Environment Management Authority (NEMA) and mandates Lead Agencies (LA) in sound management of the environment. It also specifies management measures, addresses pollution control and stipulates mechanisms for enforcement of the law. Under Part V on Environmental Regulations, the Act, elaborates the Environmental Impact Assessment process for projects listed in the Third Schedule to the Act. The process is further elaborated upon in the Environmental Impact Assessment Guideline in Uganda (July 1997) and the Environmental Impact Assessment Regulations. The projects listed therein include transportation projects such as all major roads and all roads in scenic areas. The GKRIP fits this description since it is a major national road, it passes through major wetlands around Lake Victoria.

4.3.3 The Water Act Cap 152

The objective of the Water Act is to enable equitable and sustainable management, use, and protection of water resources of Uganda through supervision and coordination of public and private activities that may impact water quantity and quality.

Section 18 requires that before constructing or operation of any water works, a person should obtain a permit from Water Resources Management Directorate (WRMD). Construction works is herein defined to include alteration, improvement, maintenance and repair of works partly or wholly situated within or on the bed or bank of any water course and therefore this provision is relevant to bridges and Aviducts. The Act also aims to control pollution of water resources (Sections 20 and 31).

The foregoing notwithstanding, Section 19 provides that subject to guidelines established by the Minister from time to time, the Director (of Water Resources Management) may exempt a public authority or a class of persons or works from requirements in Section 18 on such conditions as he or she may deem fit. UNRA's is mandated to develop such infrastructure on national roads from time to time and as a Public Authority under the national laws including the Water Act could, therefore, benefit from this provision.

This Act will specifically be *applicable* to two aspects of the proposed project:

- Water abstraction for the road construction and camp use; and
- Activities associated with construction of bridges across rivers.

4.3.4 The Mining Act, 2003

Road construction has auxiliary activities including stone quarrying and burrow materials extraction involve excavations or working where any operations are connected with mining including erections and appliance used in connection with such operations. These activities, therefore, are a subject of this Act.

Requirements under Part XI for the Protection of the Environment under the Act are therefore, relevant. Such requirements include Environmental Impact Assessment and Audits and Environmental standards for the prevention and minimization of pollution of the environment and waste management. Section 110 (2b) gives guidance on restoration activities. It provides that the environmental restoration plan shall include a detailed

time table of the accomplishment of each major step to be carried out under the restoration plan which may include the reinstatement, levelling, re-vegetation, reforesting and contouring of the affected land; and the filling in, sealing, or fencing off of excavations, shafts and tunnels. Section 3, of the Act vests ownership and control of all minerals in Uganda to the Government and provides for the acquisition of mineral rights and other related matters. The Act provides for compensation for the disturbance of rights to the occupier or legal owner in respect of crops, trees, buildings or works damaged during mining operations.

Application: Although this study does not develop a detailed project brief for the quarries and burrow areas, our recommendation is that the contractor develops detailed management plans for such areas, including reducing in situ sediment control, dust emissions, traffic management and reduction of accidents. Normally, the cost of such studies should be integrated in the bills of quantities and a cost attached during contract award against which such deliverables are tagged to approvals of works.

4.3.5 The Traffic Act

The Act applies to the GKRIP project during both construction and operation. It is relevant to the road project because it seeks to enforce safe utilization of Public roads. For this reason, the Act requires that developers of Public roads do take measures that guarantee safety of road users during project implementation. These will include alternate routing of traffic, diversions, safety signalling and the use of traffic wardens/signallers among others.

Application: A number of diversions are expected during the construction phase and the general public needs to be made aware of such activities and detailed traffic management plan prior to commencement of civil works.

4.3.6 The Land Act, Cap 227

The Land Act provides for tenure, ownership and management of land. Part III Sections 43, 44, and 45 specifically address the utilization of land in accordance with the relevant Statutes and Acts of environmental concern, which include The Forest Act, The Mining Act, The National Environment Act, The Water Act, and any other law. In addition, section 45 addresses the control of environmentally sensitive areas. In addition to the relevant environmental sections of the Land Act, 1998 (sections 42, 43, 44, 45, 70, 71, and 72) specific attention will be taken of section 40 of the Land Act which deals with Conditions of Transfer of land by family. Subsection (1) states that No person shall enter into any contract for or actually sell the land on which that person usually lives with a spouse or dependent children of the age of 18 or above except with prior written consent of either the spouse or the children.

Application: The Act is relevant to the GKRIP project because the proposed GKRIP will encroach on people's land since it is a completely new alignment that will pass through people's estates and new lands.

4.3.7 The Survey Act, 1994

Survey operations in Uganda are governed by the Survey Act. This Act is relevant to the GKRIP construction efforts in general and the GKRIP in particular, because before any attempts are made to construct any road or highway in any part of the country, a survey of the area has to be conducted. Under this Act, the Commissioner of Surveys and Mapping can authorize the carrying out of a survey of any land in Uganda if it is necessary. However there are conditions to the survey such that where a general survey is necessary, notice of such specifying the limits of the area to be affected has to be published in the Uganda Gazette.

Application: The GKRIP has been gazetted.

4.3.8 The Road Act, Cap 358

The Roads Act, Cap 358 provides for the declaration of road reserves and prohibits any persons from erecting buildings or planting trees or permanent crops within the road reserve except with the written permission of the road authority. The Act also permits the road authority to dig and take away materials required for the construction and maintenance of roads from any part of the road reserve. There are a number of development activities on the road corridor that may lie within the standards reserve requirement for the road. Standard road reserve requirements will therefore, have preference under the law and that the Authority, within this mandate may have to acquire such land in line with this standard requirements.

4.3.9 Access to Roads Act, Cap 350

The Access Roads Act regulates the rights of Private landowners who have no reasonable means of access to public highways through adjoining land. The Act further provides for maintenance of the access road in a good and efficient state of repair, and for payment of compensation to land owners of adjoining land in respect of the use of the land, the destruction of crops, trees and such other property. In essence, this means that Road construction should take into consideration that Private land owners should access highways. This is relevant to this project as the new alignment will cross many existing roads and disrupt the present access.

4.3.10 The Traffic and Road Safety Act, Cap 361, 1998

This Act is relevant to the GKRIP project during both construction and after the road construction. The Act provides for administration, registration and licensing of motor vehicles, driving permits, licenses for Public service vehicles, private omnibus, and goods vehicles. It provides for use of motor vehicles, control of traffic, enforcement and information on the National Roads and Road Safety Council. Use of motor vehicles will be relevant on account of the many vehicles to be used by the contractor and the management /control of traffic both during construction and operation of the road.

4.3.11 The Explosives Act Cap 298

It will be mandatory for the quarry operator to comply with this law. This Act regulates the use and management of explosives. Under this Act, Explosives are kept at a site approved by the Ministry of Internal Affairs (MOIA) and can only be transported to the blast site under Police escort. The loading of explosives and blasting are carried out under Police supervision.

4.3.12 The National Forestry and Tree Planting Act, 2003

The National Forest and Tree Planting (NFTP) Act of 2003, section 14 and 32 requires everybody/organization to go through the legally established procedures if it is to operate or extract products from the forest reserves. The only privileges that exist as established by section 33 of the NFTP Act of 2003 is extraction of forest produce such as wood fuel for domestic use.

Section 38 of the National Forestry and Tree Planting Act, 2003 also require a person intending to undertake a project or activity which may, or is likely to have a significant impact on a forest to undertake an Environmental Impact Assessment.
Among others, this Act provides for the sustainable use of forest resources and the enhancement of the productive capacity of forests and provides for the promotion of tree planting.

Very relevant to the Road projects in general, the Act ensures that forests and trees are conserved and managed in a manner that meets the needs of the present generation without compromising the rights of future generations by safeguarding forest biological diversity and the environmental benefits that accrue from forests and trees. This is relevant to the GKRIP since some of the road construction materials have been identified within the gazetted Forestry reserves. The Act facilitates greater public awareness of cultural, economic and social benefits of conserving and increasing sustainable forest cover. Further, the Act ensures that environmental benefits, costs and values are reflected in strategies and activities relating to forestry.

4.3.13 The Land Acquisition Act, 1965

During the construction of the GKRIP, it will be necessary to acquire land since in many places the road will be widened. More land may be required for either testing or for use with respect to road development activities. The Land Acquisition Act will be relevant to the GKRIP development efforts because it provides for the acquisition of and legal proceedings for the land including the following:

- Power to enter on and examine the land;
- Declaration that land is needed for Public purposes;
- Land to be marked out including notice to persons having an interest in the said land;
- Inquiry and award including taking possession, withdrawal from acquisition, acquisition of part a house, manufactory or any other building; and
- Temporary occupation for waste or arable land for public purposes as well as end to temporary occupation.

The Act provides for legal proceedings including appeals, references to the court, enforcement of right to possession and rules on procedures among others.

4.3.14 The Historical and Monuments Act, Cap 46

This Act provides for the preservation and protection of historical monuments and objects of archaeological pale-ontological ethnographical and traditional interests. Under this Act, the Minister has wide ranging powers to protect any of the above objects and under Section 8, no person whether owner or not shall cultivate or plough the soil so as to effect to its detriment any object declared to be protected or preserved, and no alteration is permitted on any object declared to be protected or preserved. And under Section 11, any person who discovers any object which may reasonably be considered to be a historical monument or an object of archaeological, pale-ontological, ethnographical, and traditional interests is required to report it to the Conservator of Antiquities within 14 days of the discovery. The Environmental Management and Monitoring Plan will put in place measures for the protection of Physical Cultural Resources (PCRs).

4.3.15 The Occupational Safety and Health Act No 9 2006

The health and safety of persons at work and the handling of hazardous processes and chemicals during manufacture, storage, transport and sale are in the purview of the Occupational Safety and Health Act No 9 2006. The purpose of the Act is to improve the working conditions of working people and in particular their safety, health, and the hygiene of their working environment - to ensure that they work in an environment, which is reasonably free from all hazards that can lead to injury and poor health.

It provides for the safety and health, of persons at work such as in quarries, factories, plantations and other workplaces where hazardous work may be found. It expands the scope of application beyond the "factory" into any "work place" where workers may be present for the purpose of work and may sustain injury and or disease in the course of their work. Quarrying, road construction and workshop chores/activities are therefore covered under this Act.

The Act, in Section 13, puts the responsibility of protection of the worker and the general environment to the employer and he or she must take all measures to protect the worker and the general public from the dangerous aspects of his or her undertaking. In section 18, he or she also has the responsibility of monitoring the environment under the influence of his or her undertaking.

In section 95, it requires the employer to take all preventive measure including administrative and technical measures to prevent or reduce contamination of the working environment to the level of exposure limits specified by the Commissioner.

4.3.16 The Workers Compensation Act Cap 225 (Formerly known as The Workers Compensation Act No 8, 2000):

So far there are many complaints of occupational injuries and disease from people and workers in the road construction sector. Attention is therefore drawn to the Workers Compensation Act Cap 225. This Act is closely related to the Occupational Safety and Health Act which provides for compensation to workers for injuries and diseases suffered in the course of their employment.

4.3.17 Other Labour Laws

The labour laws relevant to employment, industrial relations and workers' conditions during implementation of the GKRIP project are set out in the Employment Act (2006) and Employment Regulations (1977), the Workers' Compensation Act (2000), Labour Disputes (Arbitration and Settlement) Act, (2006) and Labour Unions Act, 2006. The Employment Act (2006) gives a provision for a Labour Advisory Board that advises on matters affecting employment and industrial relations. Ugandan labour laws address matters below which will be important for employee management during GKRIP construction:

- Contracts of Service;
- Employment of children/ child labour;
- Termination of Contracts;
- Illness of employees;
- Sexual harassment;
- Occupational diseases;
- First-Aid;
- Dust and fumes;

- Meals in certain dangerous trades;
- Protective clothing and appliances;
- Protection of eyes in certain processes;
- Treatment of injuries and sickness;
- Drugs and medical equipment;
- Examination of employees; and,
- Failure to provide for the sick.

4.3.18 The Petroleum Supply Act, 2003

This Act provides for the supervision and monitoring of the importation, export, transportation, processing, supply, storage, distribution and marketing of petroleum products in Uganda. The Act specifically takes care of the safety and protection of the public, public health and the environment from petroleum products. This Act is relevant to the GKRIP project since there will be need for large quantities petroleum products for construction machinery. For this project, there will therefore be need for the Contractor to purchase and store large quantities of petroleum products for use during road construction, generation of used products and application of those products for road construction will have potentials for environmental pollution. Accordingly, there will be need for the Contractor to comply with safety measures for transportation, storage and dispensation and disposal of petroleum products during and after project implementation.

4.3.19 The Public Health Act, Cap 281

This Act aims at avoiding pollution of environmental resources that support health and livelihoods of communities. The GKRIP project will be implemented with the corporation of the Local authorities which have been mandated by the Public Health Act to take all necessary and reasonable practical measures for preventing the occurrence of, or for dealing with any outbreak or prevalence of, any infectious communicable or preventable disease to safeguard and promote the public health and to exercise the powers and perform the duties in respect of public health conferred or imposed by the Act or any other law.

Section 103 of the Public health Act imposes a duty on the Local authority to take measures to prevent any pollution dangerous to health of any water supply that the public has a right to use for drinking or domestic purposes. This Act will apply to several watercourses along the road and land where workers camps, equipment yards and quarries will be located.

4.3.20 The Environmental Impact Assessment Regulations, 1998

The Environmental Impact Assessment Regulations 1998 reinforce the EIA requirement and describe the procedures to be followed in conducting EIA of projects and the issues to be considered. The Regulations also charge the developer with the responsibility of ensuring that the recommendations and mitigation measures outlined in EI-Statement are complied with. In this regard, therefore, UNRA has conducted the EIA in line with national requirements and will ensure that the recommendations therein are implemented. The Guidelines for Environmental Impact Assessment in Uganda, 1997, give detailed processes and procedures for the conduct of ESIAs.

4.3.21 The Water Resources Regulations, 1998

The Regulations apply, among others to persons who occupy land, on or adjacent to which there is a motorized water pump which temporarily or permanently pumps water from the borehole or water way and persons or public authorities which operate works capable of diverting, impounding or using more than 400 cubic meters of water within a period of 24 hours.

Part II, Regulation 3 provides for an application for water permit where use of motorized water pump whether temporarily or permanently from a borehole or waterway. Under Regulation 6, application for permit may be granted on conditions of projected availability of water in the area, existing and projected quality of water in the area and any adverse effect which the facility may cause, among other considerations. In view of the fact that operation of camp require use of water and that water is used in suppression of dust, the contractor will have to ensure that the construction activities do not violate this law.

In addition the Land Act Cap 227 under Section 70 provided that all rights in the water of any natural spring, river, stream, water course, pond, or lake on or under land, whether alienated or un-alienated, shall be reserved to the Government; and no such water shall be obstructed, dammed, diverted, polluted or otherwise interfered with, directly or indirectly, except in pursuance of permission in writing granted by the Minister responsible for water and natural resources in accordance with the Water Act. This provision, therefore, requires the proposed project to be implemented within the provision of water right and any deviation should be undertaken in accordance with the law. The Contractor will, therefore, have to take all the necessary measures not to interfere with water rights under this provision.

4.3.22 National Environment (Standards for Discharge of Effluent into Water or on Land) Regulations, 1999

The Standards prescribe parameter for effluents or waste waters before discharge into water or on land. All discharges from the project activities including vehicle wash bays will be required to comply with the standards. The standards further oblige every establishment to install at its premises anti- pollution measures for the treatment of effluent chemical discharges emanating from the establishment.

Application: The above Regulations apply to this project especially with regard to discharges from the workers' camp including the sanitation system. Already the wetlands are seriously polluted such that the Basic study will ensure that the baseline pollution levels are known.

4.3.23 The National Environment (Wetlands, River Banks and Lake Shores Management) Regulations, 2000

Among other objectives, the Regulations provide for the regulated public use and enjoyment of wetlands, minimization and control of pollution and ensuring that wetlands are protected as habitats for species of fauna and flora. Since development of this project has the potential to impact negatively to the wetlands that surround the Lake Victoria, it will be ensured that the activities are undertaken within the objectives for wetlands protection and therefore measures will be instituted to ensure that the construction activities do not negatively impact on the these major wetlands.

4.3.24 The National Environment (Noise Standards and Control) Regulations, 2003

These Regulations provide for among others the control of noise and for mitigating measures for the reduction of noise. It provides for the maximum permissible noise levels from a facility or activity to which a person may be exposed. Road works especially at quarries and construction sites can generate noise beyond permissible levels and need to be controlled.

Regulation of noise levels is done through prescribing maximum permissible noise levels from a facility to which a person may be exposed. Under these Regulations, a facility owner is obliged to ensure that noise generated does not exceed regulatory limits unless permitted by a license issued under these Regulations. NEMA Regulatory Noise Limits are summarized in Table 4.1.

Table 4-1: NEMA Regulatory Noise Limits

Time Period / Facility	Noise limits dB (A) (Leq)	
	Day*	Night*
Construction Sites	75	65
Residential Buildings	60	40

* Time Frame: Day 6.00 am - 10.00 pm; Night 10.00 pm - 6.00 am
Source: National Environment (Noise Standards and Control) Regulations, 2003

The standards do not have specifications for the maximum increase in background noise levels in cases where pre-project noise levels already naturally exceed regulatory limits.
Part III Section 8 (1) requires machinery operators, to use the best practicable means to ensure that the emission of noise does not exceed the permissible levels. The Regulations require that persons exposed to occupational noise exceeding 85dBA for 8 hours should be provided with the requisite ear protection.

4.3.25 The National Environment (Waste Management) Regulations, 1999

The National Environment (Waste Management) Regulations, 1999 apply to all categories of hazardous and non-hazardous waste and to the storage and disposal of hazardous waste and its movement into and out of Uganda. The Regulations promote cleaner production methods and require a facility to minimize waste generation through improvement of production processes and monitoring the product cycle from the beginning to the end.

Of much importance to the project, the Regulations promote cleaner production methods that enable the recovery and reuse of wastes, reclamation and recycling. The Regulations `protect the Environment (Water, Soil, and Air) and human health. The Regulations control onsite waste storage, haulage and final disposal. According to these Regulations, waste storage, haulage and disposal should be done by licensed entities. With respect to road construction, waste is generated at camp sites, workshops and along the working areas covering a wide spectrum from solid waste to hazardous waste. These Regulations are relevant to construction works.

4.3.26 The National Environment (Control of Smoking in Public Places), Regulations 2004

This Act prohibits smoking in Public Places including Working Areas. Workers need to be reminded about The No Smoking Act to ensure there is no smoking in Public Places and those places which have a high fire hazard risk. Section 3(1) of the Regulations stipulates that every person has the right to a clean and healthy environment and the right to be protected from exposure to second hand smoke. Section 3(2) obliges every person to observe measures to safeguard the health of non-smokers. In Section 4(1) the Regulation prohibits smoking in enclosed and indoor areas of Public Places including offices, office buildings and work places including individual offices and eating areas. The owner of a public place where smoking is prohibited is obliged to post clearly legible signs, prominently, stating that smoking is prohibited. In the road construction exercise, these Regulations will have to be observed at all contractors' premises.

4.3.27 The Draft National Air Quality Standards, 2006

The Draft Standards seek to protect the quality of air from impacts of anthropogenic activities. Construction and operation of the road, therefore needs to ensure that the maximum permissible levels are not exceeded. Major sources of emission during road construction include construction equipment and machinery, which are powered by diesel/ gasoline engines. Pollutants such as CO_2, NO_x, SO_x, VOC and particulates are expected to be emitted. Also of much concern is dust from worksites as a result of vehicle / traffic movement, quarry operations, and workers' camps. Compliance with the standards requires that Best Available Technologies (BAT) and Best Environmental Practices (BEP) are employed during project implementation.

4.3.28 The National Environment (Audit) Regulations, 2006

The Regulations reinforce the requirement to undertake Self-Environmental Audits as contained in the EIA Regulations. Normally, under approval conditions of NEMA, it is a requirement to undertake audits for projects which comply with the EIA requirement as part of the conditions of EIA approval. Further, the Regulations, under Regulation 8 provide that the owner or operator of a facility whose activities are likely to have a significant impact on the environment shall establish an Environment Management System. Project implementation will comply with Audit and EMS requirements. The Environmental Audit Guidelines for Uganda, 1999 spell out the processes and procedures for the conduct of an Environmental Audit.

Application: It is a requirement that after environmental conditions for approval are given by NEMA, annual audits have to be undertaken by the contractor for the road itself and for the additional infrastructure including camps, burrow pits and quarries. These have to be budgeted for in the bill of quantities and a cost is proposed in this ESIA.

4.3.29 MoWT General Specifications for Road and Bridge Works, 2005

MoWT has in place General Specifications for Road and Bridge Works which detail how contractors undertaking road and bridge works ought to address amongst others, cross-cutting issues (gender, environment HIV/AIDS and OSH). It has specific provisions on how costs for mainstreaming or addressing these cross-cutting issues on road projects can be integrated into the Bills of Quantities to enable their implementation.

4.3.30 Permits and licenses

In order to commence road works, a number of permits or certificates of approval will have to be obtained for the relevant authorities. These include the following as shown under Table 4-2 below.

Table 4-2: Permits and Certificates Required During the Road Construction Exercise

S/No	Permit/License	Issuing Agency	Implementing Agency
1	NEMA Certificate of Approval for the Road Project ESIA	National Environment Management Authority (NEMA)	NEMA and UNRA
2	NEMA Certificate of Approval for the Quarry and related activities ESIA	National Environment Management Authority (NEMA)	NEMA and UNRA
3	NEMA Certificate of Approval for the large Burrow areas exceeding 2acres ESIA Project Brief	National Environment Management Authority (NEMA)	NEMA and UNRA
4	Water Extraction (water users) Permit	Water Policy Committee, Department of Water Resources Management (DWRM), Ministry of Water and Environment	DWRM
5	Noise Standards And Control Permit (only relevant if the developer is expected to generate noise beyond the permissible levels)	NEMA	NEMA
6	Registration with the department of Occupational health and Safety via (Form OSH. F11)	Department of Occupational Health	Department of Occupational health
7	Certificate for Statutory Plants and equipments (Via OSH Form F.107)	Department of Occupational Health	Department of Occupational Health
8	Storage of explosives permit	Ministry of Internal Affairs	Uganda Police

4.4 The Institutional Framework

The relevant institutions in this project include National Environment Management Authority (NEMA), The Kampala Capital City Authority (KCCA) with all its key Divisions / Departments, Uganda National Roads Authority (UNRA)/ (MoWT), Ministry of Lands, Housing and Urban Development (MLHUD) and Ministry of Water and Environment (MWE) as outlined in the Table 4-3 below

Table 4-3: Relevant Institutions to the Project

No.	Stakeholder	Main Responsibility
Lead Agencies and Government Departments		
1	Uganda National Roads Authority (UNRA)	Developer and overall in Charge of the GKRIP Project. In July 2008 when Uganda National Roads Authority (UNRA) became operational, the national roads network was 10,967 km. By July 2009 this had increased to 20,000 km by central government taking over 10,000 km from district roads. Out of the 20,000 km of national roads, only 3200 km (16%) is paved: this is the lowest percentage of paved trunk roads in East African Community. However, GOU drew up a National Transport Master Plan that sets out a framework for development of the transport sector over 15 years (2008-2023). The UNRA will be key in ensuring implementation of mitigation measures and undertaking monitoring of the road works during construction and after post construction.
2	National Environment Management Authority (NEMA)	Ensures Environmental Compliance and regulates activities that affect the environment; NEMA and the District Environment Offices will be key in monitoring environmental compliance for the road project during and after the works.
3	Wetland Management Department, Ministry of Water and Environment	Mandated to manage wetlands and ensure wise use and handling of wetlands along the project road as well as within the project area; This Department as Lead Agency will be monitoring the integrity of wetlands during and after the project.

No.	Stakeholder	Main Responsibility
4	The Department of Museums and Monuments, Ministry of Tourism, Wildlife and Heritage (MTWH)	Will be responsible as a Lead Agency for artifacts, antiquities and monuments once encountered along the road works and within the project area. The same institution made technical input during the EIA study for the management of PCRs.
5	The Department of Safety and Occupational Health	Responsible for the welfare of the workforce, community health and work related incidents including Workers Union affairs. This Department will be key in regulating the welfare of the workforce during the project implementation including listening to workers labour concerns as needed.
6	The National Forestry Authority (NFA), Ministry of Water and Environment	Mandated to manage Protected Forests (Central Forest Reserves) along the project road and will discuss issues related to compensation where Protected Forests are impacted upon. The NFA as Lead Agency will be monitoring the integrity of Central Forest Reserves during and after the project.
7	The Local Governments of KCCA	Regular Inspection and ensuring environmental Compliance within the respective Districts.
8	Directorate of Water Resources Management (DWRM)	Apart from developing and maintaining National Water Laws, DWRM has the responsibility to regulate the quality and quantity of water resources in the country.
9	The Uganda Wildlife Authority (UWA)	UWA is a body mandated by the Uganda Wildlife Act, Cap 200 to assume responsibility for Wildlife in Uganda.
8	The Uganda Land Commission (ULC)	ULC holds and manages Government land in Trust in accordance with the Constitution and the Land Act Cap 227, 1998. For the GKRIP construction effort ULC will be the one to handle land that belongs to Government or National Lands such as wetlands.
Other Ministries and Government Departments		
9	The Ministry of Works, and Transport (Environment Liaison Committee)	This is the Lead Ministry under which UNRA falls and through its Environment Liaison Unit will monitor the overall project implementation and compliance with the Certificate of Approval.
10	The Ministry of Lands, Housing and Urban Development	Valuation of properties and or compensation. The Chief Government Valuer is responsible for approving District Compensation Rates. A copy of these rates is available at every District. The Department of Urban Planning in the same Ministry is responsible for structure plans in Cities and Towns.
11	The Ministry of Water and Environment	Responsible for the environmental concerns including wetlands, water bodies and Natural resources.
12	The Contractor	In charge of the Works and Project Implementation.
13	The Institutions along the area of influence (institutions and businesses)	For ease of passage, protection and safety of road users as well as protection against noise and other social concerns
14	The Department of Forestry Support Services	Responsible for the management of Forests outside of the Central Forest Reserves along the project road and will discuss issues related to management and conservation where forests are impacted upon.
16	The Ministry of Gender , Labour and Social Development	The Department of Occupational Safety and Health falls under this Ministry and has a major role to play regarding Occupational Health and Safety issues of the Workforce
17	The Department of Meteorology and Climate Change Unit	The GKRIP will need to be climate proofed using information on climate and climate change provided by the relevant Government Institution.
Communities		
18	The Local communities	These are often the directly affected persons along the road. They may include women and children who tend to be vulnerable.
19	The Road Committees	This committee made up of Chairpersons LC1, LC11 and LC111 and some others is responsible for sorting out people related bottlenecks during the design, construction and operation of roads (not yet in place within the Project Area) .
20	The National Road Safety Council (NRSC)	The NRSC which is under the MOWT is the Principal Coordinator for Road Safety activities in the country. It has a role to play in the road management measures.
Technical teams		
21	The Road Design Team	The team which is in charge of the detailed design, and possible supervision of road works.

4.4.1 The Road Committees

The Road Committees are part of the Institutional Framework which may help in road design, construction and maintenance. Although they are yet to be put in place in the project area by UNRA, they can serve as an entry point during project implementation for purposes of participatory environmental and social management during construction and post construction. They consist of the following members:

- Chairperson LC 111;
- Sub County Chief;
- Secretary of Works LC 111;
- Chair Persons of LC 1 & LC 11;
- 2 No. Women Representatives;
- Community Development Officer;
- 1 No. Youth Representative; and
- Transport Representative.

Provisional investigations show that most of the LCs would like to be involved in monitoring the road project. The roads Committees provide a good opportunity to monitor the road project.

4.4.2 Guidelines for Cultural Heritage Impact Assessment

The management of heritage resources in Uganda is under the Department of Museums and Monuments of the Ministry of Tourism, Wildlife and Antiquity. It operates through the Historical Monuments Act of 1967 and Amendment Decree of 1977. This document outlines the specific technical requirement for conducting terrestrial archaeological and built heritage impact assessments and is based upon the requirements of UNESCO to which Uganda is a signatory to as per the 1972 UNESCO Convention concerning the preservation and protection of cultural and natural heritage.

The study used the National Environmental Management Authority guidelines and the Convention on Biological Diversity (2004).Akwé: Kon Voluntary Guidelines for the Conduct of Cultural, Environmental and Social Impact Assessment regarding Developments Proposed to Take Place on, or which are likely to Impact on, Sacred Sites and on Lands and Waters Traditionally Occupied or Used by Indigenous and Local Communities.

The following were therefore considered for this Project proposed to take place on, or which is likely to impact on, sacred sites and on lands and waters traditionally occupied or used by indigenous and local communities.

1) Notification and public consultation of the proposed development by the proponent;
2) Identification of indigenous and local communities and relevant stakeholders likely to be affected by the proposed development;
3) Establishment of effective mechanisms for indigenous and local community participation including for the participation of women, the youth, the elderly and other vulnerable groups, in the impact assessment processes;
4) Establishment of an agreed process for recording the views and concerns of the members of the indigenous or local community whose interests are likely to be impacted by a proposed development;
5) Establishment of a process whereby local and indigenous communities may have the option to accept or oppose a proposed development that may impact on their community;
6) Identification and provision of sufficient human, financial, technical and legal resources for effective indigenous and local community participation in all phases of impact assessment procedures;
7) Establishment of an environmental management or monitoring plan (EMP), including contingency plans regarding possible adverse cultural, environmental and social impacts resulting from a proposed development;
8) Identification of actors responsible for liability, redress, insurance and compensation;
9) Conclusion, as appropriate, of agreements, or action plans, on mutually agreed terms, between the proponent of the proposed development and the affected indigenous and local communities, for the implementation of measures to prevent or mitigate any negative impacts of the proposed development;

10) Establishment of a review and appeals process.

4.5 The Relevant Multilateral Environmental Agreements (MEAs)/Convention to which Uganda is Party

Uganda is a signatory to a number of International Agreements which are relevant to supporting the National efforts in environmental management including the welfare of communities. They are relevant to the road construction sector / efforts provided they support or are in consonance with the applicable Laws and Regulations in Uganda. The sections below describe some of these agreements/conventions.

4.5.1 The Convention on Biological Diversity (CBD)

The aim of the CBD is to effect international cooperation in the conservation of biological diversity and to promote the sustainable use of living natural resources worldwide. It also aims to bring about the sharing of the benefits arising from the utilisation of natural resources. Parties to this convention are required to undertake EIA for projects likely to have significant adverse effects on biodiversity and develop national plans and programs for conservation and sustainable use of bio diversity.

4.5.2 UNESCO World Heritage Convention, 1972

In the international arena, the legal regime regarding cultural heritage basically emanates from the UNESCO World Heritage Convention, 1972. The convention is concerned with the protection of the world cultural and natural heritage. This convention gives the basis of recommendations developed by experts to conserve cultural heritage. Uganda is a member of UNESCO and as such is bound by the recommendations made by the convention in the protection of cultural heritage.

4.5.3 The African Convention on the Conservation of Nature and Natural Resources, 1968

The contracting states to this Convention are required to undertake / to adopt measures to ensure conservation, utilization and development of soil, water, flora and fauna resources in accordance with scientific principles and with due regard to the best interest of the people. The States are also required to ensure that the conservation and management of natural resources are treated as an integral part of National and /or Regional Development Plans. In addition during the formulation of all development plans, full consideration is required to be given to ecological, as well as to economic and social factors.

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

The United Nations Framework Convention on Climate Change (UNFCCC) addresses the threat of global climate change by urging Governments to reduce the sources of greenhouse gases. The ultimate objective of the Convention is to stabilise the greenhouse gases concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system of the world. The Framework does not have legally binding measures to contain GHG emissions. The Kyoto Protocol is the one whose focus is to decrease carbon dioxide emissions. It establishes emission – related targets for G -77 Countries as listed in Annex 1 of the Convention. There are three instruments through which Annex 1 Parties (which are the Developed Countries) may indirectly reduce their greenhouse gas emissions which are:

- Emission Trading;
- Joint Implementation (JI); and
- The Clean Development Mechanism (CDM).

4.5.5 The Convention for the Safeguarding of the Intangible Cultural Heritage, 2003

The Convention calls on States that have ratified it to Safeguard Living Heritage on their own territories and in cooperation with others. It seeks to celebrate and safeguard the intangible heritage distinctive for particular communities. It affirms that the intangible heritage of all communities – whether they are large or small, dominant or non-dominant – deserve respect.

The Convention defines "intangible Cultural heritage" as the practices, representations, expressions, knowledge, skills as well as the instruments, objects, artefacts and cultural spaces associated therewith – that communities , groups and, in some cases, individuals recognise as part of their Cultural Heritage. This

Intangible Cultural Heritage, transmitted from generation to generation, is constantly recreated by communities and groups in response to their environment, their interaction with nature and their history, and provides them with a sense of identity and continuity, thus promoting respect for cultural diversity and human creativity.

The GKRIP Project therefore will be required not to disrupt the Living Heritage but will be expected to safeguard it so that it can ensure that the heritage where it exists continues to be practiced and transmitted within the community or group concerned. Communities should be actively involved in safeguarding and managing their Living Heritage, since it is only they who can consolidate its present and ensure its future.

4.5.6 The Stockholm Convention

The Convection seeks to protect human health and the environment from persistent organic pollutants (POPs). Uganda acceded to the Convention on 20th July 2004. Among the pollutants, controlled under the Convention are unintentionally released persistent organic pollutants. The National Implementation Plan (NIP) developed under the Convention, identifies over 70% of the unintentionally released POPs to be a result of uncontrolled open burning of waste. The Plan, therefore, recommends reduction of unintentionally released POPs through emission at source by promoting cleaner production methods and Best Available Techniques (BAT) and Best Environmental Practices (BEP). Management of waste under the project will have to be undertaken in line with this requirement by avoiding burning of waste, among others.

4.5.7 The Strategic Approach to International Chemicals Management (SAICM)

The Strategic Approach to International Chemicals Management (SAICM) is a policy framework developed to guide the efforts of achieving the Johannesburg Plan goal that chemicals are produced and used in ways that minimize significant impacts to human health and the environment. Uganda is signatory to this Multilateral Environmental Agreement (MEA) that was adopted in 2006. The project activities involving chemicals will therefore be undertaken in such a way that there is minimum danger to human health and the environment throughout their life cycle. In so doing, measures will have to be put in place to ensure that transportation, storage; use and disposal do not endanger human health and the environment in line with the requirement of this MEA.

4.6 Key Development Partner Safeguard Policies

4.6.1 Japanese International Corporation Agency (JICA)

The study will use the JICA Guidelines for Environmental and Social Considerations whose objective is to encourage Project proponents among others to have appropriate consideration for environmental and social impacts, as well as to ensure that JICA's support for and examination of environmental and social considerations are conducted accordingly. The guidelines outline JICA's responsibilities and procedures, along with its requirements for project proponents so as to facilitate the achievement of these objectives. In doing so, JICA endeavours to ensure transparency, predictability, and accountability in its support for and examination of environmental and social considerations. There are seven principles that will guide the execution of this exercise:

- Use of a multidisciplinary team of Environment Impact Assessors to ensure that all impacts associated to the project have been addressed;
- Ensuring that Measures for environmental and social consideration are implemented at an early stage during the design of the project and where impacts have to be managed during implementation, a project specific institutional framework to be in place so as to enhance frequent monitoring of the project;
- JICA has responsibility to ensure accountability when implementing cooperation project;
- JICA recognizes the importance of stakeholder consultation hence the need to ensure that all stakeholders' views and concerns are integrated into this ESIA and RAP in order to ensure that they own the report and also Environment and Social Management Plan;
- JICA emphasizes the significance of Disclosure of Information. For this reason, the ESIA team will use all available information during consultations in order to ensure that stakeholders can actively participate in the assessment activity;

- Organizational capacity: - Where appropriate capacity building will be proposed in the ESMP in order to ensure that there is consideration for environmental and social factors during both construction and operation of the road project;
- Attempts at promptness: - JICA requires that undertaking environmental and social consideration studies is accelerated and prompt so as not to delay the implementation of JICA supported projects;

There are a number of differences between the Uganda Government Policy guidelines and legal requirements as compared to those of JICA. These are shown in Table 4-4 below.

Table 4-4: Comparison between the JICA Guidelines and Uganda Policies and Laws for Social Consideration

No	JICA Guidelines	Laws of Uganda	Gaps between JICA Guidelines and laws of Uganda	Policy of the Project
1	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives (JICA GL)	The Law does not specify, however the policy aims at avoiding resettlement as much as possible by finding alternatives	The Uganda Law is silent and in general the Ugandan situation does not consider loss of livelihood	Resettlement is to be avoided by choosing an alternative with minimum infrastructure disruption.
2	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken (JICA GL)	PAPs are compensated according to category of ownership at market rates in addition to paying them a Disturbance Allowance. The categories are land owners, tenants, land users/sharecroppers, as well as owners of temporary and permanent buildings.	JICA encourages compensation at replacement cost not just market value as is the case for the Ugandan situation.	PAPs will be compensated at replacement cost in addition to paying Disturbance Allowance of 15% or 30% depending on the due notice given of 3 or 6 months respectively.
3	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	Uganda Law is silent on restoration of lost livelihood, but allows for compensation of lost land, structures and other immovable properties coupled with payment of Disturbance Allowance	There is no restoration of lost livelihood according to the Ugandan Law. KCCA can only give notice to PAPs and then they will be removed if they do not leave by the given date.	Full compensation at replacement cost will be paid for taken land, structures, houses and other immovable properties. For those roadside businesses which may be displaced, PAPs will be paid transport allowance to their new locations.
4	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	Compensation is based on the current market value as much as possible.	For semi-permanent structures the compensation rates are fixed by the District Land Board annually and can be outdated by the time of valuation	Compensation will be at full replacement cost, while for perennial crops / trees and temporary structures compensation will be based on the rates as determined by the District land Board. In both cases disturbance allowance will be paid.
5	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	Compensation including Disturbance Allowances must be paid before displacement / start of project.	No difference	PAPs will be paid before displacement
6	For projects that entail large-scale Involuntary Resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	Resettlement Action Plans (RAP) are mandatory for large scale involuntary resettlement	No difference	Large scale Involuntary Resettlement Is not anticipated in this project

No	JICA Guidelines	Laws of Uganda	Gaps between JICA Guidelines and laws of Uganda	Policy of the Project
7	In preparing a Resettlement Action Plan (RAP), consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)	The Law is silent, but the Policy stipulates effective consultations with all stakeholders. The National Environment Act (CAP 153) insists on consultations with all key stakeholders in a transparent manner.	No difference	Consultations will be held with all key stakeholders and the PAPs will individually be consulted in the presence of the Local Council Leaders.
8	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)	Both English and the Local language which is understandable are used during consultations	No difference	Both English and Luganda will be used and in case there is a person who does not understand any of these languages, an interpreter will be used.
9	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICA GL)	The National Environment Act (CAP 153) insists on involving the stakeholder's right from the time of project inception till its completion.	No difference	Stakeholders are to be consulted throughout the project cycle and the PAPs will be involved during the design stage of the project through consultations and community meetings. The Local Government Leaders have already been consulted while one general community meeting has already taken place.
10	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	Grievances are to be handled through the Local Land Boards, the Local Council system and the Courts of Law	There is no specific Grievance Committee in the case of the Uganda Law apart from the Local Government Structure as well as the Courts of Law	A grievance committee which will include the local Council Leadership will be put in place to handle grievances. If the committee does not handle the grievances then the Courts of Law will be used as a last resort mechanism.
11	Affected people are to be indentified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP.4.12 Para.6)	The Ugandan Law is silent but the Policy is in place to identify and record PAPs as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of opportunists / encroachers.	As per the Policy there is no difference	The Policy of the project is to sensitize the PAPs, community, conduct a census, identify the affected properties, inform the PAPs of the cut-off date as well as the Grievance Mechanism and agree on the valuation report in the presence of the Local Leader.
12	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP4.12 Para 15)	The Land Act as amended recognizes tenants who do not have legal rights to the land but have a claim to the land. This includes squatters, tenants and sharecroppers.	No difference	The PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying will receive resettlement assistance as well as adequate compensation in accordance with their level of claim/interest.

No	JICA Guidelines	Laws of Uganda	Gaps between JICA Guidelines and laws of Uganda	Policy of the Project
13	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP4.12 Para.11)	Preference is given to cash based compensation	Uganda Government prefers to pay cash compensation	PAPs will be given the option to choose from either Cash compensation or land based compensation
14	Provide support for the transition period (between displacement and livelihood restoration). (WB OP4.12 Para.6)	The law provides for a Disturbance Allowance in addition to the computed compensation package	No support for the transition period	Timely cash compensation inclusive of Disturbance Allowance will be paid.
15	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP4.12 Para.8)	The Policy gives preference to the vulnerable groups,	No specific mention of those below the poverty line	Vulnerable people will be identified during the census and depending on the level of their vulnerability resettlement assistance will be extended to them.
16	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)	The law is quiet on this aspect	No mention of ARAP in Ugandan Laws	A full Resettlement Action Plan will be done in this project in line with the provided TORs.

4.6.2 The African Development Bank (AfDB)

Similar to the JICA guidelines on Environmental and Social Considerations is **The AfDB Environmental and social policy** which assesses environmental constraints and opportunities that affect medium and long-term development objectives across the continent. It also sets out the broad strategic and policy framework under which all Bank lending and non-lending operations will henceforth be made. It builds on the experience gained during previous decade with the operationalization of the Bank Group's Environment Policy, which was adopted in 1990 to promote environmental mainstreaming in all Bank operations.

To implement the policy, AfDB adopts the following approaches aimed at adjusting its lending operations and realigning some of its existing institutional arrangements: (i) mainstreaming environmental sustainability considerations in all Bank's operations (ii) strengthening existing environmental assessment procedures and developing new environmental management tools; (iii) clearly demarcating internal responsibility in implementation; (iv) assisting RMCs to build adequate human and institutional capacity to deal with environmental management; (v) improving public consultation and information disclosure mechanisms; (vi) building partnerships to address environmental issues, harmonies policies, and disseminate environmental information; and (vii) improving compliance monitoring and evaluation of operations.

Other polices that will be referenced by team include the following:

- **The AfDB Gender policy** defines the commitment of the African Development Bank (the Bank) to promote gender mainstreaming as a means of fostering poverty reduction, economic development and gender equality on the continent. Gender has become an issue for development intervention. First, inequalities continue to exist between women and men despite significant improvements in the absolute status of women and gender equality in most African countries. Women's culturally disadvantaged position, visible across a number of development dimensions, has limited their capacity to develop their full potential. They have less social, economic and legal rights than men and lack access to development resources, benefits and decision-making participation at all levels of society. Secondly, gender inequalities have a detrimental impact on development. In this, ESIA, the team will ensure that a detailed gender analysis is undertaken for projects in order to ensure that financial

implications related to gender are taken into account and planned for accordingly. For example, relating to project operations gender needs to be taken into account are equal opportunities to employment, social amenities and labour conditions. Of particular importance is the need to identify low income groups of both men and women in order to ensure that projects funded have limited impact on inequality. Regarding health, some of the proposals that the relationship manager can give to potential borrowers would include the promotion of programmes that strengthen family health, including community-based family planning, mother and child basic health services and nutrition; developing gender-sensitive initiatives which address sexually transmitted diseases, HIV/AIDS, FGM and other sexual and reproductive issues.

- The requirements discussed in this section and the following section on Public Disclosure is consistent with the AfDB's ***Disclosure Information Policy***. During the EA process for Category 1 projects where deemed appropriate by JICA, the project sponsor is required to conduct meaningful consultations with relevant stakeholders including affected groups, Civil Society Organizations (CSOs) and local authorities about the project's environmental and social aspects and take their views into account. The project sponsor initiates such consultations as early as possible. For meaningful consultations, the project sponsor provides relevant information in a timely manner and in a form and language accessible to the groups being consulted. The project sponsor consults relevant stakeholders during the preparation of the EIA report to discuss with them the proposed project's objectives, description, and potential impacts. The project sponsor subsequently provides a non-technical summary of the report's findings after the draft EIA report is prepared for any additional consultations.
- The project sponsor consults relevant stakeholders during the preparation of the EIA report to discuss with them the proposed project's objectives, description, and potential impacts. The project sponsor subsequently provides a non-technical summary of the report's findings after the draft EIA report is prepared for any additional consultations. Following the public consultation on the draft EIA, the project sponsor supplements the EIA report by adding details of the public consultation process, and as necessary, including the project sponsor's responses to concerns raised by the various stakeholders and details of measures taken to incorporate these concerns into project design and implementation. The project sponsor continues to consult with relevant stakeholders throughout project cycle construction and operations, as necessary, to address EIA related and other issues that affect them. JICA requires the project sponsor to report on ongoing consultation as part of its annual reporting requirements. In those cases where the Category 1 EIA has been completed prior to Bank involvement in the project, if necessary, JICA may request the project sponsor on a supplemental public consultation and disclosure plan.
- **The African Development Bank' Involuntary Resettlement Policy** was developed to cover involuntary displacement and resettlement of people caused by a Bank financed project and it applies when a project results in relocation or loss of shelter by the persons residing in the project area, assets being lost or livelihoods being affected. The policy is set within the framework of the AfDB's Vision in which poverty reduction represents the overarching goal. Within this goal, the strategic action to achieve sustainable development will be pursued. It reaffirms therefore the commitment of the UNRA to promote environmental and social mainstreaming as a means of fostering poverty reduction, economic development and social well-being in Africa. It is therefore meant to assist JICA and UNRA to address resettlement issues in order to mitigate the negative impacts of displacement and resettlement and establish sustainable economy and society. As per this guideline, the borrower will be required to prepare a Full Resettlement Plan (FRP) for any project that involve a significant number of people (200 or more persons) who would need to be displaced with a loss of assets, or access to assets or reduction in their livelihood. For any project involving the resettlement of less than 200 persons, an abbreviated resettlement plan will be released together with the environmental annex of the UNRA'S Appraisal Report. A land acquisition plan will be prepared and submitted as part of this assignment.

- **The AfDB Handbook on Stakeholder Consultation and Participation in ADB operations** helps Bank staff and borrowers better understand what participation actually means in practice. It also provides guidelines as to what staff can do to promote participation at every stage of the Bank's project cycle. In particular, it gives guidelines on how "all stakeholders, including targeted

beneficiaries of civil society, the donor community and borrower countries are involved from the outset of program design through to implementation".

4.6.3 World Bank (WB) Safeguard Policies (SP)

Environmental Assessment is one of the 10 environmental, social, and legal Safeguard Policies of the World Bank. Environmental Assessment is used in the World Bank to identify, avoid, and mitigate the potential negative environmental impacts associated with Bank lending operations. In World Bank operations, the purpose of Environmental Assessment is to improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted. The operational safeguard policies also include:

- **Operational Policy 4.04: Natural Habitats** seeks to ensure that World Bank-supported infrastructure and other development projects take into account the conservation of biodiversity, as well as the numerous environmental services and products which natural habitats provide to human society. The policy strictly limits the circumstances under which any Bank-supported project can damage natural habitats (land and water areas where most of the native plant and animal species are still present).
- The Bank's current forests policy (**Operational Policy/Bank Procedure 4.36**) aims to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty, and encourage economic development. Combating deforestation and promoting sustainable forest conservation and management have been high on the international agenda for two decades. However, little has been achieved so far and the world's forests and forest dependent people continue to experience unacceptably high rates of forest loss and degradation. The Bank is therefore currently finalizing a revised approach to forestry issues, in recognition of the fact that forests play an increasingly important role in poverty alleviation, economic development, and for providing local as well as global environmental services.
- **Operational Policy 4.09: Pest Management:** Rural development and health sector projects have to avoid using harmful pesticides. A preferred solution is to use Integrated Pest Management (IPM) techniques and encourage their use in the whole of the sectors concerned. If pesticides have to be used in crop protection or in the fight against vector-borne disease, the Bank-funded project should include a Pest Management Plan (PMP), prepared by the borrower, either as a stand-alone document or as part of an Environmental Assessment.
- Cultural resources are important as sources of valuable historical and scientific information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The loss of such resources is irreversible, but fortunately, it is often avoidable. The objective of **OP/BP 4.11 on Physical Cultural Resources is to avoid**, or mitigate, adverse impacts on cultural resources from development projects that the World Bank finances.
- The Bank's **Operational Policy 4.12: Involuntary Resettlement** is triggered in situations involving involuntary taking of land and involuntary restrictions of access to legally designated parks and protected areas. The policy aims to avoid involuntary resettlement to the extent feasible, or to minimize and mitigate its adverse social and economic impacts. It promotes participation of displaced people in resettlement planning and implementation, and its key economic objective is to assist displaced persons in their efforts to improve or at least restore their incomes and standards of living after displacement. The policy prescribes compensation and other resettlement measures to achieve its objectives and requires that borrowers prepare adequate resettlement planning instruments prior to Bank appraisal of proposed projects.

4.6.4 The European Investment Bank

In relation to the European Investment Bank, environmental considerations are taken into account at all stages of the project cycle. In the case of co-financing with other institutions, the Bank may agree to apply the environmental standards of the co-financing institution, where these are comparable to EU standards, in the light of local conditions. However, the EIB will always carry out its own independent assessment. The EIB's environmental safeguard measures include that:

- the Bank's approach to financing projects is based on the **precautionary principle**, preventative action rather than curative treatment should be taken, environmental damage should be rectified at source and the polluter should pay, according to the Treaty Establishing the European Community
- All projects financed by the Bank are the subject of an **Environmental Assessment** (EA), normally carried out by its own staff, but if by others according to the requirements of the Bank. For this purpose, projects are screened into four categories, based on the guidelines of the EU **Environmental Impact Assessment** (EIA) Directive:
    - Cat. A - those for which an EIA is mandatory (Annex 1 of the Directive);
    - Cat. B - those for which the competent authority determines the need for an EIA according to specified criteria (Annex II of the Directive, with ref. to Annex III);
    - Cat. C - for which a limited environmental assessment, if any, is required according to any likely adverse environmental impacts of the project (projects outside the scope of the Directive);
    - Cat. D - No environmental assessment required.
- All projects financed by the Bank are also screened according to their potential impacts on sites of **nature conservation**. Where the impacts are expected to be significant, a special biodiversity assessment is carried out, according to the principles and practices of the EU Habitats Directive (ref. Art. 6 of the Directive)
- Bank projects are assessed for their expected impacts in terms of **greenhouse gas emissions**; the scope for improvements in **energy efficiency** and the need for measures to **adapt to climate change** are also reviewed
- the principles, recommended practices and standards of the EU Water Framework Directive and EU Waste Framework Directive are applied for projects financed by the Bank in the sectors of **water** and **waste**, respectively
- according to the sector, projects should comply with the relevant standards laid down in EU law, for instance those of the Large Combustion Plant Directive in the **power generation** sector and the Integrated Prevention Pollution and Control Directive in the industry sector
- the Bank is also guided by recognized **good international practices**, such as those laid down by the World Commission on Dams (WCD) and the Extractive Industry Review (EIR)
- all projects financed by the Bank should comply with the requirements of relevant **multilateral environmental agreements** (MEA) to which the host country - and/or the EU in the case of a EU Member State - is a party, including the Montreal Protocol (on ozone depleting substances), the UN Convention on Climate Change and the Kyoto Protocol (on greenhouse gas emissions) and the Aarhus Convention (on environmental information).

SCOPING AND TERMS OF REFERENCE FOR INVESTIGATION OF ENVIRONMENTAL IMPACT ASSESSMENT

4.7 Purpose of the ESIA

The proposed Greater Kampala Road Improvement Project (GKRIP) is consistent with projects mentioned under schedule three of the National Environment Act Cap, 153 which require a mandatory Environmental Impact Assessment (EIA). Indeed the scoping exercise which was conducted prior to this study revealed that the road project is unique as it will for the first time in Uganda make use of FOs and an underpass. It will cross at some point the Nakivubo Channel and at the same time it is likely to disrupt some of the Utilities close to the road including pylons and telecommunication areas. Others include the Centenary Park, the Pan African Park, the Clock Tower and some places of worship. For these reasons the road project is most likely to lead to significant impacts on Local environment within Kampala unless deliberate measures are undertaken to mitigate the negative impacts of the development. While there are negative impacts, this project will on the other hand have a number of positive social impacts which would require enhancement for the community to enjoy the full benefits associated with the development. The main purpose of the ESIA therefore is to examine, analyse and subsequently assess both the negative and positive impacts of the proposed development on the overall environment within the Project Zone of Impact (ZOI) with a view to ensuring that: -

- The GKRIP will be environmentally sustainable and socially acceptable; and
- The Road development project will comply with the provisions of the National Environment Act Cap 153, 1995 as well as with the other National Policies, Laws and Regulations.

4.8 Objective of the Environmental and Social Impact Assessment

The purpose of the Environmental and Social Impact Assessment (ESIA) is to assess the potential impacts that the proposed road construction / upgrading Project will have on both the bio–physical and social environments. Impacts of all proposed project components will be assessed.

The Primary objectives of the ESIA include the following: -

- To document the baseline biophysical and social environmental conditions;
- Identify, asses and provide recommendations for the mitigation of potential environmental and social impacts;
- To conduct an environmental Impact Assessment (EIA) and prepare an Environmental Impact Statement (EIS) detailing the results of the impacts assessment listed above;
- Establish a link between the EIA and the Resettlement Action Plan (RAP) should it be required;
- To ensure that the Greater Kampala Improvement Project (GKRIP) –complies with Uganda's applicable National Environmental and Social Legal Requirements as well as those of Multilateral Lenders (especially the JICA Guidelines for Environmental and Social Considerations (as translated) - April 2010 JICA.

4.9 Screening

4.9.1 Purpose

The ESIA involved the screening process through which, it was established that, the GKRIP project would have considerable social impacts where a number of structures and other properties would be affected. In addition, trees which presently align the road will be removed and some of the urban bio diversity is likely to be impacted. Under the Third Schedule to the NEA Cap 153, the GKRIP falls under Schedule 3 which includes major roads and roads passing through such infrastructures that will require mandatory ESIAs to be conducted before their implementation (Annex 1 shows comments from NEMA). In addition, since construction of flyovers will be done for the first time, this project will necessarily be out of character with the surroundings. However, according to the JICA Guidelines for Environmental and Social Considerations (as translated) - April 2010 JICA, this road project is a category B project which is classified to undergo an

appropriate ESIA. In view of these, the construction of a new GKRIP requires an ESIA to be conducted before its implementation is undertaken hence, the need for this study.

4.9.2 Reconnaissance visit

As part of the process to acquaint the ESIA team with the project road, the team members made several visits along the entire stretch of the proposed alignment starting from Kibuye Round about through Mukwano road and ending at Lugogo bypass. These visits provided the team members with a glimpse of anticipated potential challenges likely to be encountered conducting subsequent detailed studies and as well as inherent challenges that characterize the route and the project. During these visits, team members observed that the selected option had attempted to minimize effectively the potential for relocation of people apart from those operating on road sides such as flower selling vendors and metal fabricated items (doors, beds among others). On this survey, the team assessed the following among others: -

- Potential for community disruption and relocation of PAPs;
- Numbers of structures, trees, and other infrastructure likely to be impacted;
- Possibility for construction of access roads during construction and traffic management options; and
- Proximity of sensitive ecosystems as well as drainage options.

4.9.3 Meetings with Sector Agencies

Initially, JICA organized a stakeholders meeting at Hotel Africana where most of the key stakeholders were met. The key agencies that met in this meeting included the following: -

- Ministry of Works and Transport
- Uganda Road Fund
- National Environment Management Authority (NEMA)
- Centre for Basic Research (CBR)
- World Bank (WB)
- National Water and Sewerage Corporation (NWSC)
- Kampala Capital City Authority (KCCA)
- Uganda Electricity Transmission Company Limited (UECTL)
- Orange Telecom

The meeting was to inform the stakeholder institutions about the project and seek their input on key aspects that the ESIA as well as the design teams should focus on. Amongst the issues discussed was the need to minimize, the relocation of businesses and communities as well as the likely impacts on the Nakivubo Channel amongst other considerations.

4.9.4 Other Stakeholder Consultations

Additional Consultation meetings were held with additional stakeholders and as wide as possible with the key Lead Agencies. Those consulted included the Local Government Leadership (both technical and political) in the affected Divisions of Nakawa, Kampala Central and Makindye (Photo 5-1). Consultations were also conducted with the JICA design team based at the UNRA headquarters.

Furthermore, workshops with stakeholders were conducted. The first workshop was conducted at Kibuye where almost 100 potentially impacted people were met and introduced to the project. The second workshop was conducted at Fairway hotel on 17th September 2013 which targeted the directly impacted people. Over 80 participants attended. The comments and recommendations from the stakeholders have been considered in preparing the Environment Impact Statement. Details of the contacted stakeholders and their comments are attached herewith as Annex 2 and 3 to this report.

Photo 4-1: Intensive Consultations with the Local Council Chairpersons at Makindye Divisional H/Q; Picture Taken on 23rd July 2013

4.9.5 Result of Screening and Scoping Report

JICA had conducted an initial screening and concluded that the project is a Category B Project in line with their guidelines for Environmental and social considerations. However following the comments from the National Environment Management Authority, the Environmental Impact assessment guidelines for Uganda classify this project as a Category 1 project which has to undergo a full ESIA.

Subsequently scoping was conducted and from the scoping a number of potential impacts were identified. These included the following: -

Potential to silt the Nakivubo Channel during the construction phase;
Likely flooding due to extreme weather events on account of climate change impacts and sedimentation;
Relocation of some businesses and people within the corridor;
Concerns for urban waste having an impact on the sustainability of the infrastructure as well as waste due to construction activities;
Increased air pollution due to construction activities and eventual operation of the road;
Safety Concerns due to construction and operation of the road;
Increased noise levels due to construction and operation of the road; and
Potential to disrupt social services as well as physical Cultural Resources

DESCRIPTION OF BASELINE SURVEY METHODOLOGY

The scope of work required that the consultant characterises the physical, biological socio economic and cultural environment in order to assess the impacts of the road project and the different methods used are presented in this chapter. The scope of this study included the entire stretch of the section from near the Uganda manufacturers show ground to the Kibuye Round about which covers the sections in Nakawa Division, Kampala Central Division and Makindye Division which were toured through inspection. Particular attention was placed on the congested section from the Hotel Africana roundabout to the Clock Tower area. In particular the site visit conducted was aimed at identifying the following among others: -

- Identification of the locations and characteristics of catchments and surface water features;
- Potential flood lines and the nature of the terrain;
- Identification of the available urban bio – diversity; and
- Likely structures / properties to be impacted by the road project.

In general, the methods are in line with the provisions governing ESIA procedures as contained in the National Environment Act Cap 153, 1995, The Environment Impact Assessment Guidelines, 1997; Environmental Impact assessment Guidelines for Road Projects, 2008; and the Environmental Impact Assessment Regulations, 1998. In particular the following steps were followed: -

4.10 Physical Environment

The physical environment included methodologies that capture aspects of geology and soil characteristics, topography and drainage patterns of the area including discharge of surface run off, ambient air quality and noise levels and ground/surface water resources and quality.

4.10.1 Topography, Hydrology and Geology

In order to determine the baseline of the topography, geology and hydrology, documents were reviewed and site visits undertaken. Some of the documents reviewed included;

- The Kampala Drainage master plan
- The JICA preparatory Survey;
- Geohazards in Ugandan earthquakes;
- The geology of Sothern Mengo
- Evidence for the widespread occurrence of neo-Archean GGM-type granitoids in eastern Uganda
- Summary Report on the Geology and Geodynamic Development of Uganda (in prep).

4.10.2 Air quality and Noise

Establishment of various baseline parameters of environment air quality, noise, and humidity was undertaken Integration of these parameters gives an overall perception of positive and negative impacts due to the proposed activities to be undertaken on the project area, if any.

1) Air Quality Assessment

The Air quality measurements were conducted within an interval of three hours at each of the selected five locations. The intervals have been separated to indicate day time and night time measurements as shown in Table 5-3 below. . The measurement intervals were done by taking three consecutive measurements in three hours. The reason for this was that the nature of equipment used was operating on batteries and could not sustain continuous measurements. Hence a sampling technique was used.

The number of sampling locations was selected and measurement was carried out at each location. This sample was based on important receptors that were likely to be impacted by either noise or air pollution. These important receptors are shown in Table 5-3 below. The baseline data of ambient air environment is generated for the mentioned parameters as given below:

- Respirable Suspended Particulate Matter (RSPM)
- Sulphur dioxide (SO_2)
- Nitrogen oxides (NOx)
- Carbon Monoxide (CO)

Theory of Respirable Dust Sampler (RDS)

The principle involved in Suspended Particulate Matter (SPM) sampling method is that the particles are filtered from known volume of an air sample by a suction apparatus and the particles are deposited on a filter paper. SRPM is calculated as follows:

SPM ($\mu g/m^3$) = weight of filter paper after sampling – initial weight of filter paper x 10 % volume of air.

Air Quality Analysis

Testo 350 air measurement device designed for the chemical and emission air surveillance to detect chemical air emissions was used. Air quality measurements were taken on the five (5) locations along the project area (road) for carbon dioxide, sulphur dioxide, carbon monoxide, NOx.

Nakumat Junction

Measurement at Nakumat Junction

Figure 4-1: Field Survey Status of Air Quality and Noise

2) Traffic Noise Level Measurement

The sound level was measured by using Precision Integrating Sound Level Meter Type: 4 in one Digital Sound Level Meter, Model CEM DT 8820 (range 35 – 130 dBA) for noise, (-20 – 750^{o}C) for temperature, (25% - 95%) relative humidity and (0 – 20000 LUX) for light intensity. The meter is equipped with the three frequency-weighing networks (A, B and C) that are used to estimate the response characteristic of the ear at various sound levels and frequency distribution of noise over the audible spectrum. The (A) frequency-weighing approximates the response characteristics of the ear for levels below (55dB), the (B) frequency weighing approximates the response characteristics of the ear for levels between (55 and 85) dB and the (C) frequency weighing approximates the response characteristics of the ear for levels above 85dB.

The sound level meter that was used consists of the following main features:

The Sensor or Microphone
The sensor is a high precision electrode condenser microphone, which must be protected from physical abuse, dirt, oil, water or ingress of any other such substance.

The Control Panel
The control panel comprises of the:
• Recorder for the maximum level of sound and minimum level of sound
• Range selector
• Auto and manual rest switches
• Hold on max and min level

The Range Selector
These switches can be used for selecting the relevant range of the sound level.

Survey Location
The air quality and noise level was measured at 5 locations, which are targeted sensitive receptor such as school, hospital, large living quarters and others. Readings were taken in each division of north, south, east and west of the proposed site and at various distances around the site as shown in Table 4-5 below.

Table 4-5: Location of Air Quality and Noise Measurements

No	Location	UTM	Sensitive Receptor
1	Clock Tower Junction	36 N 454177 34196	Nakivubo (Blue) Primary School, Pan-African Freedom Square (Resting Place)
2	Between Entebbe Road and Railway Line	36 N 452923 32858	UGC Quarters (Katwe Police station, Residents)
3	In front of the Police Quarters	36 N 454177 34196	Police Quarters/Training School
4	Nakumatt Junction	36 N 454549 35224	Commercial/Public Shopping Area/Hotel
5	Africana Junction	36 N 454940 35176	Centenary Park/Resting Place

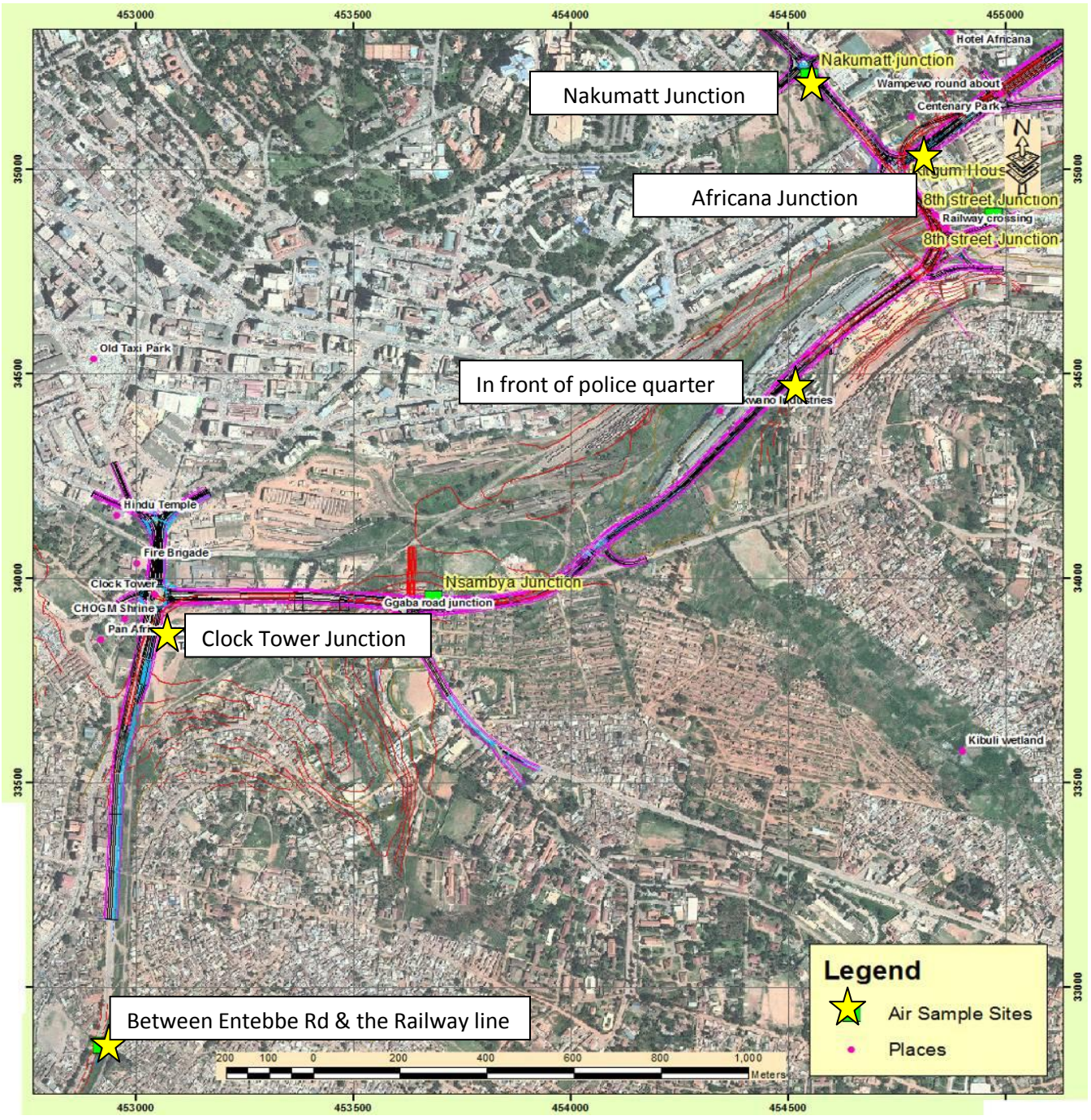


Figure 4-2: Air quality and Noise Survey Location (sites)

4.10.3 Vibrations

It was not possible to directly measure the potential impact of vibrations on infrastructure, as there was no locally available instrumentation to conduct these measurements. However from other considerations (e.g. Literature reviews) it can be possible to infer the likely hood of this impact.

While literature search continues on this aspect, there has been no mentioned history of structural failure due to motor vehicle movements within the project area. With best practice engineering measures therefore, this impact is expected to be minimal.

4.10.4 Water Quality Assessment

Sampling

Sampling points were selected based on the proposed route of the road in relation to the Nakivubo channel, which is the only recognizable surface water body in the area of direct influence by the project. To be able to identify the project influence on water quality, the monitoring/sampling was done as close as possible to the proposed discharge points of the proposed project to the receiving waters. The sampling locations should be representative of where the site discharge would have mixed with the receiving waters.

The sampling area, the Nakivubo channel, is a manmade stream that drains Kampala and its suburbs. It discharges into Lake Victoria at the Inner Murchison Bay. The channel receives raw wastewater from slums, industrial effluents, and discharge from a sewage treatment plant and from a complex of slaughterhouses. In addition, during heavy rains the channel receives a lot of storm water and it is the main drainage system for Kampala. The Nakivubo channel passes through a swamp before discharging into the lake; it is the last pollution barrier between Lake Victoria and Kampala City.

Based on the proposed road project, two sampling sites were selected. One site, the upstream sampling site was located near the fire brigade (indicated as fire Brigade site in the report) just before the channel enters the direct area of project influence and the second site was located at the railway crossing immediately outside the project area after the Mukwano Industries complex (indicated as Mukwano in the report).

The first samples were taken on 26th July 2013 while the second samples were taken on 12 August 2013. The former was at the end of the dry season and the later was at the commencement of the wet season. The objectives of pre-construction monitoring are to:

- Identify parameters for monitoring during construction; and
- Determine the indicative existing water quality baseline.

Sampling Regime and the Parameters

The purpose of pre-construction monitoring is to determine the parameters for monitoring during the construction works, with particular emphasis on the assessment of parameters that could significantly be affected by the construction activities. Pre-construction monitoring is therefore focused on all parameters identified from literature review on previous water monitoring, any initial results from feasibility studies and visual assessments. Two pre-construction samples were taken from each identified sampling site on different dates to ensure a representative sample of the site at two different times.

- Dissolved Oxygen (DO), Electrical Conductivity (EC), pH and temperature were measured *in situ* with field meters (Wissenshaftlich Technische Werkstaetten, WTW GmbH). Water sampling and handling from the various sampling points were collected according to standard methods for water and wastewater analysis (APHA 1995). The sample bottles were immediately put into dark, ice-cooled boxes and transported to the laboratory, where they were analyzed within 6 to 8 hrs of collection of the first sample.

- Total suspended solids (TSS) were determined in the laboratory by the gravimetric method. A well-mixed (100ml) sample was filtered through a weighed standard glass fibre filter and the residue retained was dried to a constant weight in an oven at 105°C. After drying the filter was weighed again, and the difference in weight over that of the empty (before filtration) filter were the total suspended solids.

- Total Dissolved Solids (TDS) - A well-mixed (100ml) sample was filtered through a weighed standard glass fibre filter and the filtrate was evaporated to dryness in a weighed dish and dried to a constant weight in an oven at 180°C. The increase in dish weight represented the total dissolved solids.

- Phenols were determined by the 4 – Aminoantipyrine method while Oil and Grease by the Hexane Gravimetric Method according to the Hach manuals and Standard Methods for the examination of Water and Wastewater (APHA 1995).

- Detergents – To determinate amount of detergent in the sampled water, a spectrophotometer, Perkins-Elmer at the UV range of 652 nm wavelengths was used, with a cell thickness of 1 cm.

- Five days' Biochemical Oxygen Demand (BOD5) was determined. The dissolved oxygen concentration before and after incubation for 5 days at 20°C was measured. Air tight incubation bottles of 300ml capacity were thoroughly cleaned with liquid soap rinsed with tap water and finally rinsed with distilled water and drained. They were filled with diluted samples and initial dissolved oxygen concentration determined using a dissolved oxygen meter. The bottles were stoppered and incubated at 20°C for 5 days in a BOD incubator. After the 5 days, the final dissolved oxygen was determined and the final results computed from the formula below.

$$BOD5 = \frac{D1 - D2}{P}$$

Where D1 = Dissolved Oxygen of the diluted sample immediately after preparation (mg/L)
D2 = Dissolved Oxygen of the diluted sample after incubation (mg/L)
P = Decimal fraction of sample used (Volume of raw Sample/Volume of sample + Dilution water).

Table 4-6: Summary of Key Parameters Measured

Water Quality	Parameter	Nr of Times	Nr of Points
Physical	pH	2	2
	EC	2	2
	Turbidity	2	2
	Temperature	2	2
	Dissolved Oxygen	2	2
	TSS	2	2
	TDS	2	2
	Phenol	2	2
	Detergents	2	2
	Oil &Grease	2	2
	BOD5	2	2
Bacteriological	Total Coliforms	2	2
	E. coli	2	2
	Clostridium perfringes	2	2

Microbiological Analysis

Media preparation and enumeration of colonies after the incubation was done according to the manufacturers' instructions. Total coli forms and E. coli were determined by the membrane filtration technique using Lauryl Sulphate Broth. After filtration, the membranes were put on adsorbent pads containing lauryl sulphate broth and incubated at 37°C and 44°C for 18hours, respectively. Yellow colonies appearing after the incubation were counted and they represented the total coli forms and faecal coli forms/E. coli, respectively.

Clostridium perfringens was determined by membrane filtration method using TSC Agar. To select for spores ***of Clostridium perfringens***, samples were first preheated at 75°C for 15 min in a water bath before filtration. After filtration, the membrane filters were placed on TSC agar plates, put in an anaerobic jar containing ***Anaerocult*** A anaerobic system (and incubated at 44°C for 24 h in a dry incubator. Black colonies that fluoresce under UV radiation (366nm) were counted and these were ***Clostridium perfringens.***

4.11 Biological Environment

Sampling

For all taxonomic groups, a team of ecologists walked the whole proposed route, stopping at selected sample points that represented unique habitats for flora and fauna. Each select point was geo-referenced using a GPS and various flora and fauna within 20 meters of the area recorded. A total of 31 points were thus recorded and the biodiversity with respect to their floral and faunal diversity was documented (Table 4 -7). Fig 4-3 shows the ecological foot print that was followed during the sampling.

Table 4-7: Geo-referenced Points Sampled for Floral and Faunal Diversity

S.P	UTM	Altitude	Estimated Area	Location	Main features
38	36 N 452923 32858	1164 m	2.7	Between Entebbe Rd & the Railway line	Waste dumping, pathways on the grass
41	36 N 452960 33211	1160 m	0.9	At the first fly over from city centre to Entebbe, on Entebbe rd	Public resting place
42	36 N 452924 33567	1165 m	Dispersed	Junction near BMK on Entebbe Rd	Stream of water, flower nurseries
43	36 N 453085 33703	1165 m	5.4	Enclosed car washing bay after Railway market on Entebbe Rd	Water logged pond, cattle kraal
44	36 N 453021 33917	1162 m	Dispersed	proximity to the fenced car washing bay on Entebbe Rd	Residential compound, street trees
45	36 N 452904 33907	1150 m	Dispersed	Katwe round about, Near Nakivubo P/S, Clock tower	Flower nursery & school
46	36 N 453044 34058	1141 m	Dispersed	Fire Brigade Head quarters, Kampala	Nakivubo Channel, food crop gardens
47	36 N 452811 34267	1185 m	Dispersed	St. Balikuddembe Market, Container Village	Nakivubo Channel, Busy place
48	36 N 452991 34210	1163 m	Dispersed	Shoprite	Parking Yards & street vegetation
49	36 N 453194 34214	1163 m	Dispersed	Near Centenary Bank, Entebbe Rd	Trees on streets and in road-way separation
50	36 N 453106 33976	1161 m	Dispersed	Post office station near the clock tower	Trees on streets and in road-way separation
51	36 N 453328 33972	1148 m	Dispersed	Between post office & Villa park	Waste land, railway remains
52	36 N 453495 33980	1153 m	7.2	behind villa park	Waste land, railway remains, gardens, water ponds
53	36 N 453686 33950	1161 m	Dispersed	Nsambya Junction	Colonization of the bear land that was demolished Barracks, flower nursery
54	36 N 453884 33971	1158 m	Dispersed	After villa park near Clinix hospital	Fast moving water, clear spring
55	36 N 454022 34052	1156 m	Dispersed	Access Rd, flower nursery	Clear water spring
56	36 N 454095 34130	1165 m	Dispersed	Access Rd, flower nursery	
57	36 N 454177 34196	1177 m	Dispersed	Mukwano complex, Access Rd	Nakivubo channel
58	36 N 454274 34265	1158 m	Dispersed	Police Training School	Spring of fast moving water
59	36 N 454610 34562	1160 m	0.9	Flower nurseries	Food gardens
60	36 N 454835 34760	1166 m	0.54	Mukwano ware house on 8th street	Ferns establishing in stagnant water
61	36 N 455140 34769	1180 m	0.18	Builder's yard on 8th street	
62	36 N 454972 34884	1152 m	Dispersed	8th street Junction	
63	36 N 454755 34955	1175 m	Dispersed	Kitgum House	
64	36 N 454549 35224	1168 m	Dispersed	Nakumatt junction	
65	36 N 454260 35482	1186 m	1.8	Golf course, next to golf course hotel	
67	36 N 454790 35118	1167 m	5.4	Centenary Park	Resting place
68	36 N 454940 35176	1173 m	Dispersed	Celtel House, Jinja Road junction	
69	36 N 454962 35390	1180 m	Dispersed	Hotel Africana	

S.P	UTM	Altitude	Estimated Area	Location	Main features
70	36 N 455050 35246	1154 m	Dispersed	Ministry of Internal Affairs	Along and in between Jinja Road
72	36 N 455190 35344	1166 m	Dispersed	UMI	Resting place

Source: Field survey, July 2013

The map below shows the ecological footprint of the Survey.

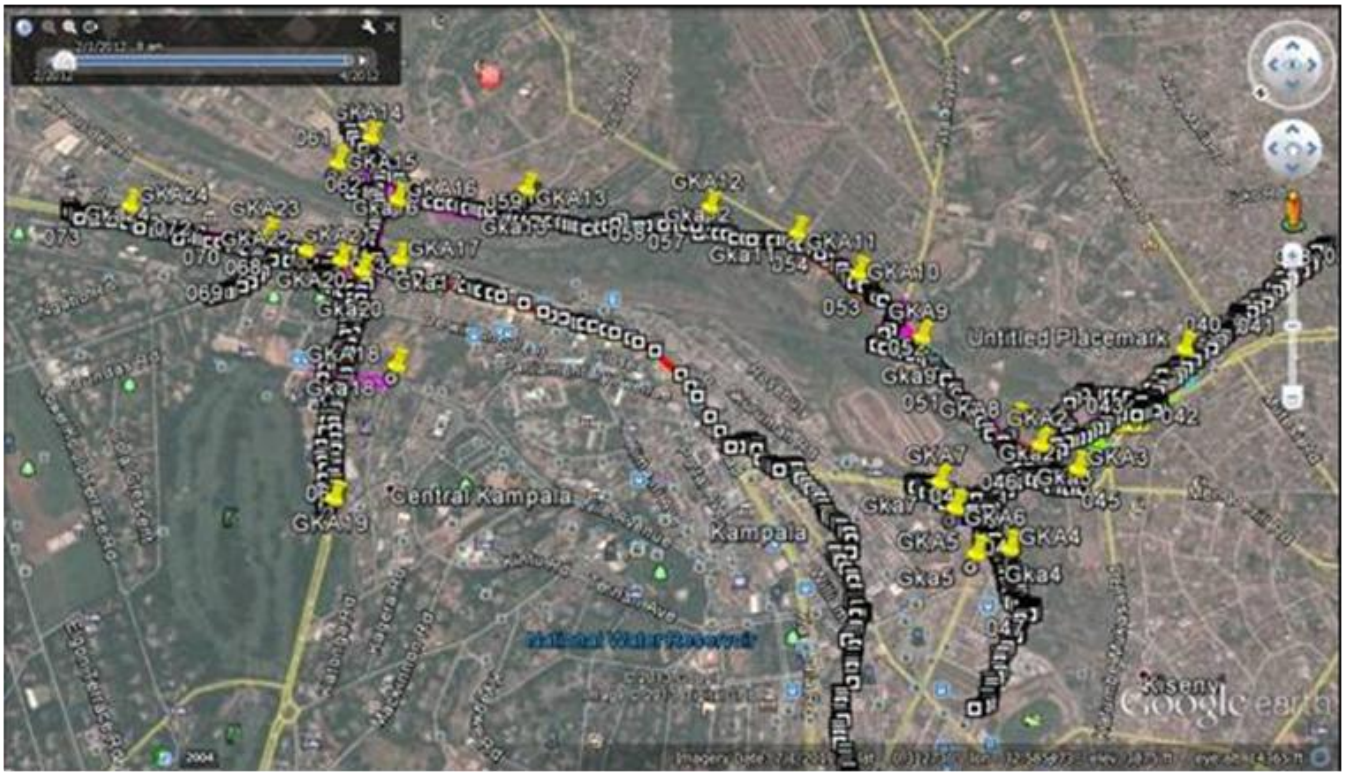


Figure 4-3: Ecological Footprint Map

As part of the consultation process for bio – diversity status some of the NGOs in the sector were consulted. Nature Uganda was emphatic that the construction will lead to potential disruption of the urban eco system such that measures for mitigation will have to be considered

4.11.1 Plants

In the case of the plants, observation of broad patterns of species composition/vegetation communities and a detailed assessment and identification of plants was carried out. Vegetation communities classified and named according to the dominant plant species. An indication of species abundance was tagged on plant species. Species not identified at the sites were noted and field guides were used to verify their identity.

For the tree life forms, the Diameter at Breast Height (DBH) was measured and their heights also estimated. Voucher specimens of difficult species to identify were collected and taken to Makerere Herbarium for verification.

4.11.2 Birds

Birds are very important in conservation and environmental impact assessments because they are good indicators of general biodiversity. Areas rich in birds have been found to also be rich in other biodiversity. Birds are very good biodiversity indicators because they are taxonomically well known, they are large, conspicuous and therefore relatively easy to survey, they are found virtually in every habitat although some

species are habitat specific and thus sensitive to environmental changes. Birds were studied using spot counts and identified based on the "Field Guide to the Birds of East Africa" (Stevenson & Fanshawe 2002). The spot count was employed because it is suited for: extensive open and uniform habitats, mobile large or conspicuous species, covering the study area very quickly and efficiently and situations where access is good.

4.11.3 Mammals

Mammals are very important components of the environment. They include large mammals (e.g. elephants), medium-sized (e.g. Uganda Kob), Primate (monkeys, chimpanzees) and small mammals (rodents, shrews and bats). Specialized habitats for mammals include forest, woodlands, grassland and swamps. Indirect evidence indicating the presence of mammals was used during the study: This included the following: dung, foot prints, tracks, and feeding signs.

4.11.4 Amphibians and Reptiles

Reptiles (snakes, lizards and crocodiles) are important taxa though there are not many scientists that have ventured into studies to better understand them. Some of them for example act as biological controllers of these pests that would otherwise have been a menace to the grains and cereals in Sub-Saharan Africa while others (such as the African Rock Python) in some communities in Africa are a source of meat. Some reptile species have an aesthetic value while others are used or revered in rituals and traditional religions. Crocodile is an economically important reptile species. Visual Encounter Surveys method was used to survey reptiles and amphibians where the investigators moved through the three transects watching the foliage above the ground carefully, turning logs or stones watching out for surface-active reptiles. Identification of herpetofauna followed Channing and Howell (2006) and Spawls et al. (2002, 2006).

4.11.5 Other Fauna

Other fauna looked out for included butterflies, bees, wasps, termites and crickets. These were sampled opportunistically. Butterflies respond quickly to environmental changes and there is now considerable data on how particular species contend with alterations in land use, and thus may play a valuable role in ecological monitoring.

4.12 Socio economic and Cultural Studies

The study approach to the socio-economic studies was qualitative; in this phase was both quantitative and qualitative. Information on the general socio-economic information was gathered from documents on Kampala including the Kampala Physical Development Plan, Progress reports 1 and 2 generated by the JICA study team and population statistics for Kampala. Stakeholder consultations were undertaken to further enrich this information and specific method explained in Chapter 8 of this report.

4.12.1 Document Review

As already mentioned above, In order to understand the general socio-economic situation in the study area, the consultant reviewed documents in order to get existing socio-economic analysis obtained from the Uganda Bureau of Statistics and the different divisions of the Kampala Capital City Authority. The consultant also reviewed socio-economic information from JICA Progress Report One in order to enrich the environmental and social impact analysis.

4.12.2 Stakeholder Consultations

For further analysis on key issues relating to social infrastructure, stakeholder consultations in the form of public meetings, formal meetings with different institutions and analysis of images were undertaken in order for the study team to integrate socio-economic concerns relating to the design. Physical observations were also undertaken guide the team on the impacts of different selection of construction materials, the design of the flyover and the general construction plan. The methodology to reach out to the key stakeholders was broken down into two stages: -

Key stakeholders and local leaders: - After conducting a stakeholder analysis, the identified stakeholders were invited at meetings at the Division headquarters. Invitations were through the local mobilizer known as Ward administrators.

Sensitization workshops: The workshops were in two sessions with the first one involving local committees while the second ones involved directly impacted people and institutions. The local committees were mobilized by the Ward Administrators while for the PAPs and institutions; they were invited by letter from the client UNRA. Letters were hand delivered.

4.12.3 Social data capture

For this aspect all, PAPs were served with structured questionnaires to collect relevant social data about them. After receiving the data sheets from the field covering the entire stretch of the project road, the data was edited, and coded before it could be analyzed. The data entry screen and questionnaire file were designed with the help of EpiData Version 3.1 software. Data from the field questionnaires were entered, checked for inconsistencies and validated and finally exported to the improved version of the SPSS Software version 16 for data analysis. Epi Data software was chosen because it is the best software for data entry since it designs a data entry screen to appear like a questionnaire itself, it provides an option for range and consistency checks and it is excellent in double entry and validation for the same data and comparison of any differences. Two levels of analysis were performed. Univariate analysis involved the use of frequency distribution tables, bar graphs and pie-charts. Various measures of central tendency and dispersion like the mean, mode, median, maximum, minimum and range were also done for easy interpretation of the findings.

4.12.4 Land Survey, Valuation and Socio-economic Census

Under the land acquisition plan, several studies were undertaken to determine the socio-economic impacts of the design details of these methodologies are presented in the Resettlement Action Plan. Generally, the process of identification of potentially affected persons began with the land survey to demarcate the corridor. When the corridor was demarcated, potentially affected persons were identified; in order to understand the socio-economic conditions of the project affected persons, a census was undertaken and a total of 110 persons were interviewed. Alongside this process, valuation surveyors documented of properties and businesses to be affected were inventoried; these are what were called the physical impacts (buildings structures), economic impacts (businesses that are likely to be affected) and are presented in tabular format in the consequent sections. Specifically, areas of interest to inform the baseline study and consequently the GKRIP include the following:

- On effects of the road on generation or reduction of employment in the area
- Impact on Businesses
- Impact on land use change
- Impact on Human Health (these are captured under the air and noise section as well)

Information generated was discussed with the JICA study team in order to further enrich the design several indicators were used to guide decision making including the number of potentially affected persons, infrastructure that could be affected and the associated costs of relocating such sensitive infrastructure, presence of alternative services within the area especially for utilities amongst others. These socio-economic considerations were further guided by existing standards and guidance from relevant agencies.

4.12.5 Physical and Cultural Resources

The studies followed the Convention on Biological Diversity (2004).*Akwé: Kon Voluntary Guidelines for the Conduct of cultural, archaeological, historical and paleontological Impact Assessment regarding Developments Proposed to Take Place on, or which are Likely to Impact on, Sacred Sites and on Lands and Waters Traditionally Occupied or Used by Indigenous and Local Communities*.
In this regard a search for potential PCR was done along the proposed alignment based on documented sources with Department of Museums and Monuments.

Baseline Study

The PCR team conducted a baseline study covering most of the project area. Firstly, desk-based research was carried out in order to identify any known or potential sites of archaeological interest within the study area and to evaluate the cultural significance of these sites once identified. Most of the search was conducted as part of the research programme from the archives of the Department of Museums and Monuments office. Other sources of data include published and unpublished papers and studies, publications on relevant historical, anthropological and other cultural studies, unpublished archival papers and records, from various libraries and Institutions.

To supplement the information gathered in the desk-based study, a site visit and survey throughout the area of study was undertaken. It was done to assess the current status of the study area and also to make note of existing impacts. In this study, all the proposed alternatives were visited and assessed.
The team met up with major stakeholders with heritage interests in the project area; these included the Uganda Museum, Uganda Wildlife Authority officials, cultural institutions, traditional practitioners, district and local leaders.

Record books, GPS, cameras, tape measures and all other relevant archaeological equipment for proper documentation were used.

5 BASELINE ENVIRONMENTAL AND SOCIO – ECONOMIC CONDITIONS

5.1 Physical Environment

5.1.1 Topography

The altitude of the central region ranges from less than 1,040 m a.s.l. in the lowlands in the north and near the shores of Lake Victoria (lake level 1,133 m a.s.l.) to 1,612 m at Bulaga hill, which is the highest point of the Bulaga sedimentary plateau in the western part of the central region. Flat-topped or rounded hills, often capped by laterite, characterize the relief of the terrain in the southern part of the area. These gentle-sloping hills represent a former peneplain, one of the three relic erosion surfaces discerned in central Uganda (Pallister 1959). Narrow swamp-filled valleys are typical for the area north of Lake Victoria, while in the central part of the area the valleys are wider and intensively cultivated. Papyrus swamps are generally limited to those parts of the valley actually filled by water. In the northern lowlands, flat and wide valleys are dissected only by a few perennial rivers.

The landscape of the studied area is relatively along a gentle slope ceding into the valley at some points (Westerhof et al. 2011). Apart from the Nsambya hill ridge and the section after the Hotel Africana Round about, most of the planned FO passes along / parallel to the valley and close to the Nakivubo Channel. The network of wet valleys covered by swamps have mostly been reclaimed and developed. The hilltops have been developed as institutional facilities including universities, churches and other important installations. When it rains, water flows into swamps via drainage channels, the topographic section and gradient of Kampala - Jinja road is shown in the figure below.

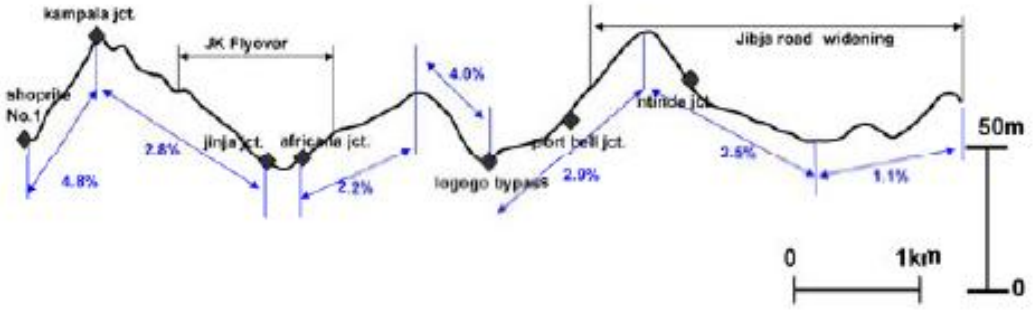


Figure 5-1: Topographic Section and Gradient for Kampala Jinja Road around Kampala City
(Source JICA Pre-feasibility Study 2010)

5.1.2 Drainage and Hydrological Systems

The proposed road runs through Kampala's central district that is located within Nakivubo sub catchment (Fig 5-2). The streams and channels in this area drain runoff, and waste water used by the urban population staying in these places into L. Victoria. They meander through swamps that have been heavily degraded eventually draining into the lake. The main contributing factor to drainage impacts is the paving and increased construction within the catchment such that water does not sink into the ground. Instead it runs off directly into the channel leading to flooding and related damages. Subsequently, flash floods have occurred in Kampala City in recent years and these have previously been mapped, Fig 5-3, shows the flood plain along the proposed road. These have been connected with heavy rainfalls during El Niño years, sealed areas and blocked drainage channels (Westerhof et al. 2011). The construction of the road especially where it widens will increase the paved area and hence the potential to flood.

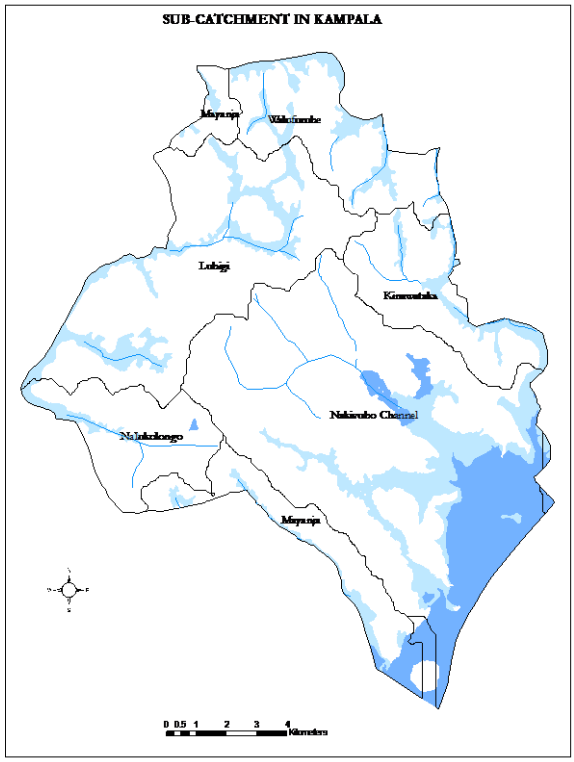


Figure 5-2: Catchment Characterization of Kampala (Source: DWRM Biomass Study)

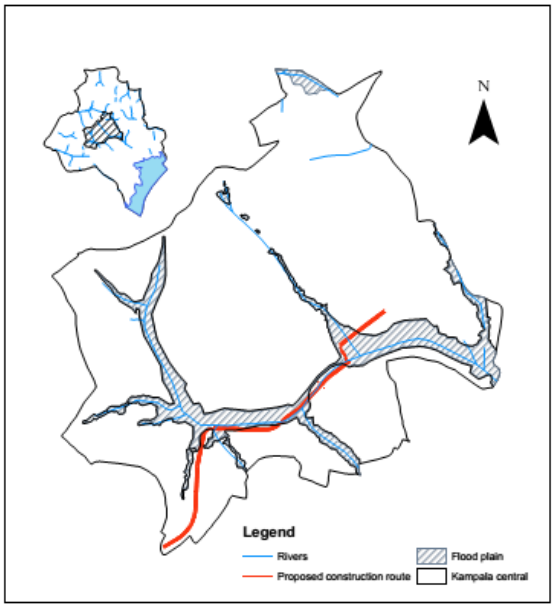


Figure 5-3: Flood Plain along the Proposed Road
(Source: DWRM Biomass Study)

The main drainage and runoff collection points along the planned upgrade:

a. Clock Tower, fire brigade Centre, Shop Rite-shell area:

The area forms the low land catchment for runoff from the upper sealed areas as far as upper and lower Nakasero, Entebbe road---from traffic lights and some parts of Katwe area. Flooding in this area shortly after

a heavy storm is a common occurrence in Kampala partly due to under sizing of the connecting channels into the main Nakivubo channel but majorly due to blocked drainage and water ways in this area.

Photo 5-1: Channel Conveying Storm water from the fire Brigade area Within the Nakivubo Channel (August 2013)

Fig above shows the channel conveying storm water from the fire brigade area into the main Nakivubo channel. It appears to be small and may need widening in this relatively flat storm water collection point.

Figure 5-4: Clock Tower, fire brigade Centre, Shop Rite-shell area

Figure above shows a satellite view of the areas discussed above. The brown outline shows the area that usually floods during times of heavy storms. In red is a representation of the planned fly over.

Photo 5-2: Drainage in the Clock Tower – Shoprite Area (August 2013)

The figures above show the drainage in the clock tower- Shoprite area. Observe the silted drain on the side of the road. Such are responsible for blocking the water ways.

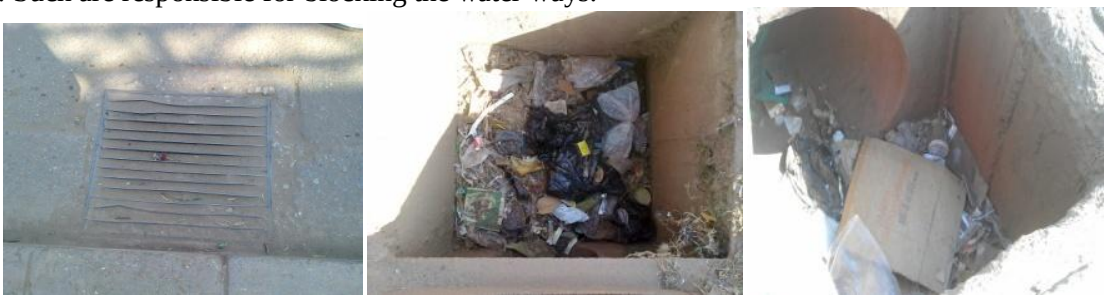


Photo 5-3: Blocked Drains and Waterways around the Clock Tower Area (August 2013)

The figures above show blocked drains and water ways around clock tower area.

b. Lower parts of Nsambya crossing the road near Gapco fuel station:

The drainage follows a fairly steep slope from the Nsambya hill leading into the wetland around the GAPCO fuel station. Storm water here is channelled into a large drainage channel and so far has not presented frequent flooding compared to Clock Tower area. This drainage channel and water way looks sufficient to carry available flows but maintenance is vital to avoid blockages and over topping.

Photo 5-4: Drainage Crossing Next to GAPCP Fuel Station Along the Clock Tower – Nsambya Road – Traffic Lights Stretch (August 2013)

The pictures above further demonstrate the channelling of the storm water from the upper slopes of Nsambaya with some of it being led to the Clock tower area while some of the storm water drains into the marsh / wetland below between railways and the Nsambya road. It is common for the runoff to collect in the lower marshland below the Nsambya traffic lights as opposed to finding its way into the main Nakivubo channel.

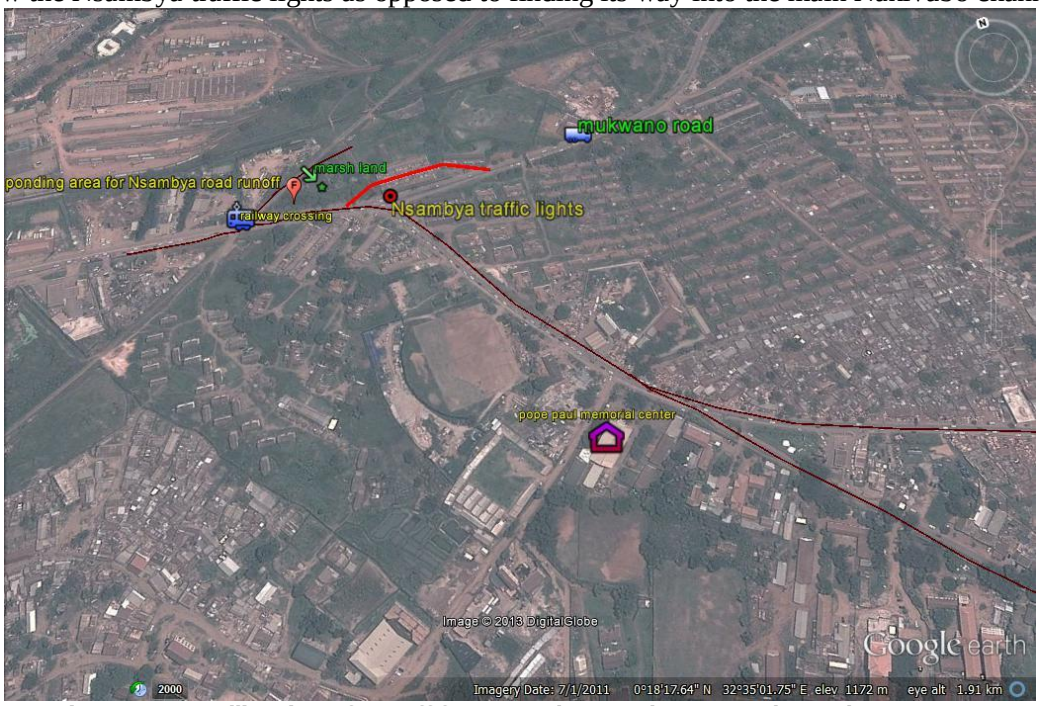


Figure 5-5: Satellite view of Runoff from Nsambya Road Up to Total Nsambya

The discussion above confirmed by the satellite image (fig 5-5) that shows a satellite view of the runoff from Nsambya road up from Total Nsambya and from the hill as outlined using the thin red line. The thicker red outline shows a representation of the proposed fly over around the Nsambya road traffic lights. There is occasional accumulation of runoff into the marsh land below the traffic lights that is usually diverted at the railway crossing.


Photo 5-5: the point where some runoff from Nsambya hill gets diverted southwards at the railway crossing into the marshland as part of it flows on in the direction of traffic pictured to the culverts near Gapco fuel station---- where the main drainage into the Nakivubo channel is located

The figures above show the point where some runoff from Nsambya hill gets diverted southwards at the railway crossing into the marshland as part of it flows on in the direction of traffic pictured to the culverts near Gapco fuel station---- where the main drainage into the Nakivubo channel is located.

c. The Greater Kibuli Catchment Along Mukwano road:

The great Kibuli Catchment is drained by the Kayunga channel. The Kayunga channel is a tributary into the main drainage system stretching from Kabalagala area. It also drains the Nsambya police quarters area and the greater part of Kibuli hill. Presently the channel is known to lead to some flooding as it conveys base flow, runoff and wastewater from the upper catchments of Kibuli hill. Moreover the domestic water pipes crossing the drainage ways near Mukwano road also interfere with the flow during peak time thereby causing blockages. This happens when there is an increased number of debris and garbage which has the tendency to block the drainage. Subsequently, this channel often times has been known to overtop leading to temporary flooding along Mukwano road during peak rainfall seasons.

Figure 5-6: Satellite picture of the drainage from Kayunga channel.

The discussion above is confirmed in the satellite image (Fig 5-6) which shows the drainage as it runs through the Mukwano factories to join Nakivubo channel.

Photo 5-6: Kayunga channel as it approaches Mukwano road

According to the photographs above, the water pipes crossing the channel at its active span can cause obstruction of flow during peak times of rainfall thereby causing channel over topping.

d. Kibuli Near Mukwano Parking Area Close to 6th and 7th Street roundabout:

The drainage from the near Mukwano parking area side of Kibuli hill also leads into the Nakivubo Channel having crossed the present Mukwano road. No flooding has been observed in this area showing adequate channelling for the present condition.

Figure 5-7: satellite image of the drainage from Kibuli hill near the 6th and 7th street round about

The above is shown in Fig 5-7 which is a satellite image of the drainage from Kibuli hill near the 6th and 7th street round about. The thin red line shows the direction of flow of runoff from Kibuli hill road near Mukwano factory and parking towards the main Nakivubo channel on the other side of the Mukwano factory.

Photo 5-7: The drainage of the area. The pothole shown is probably as a result of some water ponding on the road surface as opposed to running into the drain.

The pothole shown is probably as a result of some water ponding on the road surface as opposed to running into the drain. A sufficient slope is needed to avoid this scenario.

e. Centenary Park and Electoral Commission Area:

The centenary park all the way to the Electoral Commission zone is drained by the Kitante channel that starts from Mulago hill. The same channel drains parts of Kamwokya, Kitante hill as well as Kololo and Nakasero hills. The drainage is seen to run through Golf course till Centenary Park before crossing the main Jinja road near the electoral commission and into the main Nakivubo channel.

This is mostly a natural drainage system and is well placed to convey the extra runoff that may come with creation of the fly over around this area. However, blocked road side drains along the main Jinja road in front of the electoral commission road have been known to occasionally cause ponding of water on the surface of the road, which leads to temporal flooding. With increased paving upstream of the channel, the occasions for the overtopping of the channel through Centenary Park after an occurrence of a heavy storm are on the increase.

Figure 5-8: Satellite Image of the Drainage in this Area

The figure above shows a satellite image of the drainage in this area shown using the thin pink line. Runoff, base flow and wastewater are conveyed through Centenary Park, and cross the main Jinja road around the electoral commission before draining into the main Nakivubo channel.

It was observed that the pipes of water that cross this channel at its active span interfere with flow at this point, near the public transport stage in front of Electoral commission gate. These are concerns that the project will address during design and subsequent construction.

Photo 5-8: First view of Kitante channel as it approaches Jinja road through Centenary Park

Photo 5-9: Second view of Kitante channel as it approaches Jinja road through Centenary Park

Photo 5-10: Third View of Kitante channel as it approaches Jinja road through Centenary Park

Photo 5-11: Channel as it enters the Nakivubo channel

The first three pictures above show Pictures of the Kitante channel as it approaches Jinja road through Centenary Park. The pipes shown interfere with flow during peak times and can easily cause over topping of the channel and temporal flooding along the main Jinja road. The last picture shows the channel as it joins the Nakivubo channel.

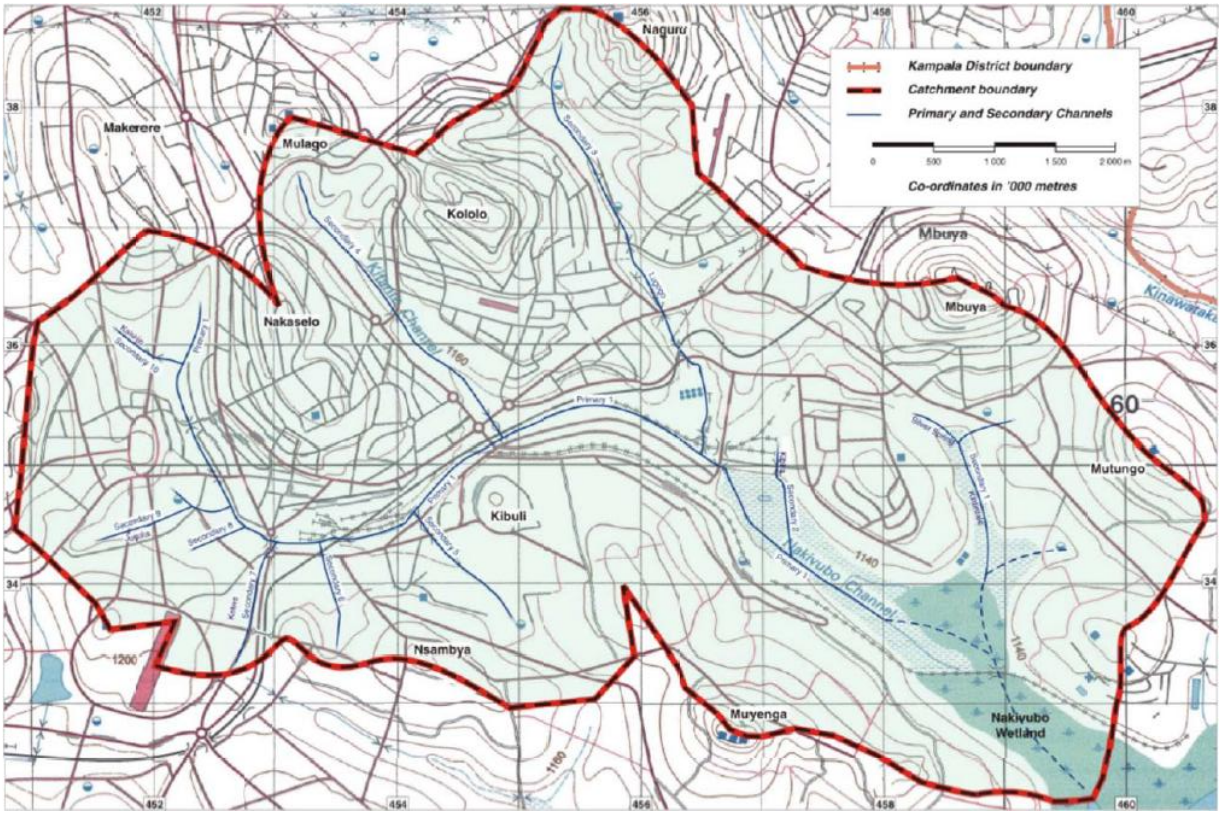


Figure 5-9: Nakivubo Channel
Source: Nakivubo Channel Rehabilitation Project

5.1.3 Nakivubo Channel and Wetland

Frequently, the flow in Nakivubo channel peaks during the rainy season leading to occasional flush floods along the entire stretch of the urban based channel including areas around the clock tower all the way towards the Mukwano Road/ Station road. Indeed the level within the Channel varies considerably and may be expected to increase the variation (frequency and intensity) due to the likely impacts of climate change (Figure 5-10).

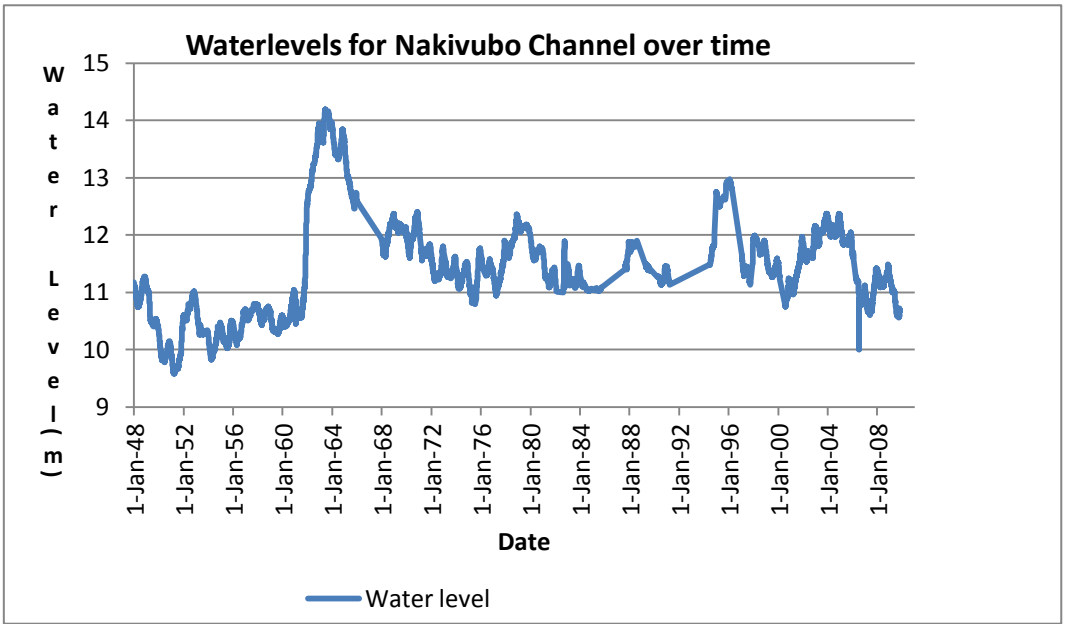


Figure 5-10: Water levels in Nakivubo channel over time

The Nakivubo channel forms the boundary between Kampala Central and Nakawa Divisions to the North and Makindye Division to the South. This channel leads into the Nakivubo wetland which is one of the major wetlands on the north-western shores of Lake Victoria. Further downstream of Nakivubo Channel, Papyrus and Mischanthus sp. dominate the plant community, although the less waterlogged areas have been modified by the cultivation of yams and sugar cane, especially around Namuwongo and Bugolobi. Nevertheless Nakivubo wetland has been gazetted as a protected wetland by the Department of Wetlands Management in the Ministry of Water and Environment.

5.1.4 Geology

The national geological map indicates that the project site is underlain by the quartz-mica and mica schist. However Uganda's central region is generally covered by the Basement Complex rocks; the thickness of the cover is relatively small since the Archaean basement is exposed widely, due to the present level of erosion. All Achaean rocks in the Kampala area belong to the West Tanzania Terrane of the Tanzania Craton (Westerhof 2012).

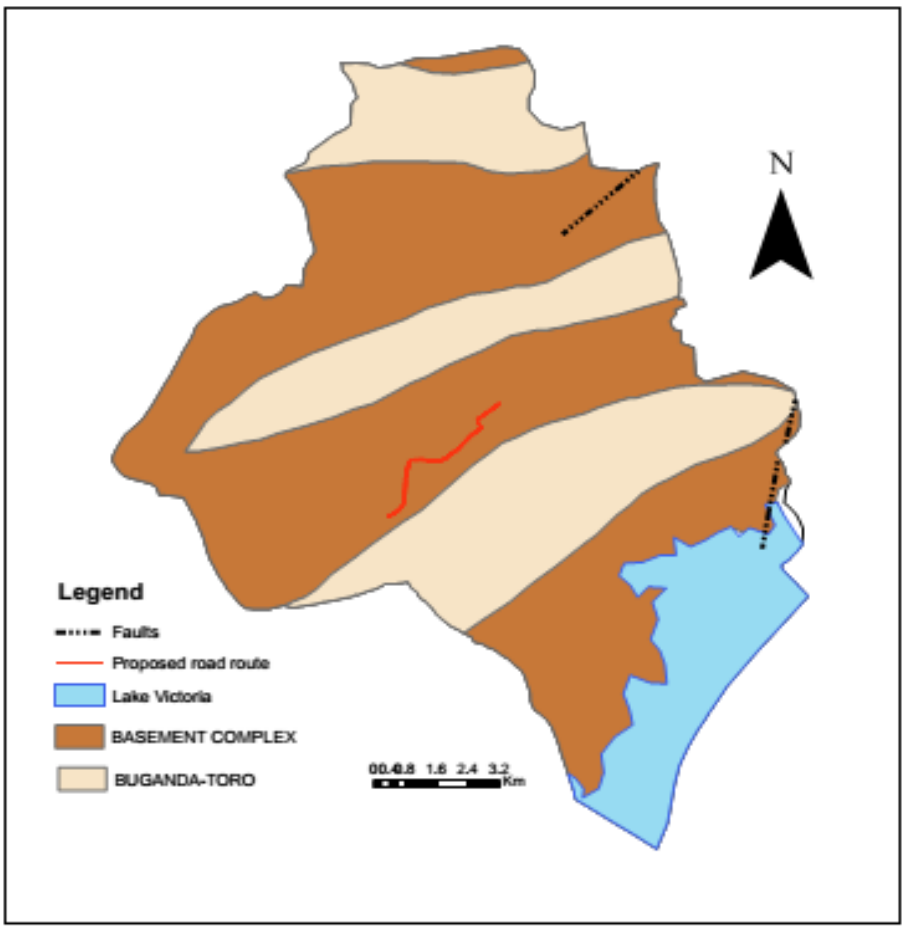


Figure 5-11: Map of Kampala District showing the Geology and lineaments
(Source: DWRM Biomass Study)

Specifically, the area is affected by the organic belt in the Precambrian Age named Kibaran orogeny and by the processes of formation of the Rift Valley. The metamorphisms form structures such as fault and foliation in the rock. Rose diagram of the fault and foliation (left) and Quartzite (right) around Kampala City is shown in the figure below:

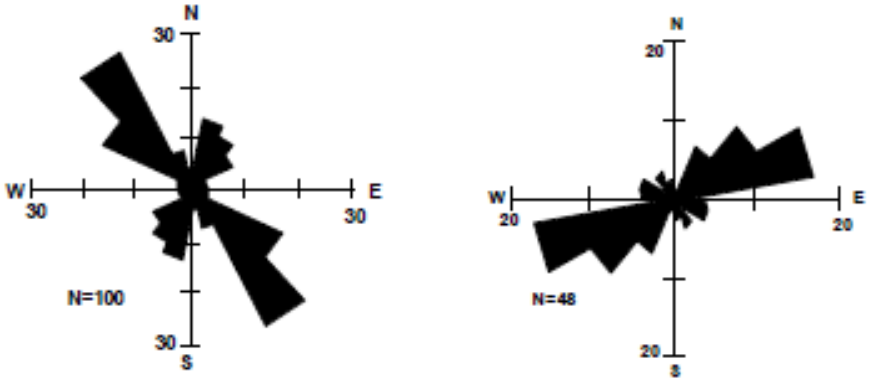


Figure 5-12: Rose Diagram of the Fault and Foliation and Quartzite
(Source: JICA progress report 1)

The dominant trend of the fault and foliations shows Northwest-Southeast; on the other hand, the dominant trend of Quartzite shows Northeast-southwest.
The Project area is characterized by a number of features which include the following: -

- **Archean**: Basement complex (*granitoid gneiss*) which is the dominant rock across the entire country including all of Kampala City. The *granitoid gneiss* has been found to be predominantly of sedimentary origin.
- **Proterozoic**: Shale, pyillite, and schist which are known as the "Buganda Series". This is mostly found along the lower valley in study area which is in the same area as the railway line. Quartzite is partly seen as dyke which has strike of southwest to northeast.
- **Cenozoic**: Most of the hills within the Buganda series are composed of flat topped Laterite formations. On the other hand, the lower ground and swamps are composed of recent quaternary swamp, alluvium and lacustrine deposit. These are predominant within the valleys, rivers, and within the Lake Victoria. From the existing geological and soil information, thickness of recent swamp deposits, alluvium and lacustrine deposit and weathered zone of the basement rock is relatively shallow with a thickness varying from 5m to 10m.

The JICA study indicates that the expected profile of Kampala City varies from Shoprite area all the way to Kyambogo where swamp deposits were detected. This is shown in Figure 5-13 below. At the project site, swamp deposits are expected to appear along the channel.

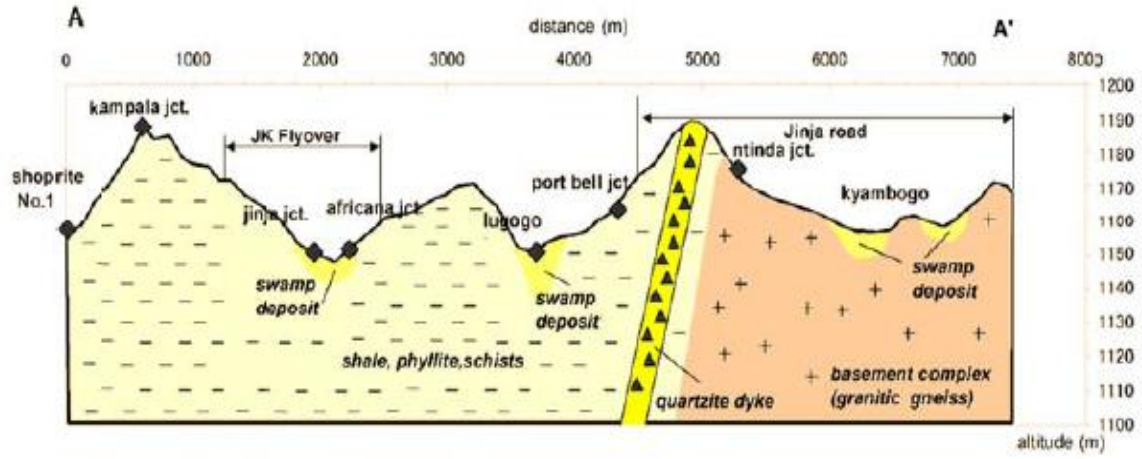


Figure 5-13: Expected Geological A-A' Profile (Source: JICA Pre-feasibility Study)

5.1.5 Earthquakes

The central region of the country has experienced over 17 earthquakes between the years 1966 and 2008 and these have had their epicenters within the central region of Uganda. The magnitudes have varied between 2.7 and 4.1 on the Richter scale. An earth quake with a magnitude 5.0 (Richter scale) occurred On September 7th, 1990 in the Lake Victoria area near Kampala, this caused destruction of many semi-permanent buildings (Nyakaana 2010).

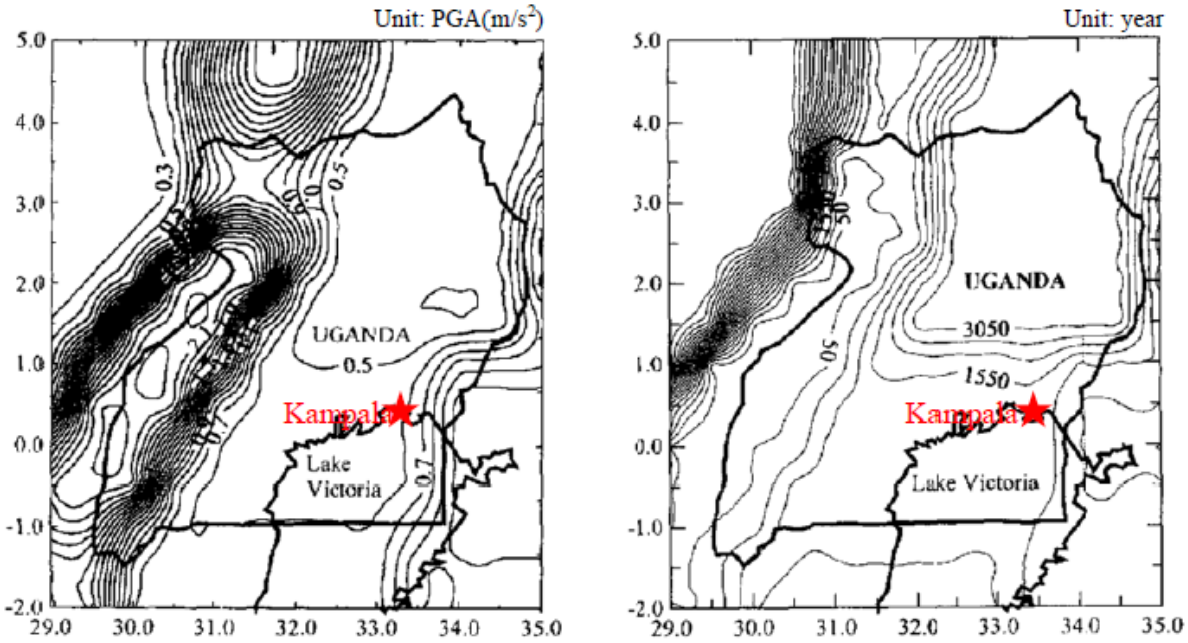


Figure 5-14: Maps showing the frequency of earthquakes in years: first map showing Mean PGA (M/S2) to be exceeded on average once every 50 years and second map showing frequency in years with various parts of the country can expect a PGA = 2.0 (M/S2)

From these maps, the characteristics of earthquakes in Kampala are summarized below:

- Kampala will be subjected to "very light" to "light" damage earthquakes every 50 years;
- Kampala city will be subjected to "Moderate/Heavy" damage earthquake at a 1050 – 1550 year interval.

Consequently, quite a few earthquakes have been observed in and around Kampala City within approximately 50 years. The earthquake which has occurred near the plate boundary in Western Uganda also did not cause severe damage in Kampala City during 50 years. This means that the proposed area for the road construction is not underlain by any major fault lines but aftershocks (tremors) would be a main concern in the construction of the fly over.

5.1.6 Soils

Most of the project area is composed of mainly clays, silts and sands overlying completely weathered bedrock (tropical residual soils) which are in turn underlain by the undifferentiated gneisses. Tests conducted by JICA show that the soils are shared amongst low plasticity clays (CL), intermediate plasticity clays (CI), high plasticity clays (CH), silty gravels (GM), and clayey sands (SC), silty sands (SM), sandy silts (ML). Generally, the particle size distribution curves show that the site is underlain by silts, clays and sands. Natural moisture content values ranges between 6.9 to 33.9%. A detailed assessment of the data reveals that moisture contents are higher at higher water tables which as should be expected.

5.1.7 Climate

Rainfall: -The rainy season is generally from March to May and September to November which generally follow the equinoxes. The annual rainfall varies between 900mm to 2,100mm.Climate in the area is warm and wet with relatively high humidity. This condition favours rapid plant growth and also encourages disease out-breaks.

Proximity to Lake Victoria has a bearing on production activities. There are two wet seasons running from April to May and October to November. The dry months are January to February and July to August. The annual rainfall mean is 1,320 mm though in many areas of the lake zone it is between 1,750 and 2,000mm. Lake Victoria, a mass of warm water of approximately 63,000 square km at an attitude of 1,134 meter above sea level is a major topographic factor of rainfall. The rainfall trend over recent years has tended to be fairly

erratic however, even the heavy down pours don't completely stop works on sites for they can be for 3-4 hours followed by sunshine after.

Temperature: - The Project area experiences an average max temperature of 27.3^{o}C during the day and average minimum of 18.1^{o}C at night due to the influence of the nearby Lake Victoria. The hottest months are December to February. The absolute minimum surface air temperature within the project area is 11^{0}c centigrade while the maximum is 33.3 degrees centigrade. There is little variation in temperature throughout the year. There are two temperature peaks, one from the months of January- May and the other from July to September. The highest temperatures are experienced in the month of February whereas the lowest temperatures are experienced in the month of July.

Visibility: - There is no nearby visibility measuring station. The nearest one is based at Entebbe airport. Nevertheless on occasions the early morning gets some mist and due to increased smoke and dust the visibility can drop to below 1kilometere (Observations by the consultant).

5.1.8 Wind Regime

The wind regime shows considerable variation across both the day and the year. The most frequent wind directions are the southerly and northerly winds. The Wind roses for the Kampala meteorological Station are shown in Figure 5-15 below, while Table 5-1 shows the actual wind data.

Table 5-1: Wind data for Kampala – Station, 00°20'N, STATION NUMBER 89320100, Alt (4304 feet or 1312 M)

		Wind Speed in Knots and km/hr				Calms	
	Daily Wind Run	9.00am	9.00am	3.00pm	3.00pm	09.00am	3.00pm
Month	in Miles	Knots	Km/hr	Knots	Km/hr	days	Days
January	72.4	7	13.0	12	22.2	2	0
February	80.1	6	11.1	13	24.1	2	1
March	85.9	7	13.0	12	22.2	1	0
April	84.7	7	13.0	11	20.4	3	1
May	92.0	7	13.0	12	22.2	2	1
June	85.8	7	13.0	13	24.1	2	1
July	78.9	8	14.8	12	22.2	3	2
August	75.9	8	14.8	11	20.4	2	1
September	80.4	8	14.8	11	20.4	2	1
October	79.7	7	13.0	10	18.5	2	1
November	74.3	6	11.1	10	18.5	2	1
December	66.1	7	13.0	11	20.4	2	1
Year	79.7	7	13.0	11	20.4	25	11

Source: Data from Uganda Meteorological Department

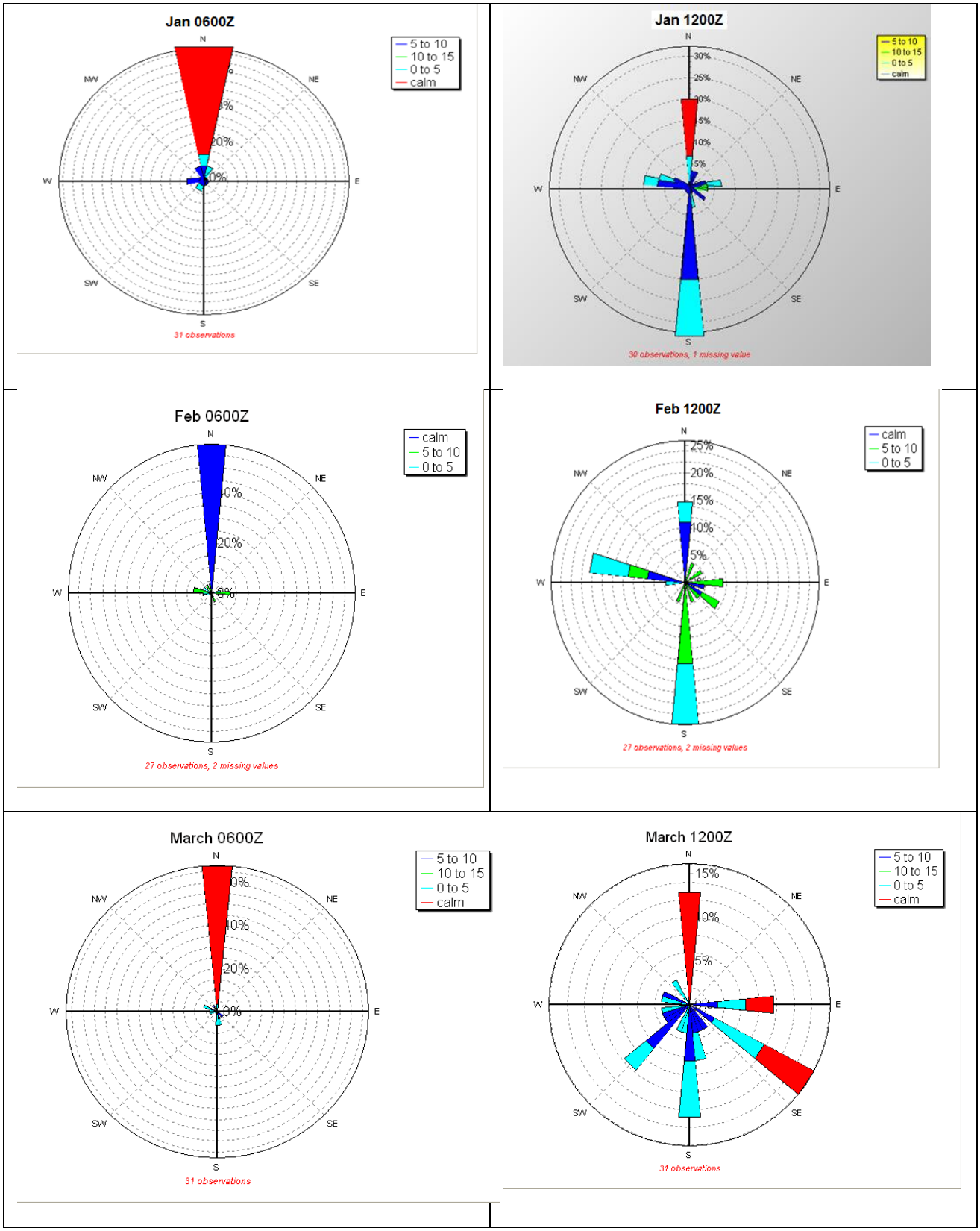


Figure 5-15(1): Wind Roses for Kampala

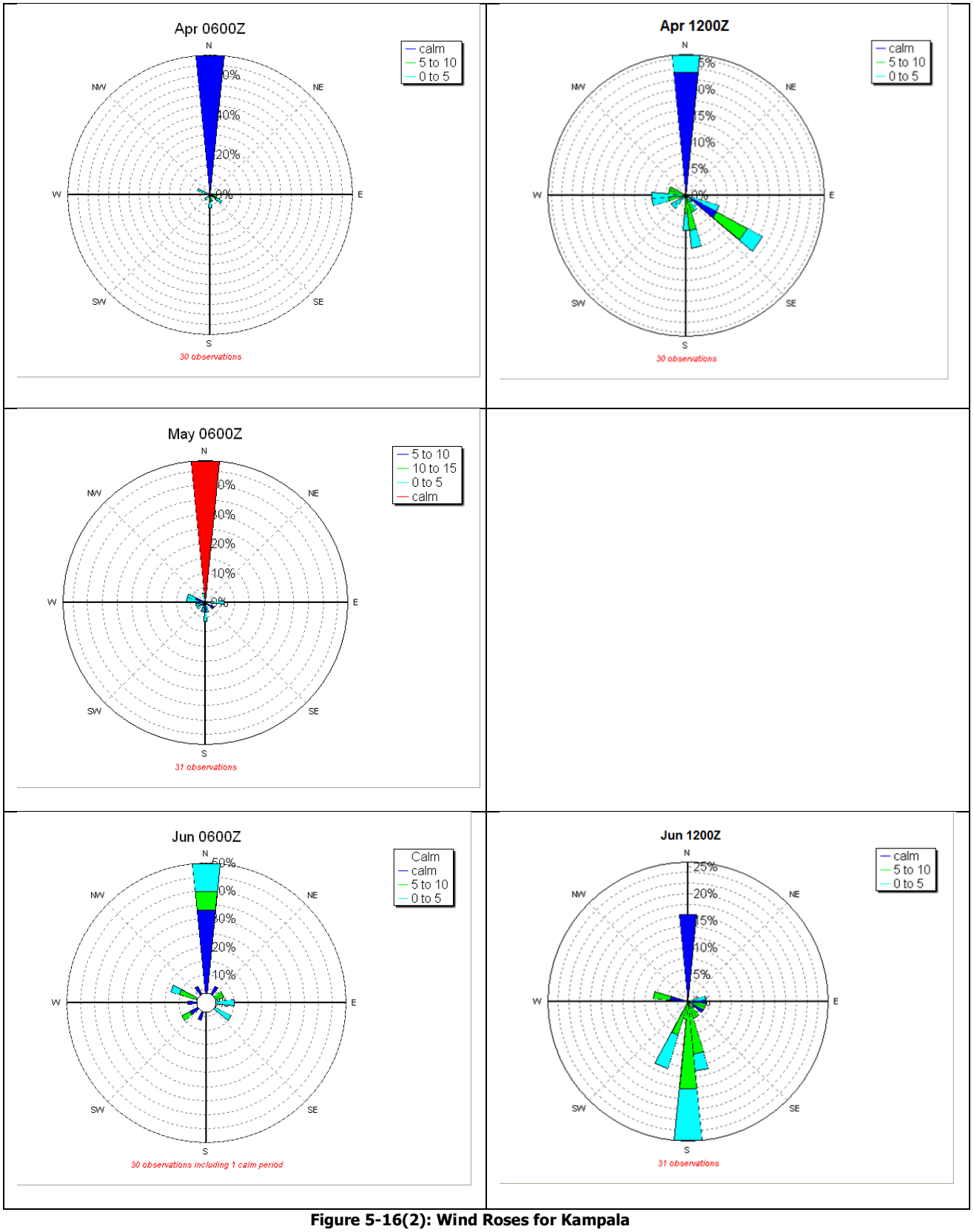


Figure 5-16(2): Wind Roses for Kampala

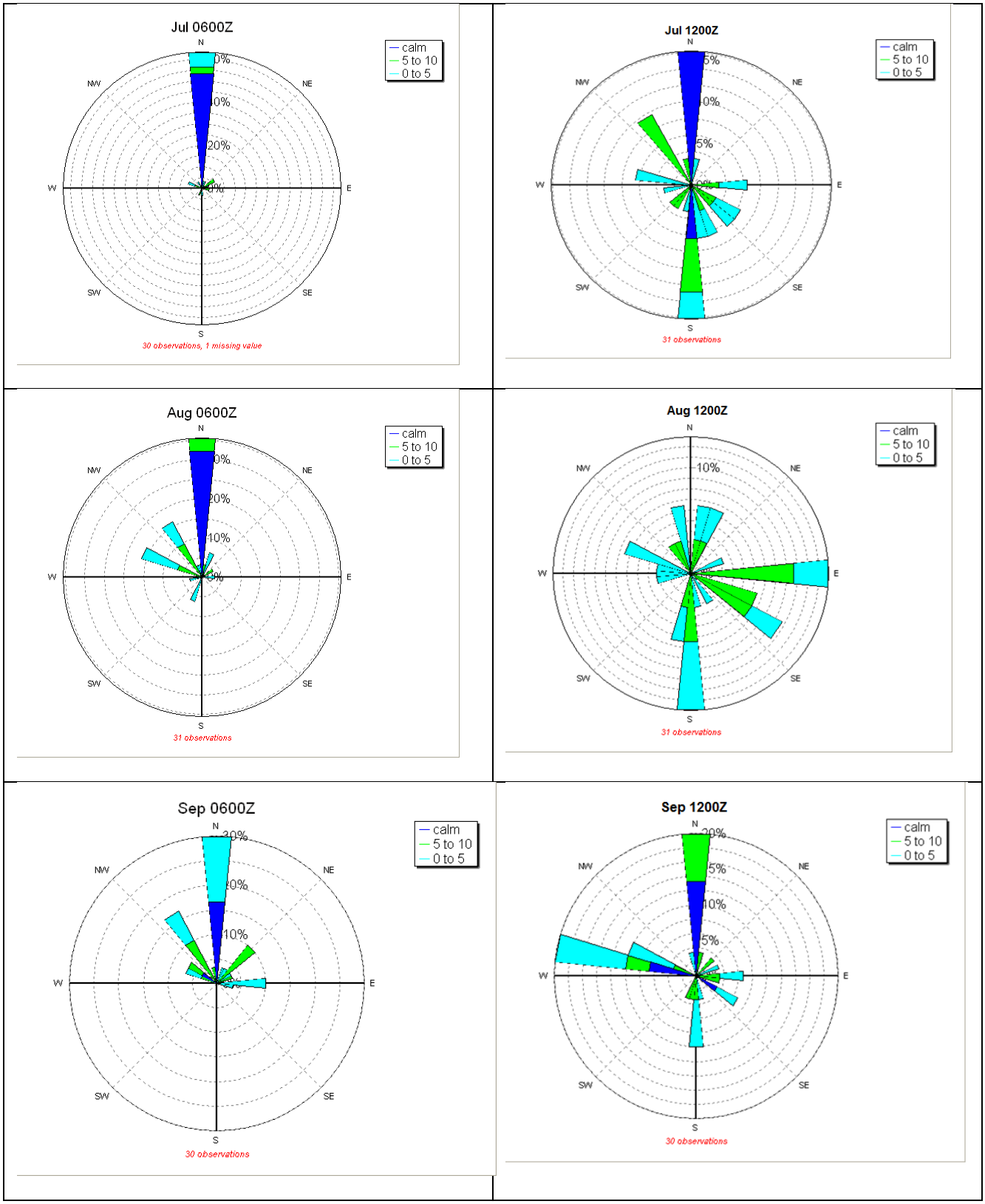


Figure 5-17(3): Wind Roses for Kampala

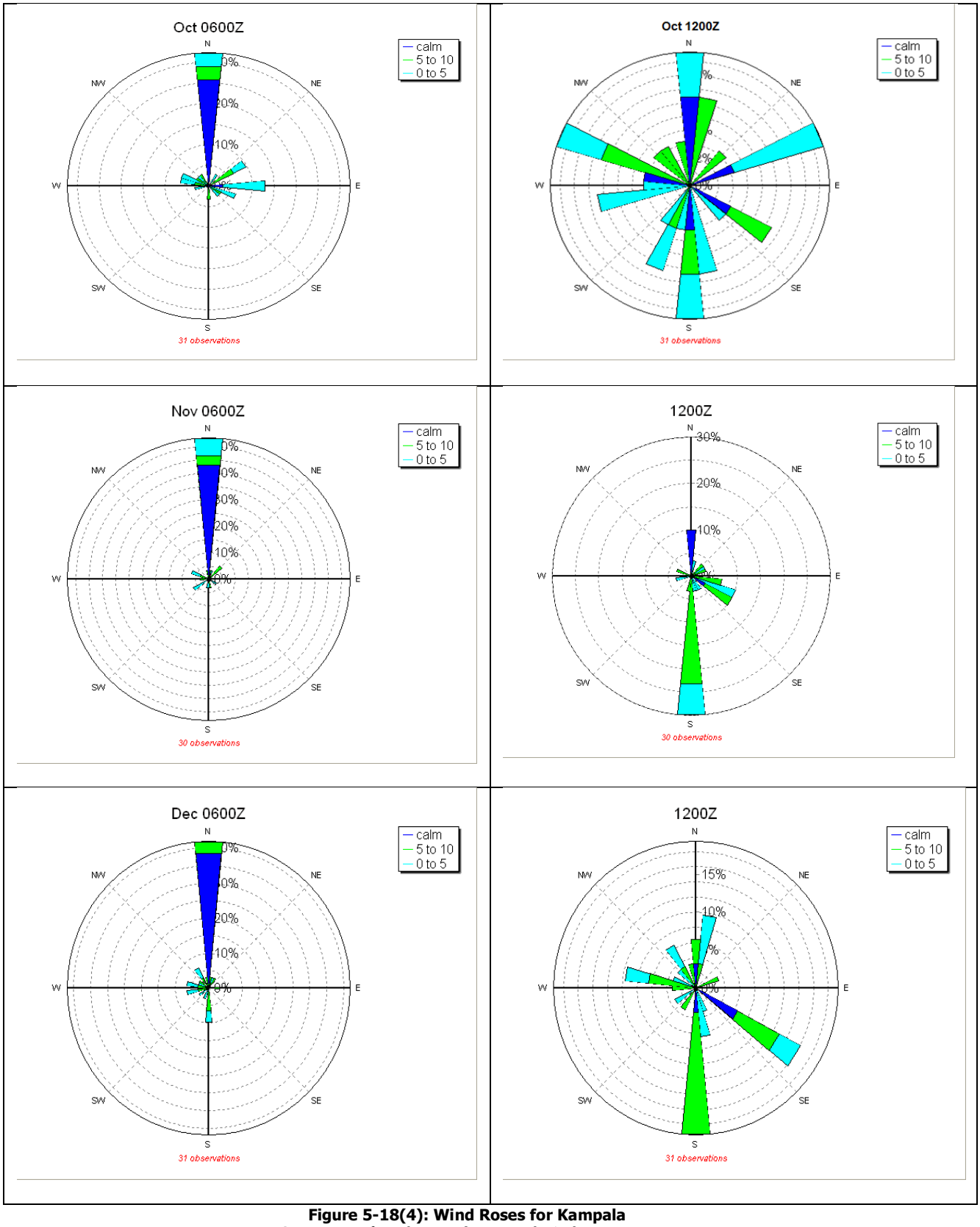


Figure 5-18(4): Wind Roses for Kampala
Source: Data from the Uganda Meteorological Department

Most of the times, the wind excessive although in the nearby Entebbe station wind gusts of up to 70 knots have been recorded during thunderstorms. This is also likely for Kampala such that flyovers will have to be designed in such a way as to withstand wind gusts in excess of 65 knots.

5.1.9 Climate Change Concerns

During the last 30 year period the maximum rainfall recorded in the 24 hour period in a nearby rainfall station at Entebbe was 100.5mm. The dominant wind direction regime throughout the year is either Northerly or Southerly. During thunderstorms, the wind gusts can reach a maximum of 60 – 70 knots (gusts are of short duration ranging from a few seconds to about five minutes and are usually responsible for most wind damage to structures) although on average the wind is between calm to 15 knots. The mean daily temperature range is 16 – 27^{o}C.

Climate Change: - Global circulation models indicate that the Lake Victoria Basin including Kampala region may experience a temperature increase of up to 2 degrees C in the next 20-25 years due to Global Warming. The extreme events are predicted to increase both in frequency and severity. Consequently, maximum wind gusts in excess of 65 knots will be more frequent. The rainfall intensity in the 24-hour period is also expected to increase. This is an area where the average rainfall is expected to increase due to Climate Change.

In view of the foregoing, it will be necessary to ensure that the storm water drains along the road project and the drainage facilities are designed in such a way that they are large enough to accommodate up to 30% or more of what the current volumes are. This will start to be apparent in the next 15 to 25 years. Secondly the wind factor for the flyovers will be expected to be more felt as the frequencies of severe weather events become more frequent due to climate change.

5.1.10 Water Quality in Nakivubo Chanel

As discussed above, two sampling points have been selected based on the proposed route of the road in relation to the Nakivubo channel. The consultant has reviewed the reference baseline data from the previous work done on the Nakivubo channel in the section of the project. Current data has been compared to the reference data in order to form an opinion on the current and future status of the Nakivubo water quality. Secondly, from the laboratory analyses from earlier impact assessment studies taken at Bugolobi area (ref Kampala Southern bypass ESIA - 2013), it was noted that most of the stream water samples picked had high turbidity. The BOD was also high due the waste water that is discharged into the swamp. The results of the analysis are presented in Table 5-2 Below while the certificate of testing is attached as Annex 8.

The water quality results indicate that the channel at the sampled location is polluted and the concentration and some key parameters are far above the standard. Total Suspended Solids, BOD5 and the bacteriological parameters were above the discharge standard.

Table 5-2: Results of the Water Quality Analysis from the two sampling sites

Water Quality	Parameter	Fire Brigade E453039 N34064		Mukwano E454848 N34842		Standard for Effluent Discharge
		26th July	12th August	26th July	12th August	
Physical - Chemical	pH	7.14	7.12	7.44	7.14	6-8
	EC (µS/cm)	632	701	551	582	1000
	Turbidity (NTU)	32	25	41	29	300
	Temperature	27.4	24.9	26.2	25.1	32
	Dissolved Oxygen (mg/L)	4.02	5.81	8.90	7.81	0.2
	TSS (mg/L)	224.3	178.8	127	102	100
	TDS (mg/L)	388	391	385	389	1500
	Phenol (mg/L)	<0.001	0.003	0.005	0.007	0.2
	Detergents (mg/L)	0.95	0.56	1.5	2.2	10
	Oil &Grease (mg/L)	1.23	0.95	2.52	2.3	10
	BOD5(mg/L)	245.2	100.9	64.4	52.1	50
Bacteriological	Total *Coliforms* (CFU/100ml)	2.6×10^{8}	2.4×10^{7}	3.8×10^{7}	2.0×10^{6}	1.0×10^{4}
	E. coli (CFU/100ml)	9.5×10^{7}	5.0×10^{5}	6.7×10^{6}	3.0×10^{5}	1.0×10^{4}

Water Quality	Parameter	Fire Brigade E453039 N34064		Mukwano E454848 N34842		Standard for Effluent Discharge
		26th July	12th August	26th July	12th August	
	Clostridium perfringes (CFU/100ml)	8.0×10^4	2.0×10^2	3.0×10^6	2.0×10^4	1.0×10^4

Source: Field survey July 2013

5.1.11 Air Pollution

Air quality Survey Measurement

The Air quality measurements were done within an interval of three hours at each location. The intervals have been separated to indicate day time and night time measurements. The major source of air pollution in the study area is traffic emissions at the road junctions due to the reduction in speed of the vehicles at these locations and this is associated with engines idling during the traffic control. This is made worse by the many motorcycles commonly known as boda-bodas (two stroke engines) whose fuel combustion efficiency is low due to poor maintenance. There is a major industrial emission source at Mukwano industries which use a mixture of wood chips and coffee husks as fuel for the boiler. The factory mainly produces refined vegetable cooking oil from crude palm oil.

The measurement intervals were done by taking three consecutive measurements in three hours. The reason for this was that the nature of equipment used was operating on batteries and could not sustain continuous measurements. Hence the sampling technique was used as shown in the Table 5-3 below.

Table 5-3: Frequency of Air Quality Monitoring

Time Period	Duration, hrs	Parameters
Day Time: 05:59-21:59 hrs on normal weekdays	3 hrs (average of 3 consecutive measurements in 3 hours.)	O_2, CO, NOx, SO_2, PM_{10}
Night Time: 22:00-05:59 hrs on normal weekdays	3 hrs (average of 3 consecutive measurements in 3 hours.)	

Survey Results

The air quality monitoring survey was carried out in September 2013. The parameters of air quality are oxylatooxygen (O_2), inhalable particulate matter (PM10), nitrogen oxides (NO_X), and sulphur dioxide (SO_2). The field survey results are shown in Table 5-5 and the draft ambient air quality standard of Uganda is shown in Table 5-4. The project area would be categorized as industrial and mixed-use area. Based on the comparison of field survey results with the standards, at the Clock Tower Junction, PM10 parameter has exceeded the standard.

The observed data is given as Annex 9 to this report covering both the air pollution and noise measurements.

Table 5-4: Ambient Air Quality Standards

Parameter / Location	%	Concentration (µg/m3)		
	O_2	PM10	NOx	SO_2
Industrial and Mixed Use	19.5-23.05	500	120	120
Residential and Rural	19.5-23.05	200	80	80
Sensitive	19.5-23.05	100	30	30

Source: JICA Survey Team

Table 5-5: Air Quality Survey Results

Parameter / Location	%	Concentration (μg/m^3)		
	O_2	**PM10**	**NOx**	**SO_2**
1.Clock Tower Junction	20.53	527.50	0.84	82.83
2.Between Entebbe Road and Railway Line	20.63	449.50	1.74	69.83
3.Infront of Police Quarters	20.55	113.67	0.48	19.83
4.Nakumat Junction	20.22	154.00	0.61	57.83
5.Hotel Africana Junction	20.53	174.83	0.70	89.67

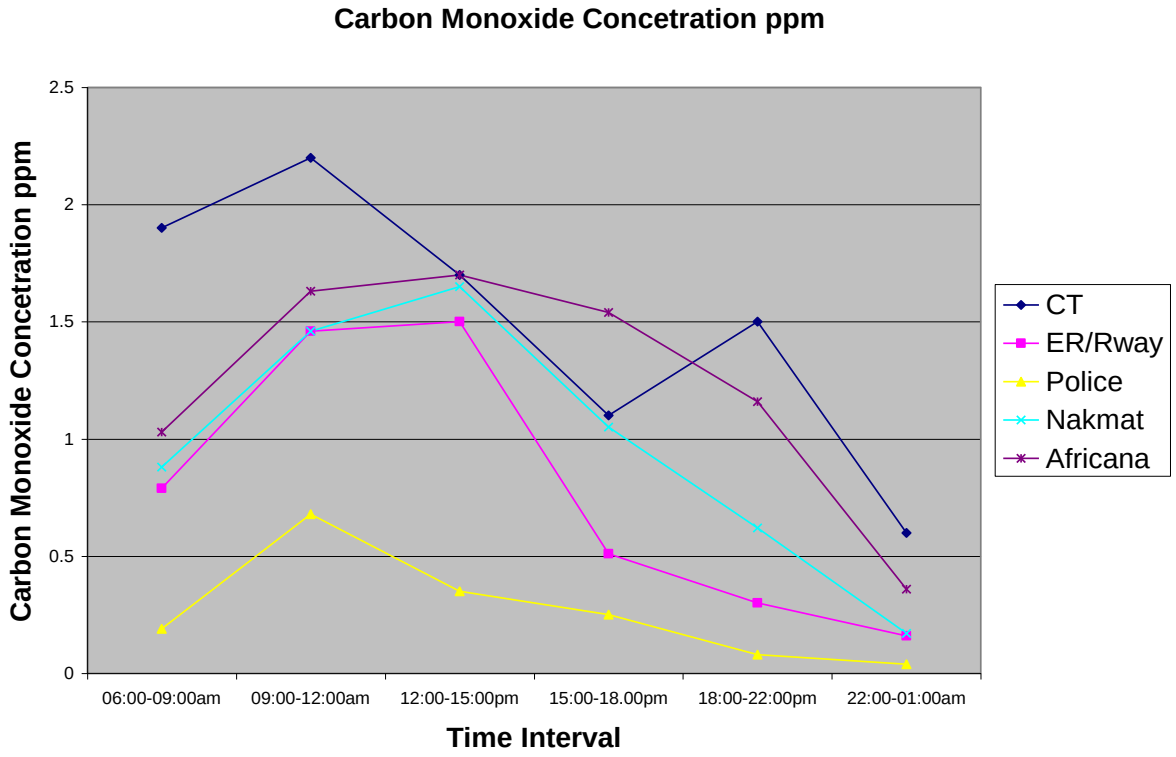
Note: Air quality data highlighted in gray exceeded the air quality level standard.

Source: JICA Survey Team

In the graphs and data sets, the locations have been abbreviated in accordance with the following format: -

Location	**Abbreviation**
Clock Tower	CT
Railway Junction at Entebbe Road (Kibuye)	ER/Rway
Police Training Residential area near Mukwano Industries	Police
Nakumat Junction on Yusuf Lule Road (Garden City area)	Nakumat
Hotel Africana Junction next to (Airtel House)	Africana

From the graphs below, it is observed that for most of the monitored variables (apart from SOX), there is a peak from about 8.30am to 12.pm and yet another one from about 6pm to 10pm. This corresponds to the traffic peak hours. It is interesting to note that the morning peak hours have a higher peak compared to the evening ones (apart from SOX). The possible explanation for this is the lower pollution potential exhibited during the afternoons compared to the mornings (*SAK Magezi – Urban pollution potential with emphasis on the tropics 1985***).**



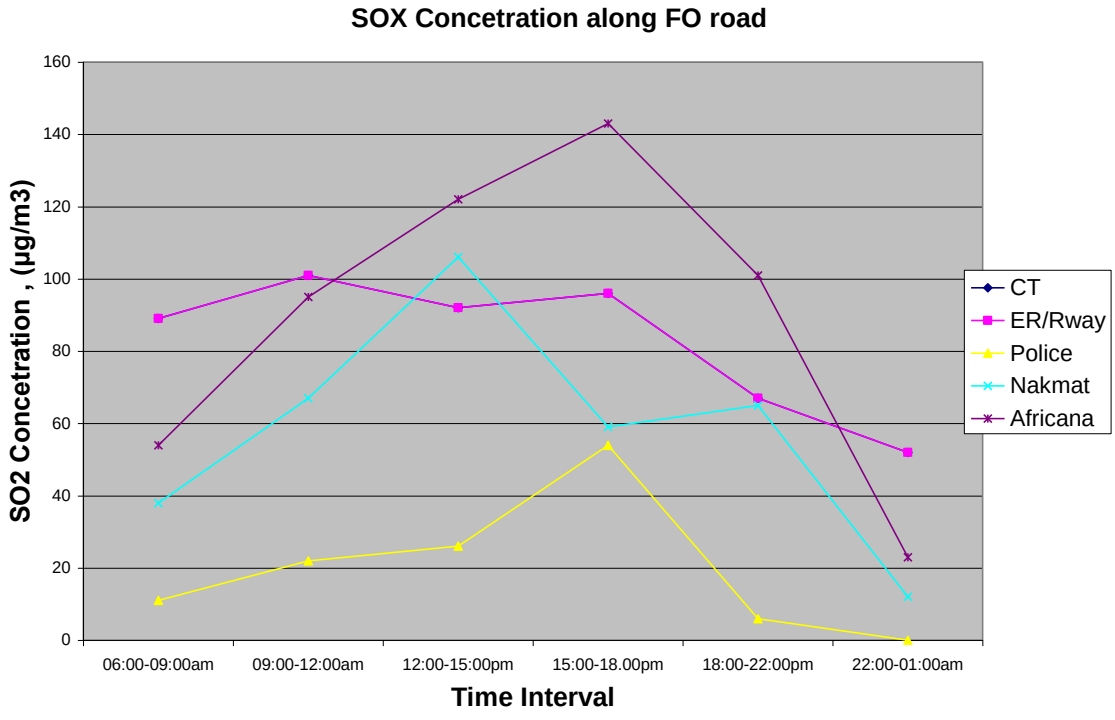
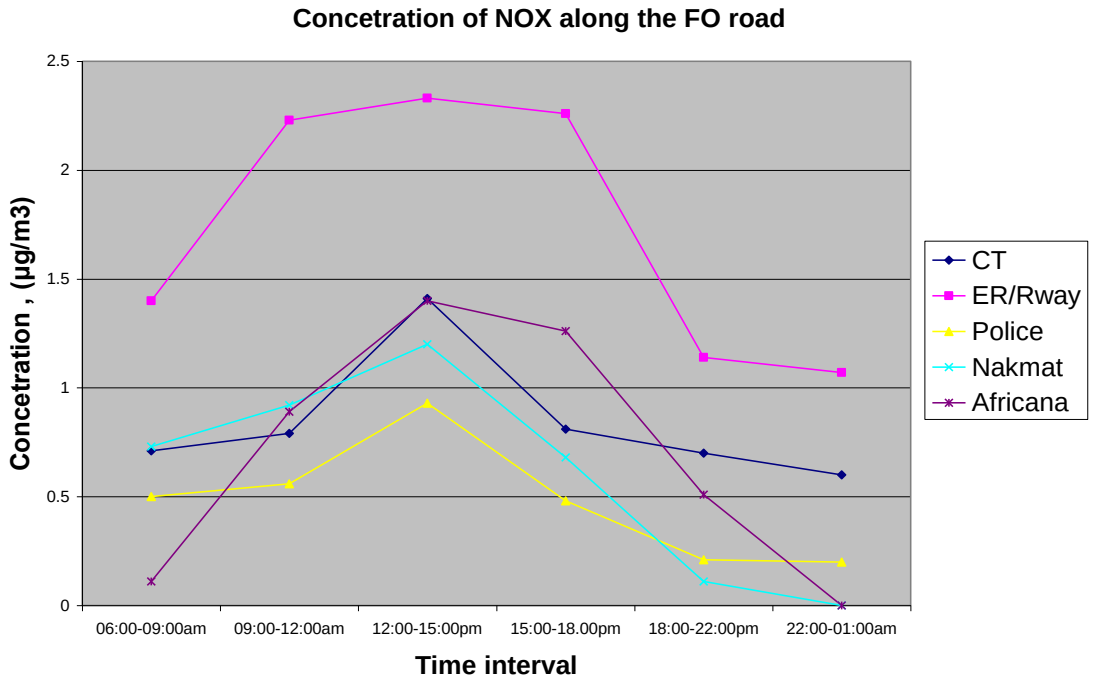


Figure 5-19(1): Graphical Presentation of Air Quality levels



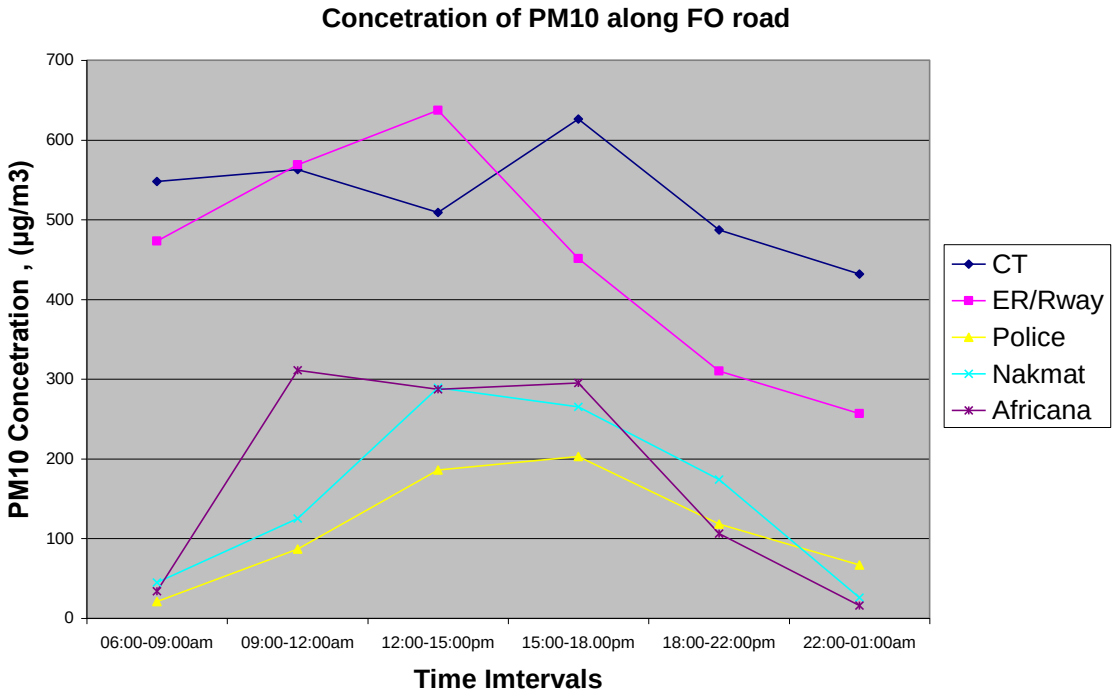


Figure 5-20(2): Graphical Presentation of Air Quality levels

5.1.12 Noise and Vibration Assessment

Traffic Noise Survey Measurement

Road and rail noise are significant contributors to the ambient noise environment, particularly around the city. Noise pollution contaminants are generally waves that interfere with naturally occurring waves of a similar type in the same environment. However, noise pollution is defined as unwanted sound or sound that is loud or unpleasant. Sounds are considered noise pollution if they adversely affect wildlife, human activity or are capable of damaging physical structures on a regular basis. In addition, it is considered noise pollution if sound disturbs any natural process even if the sound does not occur on a regular basis. Noise from various sources intrudes unreasonably into the daily activities of human beings and animals creating adverse effects.

Survey Location

The noise data has been captured at an interval of an hour for the measurement at the five locations. The Locations of noise monitoring survey are at the same locations as air quality survey.

Survey Result

The noise monitoring survey was carried out in September 2013. The field survey results are shown in Table 5-6. The noise level standard in Uganda is shown in Table 5-7 and Table 5-8. At the Clock Tower Junction and between Entebbe Road and the railway line, the noise levels for both day time and night time have exceeded the maximum permissible level for construction site. These areas where the noise levels have exceeded the standard are also the areas with high traffic congestion. This is more apparent during the peak hours in the morning and the evening as can be seen from the table.

Table 5-6: Traffic Noise Survey Results

Time / Monitoring Point	Day Time				Night Time	
	06:00-09:00	09:00-12:00	12:00-15:00	15:00-18.00	18:00-22:00	22:00-01:00
1.Clock Tower Junction	75	80	81	82	77	55
2.Between Entebbe Road and Railway Line	76	82	82	78	72	59
3.Infront of Police Quarters	50	77	69	73	71	41
4.Nakumat Junction	57	73	78	71	72	59
5.Hotel Africana Junction	58	75	77	74	74	49

Note: Noise levels highlighted in gray exceeded the noise standard for construction site

Source: JICA Survey Team

Table 5-7: Maximum Permissible Noise Level for Construction Site

Parameter / Facility	Maximum Noise Level Permitted (Leq) in dB(A)	
	Day (6:00 a.m.-10:00 p.m.)	Night (10:00 p.m.- 6:00 a.m.)
i)Hospital, schools, intuitions of higher learning homes for the disabled, etc.	60	50
ii) Buildings other than those prescribed in paragraph (i)	75	65

Source: National Environment (Noise Standards and Control) Regulations, 2003

Table 5-8: Maximum Permissible Noise Level for General Environment

Parameter / Facility	Maximum Noise Level Permitted (Leq) in dB(A)	
	Day (6:00 a.m.-10:00 p.m.)	Night (10:00 p.m.- 6:00 a.m.)
A. Any building used as hospital, convalescence home, home for the aged, sanatorium and institutes of higher	45	35

Facility \ Parameter	Maximum Noise Level Permitted (Leq) in dB(A)	
	Day (6:00 a.m.-10:00 p.m.)	Night (10:00 p.m.- 6:00 a.m.)
learning, conference rooms, public library, environmental or recreational sites		
B. Residential buildings	50	35
C. Mixed residential (with some commercial and entertainment)	55	45
D. Residential + industry or small scale production + commerce	60	50
E. Industrial	70	60

Source: National Environment (Noise Standards and Control) Regulations, 2003

Furthermore, the data has been separated into Day and Night periods with the corresponding average mean calculations. Night time period from (21:59 to 24:59) hours was considered as the period after this time has very minimum if any traffic on the road. Most bodabodas stop operation around 24:00 hours along these areas and their operation is shifted to areas with night activities.

The noise data is attached as an Annex 10 to this report while the graphical representation is shown below.

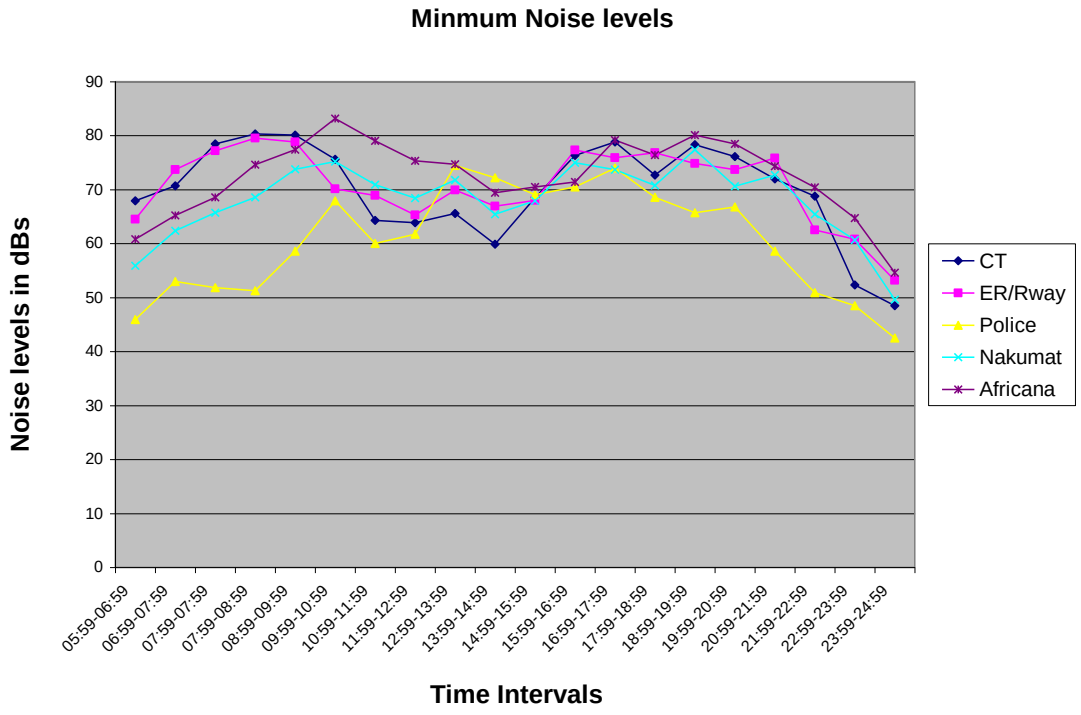
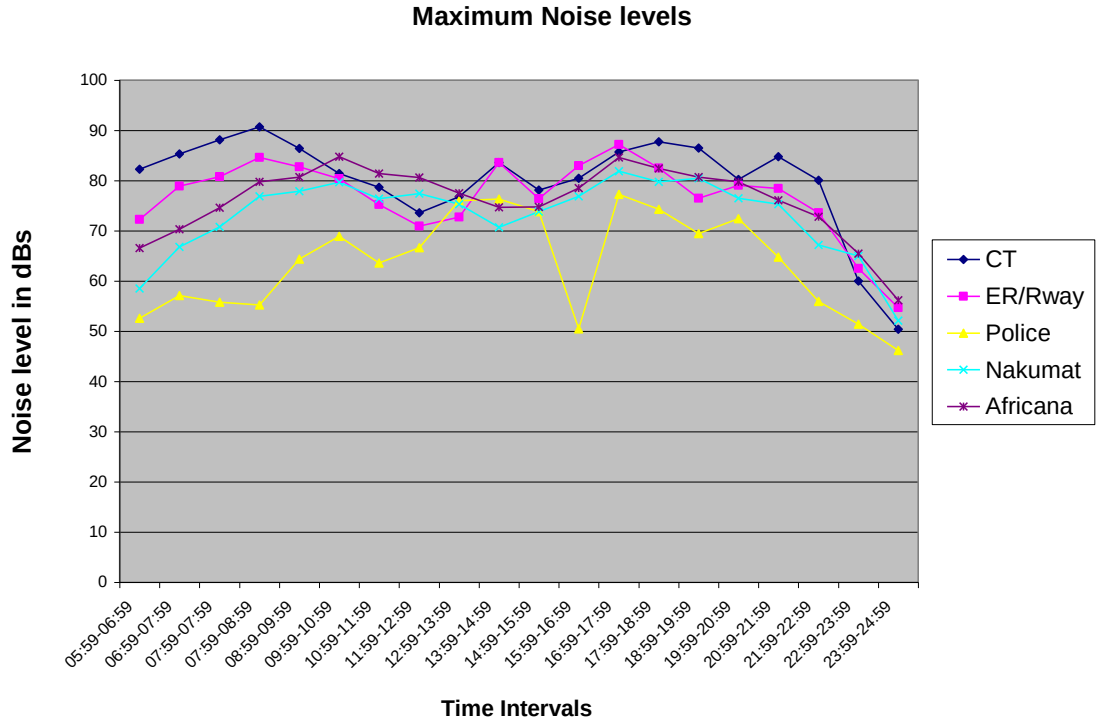


Figure 5-21(1): Graphical Presentation of Noise Pollution levels



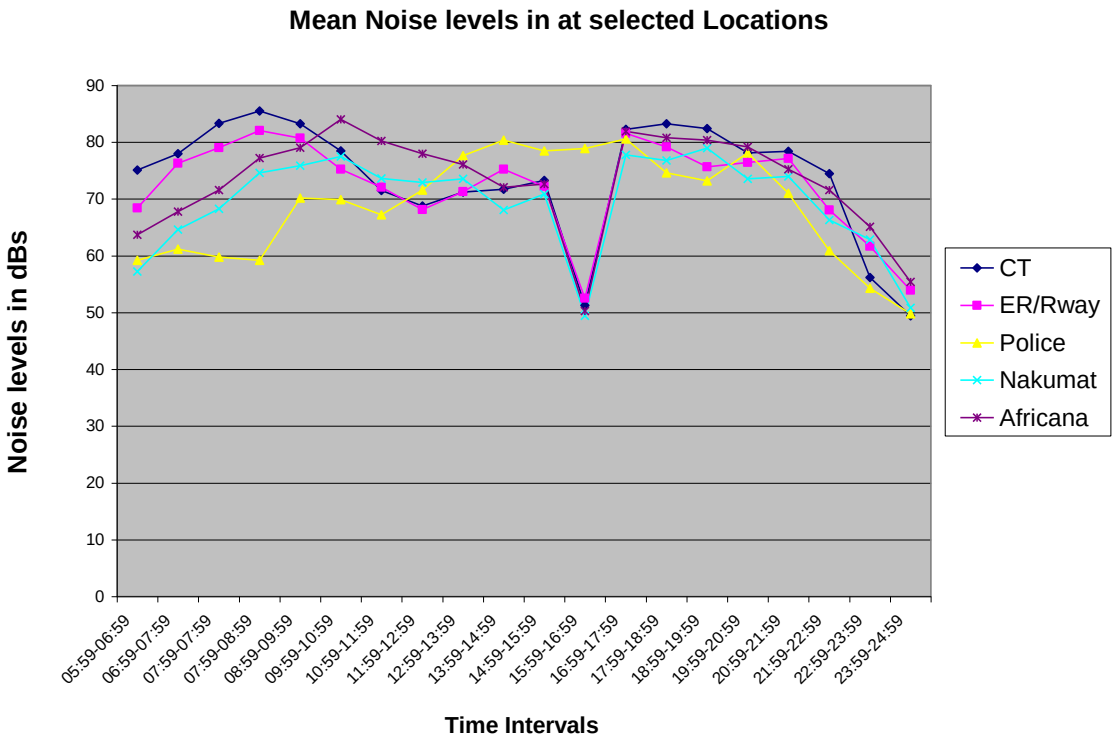


Figure 5-22 (2): Graphical Presentation of Noise Pollution levels

From the recordings as shown in the annexed table, most of the areas monitored had noise levels below the standard apart from at the clock tower and railway crossing at Entebbe Road where the measured noise levels

exceed the Project daytime Standard (of 75 dB(A)). For the night time measurements all the noise levels are were below the Project Standard of 65 dB(A) for operation of facilities and less than 45 dB(A) for mixed residential area. Regarding the above standards noise levels, the main cause for this is the compound sound from the nearby Market place, the public commercial areas and vehicles moving at a slow speed around the junctions and unnecessary hooting by the drivers. The noise of the motors subdues the noise of tires friction against the road surface. After the rehabilitation and at the increased traffic intensity and their speed, the noise level of tires will increase, adding up to the noise of motors. However, due to the high attenuation levels for noise, the areas within 50 metres of the road are not likely to experience above permissible noise levels.

Existing Vibration data

As discussed before there are no existing data available on the vibration profile along the routes. The most common vibration sources present include those from transportation systems, namely road traffic from (heavy vehicles), railroads, light industrial activity (mainly metal fabrication) and Mukwano Industries, all of which generate very low levels of ground-borne vibration. The existing rail line runs from Nalukolongo railway workshop through Kibuye/Katwe on Entebbe road junction, along Queens' way to the Railway Headquarters neighbouring Mukwano Industries. The rail traffic along this line is slow and not frequent; therefore the current vibration levels experienced from this source are relatively low. Subsequently, the population and other sensitive land uses along the project route currently experience no ground-borne vibration effects. This may change during the construction of the FOs.

Secondly, the rail line is planned to be expanded to a wider high speed line known as the standard gauge. When this happens, there is a high potential for the vibrations to increase.

During the project construction and operation phases, it is recommended that the precautionary principle be followed and vibration control measures be carried out during the construction and operation phases of the project to define the vibration levels from construction equipment and its impact onto environment, and development of recommendations to reduce vibration with respect to the specifics of the project area.

5.2 Biological Environment (ecology)

Although the preparatory survey on the Greater Kampala Roads Improvement Project in the Republic of Uganda preliminary scoping results pre-supposed that the Impact to flora, fauna and biodiversity by the project almost never occur during the design and construction phase as well during the operational phase because the project area is already a developed area. The impact score D states that No Impact is expected. The ESIA team found that this is a gross understatement since Kampala City has urban biodiversity. Wildlife can be very adaptable and most Kampala City's urban biodiversity falls into this category.

This ESIA serves to document the current status of the flora, fauna and biodiversity in general to bring out the perspective of the importance of urban biodiversity and the impacts of the proposed activities on them. During the scoping exercise, a number of sampling points were identified from which biodiversity samples have been taken. These are shown in Figure below.

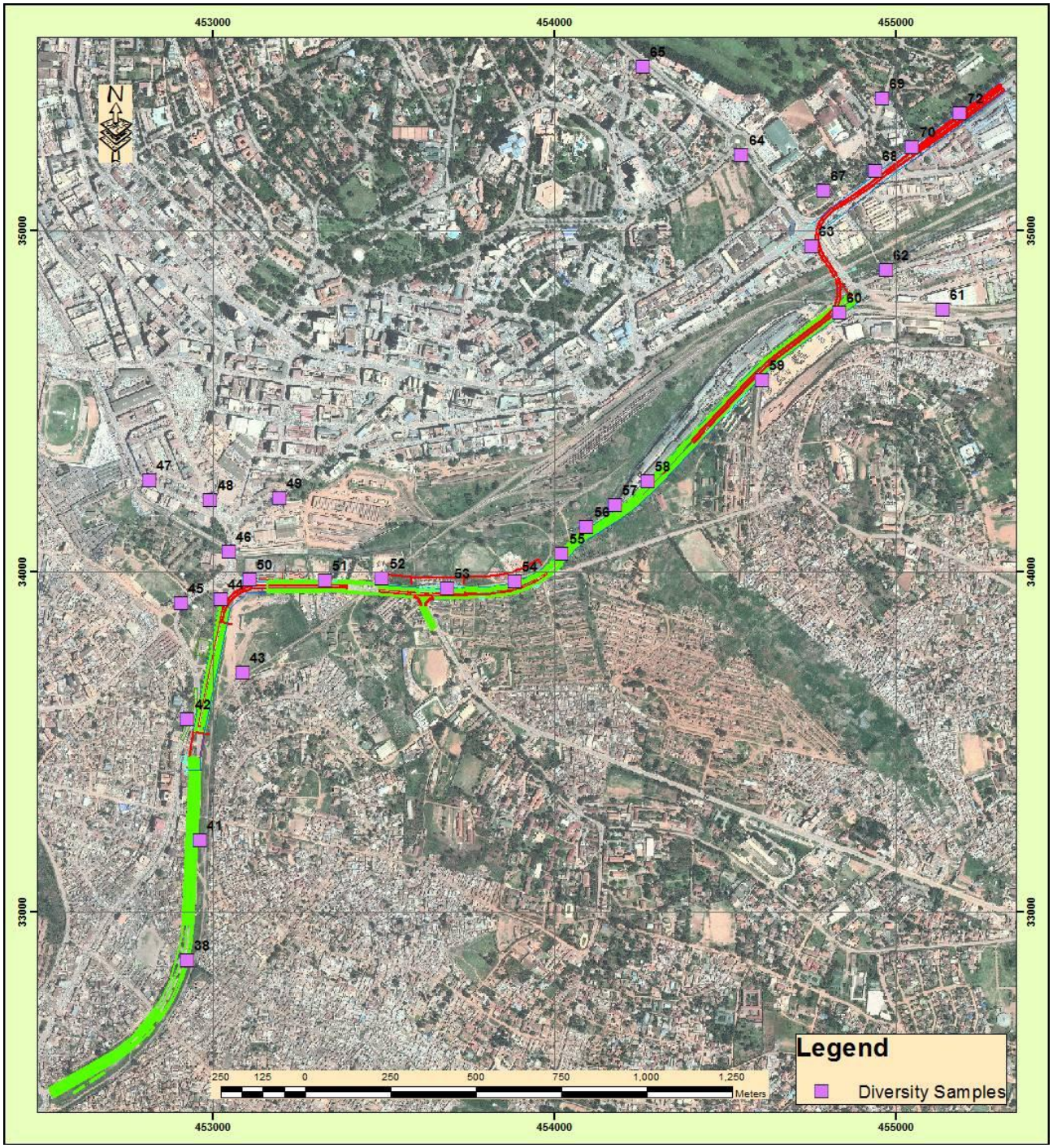


Figure 5-23: Biodiversity sampling points within the project Zone of Interest

Flora

In all, a total of 63 tree species were recorded, 16 of whose determination has been concluded (Annex 4). The spindle palm was the commonest species found in 16 of the 31 plots, followed by Eucalyptus sp (13/31), then Mangifera indinca – the mango tree (10/31) and Terminalia superba (8/31). Plot 68 in Centenary Park had the highest diversity of tree species with 11 species followed by plot 64 near Nakumatt contagious with the Golf Course(10 species), then plots 70 (before reaching the Cemetery near Ministry of Internal Affairs building), 67 (second plot in Centenary Park) and 44 (Kalintusi road near Clock Tower) each with 9 species. Here one observes that the green belts / vegetated habitats have high diversity of tree species, as is expected. The survey has identified all the plots which have tree species that are likely to be impacted. Some of these are shown in Figure 5-24 below: -

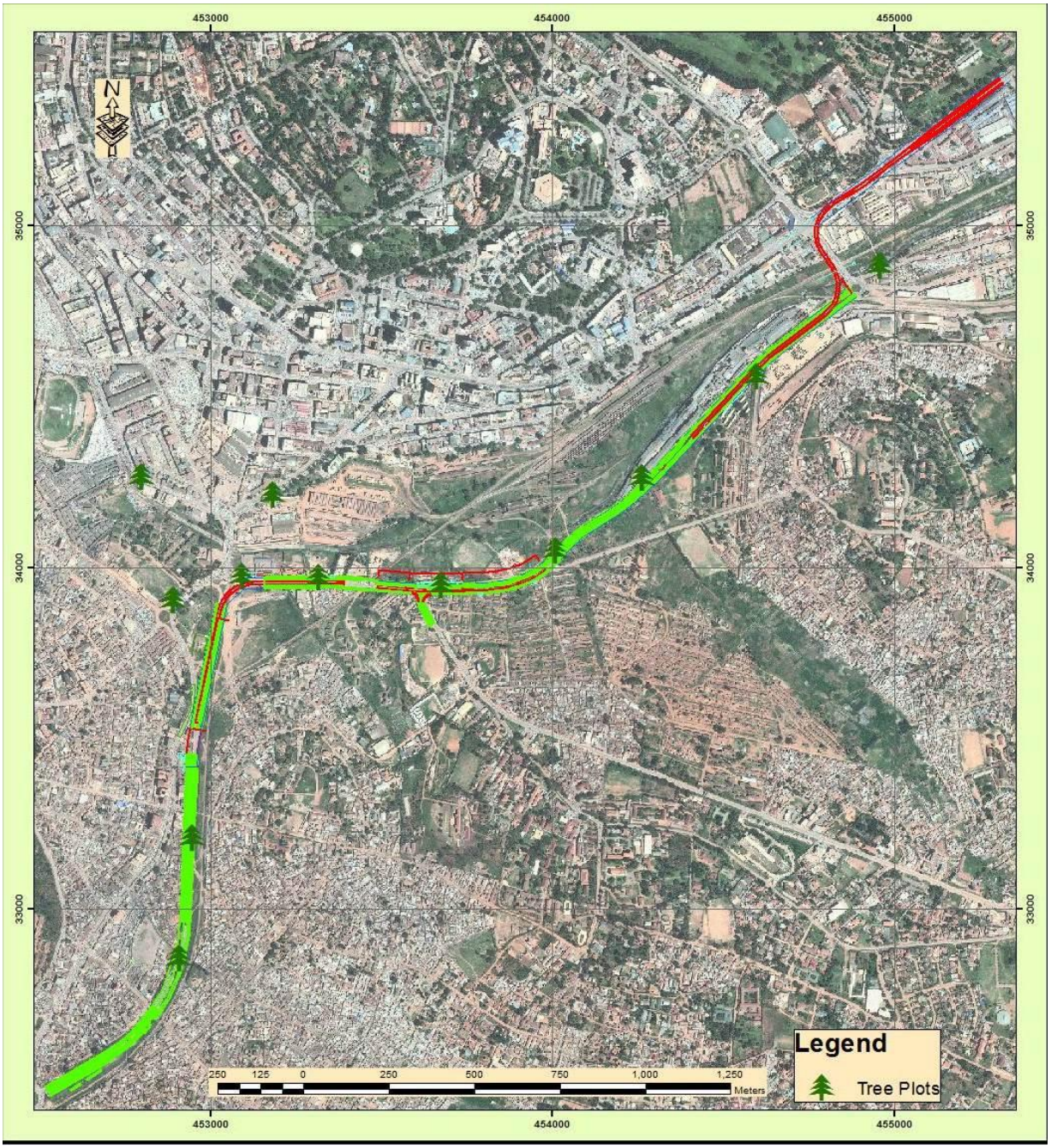


Figure 5-24: Plots along the project road with different species of trees

A host of other non-tree species, herbs, shrubs and grasses, including those of agricultural value were also recorded in the project area. (Annex 5).

A total of 22 species consisting of 54 individuals had their DBH measured (Table 5-9). Thirty of the trees had a DBH of 500mm and above while the rest had a DBH of 100-450mm. The plots with such big trees were those in the relatively big areas, with semi-natural habitats. The survey did not encounter any species of conservation concern in the project area.

Table 5-9: Tree species with DBH 100mm plus

Sample point	locality	Tree species	Total No.	Average DBH (mm)
38	Between Entebbe Rd & the Railway line	*Hyopharbe verschaffetti*	5	560
	Between Entebbe Rd & the Railway line	*Callistermon citrinus*	1	100
	Between Entebbe Rd & the Railway line	*Grevellia robusta*	7	260
41	Next to the first fly over along Entebbe Road	*Grevellia rubusta*	3	260
	next to the first fly over along Entebbe Road	*Hyopharbe verschaffetti*	2	560
45	Katwe round about, Near Nakivubo Blue Primary School (P/S)	*Albizia zigia*	2	300
	Katwe round about, Near Nakivubo Blue Primary School (P/S)	*Eucalyptus sp.*	4	500
	Katwe round about, Near Nakivubo Blue Primary School (P/S)	*podocarpus latifolius*	2	200
47	Owino Market/ Container village	*casuarina equisetifolia*	1	500
	Owino Market/ Container village	*pyopharbe verschaffetti*	2	150
49	Near Centenary Bank, Entebbe Rd	*Polyalthia longefolia*	3	> 500
50	Near Post Office - Entebbe Rd	*Eucalyptus sp.*	3	>500
51	Before Villa Park	*Eucalyptus sp.*	1	120
53	Nsambya Junction	*Eucalyptus sp.*	1	>500
55	Flower Nursery on Access Road	*Hypopharbe verschaffetti*	1	>500
58	Police Training School	*Casuarina equisetifolia*	1	150
	Police Training School	*Eucalyptus sp.*	5	200
	Police Training School	*Acassia Hoccii*	1	400
59	Flower Nursery	*Milicia exaelsa*	2	>500
62	Flower Nursery	*Podocarpus usambarensis*	1	200
	Flower Nursery	*Eucalyptus sp.*	8	>500
	Total		56	

Source: Field survey July 2013

5.2.1 Fauna (Wildlife, Small Animals)

Small mammals in natural and semi-natural environments are expected. Indirect evidence yielded the following small mammals in the surveyed areas: Lemniscomys striatus, Rattus rattus (the common rat), Mus musculus (mice) and Atilax paludinosus (Marsh mongooses) Cricetomys gambianus (Giant rat) and Funisciurus sp. (African striped Squirrel). The common rat and mice are known to share habitats with human being. They are known as vermin and are probably some of the key vectors of vectors of diseases of man.

5.2.2 Avifauna

A total of 24 bird species were recorded during the study and a list of the of bird species in the project area is attached as Annex 6. The commonest bird was the Marabou stork recorded in seventeen out 31 sites, followed by the Black kite and Pied crow each in 14 out of 31 sites, then Hadada (11/31), Cattle egret (9/31) and the Speckled pigeon (8/31).

The species of interest were the Uganda crane which was recorded inside the enclosed washing bay after the railway market (Photo 5 - 12). Both the crane and the **Grey Heron are regionally** near threatened species.

Photo 5-12: The Crested Crane as seen inside the washing bay after the railway market

The most diverse site was plot 72 (near the cemetery and UMI) with 7 species of birds, This was followed by plot 38 (between Entebbe Road and railway line) and 43 (enclosed washing bay after the railway market) each with 6 species of birds, then plots with 5 species of birds each includes: - 42(flower nursery), 44 (near the clock tower in the proximity of the fence), 45 (Katwe round about, Near Nakivubo Blue p/s), 46 (fire brigade headquarters), 59 (flower-nursery near Police training school) and 60 (near Mukwano ware house).

So, it is clear that most of the important habitats for birds are the remaining green areas in the city that include the road reserves which seem to still have considerable amounts of natural vegetation, that are good breeding/foraging /roosting/ stop-over grounds. During the design of the road, care will be taken not to encroach on the remaining open spaces such that avifauna is not disturbed.

5.2.3 Other biodiversity

Other biodiversity recorded in the project area included amphibians, reptiles and insects such as butterflies, bees, crickets, wasps and termites.

The amphibian fauna recorded were associated with wetlands and were in the following plots: 42 (Near BMK on Entebbe Road), 43 (Enclosed car washing bay after the railway market), 46 (Nakivubo channel near the fire Brigade headquarters), 52 (Wastelands behind Villa Park), 54 (fast moving water after the villa Park), 55 (spring), 58 (fast moving water from police training school to Mukwano channel), 60 (stagnant water with *Azolla* sp. near Mukwano ware house). The following species were recorded: *Amietophrynus* sp (Toads)., *Phrynobatrachus natalensis* (Snoring frog), *Hoplobatrachus occipitalis* (Bullfrogs), *Ptychadena* sp (Grass-ridge frogs) and *Hyperolius* sp (tree frogs). All these frogs were recorded based on calls.

The speckle-lipped skink (*Mabuya maculilbris*), the Side-striped skink (*Mabuya striata*) and the common house gecko (*Hemidactylus mabouia*) were the only reptiles recorded during the study. However, the water cobra (*Naja melanoleuca*) which is highly associated with wetlands, the Common house snake (*Lamprophis fulginosus*), the laceolate blind snake (*Typhlops lanceolata*) and some chameleons are also expected in the abundance herbaceous layers and hedges.

In summary, the following areas will have a higher presence of Biodiversity along the project road.

1. (a) - the stretch between Katwe FO and the areas surrounding the clock tower and (b) the plots between Mukwano round about and Nsambya Junction form primary blocks with considerable biodiversity. This is because they have more diverse micro habitats and composite flora and fauna.

2. The plots between cemetery covering the Hotel Africana roundabout and Centenary Park constitute secondary site because they are primarily green belts where flora is the key biodiversity. However, note too that more studies in this area could easily yield more bird species with more time input.

5.3 Socio-Economic and Cultural Environment

This section outlines the overall set up regarding the social, economic and cultural environment within the project area. This is necessary because an understanding of these variables is a prerequisite for analyzing the benefits, threats and relevant mitigation options for the proposed GKRIP.

5.3.1 Population

Kampala's population is young, albeit older than the national averages, with an estimated median age of 23 and an estimated average age of 24 years. Differences in age (median, average and distribution) between the KCCA and KMTC are relatively negligible.

Kampala has an extremely low Dependency Ratio, 9 of 45 dependants to 100 persons of economic activity age, largely a result of in-migration from rural areas. The 20-29 age group accounts for over one quarter of Kampala's population indicating both the scale and the impact of in-migration of young adults from the rural areas. Such a low ratio is termed a "Demographic Windfall" wherein the proportion of dependants is so low that the scale and proportion of the active work-force provides distinct opportunity for rapid economic growth. This constitutes a unique window of opportunity which Kampala, and indeed Uganda, cannot afford to squander with the current levels of unemployment and under-employment.

According to the Kampala Physical Development Plan, the population targets for the Greater Kampala Metropolitan Area are shown in the table below.

Table 5-10: Greater Kampala Metropolitan Area Population Targets

Population and Households	2011	2022 (Projection)	2022 (Target)	Long-term Target
Population	3,150,000	5,000,000	5,800,000	8,000,000
Household size	3.9	3.8	3.8	3.6
Households	800,000	1,300,000	1,500,000	2,200,000

Table 5-11: Greater Kampala Metropolitan Area Workforce Targets

Indicator	2011	2022 Target	Long-term target
Workforce	2,150,000	3,950,000	5,300,000
Economically Active	(66%)	(66%)	(67%)

The population statistics of all the divisions as per the 2002 population and housing census reveal that Nakawa division has the highest population in Kampala Capital City Authority followed by Makindye and Rubaga Division as shown in the figure below.

Table 5-12: Population and Households in Kampala

Area	Population			Households	
	Population (Number)	Percentage of total population(%)	Number of males per 100 females(%)	Number of Households	Average household size

				(Number)	
Division					
Central	88,094	7.73	99.8	22,774	3.7
Kawempe	262,165	21.7	89.1	68,952	3.7
Makindye	303,171	25.58	92.3	78,623	3.8
Nakawa	240,624	20.75	96.4	59,117	3.9
Rubaga	295,088	24.24	87.8	76,712	3.8
Kampala	1,189,142	100	91.8	306,178	3.8

Source: Uganda Bureau of Statistics: - Population and Housing census

The average household size in all divisions is lower than the national average. Further analysis of the population reveals that apart from the Central Division, there are more females than males in all divisions.

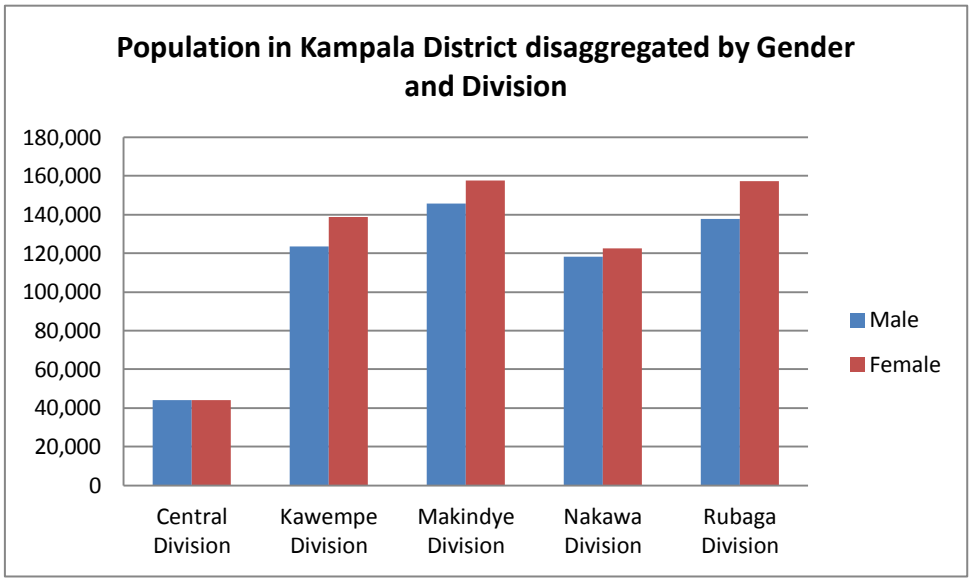


Figure 5-25: Population in Kampala District Disaggregated by Gender and Division

Kampala nowadays accommodates 3,150,000 residents, a number which doubles during the day as millions flood the city from the surrounding settlements. As the city continues to attract migrants from all corners of the country, a population growth is predicted in the short and long term. Increased in-migration has different implications on the functioning of the KCCA and metropolitan area such as employment, transportation, housing etc. Considering the physical aspects of the metropolitan area, the increased in-migration will have a major effect on the structure of the urban tissue.

5.3.2 Population by Type

Makindye Division has the highest household population, followed by Rubaga Division; Central Division has the lowest household population.

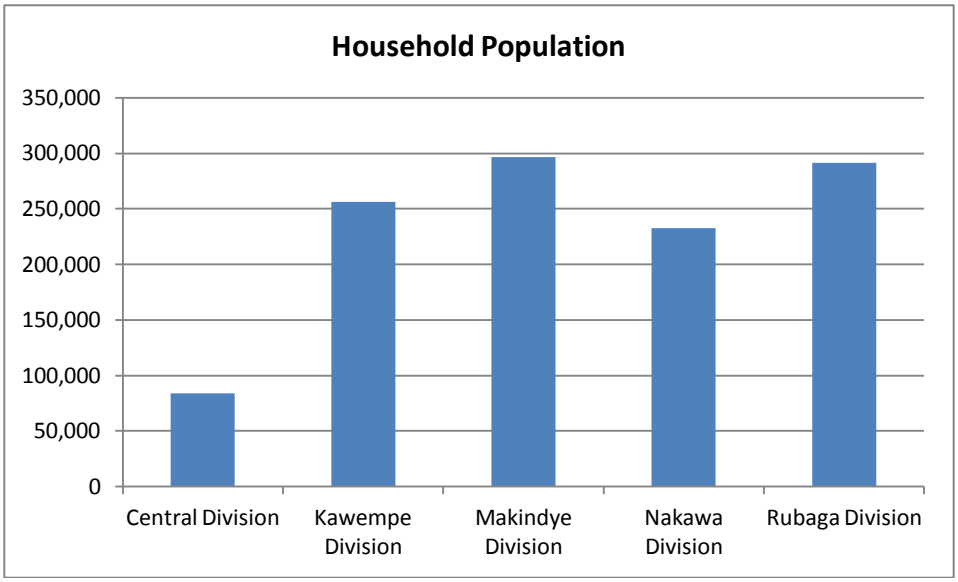


Figure 5-26: Household Population in Kampala Capital City Authority
Source: UBOS Statistical Abstract 2011

Nakawa Division has the highest institutional population as shown in the figure below, Rubaga Division has the lowest as shown in the figure below.

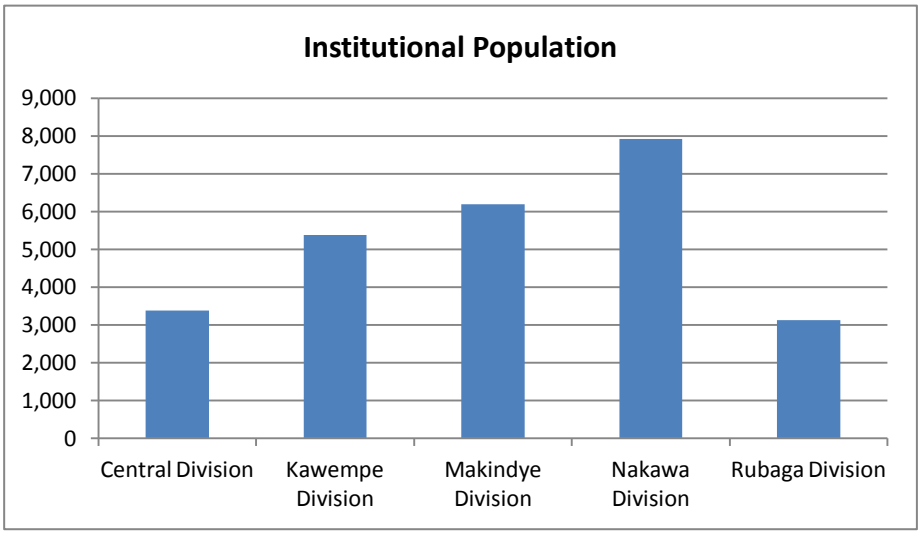


Figure 5-27: Institutional Population in Kampala Capital City Authority
Source: UBOS Statistical Abstract 2011

As shown in the figure below, Central Division has the highest population in hotels given the high number of hotels in the area.

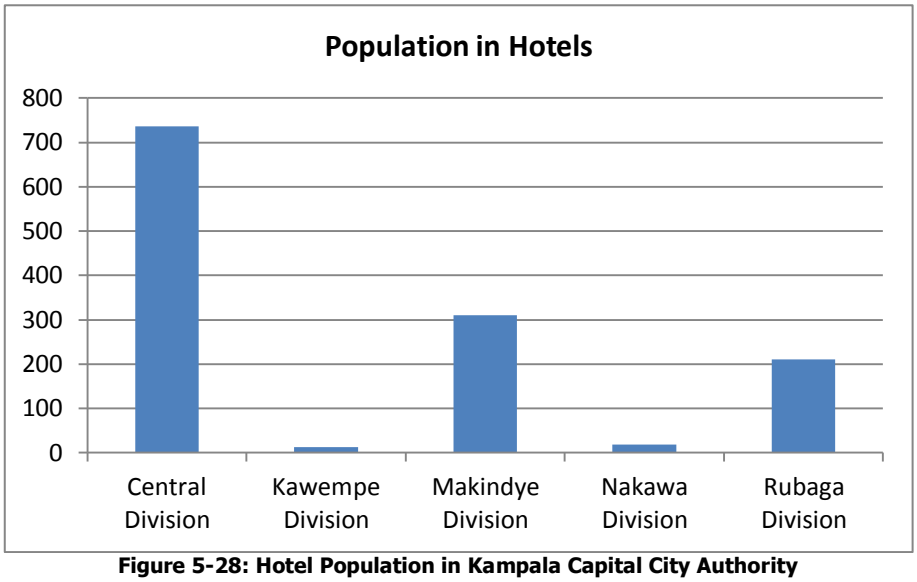


Figure 5-28: Hotel Population in Kampala Capital City Authority
Source: UBOS Statistical Abstract 2011

Also as shown in the figure below, Central Division has the highest number of homeless people in Kampala Capital City Authority.

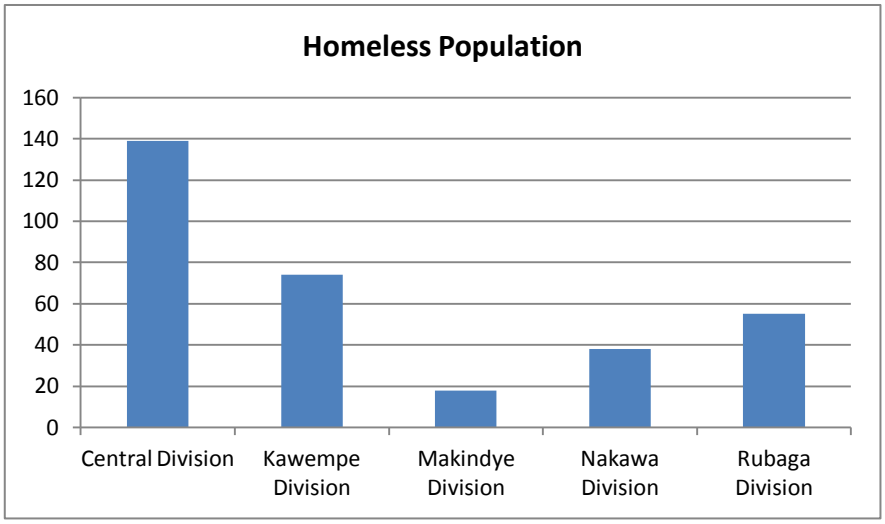


Figure 5-29: Homeless Population in Kampala Capital City Authority
Source: UBOS Statistical Abstract 2011

As shown in the table below, the below 18 population is the highest in all the followed by the adolescent population and lastly the elderly.

Table 5-13: Broad Age Groups by Division for Total Population in Kampala

	Children					Adolescents			Adults	
Division	Under 1	Under 5	6 -12 yrs	Under 15 yrs	Under 18 yrs	10 - 14 yrs	15-24 yrs	18+ yrs	18 - 30 yrs	60+ years
Central	2,280	9,737	12,852	28,601	35,380	9,618	26,259	52,714	32,657	1,687
Kawempe	9,202	37,693	45,532	102,648	122,862	32,371	74,247	139,903	91,358	4,685
Makindye	10,320	43,879	50,396	116,236	138,835	35,130	85,026	164,336	106,963	5,238
Nakawa	7,102	31,128	39,952	88,424	106,705	28,266	68,345	133,919	85,248	3,952
Rubaga	10,762	44,373	48,722	114,990	138,487	34,675	86,447		105,580	5,504
Total	**39,666**	**166,810**	**197,454**	**450,899**	**542,269**	**140,060**	**340,324**	**490,872**	**421,806**	**21,066**

5.3.3 Ethnic Composition and Cultural Set Up

This is a cosmopolitan area where all the National ethnicities are represented. A walk through the project area showed that most of the ethnic groups in Uganda are represented. As is expected, within the cosmopolitan areas, the different ethnic groups tend to live in harmony. Within the project area, the dominant ethnic group is the Baganda who by nature are very accommodating to other ethnic groups in Uganda. The communities are mostly Patrilineal with men dominating the decision making process. Government affirmative action, however, has enabled some of the women to be part of the decision making machinery.

5.3.4 Economic Structure

Kampala's population has been formed by continuous waves of immigration. As such, the City's society has and is constantly struggling to climb the socioeconomic ladder, and socio-economic mobility is neither guaranteed nor always linear. These adjustment processes have many after effects including the emergence of specific housing and lifestyle conditions such as the slums, cheap rental housing (*Muzigo*), overcrowding and an ever growing demand for work opportunities and housing particularly for young adults (both local born and bred and migrants). Unemployment is widespread and under-employment even more prevalent. Women tend to be at the bottom of the ladder (particularly single mothers).

The correlation between high education and socio-economic status is often dissipated by the limited availability of appropriate employment opportunity. Absolute income constraints limit welfare levels even for the middle classes and a significant proportion of young, relatively higher income families "choose" to live in inadequate rental residences in order to save towards buying land and constructing a house in the future. Middle and Working Class (Upper Middle to Low Socio-economic categories) households are generally headed by salary earners in the governmental and formal sectors, generally living in basic-inadequate housing. Over one-third of all households fall into the Subsistence or below SE category, with Heads of Household being unemployed, daily laborers or working in the informal sector, generally residing in inadequate-inappropriate housing and facing associated harsh living conditions.

Kampala's social landscape is a "sea" of pervasive poverty with troughs of deep poverty and "islands" of welfare and affluence. Most of the very poor are concentrated in the City's slums but in most parishes there is a mix of poor and working classes living side by side in informal settlements with the higher income groups in close proximity in identifiable structured and relatively organized, better serviced neighborhoods.

5.3.5 Housing

There is a high correlation between Socio-Economic status and Housing Standards in Kampala although this is partially distorted by the shortage of reasonable and basic standard housing in the City. In Kampala fully 69% of all households reside in rental accommodation. Whilst this is not exceptional in large cities in developing countries, it is indicative of the extent of poverty in such cities, including Kampala. Internationally residential property ownership is the primary medium for capital accumulation for the Middle Classes. The purchase of a home is usually the largest and most significant investment for the average Middle Class family. Mortgage payments are generally the most significant form of savings for the Middle Class household and once paid off the asset provides financial security to the household.

In Kampala however this is not the case. The immature property and financial markets in the City are generally not structured to enable the financing of the purchase of residential property. The only financing available is short-term small-sum loans secured against salary income in addition to savings and familial resources if available. In these circumstances inflation plays havoc not only on the poor but no less on the Middle Class. As land prices rise and the value of cash savings depreciate, the dream of acquiring an "owned home" dissipates. Double digit inflation, as in 2011, significantly reduces, in most cases precludes, the possibility of the average Working or Middle Class household attaining an "owned home".

5.3.5.1 Settlement Patterns

Growing concentrically from its very establishment, Kampala has expanded and developed in the same pattern over the past century. Growth has continuously extended along the primary movement routes, later filling in the gaps between the various routes. The gaps between the radial arms begin to close as development along the route widens out, achieving an effective balance in access time to the centre. As such inner gaps get filled in concomitantly with the ongoing extension along the movement routes.
The GKMA is effectively composed of the following:

- The Metropolitan Core - the **City Centre**;
- An Inner Ring - the **Inner City Suburbs** - with only minor gaps in the ring defined by significant natural constraints (channels and large wetlands) to the south-east;
- An Outer Ring - the **Outer Dormitory Towns and Suburbs** - with gaps to the south and east again defined by the same natural constraints; incorporating most of Kira and Nansana Towns;
- **Peripheral Towns** - specifically Entebbe (distinctly the most urbanised), Mukono (with a small, weak urbanised centre) and Wakiso (with a town centre reminiscent of an enlarged village centre).
- Significant **Peri-Urban** extension "fingers" to the south-west towards Entebbe (with a peri-urban extension developing from Entebbe north east towards Kampala) and to the east towards Mukono.

Given that the city has a low population, there are a lot of movements within the GKMA; in and out of the city in the morning and evenings respectively. With the growing day population, it is expected that the total numbers of trips in 2023 and 2033 will be at approximately 1.5 and 2.3 million per day, respectively.

5.3.5.2 Land Tenure

The Land Tenure System is one of the major impediments to the development of Kampala, impacting on multiple fields and in numerous ways including:

- Limiting the supply of land for housing, public services, economic activity, particularly for activities requiring large parcels and/or concentrations of activity (e.g. primary institutions, industrial and business zones, etc.);
- Enabling and encouraging land speculation and distorting the Property Market;
- Limiting the supply of developable land and consequently directing development to where land is available, thereby distorting the Spatial Structure on the metropolitan, city and local (parish and neighborhood) scales including:
    - Leap-frog development on the periphery;
    - Concentration of middle-order functions and activities (markets, schools, clinics, etc.) in and around the City Centre;
    - Intolerable densities in Inner-city slums and informal neighborhoods;
    - Small scale residential or industrial developments lacking continuity and hence not achieving local thresholds;
    - Encroachment into marginal lands and environmentally sensitive areas;
    - Encroachment into public lands including roads and rights of way;
    - Location of and access to public services;
    - Minimal, if any, maintenance of most properties given tenure insecurity; and more.
- Requiring enormous financial resources to enable land acquisition for infrastructural development and public service facility provision, effectively restricting infrastructural and service provision;

- Entrenching poverty by effectively placing home ownership beyond reach, even for families with two working bread-winners;
    - Constricting and limiting local initiative and entrepreneurship by limiting access to mortgage finance for most home owners with unregistered properties;
    - Significantly complicating and delaying the planning and implementation of assorted projects, both public and private, often even scuttling projects;
    - Deterring foreign investors; and much more.

Given these unique aspects relating to land tenure, the land acquisition assessments have taken into account such considerations and have in most cases tried to reduce the impact on physical structures and land that belongs to individuals; this would then reduce the costs relating to land acquisition.

5.3.5.3 Education

There are an estimated 1,500 schools in Kampala today, over 800 of them in KCCA. These include over 1,250 Primary schools and over 250 Secondary schools. In sharp contrast with national norms, the large majority, over 80%, are private schools. The total number of enrolled pupils, primary and secondary, in the GKMA is estimated to exceed 570,000 (530,000 in 2009) with over 350,000 or over 60% in private schools. Of these, a little over 60% study in the KCCA. Primary pupils generally attend school in their residential neighborhood, whilst secondary pupils tend to travel, generally to or within the KCCA. As is to be expected schools in Kampala are larger than the national average, secondary schools are significantly larger than primary schools but in comparative terms remain relatively small and private schools are significantly smaller than public schools.

Table 5-14: Primary and Secondary Schools by Area

	Primary		Secondary	
Area/Category	Schools	Pupils	Schools	Students
KCCA Total	635	217,038	158	89,534
Community	31	6,582	5	1,745
Government	87	63,418	20	32,686
Private	517	147,038	133	55,103
KMTC Total	571	185,058	84	38,777
Community	22	5,715		
Government	169	83,359	11	9,195
Private	380	95,984	73	29,582
GKMA	1,206	402,096	242	128,311

Source: Kampala Physical Development Plan

Enrolment in primary education in Kampala exceeds 90% and universal secondary education is progressing rapidly. The planned extension of universal education to include high schools (S6) will obviously significantly increase enrolments as facilities are constructed and services provided.

The public education services in Kampala have simply been overwhelmed by the rapid growth in demand driven by both population growth and by demand for educational services, particularly quality educational services. As a result the majority of primary education services in the City and the large majority of secondary education services are provided by the private sector. The public sector struggles to manage its own schools, let alone regulate and supervise private sector services, resulting in a reported wide range of standards in service provision.

5.3.5.4 Health

Health issues in Uganda are best summated by a single statistic, life expectancy of a little over 50 years as compared with expectancies in the late 70s and even early 80s in developed countries.
Life in Kampala is fraught with health risks:

- Endemic diseases associated with the wetlands, malaria in particular but also bilharzia and diarrhea;
- Contagious diseases associated with poor sanitary conditions compounded by the warm climate;
- Road safety and work related accidents;
- And HIV-AIDS amongst others.

The health system in Uganda is hierarchical with outreach health workers in the field at the lowest rung to Mulago Hospital in Kampala, the primary referral hospital in the country. Health services in Kampala are widely distributed in the KCCA, particularly in the inner City and still reasonably accessible in KCCA outer Suburbs as well as Mukono and Entebbe. KMTC Outer Suburbs are generally less well catered for and in the peri-urban and rural peripheries access is poor. Specialized capacities are generally concentrated in and around the City Centre. Health services, apart from the main hospital and higher order HCs, are largely private sector see table below. In KCCA at least, access to services is more about affordability than physical access.

Table 5-15: Health facilities in Kampala disaggregated by type and ownership

HCs and Hospitals	Government/ KCCA	NGO/CBO	Private
HC II	0.30%	0.40%	99%
HC III	13%	14%	73%
HC IV	38%	15%	46%
HC V	14%	29%	57%
Hospital	36%	21%	43%

Source: Kampala Physical Development Plan

The state of most HC and even hospital facilities is by and large poor, indeed sub-standard with sanitation and hygiene constituting serious challenges and patient comfort and convenience largely an unknown concept. Medical waste disposal is effectively only organized in the hospitals. In HCs medical waste is generally burnt on-site. In addition, public sector facilities in Uganda suffer from stringent budgetary constraints and in Kampala at least severe staffing problems given remuneration levels (in effect Kampala is investing in and training medical personnel who then cannot afford to work and provide services in the City). Intervention to improve the health of the population is urgently required with emphasis on resolution of the primary health risks including:

- Rapid expansion of the sewage network;
- Ensure basic standards in all new housing development, formal and informal;
- Resolution of the wetlands issue, either structured, adequate infill and flood protection or systematic relocation out of the wetlands; and stringent enforcement of development restrictions;
- Systematic upgrading of the markets, specifically ensuring shading and enabling refrigeration, and strict enforcement of hygiene standards for all non-durable food product trade;
- Appropriate road safety measures;
- Systematic upgrading of HC facilities and strict supervision of the private sector.

5.3.5.5 Social Concerns Regarding Infrastructure

The water lines as well as the sewerage lines are for the most part restricted to the road reserve and will not be impacted by the development as (shown in figures 5-35 to 5-38). In a number of cases however both the water mains and the sewerage lines do cross the road with a high likelihood that they will be impacted by the development. As may be seen from the maps, the critical crossing points include the following areas: -

- Hindu temple Fire brigade area /zone;
- Nsambaya Hospital Junction off Gaba Road;
- Clock Tower area;
- Centenary park to electoral commission crossing;
- Centenary park to Nissan Building across Yusuf Lule road; and
- Railway crossing / Nakivubo channel towards Mukwano industries

Sewerage System

There is a serious lack of waterborne sewerage systems in the KCCA and particularly in the KMTC. In KCCA it is estimated that not more than 10% of the population make use of these systems, while the rest use on-site or collective sanitation facilities. Most of the on-site and particularly the collective toilets are the source of serious ecological and health problems. Industrial discharges either direct to the natural system or to the treatment plant are the source of other, different, pollution problems.

The main measures planned or underway in KCCA are:

- Rehabilitation and expansion of the Nakivubo waterborne sewerage system, including rehabilitation of the existing STW at Bugolobi, to be followed by a new STW in the Nakivubo wetland;
- Development of a new waterborne sewerage system at Kinawataka to serve the eastern part of KCCA, this system to include a STW;
- Development of a FSTW in the Lubigi wetlands, which will include a STW, but whose main role will be to receive sludge removed from on-site sanitation facilities.

The programmes above will provide very significant improvements to the sanitation systems but the development of the systems is faced with serious financing problems and the inability or unwillingness of the population to pay for appropriate facilities. Despite the progress described above there is concern that on-site facilities will not be environmentally sustainable. The status in KTMC, and sanitation solutions for the area, need to be the subject of in-depth studies as have been done in the case of KCCA. Parts of those areas are already densely populated and there needs to be holistic solutions for them. Analysis and planning should to take into account the forecasts and proposals for location of population and different land uses in the KPDP. These should guide ongoing planning of sanitation.

Water Supply

Access to safe water is the norm in the built areas of Kampala. However significant problems have been indentified, including:

- The age and disrepair of the distribution network;
- Standard and quality of water given the above ("safe water" is not necessarily safe);
- Access is generally not direct in-house or even on-plot access with a preponderance of collective access points (stand pipes) frequently resulting in high fees charged by yard-tap owners and kiosk operators;
- Limitations of the distribution system in peripheral areas leading to the use of often polluted and unhealthy springs and shallow wells.

The distribution network in the older established areas of KCCA in particular requires urgent upgrading and the projected growth of the City will require significant expansion, only partially catered for in the existing plans. The population and land use projections of water supply planning in total and for specific areas will need to be compared with those of the KPDP to ensure coordinated planning. Given that water supply is already established as a norm in Kampala today the future development of water supply system can and should be used to direct and selectively support or constrain growth. Moreover, water is a precondition for agriculture, particularly commercial agriculture, and for industry. Given the natural abundance of water in most of the country, including Kampala, Uganda retains clear relative advantage for water intensive industry (e.g. sugar, timber/pulp, beverages, textiles and high quality water for hi-tech, etc.). As such, appropriate water supply is a key to the economic development of the City.

Waste Management and Treatment

Presently the waste management and treatment system by the KCCA is not well streamlined with the collection and facilities not up to the task. Moreover Kampala has many informal settlements where the waste management system is not under control. The main landfill site is Kiteezi which is soon reaching its maximum capacity. Waste management is one of the challenges which have been faced by UNRA since the tendency is to let the waste into the drains leading to eventual blockage and subsequent road damage. Most people have the tendency to dump waste at the nearest point which waste ends into the drainage system together

with storm water. In the past this has led to blocking of drainage and subsequent road damage. Discussions with UNRA reveal that this is one of the major causes of road damage across the country and are the leading causes of flooding during the rainy season. Attempts have been made by KCCA to pave the Nakivubo channel so as to reduce the flooding. Unfortunately this has addressed the symptom as garbage continues to be dumped within the drains across the entire stretch of the project area.

There is an urgent need therefore to continuously address the waste disposal system so that roads in urban sectors are protected from damage due to waste in drains.

Electricity

In general the network is in poor condition, with frequent outages and it is intended to upgrade and rehabilitate it. In view of the failure to produce sufficient hydroelectric power in recent years, power has also been supplied by thermal generation, using petroleum products (diesel or heavy oil), so that fossil fuels have played an increasing role in power supply, especially for peak periods. With the discovery of oil in the Lake Albert Basin, this is likely to continue. The environmental impacts are of concern especially when compared with clean hydroelectric power. Two of the plants are in Kampala (a third at Lugogo has been decommissioned). Power supply is an obvious precondition for economic activity, development and productivity. It is also an effective precondition for health and education, both within the household and institutional. It also significantly impacts living standards and lifestyles.

Telecommunications

The telecommunications sector in Uganda is dominated by mobile services, which are growing rapidly, spurred on by new entrants and intensive price competition. Fixed line services, which are supplied by two operators, are also growing significantly but form a small segment of the market. The sector is a major contributor to economic growth in Kampala and indeed the country, both directly in terms of activity, hiring, etc. and indirectly enabling activity and productivity. However, the telecommunications industry in Uganda, including Kampala, is still in its infancy, still concentrating primarily on market penetration. Most standard value added services, if on offer, are unknown in the market place with value added services limited to SMS, ring tones and a newly introduced, successful, useful and efficient money transfer service. Telemarketing is marginal, largely limited to the service providers themselves. e-Commerce, e-Banking and certainly e-Government are unknown. Even emailing is not a reliable communications method, let alone an alternative to paper usage. Internet usage remains basic and relatively limited to the formal sectors. The transmission network today consists of mainly microwave links. There are however fibre optic cables, mostly in the south of Uganda, but a national fibre Backbone is being implemented in stages. UTL, MTN and the electricity company UETCL have networks. There are fibre-optic rings in Kampala CBD. Also being implemented or planned are links to other East African countries and participation in an undersea cable from Kenya, but international connections are currently through satellite links. There is a direct relationship between fixed-line infrastructure, particularly fibre-optics, and the provision of broadband high speed internet services with all its social and economic implications. In its absence solutions exist based on the power network for the provision of broadband internet. This option needs to be assessed as a potential solution for Kampala. The current microwave transmission network carries significant environmental impacts and constitutes a serious health hazard. The common approach is to reduce the number of transmitters and masts in appropriate locations. However, “Best Practice” today, particularly in Europe, is towards larger numbers of low power transmission antennae widely distributed which impact less on the environment and significantly reduce health hazards.

5.3.5.6 Urban Sprawl

Kampala today is characterized by extensive urban sprawl. The urban sprawl extends beyond the boundaries of the KCCA into the peri-urban and rural areas of the KMTC. Three smaller additional urban centres exist outside of the KCCA boundaries: Wakiso-Nansana, Mukono-Goma-Kira and Entebbe. Though these centres are disconnected from the KCCA, they are linked and dependant on the KCCA for services, employment, etc. The areas between these centres and the KCCA are littered with disorganized settlements along the roads, which form the urban sprawl. The density in these areas is extremely low in comparison to the KCCA average. The result of this situation is disjointed and incremental growth. These settlements burden the

existing infrastructure of the GKMA, and the KCCA in particular, as many flood the city daily in search of employment and services. This causes major traffic conjunction in the city and along its access routes.

5.3.5.7 Land use

The present land use of the Greater Kampala Metropolitan Area shows that 60% of the area remains undeveloped; however, Kampala Capital City Authority is almost entirely built up. The large bulk of the development is residential at 23% of the GKMA. Employment associated uses account for only 3% and public facility account for 2%.

The project area of influence is mainly characterized as a Commercial area with shopping malls especially around Zone 2. Institutional facilities including the fire brigade, Post Office and Ministry of Works are also located in the project area. Other facilities in the area include the Hindu Temple, fire Brigades Headquarters, Storehouses, park and Sports Ground as well as the Police quarters along Mukwano Road.

Along Mukwano Road, there are several persons that are benefiting from the flower selling business. However, an analysis of their responses showed that for most of them the flower business is not their main source of income. It is a side business.

5.3.5.8 Commuter Population and means

Within the project area, the highest number of commuters is pedestrians and then the motorised transports follow. The Motorcycle (boda-boda) is the most dominant type of transport which accounted to more than 50% of the total traffic volume at Kampala Road, Entebbe Road, Nsambya Road and Katwe. Jinja Road and Yusuf Lule Road had relatively more traffic of passenger vehicles. Share of heavy vehicles was almost the same on all surveyed roads, which was not found to be high.

Table 5-16: Volume Comparison between 2010 and 2013 at Major Roads

	AM 7.00 - 10.00			PM 16.00 - 19.00			
Jinja Rd (PCU)	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**AM+PM**
2010	8838	6258	15096	6366	8716	15082	30178
2013	8548	7253	15801	7630	7764	15394	31195
Change	-3%	16%	5%	20%	-11%	2%	3%
	AM 7.00 - 10.00			**PM 16.00 - 19.00**			
Y.Lule Rd. (PCU)	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**AM+PM**
2010	3710	3728	7438	5850	2982	8832	16270
2013	5258	4805	10063	3601	5793	9394	19457
Change	42%	29%	35%	-38%	94%	6%	20%
	AM 7.00 - 10.00			**PM 16.00 - 19.00**			
Entebbe Rd. (PCU)	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**AM+PM**
2010	15958	9743	25701	8300	10906	19206	44907
2013	14698	14069	28767	9346	11874	21220	49987
Change	-8%	44%	12%	13%	9%	10%	11%
	AM 7.00 - 10.00			**PM 16.00 - 19.00**			
Overall (PCU)	**Inbound**	**Outbound**	**Total**	**Inbound**	**Outbound**	**Total**	**Overall**
2010	28506	19729	48235	20516	22604	43120	91355
2013	28504	26127	54631	20577	25431	46008	100639
Change	0%	32%	13%	0%	13%	7%	10%

Source: JICA survey team

From the table above, an overall growth rate is obtained at 10% for the last three years corresponding to 3.3% per annum which is much lower than the RSDP of 7.5%. The result shows that the traffic volume at Jinja Road has the smallest growth rate compared to others.

5.3.5.9 Non – Motorized Transport (NMT) - Bicycles and Pedestrians

The majority of the lower and middle workforce in Kampala Capital City Authority do not have easy access to motorised transport. They mostly walk to work, to the market and back to their residences. One of the main concerns is that NMT has no specific provisions such that both Bicycles and pedestrians continue to compete for the limited road space amidst undisciplined motor vehicle drivers. Besides, the Uganda Police have shown a serious lack of commitment to maintaining acceptable driving and traffic standards.

For the road project, the most crowded NMT areas include -the Clock Tower, Shoprite area, Mukwano Road and Hotel African Roundabouts. In the preliminary feasibility study, JICA conducted an NMT survey at the clock Tower and Shoprite Junctions. The results of NMT Survey Team show that the number of pedestrians and Bicycles is highest during the peak three hours of the morning and evening. The peak hours are from 6.00 to 9.00am and 4.00 to 7.00pm. The JICA findings are shown in Figures 5-30 and Figure 5-31 below.

Figure 5-30: : Cyclist Movements in AM Peak Hours Cyclist Movements in PM Peak Hours
Source JICA Survey Team

The largest number of Bicycles per hour was 614 which was recorded at the section in front of the fire station. At this point both Cyclists and pedestrians use the same space (the pedestrian Walkway) which is often dangerous to pedestrian movements.

As for the pedestrians, they also follows the main route of the cyclists which is between Nakivubo Place Road and Queensway. The number of pedestrians crossing the Entebbe Road in front of the Shell fuel station that is from/to CBD is outstanding. Even with signalization at Shoprite Junction and Clock Tower Junction, these junctions are often manually controlled by traffic police and NMT is crossing between vehicles while dodging them especially during peak hours .

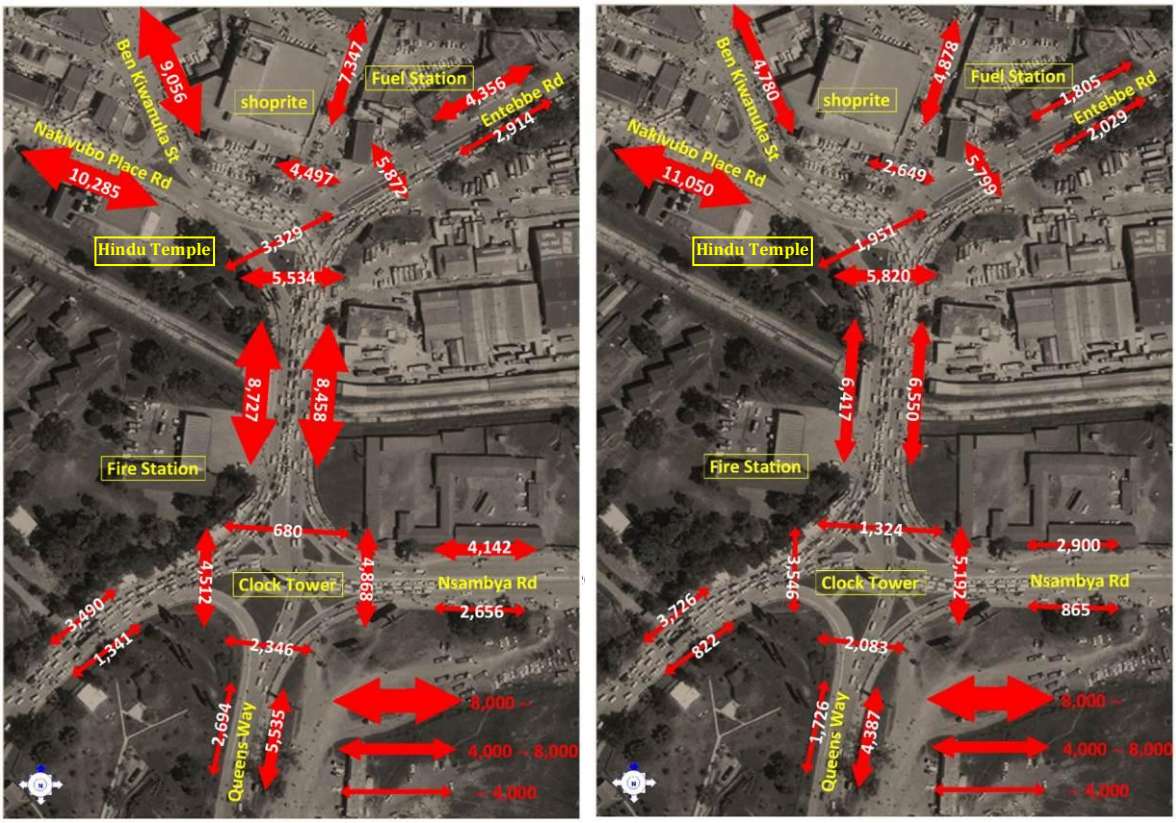


Figure 5-31: : Pedestrian Movements in AM Peak Hours Pedestrian Movements in PM Peak Hours
Source JICA Survey Team

The JICA survey team cionfirmed that the numbers of pedestrians crossing Entebbe Road in front of Baps Swaminarayan Mandir (Hindu Temple) and those crossing Nsambya Road at Clock Tower Junction are also outstanding. Most of the pedestrians cross at the section that is controlled by traffic police, but a large number of pedestrians are likely to cross roads at whatever location they can try even if there is no signal and zebra crossing. There is an obvious conflict between motorised transport, Bicycles and pedestrians across the entire spectrum of the wide road.

In view of the above, the Major NMT route has been identified as shown in Figure 5-32 below. In order to reduce conflict a pedestrian bridge has been proposed at most of these places to ensure the safety and comfort of pedestrians. .

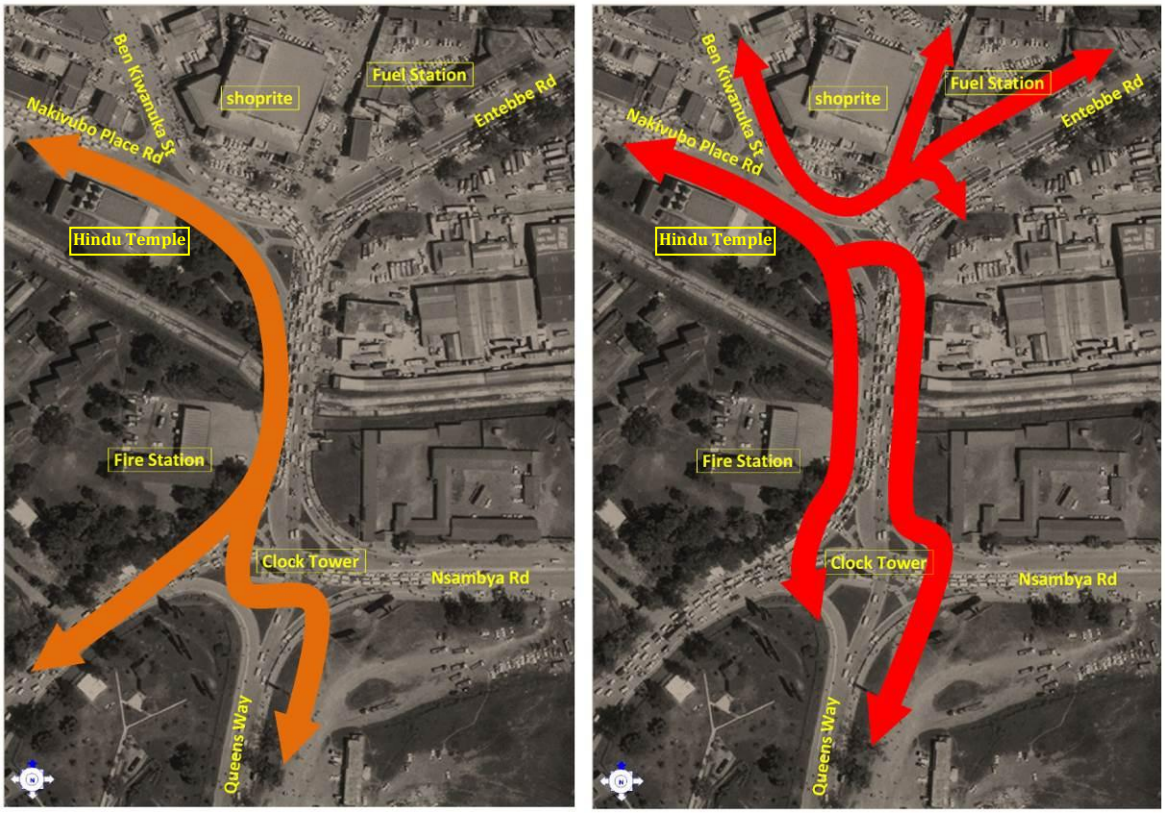


Figure 5-32: : Main Cyclists Route in Zone 2 **Main Pedestrian Route in Zone 2**

Source JICA Survey Team

In spite of the high number of NMT, the available facilities cannot be said to be adequate. The available pedestrian Walkways are narrow and in many places have numerous potholes. In some places the manholes are broken posing a danger to the pedestrian traffic. The worst bit is that sometimes the motorized transport (Boda-Boda and even taxis) have a tendency to move along the walk way especially during the peak hours. In some parts of the project area street vendors have taken up a large part of the sidewalks. Drivers and motor cyclists park anywhere even where it is not allowed, for example on sidewalks blocking the way for pedestrians. Finally, no cycle lanes are provided and pedestrians' safety is compromised by open drainage channels and inadequate street lighting.

5.3.6 Vehicle Population Trends -Traffic Trends

5.3.6.1 Vehicle Registration in Uganda

The motorization in Uganda has increased rapidly in the recent years; the number of registered motor vehicles has increased at an annual rate of 10.2% between the years of 2005 and 2009. Motorcycles have increased with the highest rate (28.2% per annum) and followed by minibuses (22.6% per annum) during the same period. Trucks indicated a high increase rate of 15.7% per annum. However, the vehicle ownership of motor cars per 1,000 population in 2009 is 3.1 vehicles and not so high at present.

5.3.6.2 Traffic Volume

In a recent traffic survey conducted by the JICA Study team, the largest traffic volumes were recorded at Entebbe road totalling to 83,180 with the second largest recording of 74,369 being recorded at Jinja Road.

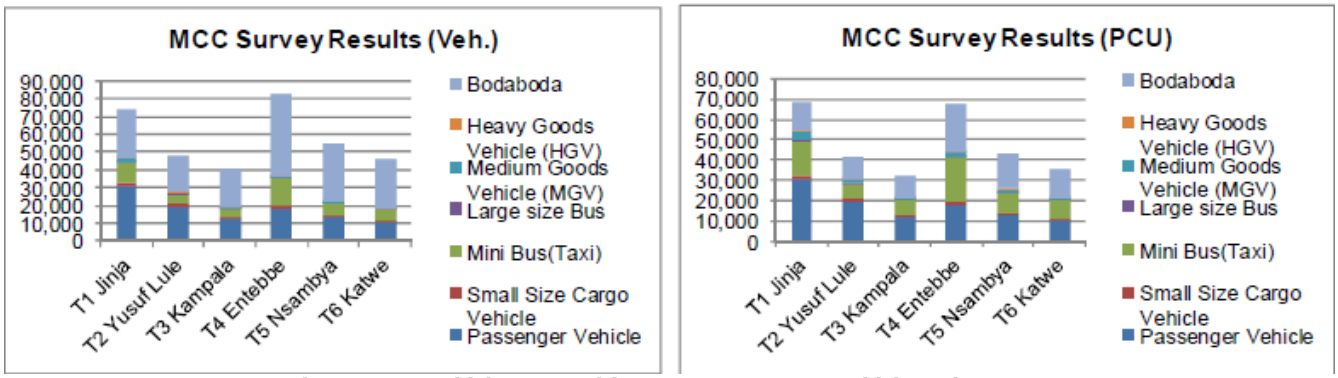


Figure 5-33: Vehicle Composition at Survey Hours. Vehicle and PCU
(Source: JICA Survey Team)

Relating to vehicle volume, the highest number of passenger volumes are on Jinja Road junction while the biggest number of minibuses were observed on Entebbe road junction; most boda boda were found on Entebbe Road junction.

5.3.6.3 Mortality Rates and Traffic Accident Data

Accident data collected from Kampala Central Police Station revealed that over three years, the number of accidents was almost constant totalling to around 12,000 cases. In 2012, a slight improvement was seen in the case of minor accidents, the Katwe area was reported as an area with high number of accidents occurring throughout the day while other stations had hourly variation pattern (no accident at midnight). Number of accidents is lowest at Wandegeya station which could be attributed to the presence of traffic lights. Overall up to 80% of the motor vehicle accidents are attributed to Human (Driver) an indication of the poor driving skills in Uganda.

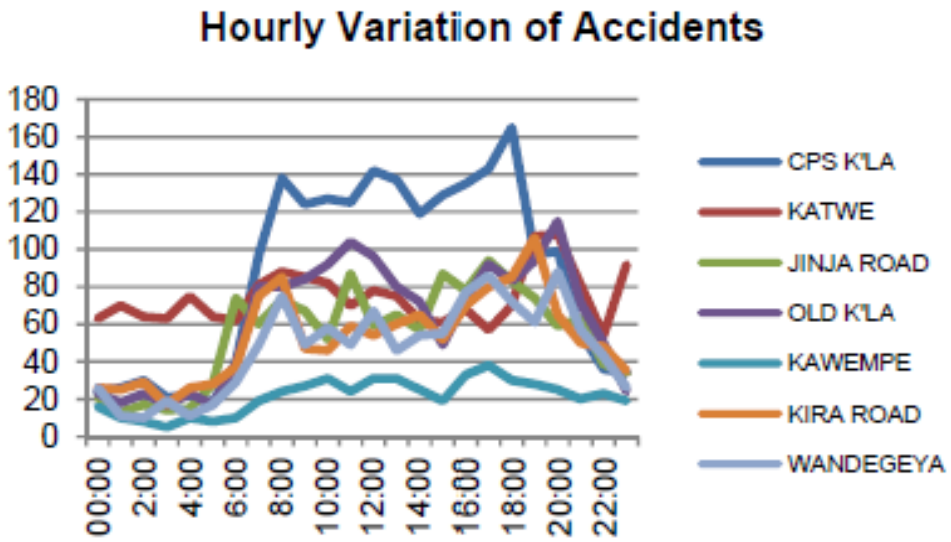


Figure 5-34: Hourly Variations in accidents in the project Area
(Source: JICA Study Team Progress Report 1)

5.3.7 Significant Cross Point positions to be considered

Apart from the points identified above as hotspots for NMT, there are other additional significant points to be crossed that have a significant socio-economic impact. These include the railway lines along both Nsambya and Mukwano roads as well as the major roundabouts and traffic junctions. These are likely to cause heavy traffic holdups especially during the construction phase unless measures for bypasses and targeted traffic management procedures are implemented by the contractor.

5.3.8 Direct Socio-economic Aspects of the GKRIP

The design of the project has ensured that only inevitable structures and houses have been impacted. Most of the buildings were bypassed apart from three including the Residential house at Nsambya belonging to URC, an abandoned armoury belonging to Police along Mukwano Road, and two restaurants within Centenary Park (also constructed from temporary materials).

Regarding people, there are 8 families within the Uganda Railway Corporation (URC) building who will be relocated by the employer before construction commences and preferably after compensation has been paid to URC.

With respect to land acquisition, most of the land to be taken belongs to Government Institutions with a few individuals. The table below provides a provisional estimate of the land to be taken.

Table 5-17: Expected Land Acquisition Area

Owner		Number of Affected Plots	Affected Area (ha)
Official	KCCA	NIL	NIL
	Uganda Railways Corporation	4	1.6423
	Uganda Police Force	4	1.195
	Uganda Telecom	1	0.1449
	Posta Uganda	1	0.0947
	UMEME	1	0.0395
	Sub Total	11	3.1164
Private	Private Company	7	2.2991
	Individual	12	0.5852
	Subtotal	19	2.8843
Official		30	6.0007

Source: Land Survey, 2013

5.3.9 Access to Social Services

Regarding access to social services most are accessible for community members as shown in the table below; the land use survey has established that nosocial infrastructure will be affected by the project.

Table 5-18: Access to Social Services within Kampala Capital City Authority

	Health Facility		Primary School		Water Source		
	Up to 5km	Over 5km	Up to 5km	Over 5km	On premises	Up to 1km	Over 1km
Central	22,662	112	22,719	55	9,683	12,930	161
Kawempe	67,657	1,295	68,115	837	14,726	53,335	891
Makindye	72,376	6,247	76,778	1,845	21,289	56,254	1,080
Nakawa	54,567	4,550	58,352	765	17,328	40,808	981
Rubaga	71,497	5,215	75,803	909	16,381	59,002	1,329
Total	**288,759**	**17,419**	**301,767**	**4,411**	**79,407**	**222,329**	**4,442**

Source: Kampala Physical Development Plan

5.3.10 Social Infrastructure and Utilities

The roadside is a channel for various infrastructures particularly those related to water mains, electricity, and telecommunications. Discussions with NWSC indicate that the area along the Centenary Park is the most significant transit region for the water that serves most of Kampala. This is the same for the power distributor, UMEME, which has a key power station in the area. It was not possible to inspect the underground utility lines, but the consensus is that during construction the contractor working closely with the utility provider will assess the level of impact. For the purposes of this study, the outlay of the lines Vis a Vis the road alignment is provided in the maps below. In summary the maps provide the following utility lines.

Table 5-19: Utility Lines Along the Project Area

S/No	Utility Line	Remark / Comment
	Underground Cables for Airtel /Warid	These to be protected during construction
	Underground Cables for MTN	These to be protected during construction
	Underground Cables for UTL	These to be protected during construction
	Underground Cables for Orange	These to be protected during construction
	Utility for Sewerage lines	Contractor to work around them
	Umeme Underground Cables	These to be protected during construction
	NWSC Water Mains	Contractor to work around them
	Overhead Power lines for UMEME	To be relocated before construction works begin

In addition the traffic lights and other related signalling structures will be relocated to be aligned and upgraded for the new FO project

These have been indicated in the Figures below covering the entire section of the project area.

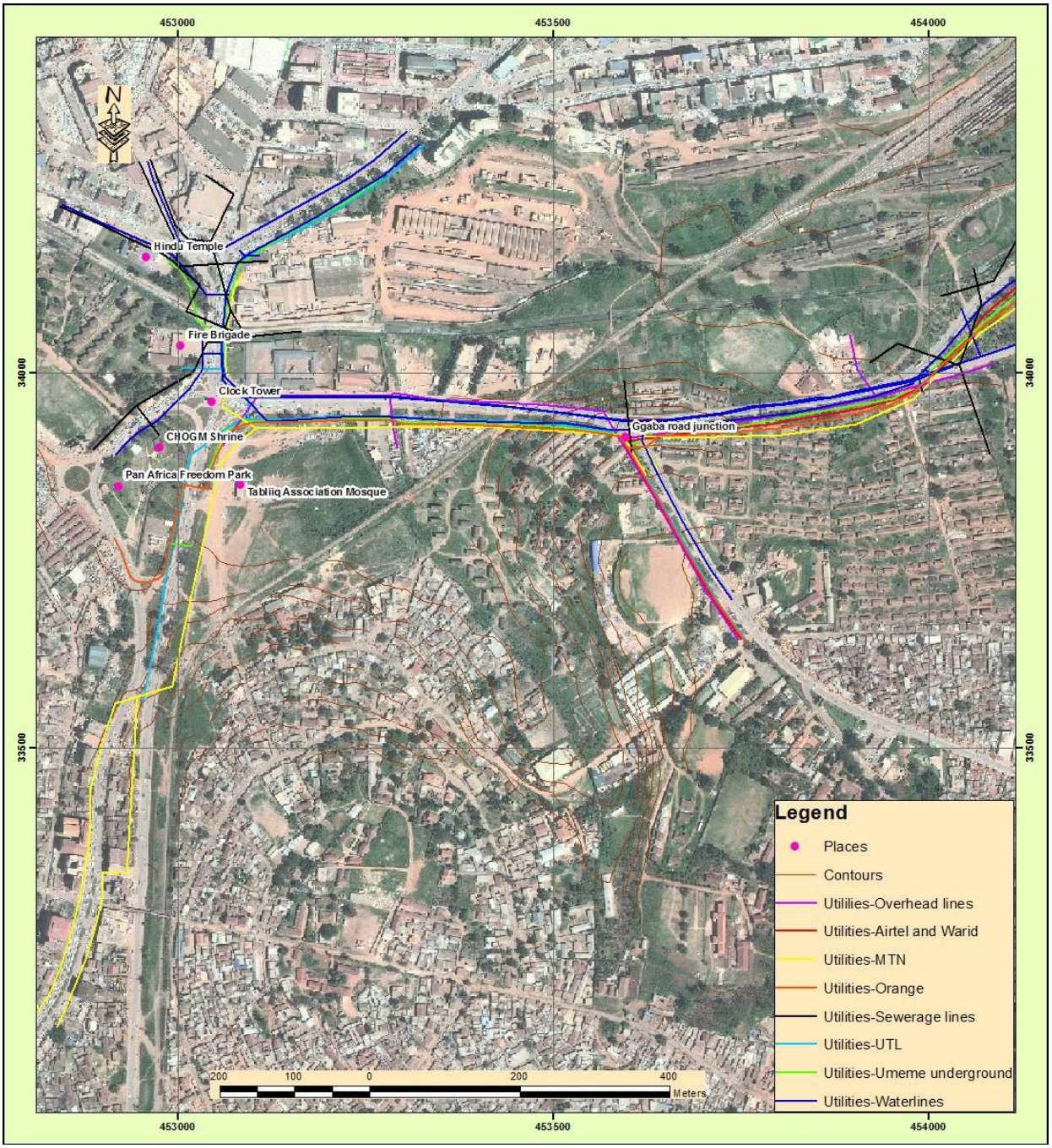


Figure 5-35: Utility Lines along Nsambya Road

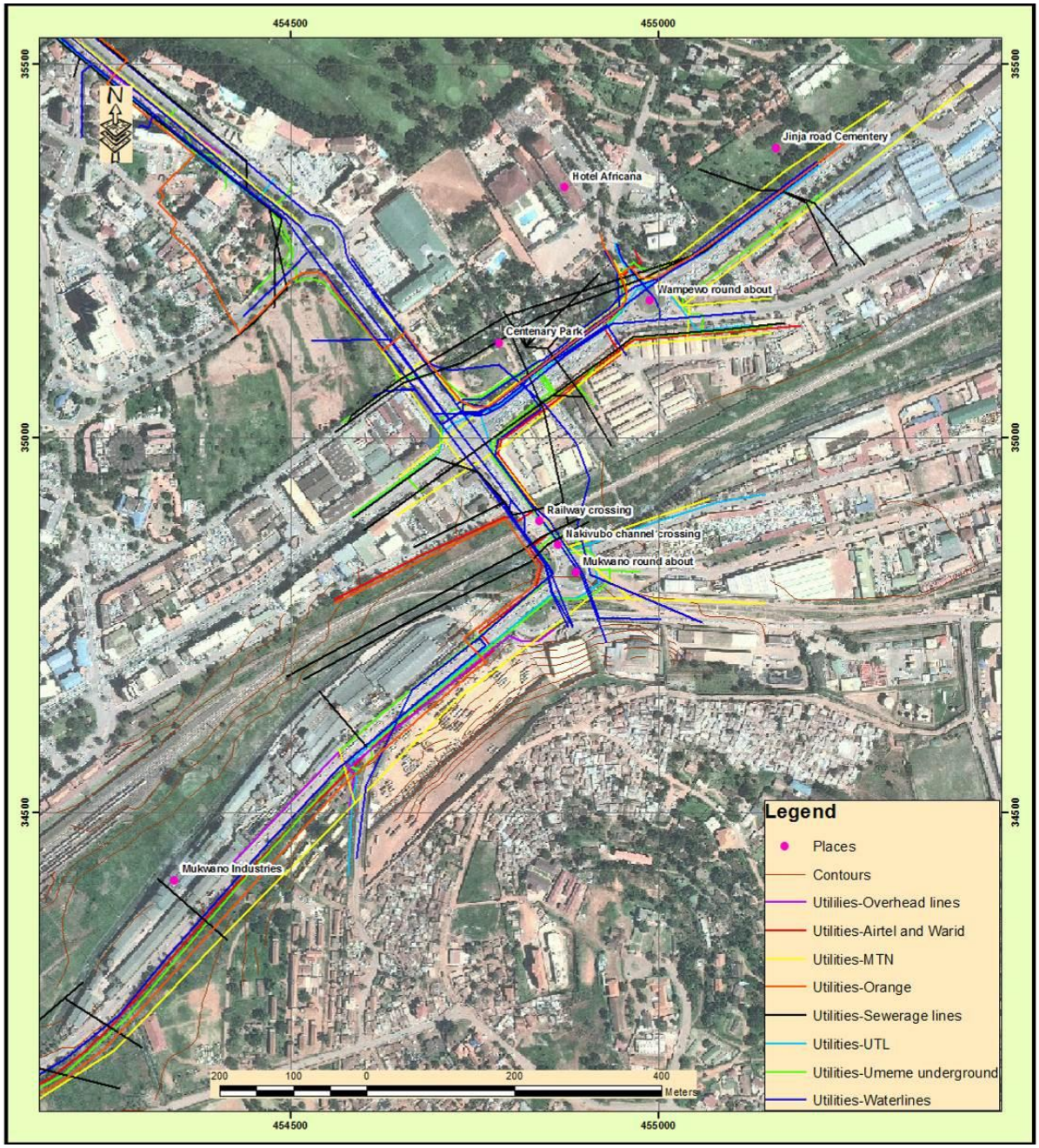


Figure 5-36: Utility Lines along Nsambya Road

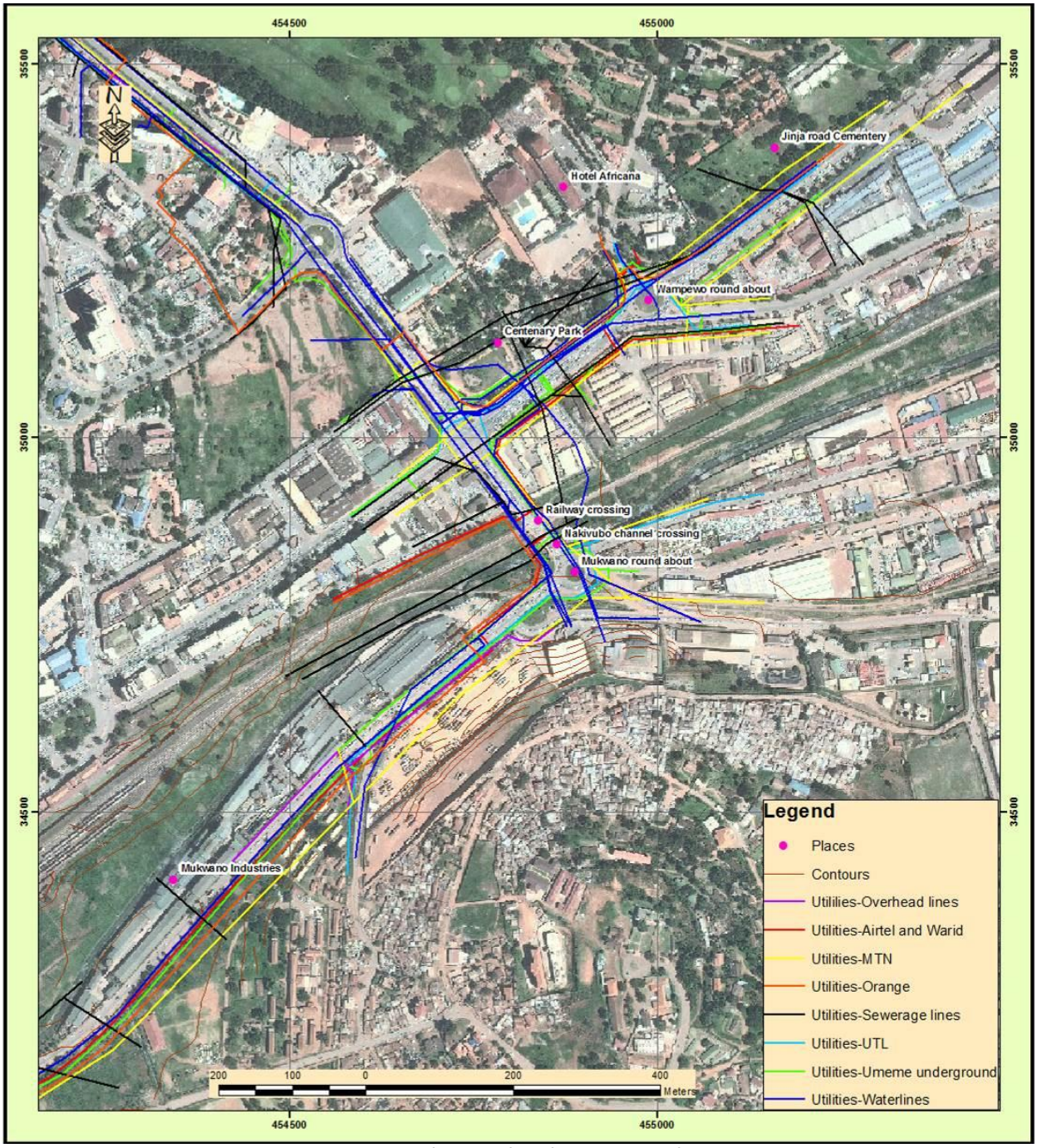


Figure 5-37: Utility Lines along the Centenary Park Area

Figure 5-38: Utility Lines along the Yusuf Lule Road

Table 5-20: Utilities likely to be affected in the Shoprite Area

No.	Item Description	Quantity	Unit Of Measure
1.	Ring Main Units (MV)	3	PC
2.	Transformer- GM -500kVA	1	PC
3.	Feeder Pillars (LV)	4	PC
4.	Meters (3 phase)	3	PC
5.	Cables 185sqmm (M) - A	680	10M
6.	Cables 70sqmm (M) - A	120	10M
7.	LV cables (M) -N	180	10M

Table 5-21: Utilities likely to be affected from Jinja Road Traffic lights to the Garden City Area

No.	Item Description	Quantity	Unit Of Measure
1.	Ring Main Units (MV)	4	PC
2.	Transformer- GM -315kVA	1	PC
3.	Meters (3 phase)	2	PC
4.	Cables 185sqmm (M) -A	730	10M
5.	Cables 70sqmm (M) - A	50	10M
6.	Cables 185sqmm (M) - N	190	10M
7.	Cables 35sqmm (M) - N	50	10M

***A and N denote Asphalt and Normal to differentiate between the grounds beneath which the cables are laid*
**UOM- Unit of Measure*

The summary of the costing for the two locations provided up is solely for the recovery of the mentioned switchgear, equipment and cables. It is in summary a labour cost that will also include the transport and mobilization of resources and notifications/approvals from the relevant Authorities e.g. Umeme management, KCCA, Uganda Police etc

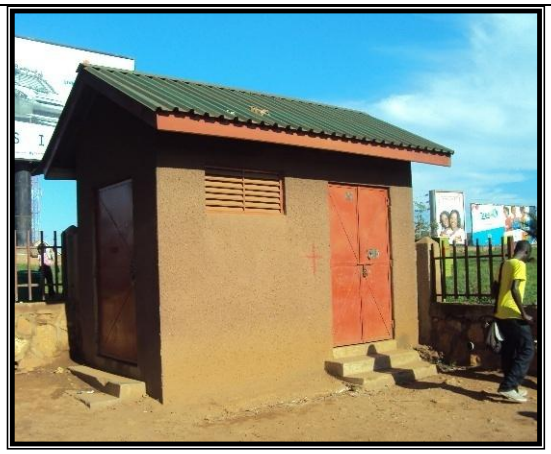
The following have not been costed:

- The overhead lines and transformers between Clock tower and Nsambya traffic junction. Since overhead lines decommissioning is less labour intensive an understanding can be reached with the contractor to have this done within the proposed costs provided above.
- Kitante S/S removal wasn't costed as an overall asset assessment of the switch gear within the plant house couldn't be derived within the limited time.
- As indicated that this is a recovery cost estimate, a thorough assessment done with the asset owner (Umeme Ltd) indicates that the actual implementation of the recovery will inevitably take a different turn. It is impossible to decommission this power supply switch gear/equipment without creating parallel infrastructure prior to the decommissioning. The energy loss during the decommissioning process has a significant implication both commercially (Umeme Ltd) and economically (Traders and business owners in the affected areas). The affected areas as a result of decommissioning this equipment would be the whole of Ben Kiwanuka street, Nakivubo, both taxi park areas, Bombo road, mini price, Market street, part of Kampala, Electoral commission, MOW, Wampewo avenue, Garden city, Nakumatt, the whole of Yusuf Lule and Acacia etc. These works cannot be done in less than one week. An outage in durations of this magnitude even when well planned would cause a paralysis of business in these areas.

Table 5-22: Electromechanical/Telecommunications Installations likely to be affected by the Proposed Works

These are located along Entebbe Road / Queens way along walling of Indian temple.

Located next to Uganda Police Fire Brigade Station



TRAFFIC LIGHT STATION HOUSE

Located next to the Queens way traffic lights

Located along Nsambya Road just after Posta Offices

Located just before Posta along Nsambya Road

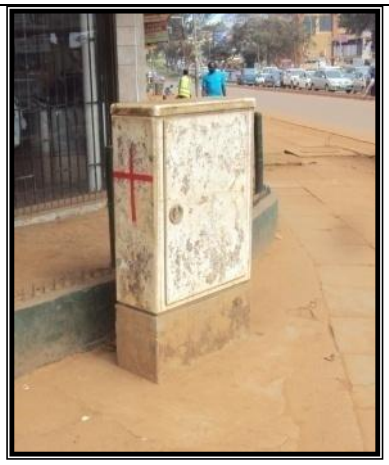
TRAFFIC LIGHT STATION HOUSE

Located at Nsambya Road traffic lights

Located within Uganda Railway quarters just after Nsambya Traffic Lights

Located at junction of Mukwano Round about and sixth street industrial area.

Located along Electoral Commission Jinja Road



Along Jinja Road traffic lights next to Nissan Building

UMEME substation centenary park.

The draft estimated volumes for relocating underground UMEME cables and telecommunication lines are shown in the tables below.

Table 5-23: Estimated Relocation Works of Underground UMEME cables

	Relocation Works of Underground UMEME Cables		
Location	Type	Direction	Length
Queens Way			
0+350	11kV Cable	Crossing	50
0+350 - 0+560	11kV Cable	Along	210
0+650 - 0+740	11kV Cable	Along	90
1+750 - 1+580	11kV Cable	Along	510
1+750 - 2+280	11kV Cable	Along	530
Mukwano Road			
2+285	Transformer		
2+290 - 2+640	11kV cable	Along	1 no.
2+580 - 2+640	11kV cable	Along	350
			60
Access Road			
2+695	11 kV cable	Crossing	20
2+720 - 2+840 x 2 cables	11 kV cable	Along	240
Yusuf Lule Road			
0+260	Transformer		2 no.
0+160, 0+220, 0+260, 0+440, 0+520	11kV cable	Crossing	200
0+620 - 0+680	11kV cable	Along	60
Jinja Road			
2+990 - 3+000 x 3 cables	11kV cable	Crossing	120
0+040 - 0+100 x 2 cables	11kV cable	Along	120
2+840 - 3+000 x 2 cables	11kV cable	Along	320
0+100 - 0+580	33kV cable	Along	480
Sub totals	11kV cable		2,880
	33kV cable		480
	Transformers		3 no.

Source: JICA Study Team

Table 5-24: Estimated Relocation Works of Underground Tele-communication Cables

Relocation Works of Underground Tele-communication Cables			
Location	**Type**	**Direction**	
Mukwano Road			
0+480 - 0+560, 1+050 - 1+400	Orange	Along	430
0+540 - 0+570, 2+350 - 2+620	UTL	Along	300
1+050 -1+400, 2+620 - 2+650	Airtel	Along	380
Jinja Road			
2+900 - 2+930, 3+020 - 3+050	MTN	Along	60
2+900 - 2+930, 3+020 - 3+050	Orange	Along	60
3+340 - 3+580	Orange	Along	240
Sub-totals			Quantity
	Airtel		380
	MTN		60
	Orange		730
	UTL		300

Source: JICA Study Team

5.3.11 Socio-economic characteristics of affected persons

On location of affected persons, a socio-economic study revealed that majority (84.7%) were from Makindye division of Kampala city while (15.5%) were from Central division. The highest number of respondents from Makindye division was due to the fact that it is a core area where major road construction will take place if compared to the Central division but on over all opinions of people on the proposed Kibuye to Jinja road from both divisions was deemed necessary.

Occupations

In order to understand how the flyover project would impact on the communities along the road, a description of affected members revealed that the majority (78.3%) said that they were working as flower attendants, (14.5%) mentioned other jobs like restaurant or hotel attendant and boda-boda riders, (4.8%) said that they were traders, casual laborers and carpenters had equal representations of (1.2%) respectively.

Use of affected site

Majority of affected persons (85.8%) used the site as a working place; while (7.1%) reported that their place was just used as living area, while those who used their place for both work and living were (7.1%). The majority had earlier indicated their occupation was flower attendant, it is the reason why results showed that respondents were using the sites for only work, while those who reported to be working and living at the site were mainly business people and restaurant attendants.

Land holding

Majority of the affected persons (75.9%) are staying on public land as squatters. These were followed by respondents (12%) who were on the inherited land with no titles, (9.6%) were tenants on titled land. Only a handful of the respondents (2.4%) had possession of land titles. Majority (72.6%) have spent between 0-10 years on the affected land, followed by respondents (21.4%), who had spent between 10-20 years, those who

reported to have spent over 20 years were (4.8%) and a small number of respondents (1.2%) had stayed on the affected land since birth. On land tenure, most of the land affected is freehold as shown in the figure below:

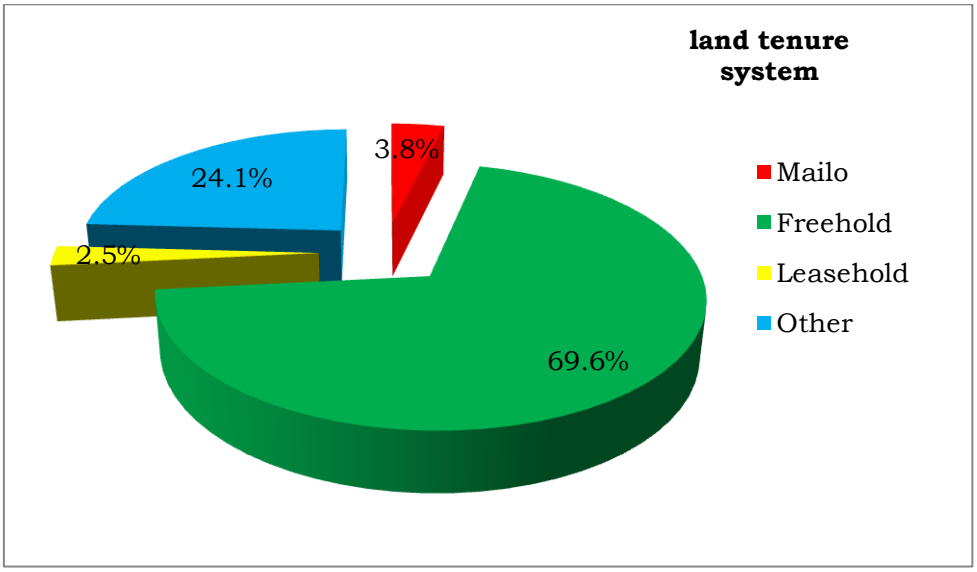


Figure 5-39: Land Tenure System in Project Area
Source: Field data, 2013

On land affected, 69.6% of land owned is on a freehold land ownership arrangement, followed by (24.1%) that is government land and while mailo covers (3.8%) and lease covers the least (2.5%).

Livelihoods

Majority of the affected persons (76.2%) were reported to be flower attendants, (11.9%) owned other business like hotels and salons, the managers and traders had equal proportions (3.6%) respectively, while other respondents (2.4%) mentioned to be carpenters and casual labourers respectively. This distribution is however valid since people to be much affected by the road were the flower sellers who carry out their business by road sides.

5.3.12 Archaeological concerns including PCRs

Although the identified cultural sites do not directly fall within the ROW, they are sufficiently in the vicinity to be of concern. Some of those identified are shown in the figure below.

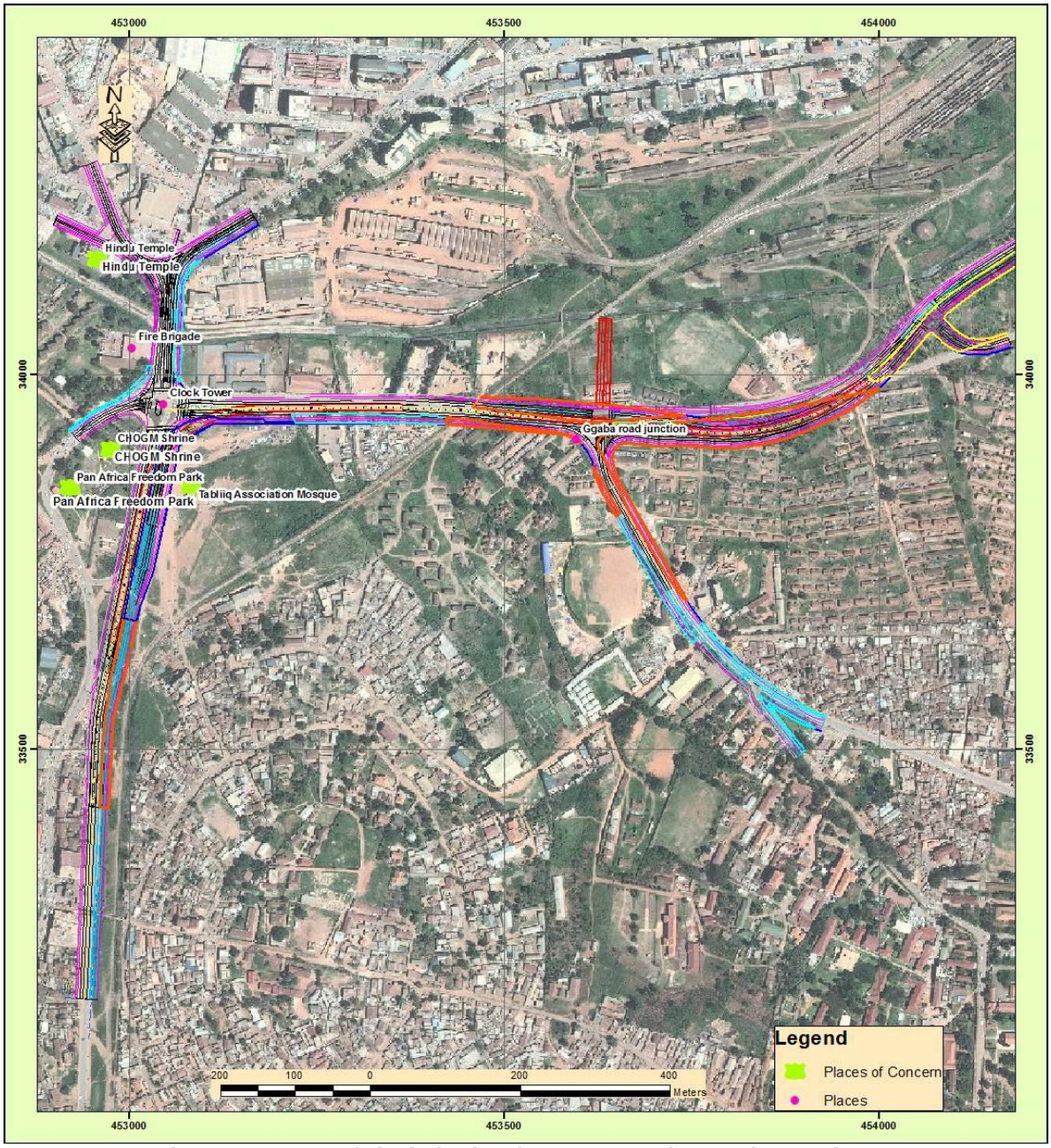


Figure 5-40: Areas of Physical Cultural Resources on the Nsambya Road Area

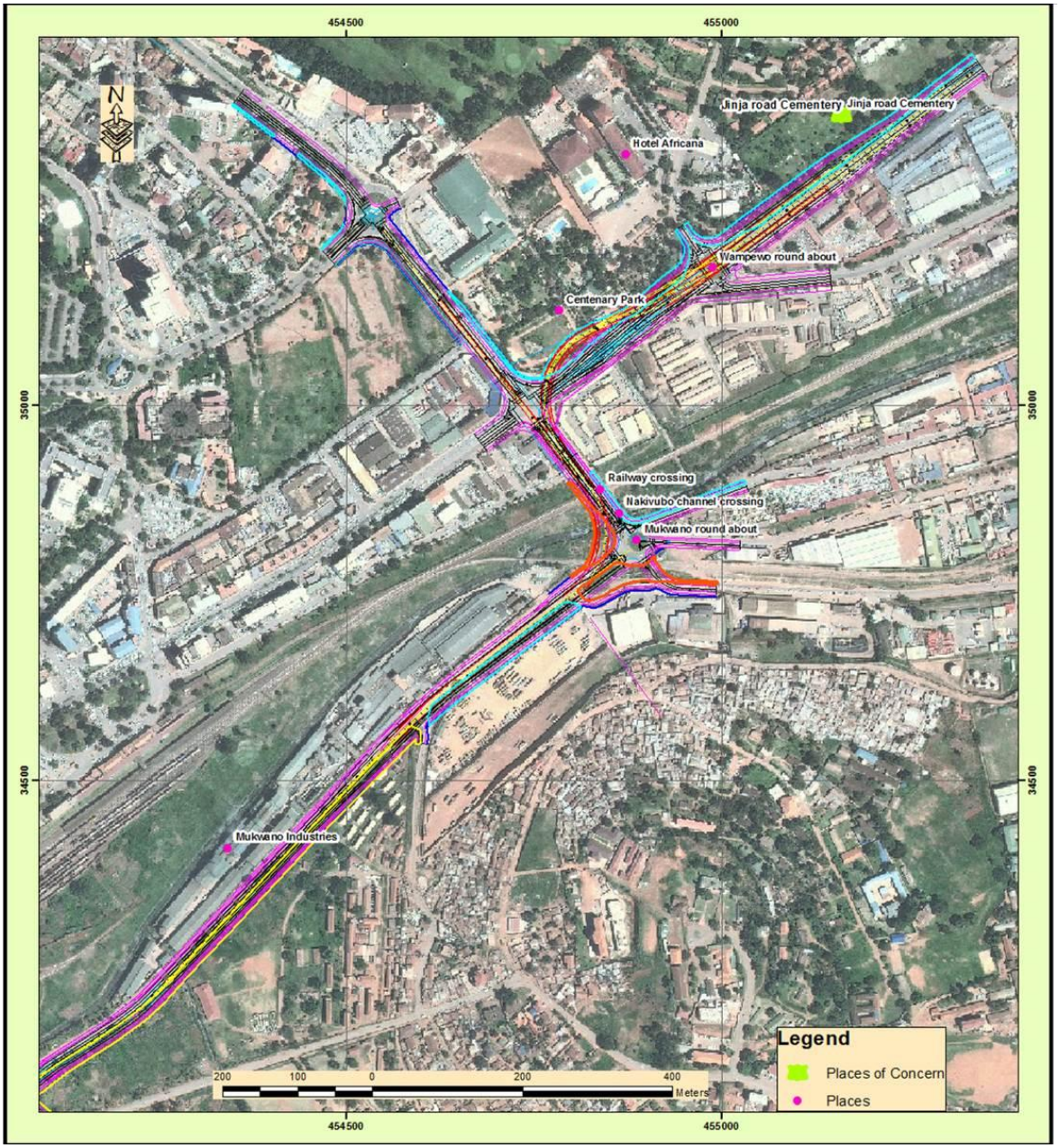


Figure 5-41: Areas of Physical Cultural Resources around the Centenary Park Area

Site 1: Jinja Road Cemetery/European Cemetery

This is one of the most important historical burial grounds found in the periphery of the project area. It is located along Jinja road, close to Hotel Africana Roundabout on 36 N 0455047 UTM 0035634, elevation 1166m. The site is under Kampala Capital City Authority (KCCA) who has put up a wall fence to bar trespassers from the Cemetery. The Cemetery is a historical treasure as it is a burial site for some World War II heroes and colonial rulers. It is against this background that the undertakers of the proposed project need to take care of the site since the project starting point is so closed to the Cemetery.

Photo 5-13: Jinja Road Cemetery

Site 2: The Pan African Freedom Park

Another important historical site in the project area which may be affected indirectly is the Pan African Freedom Park (Square). It is located near the Clock Tower on 36 N 0452887 UTM 0034156, elevation 1162m and is believed to have served as a venue for a lot of events both positive and negative to Pan Africanism. During the time of fighting colonialism, it was used as a meeting point for freedom fighters; later on it is alleged to have been used as a killing zone during the era of President Idi Amin Dada in the 1970s.

However during the preparations of the 7th Pan African Congress that took place on 3rd – 9th April, 1994 in Kampala, the Park was officially handed over to the Pan African Movement in Commemoration of this historic event for Africans and other sympathizers. It was officially opened by the Late Dr. Betty Shabazz, widow of the great African – American revolutionary leader and Pan Africanist Malcolm–X with delegates and participants from over 50 countries in Africa and the Diaspora who attended the Congress, planting trees in the Square on behalf of their Countries and people.

On 24th November 2007 during the Common Wealth Heads of Government Meeting (CHOGM) in Kampala – Uganda, the Pan African Freedom Park hosted Common Wealth Foreign Ministers who planted trees in the Park. This is in support of nursing the environmental changes across the globe. To further the dedication of recognizing the former Pan Africanist and inspiration of the present Comrades in the struggle, the Pan African Movement together with the people of South Africa and the ANC government, constructed a monument In Commemoration of the MK fallen combatants who died in Uganda.

The Park (Photo 5-14) is therefore a very important historical landmark dedicated to the Pan African Freedom fighters who gave up their lives so that Africa and Africans be free. Different Activities such as Rallies, Tree planting, public assembly, Tourist Attraction, Resource Centre, Workshops are what compose the site.

Photo 5-14: Some of the Monuments at the Pan African Freedom Park

Site 3: Cultural Shrine at 10m South East of Queensway on 36 N 0452918, UTM 0033902
This is yet another cultural site located closed to the project area. Though it may not be affected directly by the project, it is worth documenting for future reference. The site (Photo 5-15) is made up rock beds and boulders located about 500m away from Clock Tower along Queensway and only 10m south east of Queensway on 36 N 0452918, UTM 0033902, elevation 1171m. It is believed to be a spiritual site where traditional cultural practitioners/healers do make sacrifices/rituals in times of need. The exact ownership of this site is not claimed by anybody but it is jointly used by the surrounding community. One of the local resident said that during 2007, CHOGM meeting, it was named CHOGM stone but the exact meaning and reason for naming it is not known. The site therefore holds a spiritual value.

Photo 5-15: Cultural Shrine on Queensway

Site 4: The Uganda Muslim Tabliq Association Mosque
This site belongs to the Uganda Moslem Tabliq association. It is located between 200-500m south east of Clock Tower. The site is located within a wet land on 36 N 0452955 UTM 0034252, elevation 1162m. The site is important because it is a religious site and carries a lot of spiritual values to the sect who are passionate about it.

Photo 5-16: The Uganda Muslim Tabliq Association Mosque

Site 5: BAPS Shree Swaminarayan Madir- Hindu Temple

The magnificent Hindu temple ***(Biwologoma)*** stands on Berkeley Road, close to the existing road between Shoprite and Clock Tower junctions expected for upgrade to 6 lanes for general traffic use. It is located on 36 N 0452943 UTM 0034432, elevation 1162m. There is no doubt the site which has stayed for more than fifty years carries spiritual, aesthetic, historical and tourism values. It is however not yet very clear whether the project will affect it directly or indirectly.

Photo 5-17: BAPS Shree Swaminarayan Madir- Hindu Temple

Site 6: The Clock Tower: The Clock Tower is an impotent symbol of Uganda's History as it was constructed in commemoration of the British Queens first visit in early 1950s. It is recognised as the face of Kampala and over the years different interest groups including the British high Commission, Shell have taken care of it although as a historical monument it is under the protection of the Department of Museums and Monuments. There has been a proposal that the Clock Tower should be relocated and this has caused considerable debate for and against the proposal. This is because most Ugandans believe it is a significant National monument.

Photo 5-18: Clock tower at Junction of Queensway and Nsambya road

Photo 5-19: Marabou stock perching at top of clock tower.

Indeed the clock tower is a national monument and the Department of Museums and Monuments is responsible for it. The Department of Museums and Monuments have accepted that it can be relocated with conditions as shown in Annex 7.

In addition following change in alignment to avoid Electro Commission Buildings, the sculpture within the Centenary Park gets very close to the Road reserve with its fencing within the Road Reserve. It falls about 1 meter within the proposed road reserve and will be nearly below the proposed flyover. It has been proposed that this should be left intact and a kink in the road reserve be introduced to safeguard this Sculpture (Photo 5-19).

Photo 5-19 The proposed Road Reserve will pass to the right of the arrow following change in alignment

6 BASELINE STUDY METHODOLOGY INCLUDING STAKEHOLDER CONSULTATION PUBLIC PARTICIPATION /CONSULTATION

6.1 Documentation

Apart from the baseline survey methodology as described in Section 4 of this report, Comprehensive documentation reviews were done in order to understand the socio-economic situation in the study area and to establish the inherent and documented environmental and social concerns within the Zone of Impact (ZOI) of the project. In this regard, the JICA Study Team had already conducted a prefeasibility study which was a source of useful information. The documents included the initial JICA progress report and the KCCA Division Development Plans (DDP). The review also covered relevant environmental legislation that relates to roads and the transport sector at large. In addition the consultant reviewed documents to get existing socio-economic data obtained from the Uganda Bureau of Statistics and the different divisions of the Kampala Capital City Authority. As discussed before, the team also reviewed technical reports covering the road sector, health and safety and procedures, environmental emergency preparedness and response plans in addition to occupational health and safety aspects relating to the road works sector. The other reviewed included the Greater Kampala Transport Master Plan (from the KCCA), National Water Assembly study, and the Kampala Master Plan. Reference was also made to the guidelines from some of the development partners including the World Bank (WB) and JICA.

To document the present baseline, the social data was obtained using a questionnaire as well as discussions from stakeholders. Apart from the document reviews, the other biophysical parameters were also obtained using direct measurements, sampling as described under each of the sectors above and briefly recapped here below: - .

- **Topography. -** This was obtained from mostly document reviews since it does not change that much. Observations were also made to note areas that were likely to suffer erosion in light of steep gradients.
- **Project area geology and soils:** - Similarly, this was obtained from document reviews as it does not change much overtime.
- **Hydrology: -** the hydrology of the area was obtained from current status as documented. The flood lines were analysed by a search of the satellite data as shown in the main section related to hydrology. The hydrologist in addition conducted field investigations

The other principals as they relate to stakeholder consultation and community participation are discussed in the following subsections.

6.2 Regulatory Basis

Equator Principles

The study took note of Equator Principle No. 5 which highlights the need to involve communities in low income countries in development projects. It states that for all Categories A and, as appropriate, Category B projects located in non-OECD countries, and those located in OECD countries not designated as High-Income, as defined by the World Bank Development Indicators Database, the government, borrower or third party expert has consulted with project affected communities in a structured and culturally appropriate

manner. For projects with significant adverse impacts on affected communities[1], the process will ensure their free, prior and informed consultation and facilitate their informed participation as a means to establish, to the satisfaction of the EPFI, whether a project has adequately incorporated affected communities' concerns[2].*During this assessment, there was project disclosure to communities on the baseline study and consultations with district staff on access to data. However, in relation to data, the team was advised to get information at national level. Detailed consultations on impacts and mitigation have to be undertaken during the full EIA study.*

6.3 Stakeholder Identification and Analysis

The stakeholders and beneficiaries of the project were identified and a stakeholder analysis and **engagement matrix shown below was used to guide further consultations.**

Table 6-1: Stakeholder analysis matrix

Stakeholder	Relevance	Opportunity	Concern	Engagement mechanism
Uganda National Roads Authority	The main client and the Developer of the road project;	Will be in charge of the road project and need to harmonize the different aspects of the road project	Implementing environmental and social issues highlighted in this ESMP	Formal meetings on progress, technical planning
Kampala capital City Authority	In charge of planning and administration of the city	Different departments that can be engaged with during implementation as well as plans for the city	Interaction with other development plans for the city; physical development plan and urban plans	Meetings
National Environment Management Authority (NEMA)	Ensures Environmental Compliance and regulates activities that affect the environment;	Support environmental compliance for the benefit of all stakeholders	Environmental impact assessment and audit requirements for the project	Formal meetings
Department of Museums and Monuments	To take care of any Artifacts and findings of archaeological or Cultural Significance	Minimizing the impact on clock tower	Selection of the best option and proposals for mitigation	Formal meetings
Ministry of Lands, Housing and Urban Development;	Survey and Valuation of properties and or compensation	Facilitates land transfer and compensation if necessary	Various legislation including the Land Act Cap 227, Constitution, and Compensation Policy	Formal meetings
Ministry of Water and Environment	Responsible for the environmental concerns including wetlands, water bodies, forests and Natural resources;	Will support environmental compliance for the benefit of all stakeholders	Blind application of the law without considering mitigation factors	formal meeting
Wetland Management Department, Ministry of Water and Environment	Road project passes through a number of seasonal and perennial wetlands/swamps	During Construction there is potential to negatively impact on wetlands;	Failure to take measures may lead to destruction of fragile wetland ecosystem; flooding	Formal meeting
UMEME	Electricity distribution	Integration of concerns at sub stations into design	Occupational Health and Safety issues during construction and maintenance at Kitante Sub station	Formal Meeting
Project Affected People (PAP) along the proposed	This includes most of the local community who may be affected either	Limiting the number of structures and peoples affected at design phase	compensation and livelihood restoration; noise and vibrations	Formal Meeting

[1] **Affected communities** are communities of the local population within the project's area of influence who are likely to be adversely affected by the project. Where such consultation needs to be undertaken in a structured manner, EPFIs may require the preparation of a Public Consultation and Disclosure Plan (PCDP).

[2] **Consultation** should be "free" (free of external manipulation, interference or coercion, and intimidation), "prior" (timely disclosure of information) and "informed" (relevant, understandable and accessible information), and apply to the entire project process and not to the early stages of the project alone. The burrower will tailor its consultation process to the language preferences of the affected communities, their decision-making processes, and the needs of disadvantaged or vulnerable groups. Consultation with Indigenous Peoples must conform to specific and detailed requirements as found in Performance Standard 7. Furthermore, the special rights of Indigenous Peoples as recognized by host-country legislation will need to be addressed.

Stakeholder	Relevance	Opportunity	Concern	Engagement mechanism
alignment	positively or negatively.	and through environmental and social mitigation planning	temporary disruption during construction	
Utility companies (NWSC) telecommunications companies	Provision of services	Design to reduce impact on infrastructure including change of technology	Minimizing costs for relocation	Formal meetings
Uganda Police	Maintaining peace and order in the city	Increased traffic during construction	Alternative routes during construction	Formal meeting
Department of Occupational Safety and Health	Workforce could be at Risk due to construction activities	Workforce and nearby communities may be exposed to risks as they relate to both construction and operations activities	Design considerations to take relevant precautions could lead to serious injury or work related sicknesses	Formal meetings
Department of Museums and Monuments	Physical and Cultural Resources may be affected during the construction phase	guidance on impact management for all PCRs	Clock Tower and other important monuments	Formal meetings

6.4 Objectives of the Public and Stakeholder meetings

The public participation process is designed to provide sufficient, accessible and objective information to Interested and Affected Parties (I&APs) or stakeholders to assist them to participate. The objective of their participation in the ESIA process included the following:

- To provide sufficient, accessible and objective information to all stakeholders and interested parties that will assist them to participate in the whole process of the project.
- To get views from stakeholders on anticipated benefits, fears, opportunities, concerns and suggestions on how best to mitigate them and different aspects of the community in regard to the project.
- To introduce the project to all stakeholders and prepare communities for what will be happening in the near future.
- To create an enabling environment through which the project will smoothly operate in friendly co-existence with other stakeholders.
- To collect all relevant information about the trends, practices and norms in the project area within which the project will operate.

During the ESIA study two public hearings were conducted as well as discussions with key stakeholders to the project. The Public has participated by: -

Raising issues of concern and suggestions for enhanced benefits;

- Verifying that their issues have been captured and considered by the technical investigations; and
- Commenting on the findings of the ESIA among others.

Photo 6-1: Public in a Consultation Meeting Held at Glory Church International Katwe

Photo 6-2: Consultation with PAP at Fairway Hotel on 17th September 2013

6.5 Schedules for the stakeholder meetings

The study arranged for various stakeholder meetings. Some of the meetings were organised by the main JICA study team while some were specifically designed for the ESIA and RAP process. The ESIA and RAP meetings took place at each of the impacted divisions of the city as well as one general meeting to include stakeholders at the local level. The last meeting will target the directly project impacted people whose date is yet to be fixed. The final meeting was for the Directly Impacted People which were held on September 17th 201at Fairway Hotel in Kampala.

The time line has been as follows: -

Table 6-2: Stakeholder Engagement Schedule

S/No	Meeting	Place	Date
1	Meeting LC II Councillors, LC II Chairpersons, and the Ward Administrator	Makindye Town Council Boardroom	23th July 2013
2	Meeting with the Ward Administrator,	Makindye Town Clerk's Office	20th August 2013
3	Meeting with the Ward Administrator, Acting Town Clerk	Nakawa Town Clerk's Office	
4	Meeting with ward Administrator	Central Division Offices	
5	Meeting of the Stakeholder community from the project area	Glory Church International, Katwe	
6	Meeting of Project Impacted People (PAP)	Fairway Hotel, Kampala	17th September 2013
7	Lead Agencies were met individually	At their workplaces	At various times
8	Directly Impacted people	At their workplaces/ residences	During the census exercise from 02-Oct-13 to 20 -March-2014

6.6 Stakeholder Perception, Views and Concerns

During the various Stakeholder engagement meetings, they were asked to give their views regarding the project while taking into account these key characteristics that tend to define their perception towards sustainability of the proposed project. The minutes of the various meetings are attached as Annex 3 to this report. Generally, most stakeholders were happy with the proposed development while some raised the following concerns: -

➢ Staff at UMEME in relations to	➢ First is that the flyover is directly above the substation	*Option 1: Taking the flyover higher* In this option, the flyover would be taken higher to

the Kitante Substation	➢ From the substation towards Africana Roundabout, there is a pier very close to the facility ➢ The main issue is about maintenance of the substation when the flyover in existence ➢ A clearance of 7 to 8m isn't adequate for the operations ➢ The crane operator said, for maintenance and upgrading of the substation, a clearance of about 18m is necessary.	accommodate the need for maintenance *Option 1: Relocation of the substation* This would involve shifting the whole substation to another location. The issue with is option is it would require more land i.e. for the construction of a new substation and an area for the operation of the crane during maintenance. It would also involve relaying all the underground cable network hence an increased cost as new cables have to be installed *Option 2: Relocation of the two transformers* In this option, the substation house would remain in its current position and only the transformers shifted out of the flyover underside. Some land would be required for this operation and also an access road to the substation would be necessary. **Conclusions** Option 3 seemed to be an appropriate solution but still all the options were going to be looked into details for further considerations by the Survey Team

Table 6-3: Summary of stakeholder concerns and possible mitigation measures

SN	**Stakeholders Concerns**	**Proposed action or mitigation measures by the stakeholder**
1	Most contacted persons especially the PAPs were worried if their structures such as Kitgum House and others were going to safe and the end point of the project and if the FO will cut down the traffic jam.	The design will avoid most structures in as far as will be possible. Subsequently no residential or commercial houses would be brought down because of the project. Important sits such as temples, churches will also be avoided Secondly, the laws of Uganda provide that, all people who will be affected by a project are to receive resettlement and compensation packages and also be assisted to resettle.
2	There were some concerns from some of the leaders that some contractors tend to take peoples wives, and wondered how this was going to be handled. This would be a challenge in light of the HIV/AIDS pandemic which is a major national concern.	The project will not have a workers camp which leads to increased promiscuity and there will be provision for HIV/AIDS counselling, sensitization as well as treatment of related ailments by the project.
3	The local leaders and the Town Clerk were concerned that perhaps the employment opportunities provided by the project would not be availed to the locals when the project begins. The level of unemployment was high in the project area.	The ESIS recommends that Jobs which do not require skills can be given to the local community with the cooperation of the local LC executive.
4	Most of the Lead Agencies wished to be assured that the ongoing projects and plans within Kampala have been taken into account by the Project. The major ones included the , BRT project the Kampala Master Plan, the Planned FO from Nsambya to Nasser road (Roseberry Avenue) within the CBD, the NMT project along Namirembe Road, Luwum Street linking into Entebbe road among others	Lead Agencies were assured that the different projects were considered including the BRT. The design will combine the BRT and the FO along Queensway and at the Hotel Africana Roundabout along Jinja Road.
5	Most of the service providers were concerned about their infrastructure that would be impacted and the likely disruption to services. The key ones were the NWSC, UMEME, the Telecommunication Companies as well as the Fire brigade. They noted that the area around Centenary Park was a beehive for most of the utilities especially NWSC and UMEME.	The design team as well as the contractor will work closely with the Utility Providers to ensure minimum disruption of the services through concerted planning and execution of works. Moreover the ESIS recommends the use of light equipment as well as manual methods in the initial stages of excavation so as not to disrupt the utilities (as is the practice world over while excavating in the urban environment). Any relocation of utility lines to be done before the construction begins.

SN	Stakeholders Concerns	Proposed action or mitigation measures by the stakeholder
6	Some of the lead Agencies noted that the area around Pan Africa Park is a monumental area. First of all the Clock tower is a national Monument which needs to be treated as such. Secondly the Park is both a National and International Monument due to the CHOGM Planting of trees in the park each of which was planted by a specific African Country. Secondly they were concerned that while compensating for tree, they should not only consider the value, but should add money for growing the trees until they mature because the Trees in Kampala are under threat, hence the need to grow them and put in funds for grooming the trees.	There have been many arguments for and against thru removal of clock tower. At the time of this report the Department of Museums and Monuments was still considering the case. Their initial response was that the Clock Tower can be relocated but should be put in an equally prominent place such as at Shoprite Junction. On the other hand any relocation should involve the department who will advise on the method and best way of relocation. If there is an option, then the Clock Tower should not be relocated.
7	The Lead Agency on Wetlands noted that the GKRIP and especially the FO road project, does not impact the wetlands much. The road crosses the Nakivubo Channel at one point where there is no wetland. However downstream the Nakivubo wetland is important. Therefore care to be taken not to silt the wetland below.	Measures to reduce silting of the channel to be put in place by the design. During operation of the road, UNRA will continue to ensure that erosion is minimized
8	Most of the PAPs were worried that Government has tendency to delay compensation such that by the time compensation comes around, the value of the property has greatly changed.	UNRA informed the PAPs that the compensation funds would be included in the 2014/15 Budget and compensation would be done in 2015 before construction commences in 2016.

6.6.1 Disclosure Process

Following from the disclosure of the Scoping Report, the draft final Environmental Statement will be shared with stakeholders, especially key Lead Agencies and Local Government to obtain their feedback. The first disclosure by NEMA seeks comments from stakeholders and lead agencies on the Scoping Report then on the ESIA Statement. These comments make key contributions to the reports.

The JICA is mandated to disclose important information about environmental and social considerations at the main stages of cooperation projects, in a manner in accordance with their guidelines. The information to be disclosed includes that of environmental and social considerations and of the cooperation projects, Secondly besides the information to be disclosed publicly by JICA, JICA will disclose information about environmental and social considerations to third parties to the extent possible in response to requests. And in this regard, JICA encourages project proponents to disclose and present information about environmental and social considerations to local stakeholders.

For this project, the information has been disclosed well in advance through community meetings, stakeholder meetings as well as lead agency discussions. The disclosure has been done in the English language which is official language in Uganda. At community meetings, the Local languages have been used intermittently with English to be able to reach out to all stakeholders.

Finally, while taking note of the confidentiality of information of a commercial nature and other concerns of project proponents, JICA discloses information on its website in Japanese, English, and/or local languages, and provides related reports for public reading at its library and at related overseas offices.

Moreover, if Lead Agencies, NEMA or a significant number of stakeholders consider the project, approach or methodology to be controversial then the Final disclosure is through a Public hearing arranged before a certificate of approval is considered. This is considered most unlikely since the scoping report did not receive any controversial responses after its disclosure to lead agencies by NEMA.

Following approval by the Authority, copies of the Environmental Statement will be retained at the District Local Government offices with the District Environment Offices of KCCA, with the developer/contractor and any other stakeholder who may wish to ensure that the mitigations as approved are being implemented.

7 ANALYSIS OF ALTERNATIVES

7.1 Overview

The JICA survey team has already made preliminary studies based on various engineering options. The studies have considered the three options which are as follows:

- Option 1: Direct access to the City centre from Clock tower and Shoprite Junction;
- Option 2: Aims at Dispersing traffic towards Yusuf Lule road ;
- Option 3: Aims at diverting traffic from the CBD to Mukwano / Access Road; and this ESIA also considers the 4th Option ;
- Option 4: Do nothing Option

The major concerns when conducting the analysis of alternative include the social, economic and environmental impacts of implementing the different alternatives. The different options correspond to definable sections of the road alternatives within and around the CBD. This enables analysis using a modular approach.

7.2 Design Options and Different Approaches and Alternatives Considered

7.2.1 Option 1: Direct access to the City centre from Clock tower and Shoprite Junction

This option considers accessing the city centre directly from Queensway through to Clock tower, Shoprite Junction ending along Jinja road at Hotel Africana Round about.

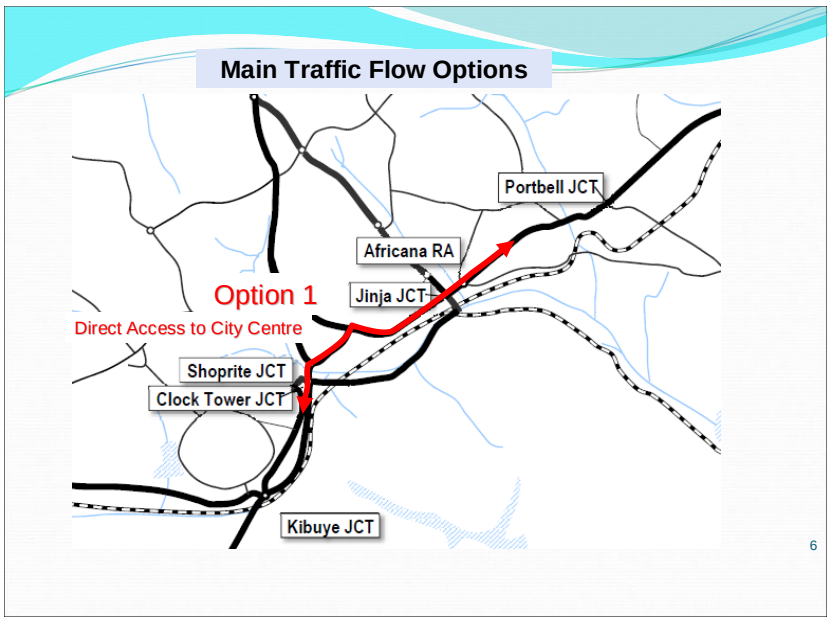


Figure 7-1: Tentative Plan for Option 1

Under this option, there would be a Jinja-Kampala Road FO above the planned BRT lanes. The FO is essential because there is no room to widen the road due to the buildings / structures on the sides.

7.2.2 Option 2: Aims at Dispersing traffic towards Yusuf Lule road

The second option, Option 2 aims at dispersing traffic towards Yusuf Lule Road and thereby reducing traffic congestion within the CBD. Under this arrangement, the traffic would be moved from the Jinja road Junction

as well as the Hotel Africana Round about Junction towards the Yusuf Lule Road. This would entail the construction of a FO above Mukwano/Access Road to connect with a FO above the Yusuf Lule.

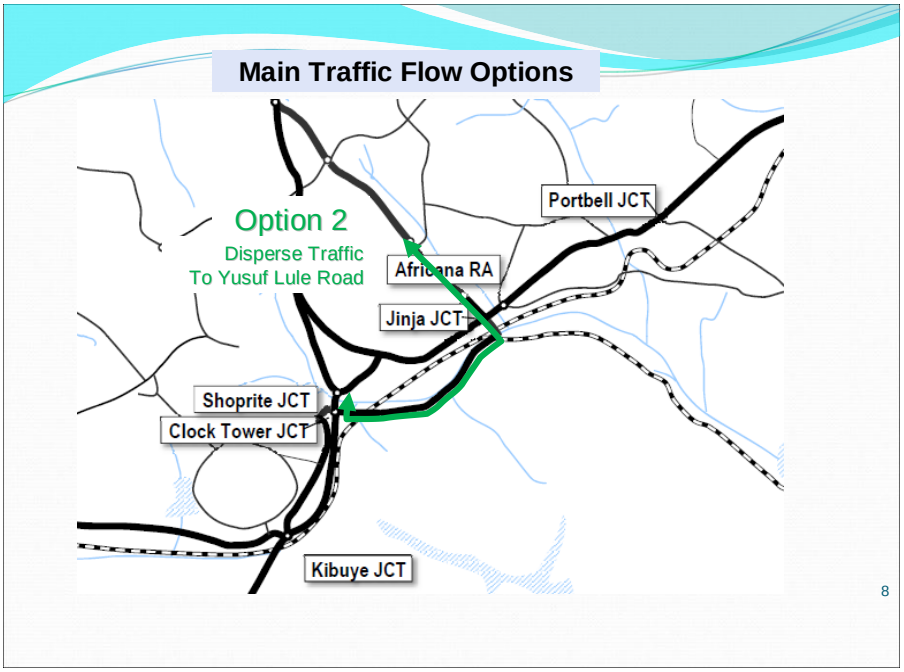


Figure 7-2: Tentative Plan for Option-2

7.2.3 Option 3: Aims at diverting traffic from the CBD to Mukwano / Access Road

Option three will involve the widening of Queensway and constructing two flyovers (one from Queensway to Nsambya road and the other from Access road to Jinja road) with an underpass below the Nsambya junction. Under this arrangement, part of Mukwano road will be widened as well as the Jinja road after the Cemetery. Option 3 has some similarity to Option 2.

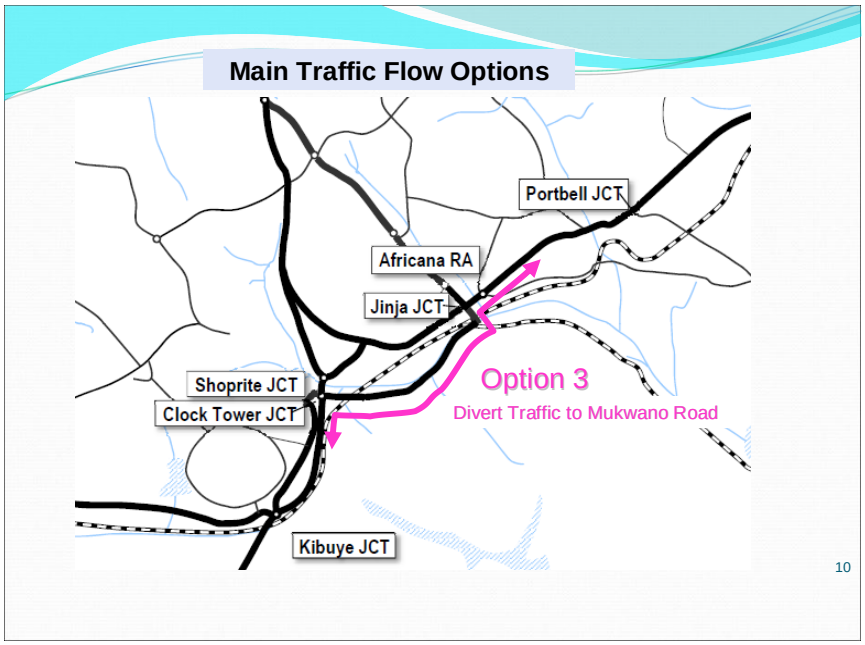


Figure 7-3: Tentative Plan for Option 3

Briefly, Option 3 consists of the following:-

- A two lane flyover that would commence from the upper side of Jinja road starting at the cemetery area, and will go westward above the Hotel Africana Roundabout , slightly curving into part of the Centenary Park before moving southward towards the Sixth Street Roundabout;
- It will then move towards Mukwano / Access road. There will be an underpass at the Nsambya junction leading to yet another flyover that will pass on the left of the Clock tower into the Queensway ending at the Katwe Bridge along Queensway.

7.2.4 Option 4: Zero Option (Do nothing Option)

In conducting an ESIA it is imperative that options considered include the do nothing option. Under this option, the status remains as is and nothing will be done in terms of road construction aimed at alleviating their congestion within the CBD.

7.2.5 Environmental and Social Implications of Design options

Of the three main options 1 has the highest impact on social infrastructure, since the road will pass through already highly developed urban setting. It will have the capacity to disrupt social life both during construction and operation. The alignment of Option 1 is marginally longer than that of Option 2 and the property acquisition required for Option 1 is likely to be greater than that required for Option 2 and less relocation is expected for Option 2 compared to Option 1.

In the case of Option 1, the proposed Flyover along Kampala and Jinja Roads will be so close to working places and the noise factor especially during operation could be very high. Moreover it will require that the BRT is put in place first before the Flyovers can be constructed. For Option 1, there will be limited biological impacts since that area is devoid of intensive biological diversity compared to Options 2 and 3.

Both option 2 and 3 move parallel to Nakivubo Channel and cross it at one point along Access Road compared to Option 1 which crosses the channel once after the fire station but is otherwise away from the system for the most part.

Option 3 will have more biological impacts due to the many trees which line the roads and are likely to be removed to create way for expansion of the road. Fortunately most of the biological impacts can be compensated for through replanting of other trees.

7.3 Options for the Kitante Sub Station

Main concern during construction is management of outages; although Nakasero and Queensway sub stations are proposed, these are not yet constructed.

Currently the substation is 28MVA i.e. 2 transformers each 14MVA and running at 80%, there are future plans for upgrading, note, there are some works going on at the moment.

The flyover and substation can co-exist, although maintenance of the substation would become a problem. The clearance of 8m may not be enough to lift the transformers using a crane, load them onto a vehicle and then take them for maintenance; traditional methods for shifting the transformer are possible but would mean that the process of maintenance takes longer and is more costly.

Additionally, the substation has very little land and relocation or establishing an additional loading bay would require more land. More so, an alternative access route may be required, land is not available.

Any works over the substation means that one is working in the substation and therefore requires clearance from UMEME in order to get safety guidance. The issues of concern here is the safety of people working on the road during construction and maintenance e.g. painting of the structure.

There is a 2m meter clearance from the substation but still all works have to be supervised by an UMEME authorized person in order to manage outages and also the safety of the people working.

Observations

- The design has considered that the flyover is directly above the substation. From the substation towards Africana Roundabout, there is a pier very close to the facility
- The main issue is about maintenance of the substation when the flyover in existence clearance of 7 to 8m isn't adequate for the operations. The crane operator said, for maintenance and upgrading of the substation, a clearance of about 18m is necessary.

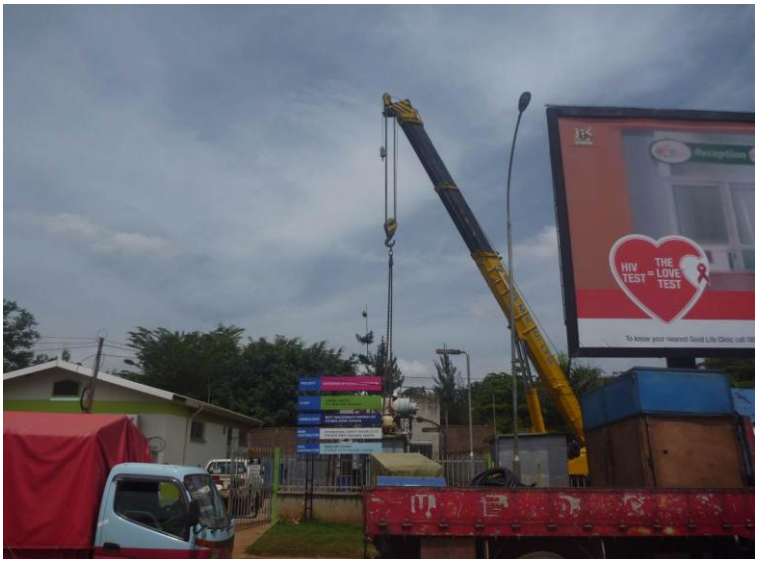


Photo 7-1: An impression of the maintenance challenges based on lifting operations as viewed from the Island on Jinja road

Option 1: Taking the flyover higher

In this option, the flyover would be taken higher to accommodate the need for maintenance.

Option 2: Relocation of the substation

This would involve shifting the whole substation to another location. The issue with this option is it would require more land i.e. for the construction of a new substation and an area for the operation of the crane during maintenance. It would also involve relaying all the underground cable networks hence an increased cost as new cables have to be installed.

Option 3: Relocation of the two transformers

In this option, the substation house would remain in its current position and only the transformers shifted out of the flyover underside. Some land would be required for this operation and also an access road to the substation would be necessary.

Conclusions

Option 2 seemed to be an appropriate solution but still all the options were going to be looked at in details for further considerations by the Survey Team.

7.4 Multi-criteria Analysis

As a way of optimizing the options discussed above, the following has been done. On a scale of 0.00 to 1.00, the negative impact is estimated and then the total is provided. The higher the score, the higher the negative impact (hence less favourable). The choice of the weight has been qualitative. A comparison of the total score

gives the likely choices regarding the options. Briefly the considered options (alternatives) are those which were discussed above and are: -

- Option 1: Direct access to the City centre from Clock tower and Shoprite Junction;
- Option 2: The road starts from Shoprite Junction moves South towards Clock Tower and turns along Nsambya Road – Mukwano Road and disperses traffic towards Yusuf Lule road ;
- Option 3: Starts from Queensway, follows Nsambya Road – Mukwano Road and turns toward Jinja road past Hotel Africana Junction and ends after the Cemetery. It has two Flyovers the first one from Queensway and the last one starting after Mukwano industries and ending at the Cemetery along Jinja Road;
- Option 4: Zero-Option (Do nothing Option).

The main objective under this MCA is to minimize environmental and social impacts, reduce the costs of relocation and keep the costs of mitigation at a minimum.

Table 7-1: Multi criteria Analysis for environmental and social considerations

Variable Impact	Op 1	Op 2	Op 3	Op4
Physical Impacts				
Removal of High value Buildings / Structures	0.7	0.5	0.4	0.3
Disruption of National Infrastructure (Water / Power /etc)	0.5	0.5	0.6	0.3
Impact on Aesthetics (Visual Impacts)	0.7	0.6	0.5	0.3
Reduction in total travel time	0.5	0.5	0.4	0.85
Likelihood of Soil Erosion and Subsequent Silting	0.4	0.4	0.4	0.5
Generation of Spoil and Requirements for its Disposal	0.6	0.6	0.6	0.5
Pollution of Water sources	0.4	0.4	0.5	0.6
Biological Impacts				
Loss of roadside trees	0.3	0.5	0.6	0.3
Loss of Habitats for urban Biodiversity	0.3	0.4	0.5	0.3
Disruption of Habitats for Aquatic Wildlife	0.3	0.3	0.2	0.2
Social Concerns				
Relocation of flower businesses and artisans	0.3	0.4	0.4	0.5
Potential to interrupt shrines and other artifacts	0.4	0.4	0.4	0.4
Impact on Churches and Mosques	0.4	0.4	0.5	0.4
Disruption of Businesses during construction	0.7	0.6	0.4	0.4
Disruption of business during operation	0.6	0.5	0.3	0.5
Improvement on NMT	0.5	0.4	0.2	0.8
Land take to widen road	0.4	0.4	0.5	0.3
Number of Landlords/stakeholders to Deal with	0.6	0.6	0.4	0.4
Likely Disruption of Other Roads and Road Users	0.6	0.6	0.5	0.4
Reduction in Traffic congestion	0.5	0.5	0.3	0.9
Removal of traffic from the CBD	0.5	0.5	0.3	0.9
Total Score	10.2	10	8.9	10.05

From the above qualitative analysis the preferred Option is provided in the Table below: -

Options /Alternative	Score	Ranking
Option 1	10.2	4
Option 2	10.0	2
Option 3	8.9	1 (Best alternative)
Option4(Zero-Option)	10.05	3

Briefly, therefore the limited analysis shows that Option 3 is the most viable.

8 ANTICIPATED ENVIRONMENTAL IMPACTS

The methodology for impact identification has been described above. The mitigation measures have been arrived at after considering the likelihood, and severity of the potential impact as described in the methodology.

8.1 Environmental Impacts during Design Stage

Except the requirement of conducting consultations with and sensitizing local communities and stakeholders, particularly in preparation of the Resettlement Action Plan (RAP), impacts during design stage are minimal and will not have an influence on the proposed Flyover project. At design stage the major potential impact is the likely hood to raise the expectations of the community beyond what the project will provide. This can be handled through effective sensitisation and participation of stake holders as described below.

At design stage major mitigation measures are: -

- To ensure that all stakeholders have been contacted and their concerns incorporated in the design. Secondly adequate research/studies regarding the state of the social environment have been made.
- Ensure that the Local Government (in this case the KCCA), who provide the enabling environment, are fully involved.
- Sensitization and sharing of information to harmonize expectations of local communities with project progress.

It is recommended that UNRA closely liaises with the KCCA to assist contractors when liaising with local communities.

8.2 Environmental Impacts during Construction Phase

Environmental impacts include; construction site waste generation; soil erosion and sediment control from materials sourcing areas and site preparation activities; fugitive dust and other emissions (e.g. from vehicle traffic, land clearing and movement, and materials stockpiles); noise from heavy equipment and truck traffic; and potential hazardous materials and oil spills associated with heavy equipment operation and fuelling activities. Environmental issues that are likely to be experienced during construction and operation of roads include the following:

- Habitat alteration and fragmentation
- Storm water
- Waste
- Noise
- Air emissions
- Wastewater

Other impacts will be social in nature since the project is within an urban environment which has a high population density.

There are also positive impacts that are associated with the project including the following:

- Employment Opportunities
- Reduced traffic congestion
- Improved skills for community members

These are described below:

8.2.1 Positive Impacts during Construction Phase

8.2.1.1 Job Creation and Related benefits

During construction the local community is likely to be employed as casual labour and service providers (e.g. food vendors etc.).

8.2.1.2 Reduced Travel time

During operation transport options especially for motorized transport as well as NMT at Junctions and along the FOs will improve along with substantial time savings and a reduction in vehicle emissions. These will translate into a healthier environment and improved living conditions for the impacted community.

8.2.1.3 Improved Safety

Presently the boda boda, pedestrian and the motor vehicle do compete for the same space along the narrow road. After the construction, there will be separate lanes for motorized transport and pedestrians which will reduce the potential risk of accidents against pedestrians. The present causality rate in the country impacts most the pedestrians and cyclists in that order.

8.2.1.4 Improved Skills for Local Communities

Local labour employed on the construction works would benefit only from increased income but in technical skills training also. The potential positive impact of improved skills in local communities is assessed to be of low significance without optimization and medium with optimization. .

8.2.1.5 Tree Planting and enhanced landscape management

Removed trees will be replanted alongside the FO in suitable areas in addition to more beautification of the project area. In many places such roadside trees will provide a natural buffer between the road and adjoining land / businesses. MoWT policy (2006) along highways is that trees are planted along the road reserve to improve aesthetics and mark road reserve boundaries. NFA and UNRA are currently working on guidelines for tree planting.

The majority of impacts during construction are likely to be negative if only for the construction. Construction works have capacity to impact on the terrain and soil erosion loading, as well as on some of the urban biological environment. Causes of the impacts will include (i) site clearance, (ii) Dislocation of Infrastructure especially utilities, (iii) excavations, (iv) tunnelling if adopted; (v) possible silting of Nakivubo Channel and wetland downstream (vi) operation of burrow pits and quarries (vi) Site rehabilitation

8.2.2 Negative Impact on Natural Environment

8.2.2.1 Topography and landscape

Apart from the area around the Nsambya bypass, the topography will not be greatly impacted by this development. This is because elsewhere, the road level remains the same apart from those points where the road will be widened.

8.2.2.2 Hydrogeology

Excavation and tunnel / Underpass construction

Excavation and tunnel construction along the proposed route may distort the hydrology and hydrogeology flow patterns of the studied area. Most of the waters draining from the Nsambya and Kibuli sub catchments shall be flowing past the proposed underpass. The construction of the road and tunnel will largely affect the hydrogeology and hydrological regimes in the area. However since the underpass will be on a fairly raised ground (at the Nsambya Junction), the magnitude of the impact of excavation on the watercourses is considered as low albeit negative.

8.2.2.3 Soils

Soil Erosion

Soil erosion is likely due to the slopes especially off the Nsambya hill as well as Kibuli hill. The anticipated cut operation exposes the soil in addition to changing the slope gradient all of which lead to potential for increased erosion.

Where the cut is deep and if no protection is accorded the potential for slope failure is high especially around the zone where the underpass will be created. Subsequently, the potential risks of soil erosion, soil pollution, slope failure at the underpass and general degradation resulting from construction activities must be taken into consideration.

Increased sediment load in surface waters (that could lead to siltation of the Nakivubo channel, adjacent wetlands and eventually Lake Victoria) is a direct result of soil erosion and slope failure in excavations or embankments. The magnitude of the impact of soil erosion on the watercourses is considered as low negative.

8.2.2.4 Soil degradation and Pollution

Toxic construction materials used in the road corridor especially oils and fuels from vehicles and other equipment which may frequently spill have capacity to, contaminate the soil and may wash down drainage systems to the wetlands. The other potential sources of toxic substances are the packaging materials which are used for some of the construction supplies. However, due to the short span of the road project and the fairly low slopes within the project area, the magnitude of the impact on soil degradation and pollution on the watercourses is considered as low negative.

8.2.2.5 Hydrology

Storm Water

Storm water is a major concern to UNRA and road projects. In the case of Kampala, the scenario is complicated by uncontrolled dumping of garbage into the drains thereby blocking the storm water flow. This can be further enhanced by the construction debris as well as soils if they are allowed into the drainage system.

Because of the predicted weather instability expected as a result of global warming, storm water drainage provision for all GKRIP should be capable accommodating an increase of up to 30% compared to present runoff and cater for the 100 year return flood level in the Kampala Drainage Master Plan which is about 5m above the present lake level on the fringes of lake Victoria. Wind gust speeds are also predicted to increase and ancillary elements such as street lamps, road signs etc must be designed to withstand wind gusts of up to at least 100 knots.

Road drainage should discharge into existing natural water courses to reduce scour. Culvert outlets where constructed should be protected by Reno mattresses or similar. All slopes to be grassed with *Bahia grass* or similar approved to control erosion (including stone pitching as appropriate).

8.2.2.6 Water Quality

Nakivubo Channel Water Quality

Part of the project is located in a flooding prone zone. The Nakivubo channel is a major drainage system for Kampala and its water quality is of significant implication to the Nakivubo wetlands, and subsequently Lake Victoria. Potential impacts from construction activities could result from erosion and sediment transportation, especially during rainfall events.

The activities that will involve excavation, pitting for erection of support pillars for the FO and the general ground clearing will result into significant soil amount being piled within the vicinity of the channel. The impacts related to erosion and increased sediment transport in the channel will go beyond the project immediate area of influence, these will include:

- Silting up of the Nakivubo wetland where most of the soil and sediments will be trapped. This will reduce the capacity of the wetland to retain water and perform its filtration and pollution control functions resulting into a pollution risk to the inner Murchison bay of Lake Victoria
- Increased deposition of soil into the channel will also reduce the channels capacity to hold/ carry storm water from different areas in Kampala. Given that even right now, during heavy rains, floods are a common event in the low lying areas of Kampala, there will be increased likelihood of floods.

8.2.2.7 Air Quality

During construction, increased traffic volume and movement of construction equipment, construction activities (extraction, transport and stockpiling of materials, excavation, compaction etc.) will cause deterioration of air quality due to generation of dust. Another source of air pollution is emissions from equipment and vehicle exhaust. This can be of concern especially during the busy hours when for example at the Clock Tower where the ambient air pollution levels are hovering around the permitted levels

8.2.2.8 Noise levels

During construction, increased traffic volume and movement of construction trucks and equipment, construction activities (including cutting and compaction) will increase the level of noise and vibrations to the level above the present. Improvements of the road will cause increase utilization of the roads and so higher traffic volume. Upgrading of the road will increase noise and vibrations due to the fact that bitumen road propagates noise and vibrations much more effectively than gravel and loose soil.

Apart from road noise, it is important to recognise that there are many other sources of noise within the project environment. This has a tendency to increase the noise density otherwise known as the reachable cluster noise. While the project may not control the impact of cluster noise other furore developments have to take it into account since for every additional activity the chance for increasing cluster noise is high.

8.2.2.9 Flora and Fauna

Since the project is very close to the CBD, most of the project area has been greatly modified by anthropogenic activities. Subsequently apart from the adapted urban biodiversity there is hardly any indigenous biodiversity in close proximity to the Road project.

Loss of Vegetation and other trees

Never the less as discussed above a high number of tree species as well as other non tree species (Annex 5), herbs, shrubs and grasses, including those of agricultural value were also recorded in the project area, These will be removed and hence the need to replace them to preserve biodiversity and at the same time to continue providing the special functions of attributable to these flora. A number of other fauna and avi-fauna were also recorded. The main impact would be the destruction of their habitats if measures are not taken to minimise land take and excavations.

Loss of Flower gardens and other Agricultural crops (ornamental Trees)

As discussed before, many areas especially along Mukwano Road have numerous flower gardens that are going to be disrupted by the construction. Thy owners are many such that some of the plots are about as small as a few square metres in area. However, they have been organised in a society which is easier to deal with.

8.2.2.10 Disturbance to Fauna and Avi fauna

The survey identified a few urban Fauna and Avifauna (Annex 6). The main impact would be the destruction of their habitats as well as key crossing points for this urban biodiversity. Overall, the impact will be minimal. There might be some birds and other species which are laying eggs within some of the trees likely to be cut. In this case a “soft” or “delayed” start approach is recommended along avenues where birds are laying eggs. This

will enable birds move away from the work area before serious construction starts and give time for any laid eggs to hatch. The main impact here is on birds like the Marabou Stoke and other migratory birds. The use of pillars to hoist the Flyover will leave some room for avi-fauna and other species to fly across the road. Mitigation measures to minimise these impacts on the fauna are described in the table below.

8.2.3 Negative Impact on Socio-Economic and Cultural Environment

Positive impacts were highlighted in Section 9.2.1 the majority of them being social impacts. When constructing the Flyovers every effort will be taken to ensure that existing social patterns are not greatly disrupted adequate resettlement assistance provided to impacted individual and communities when required to ensure that no losses pass to the local community. During the design of the project road, measures have been taken to ensure that no structures /Buildings are taken apart from where adjustments could not be made to avoid the structure / building. The project will utilize mostly Road reserve land. In a few cases private land has been taken and a resettlement Action plan has been commissioned to compensate the impacted people. Most of the land will be within the road reserves or slight encroachment which is unlikely to disrupt economic activities. The following paragraphs describe some key social impacts likely to arise from FO project.

8.2.3.1 Community Health and Safety

Community health and safety issues will include amongst others dust, noise, and vibration from construction vehicle transit, and communicable disease associated with the influx of temporary construction labour. Significant community health and safety issues associated with road projects include:

- Pedestrian safety
- Traffic safety
- Emergency preparedness

Pedestrian Safety

Pedestrians and cyclists are at greatest risk of serious injury from collisions with moving vehicles. Children are generally the most vulnerable due to lack of experience and knowledge of traffic related hazards, their behaviour while at play, and their small size making them less visible to motorists. Recommended pedestrian safety management strategies include the following:

- Provision of safe corridors along the road alignment and construction areas, including tunnels and bridges (e.g. paths separated from the roadway), and safe crossings (preferably over or under the roadway) for pedestrians and cyclists during construction and operation. Crossing locations should take into account community preferences, including those related to convenience or personal safety (e.g. the prevalence of crime at potential crossing point locations).
- Installation of barriers (e.g. fencing, plantings) to deter pedestrian access to the roadway except at designated crossing points;
- Installation and maintenance of speed control and traffic calming devices at pedestrian crossing areas;
- Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian facilities or bikeways.

Automobile Safety

Collisions and accidents can involve a single or multiple vehicles, pedestrians or cyclists, and animals. Many factors contribute to traffic accidents. Some are associated with the behaviour of the driver or the quality of the vehicle, while others are linked to the road design, or construction and maintenance issues.

Emergency Situations and security

Emergency situations most commonly associated with road operations include accidents involving single or multiple vehicles, pedestrians, and / or the release of oil or hazardous materials. Other potential impacts include terrorist attacks and civil unrest.

Security on the FO can be a cause of concern especially at night and under the underpass. This may impact the pedestrians and cyclists more although motorists are not immune either.
Road operators should prepare an emergency preparedness and response plan in coordination with the local community and local emergency responders to provide timely first aid response in the event of accidents and hazardous materials response in the event of spills.

To improve security, the FO should be well lit at night and pedestrians and or cyclists will not be allowed along the FO. Separate lanes for pedestrians and cyclists to be put in place. These to will be well lit.

8.2.3.2 Land Use

Land Acquisition
The FO project will not take a completely new alignment which would lead to large scale land acquisition. Measures are to be taken in the design to avoid land take (especially where the private sector and individuals are involved). As discussed above, land take has been minimized. Temporary land will also be required for ancillary works as well as access roads during construction. This has been designed along Nsambya road and parts of Mukwano road, Overall this impact are estimated to be low (negative),

8.2.3.3 Service Utilities

The main utilities impacted have been discussed but are the Communication cables, power lines and mains. Some of these cross the road and especially communication lines have not followed straight lines in a number of places. At the same time it has not been possible to critically isolate them during neither the ESIA nor the RAP studies. It will therefore be necessary that the contractor works closely with the utility providers to ensure that services to the community are not disrupted during construction and that during the operations of the road project utilities will be accommodated along side the road. It had been proposed that separate ducts be constructed alongside the road to convey utilities and that if this is to be done, it will be done before the construction commences. This has since been discouraged since the cost would be higher and has not been planned for.

8.2.3.4 Waste Management Implications

Solid waste produced by construction activities may be classified under General waste, Construction waste, human waste, and hazardous waste. This is described under: -

General waste: - this is mostly produced from camp and office waste and will include waster paper and other, domestic.

Construction Waste: - this will mostly include asphalt debris, concrete products, workshop scrap and other wastes including miscellaneous packaging waste.

Human waste: - This will mostly arise from camps and even along the FO for lack of sanitation facilities.
Hazardous waste: - This will arise from all sections depending on the materials in use. At camps the hazardous waste includes torch batteries and plastics, while at the workshops and along the road works the main hazardous waste are the oils. Some of the packaging materials could have hazardous components including asbestos and other insulating components.

In order to mitigate these impacts appropriate measure will be taken first to separate the hazardous waste from the nonhazardous ones. Hazardous materials will then be stored according to manufacturer's requirements and fuel and bitumen stored in areas with impermeable surfacing runoff from which is collected in oil traps. Human wastes which fall under sewerage disposal within the project area (the project area is connected to the central sewer) must be disposed of in accordance with the requirements of the appropriate authorities within the KCCA.

8.2.3.5 Moving during construction activities. Demographics and Settlement Pattern

Relocation and Compensation

There will be no relocation of people under this project. This is because the design measures have been taken to ensure that most structures are not affected. However there will be some people who have been conducting business along the road reserve that will be removed. These are mainly the flower garden attendants especially along Mukwano road and the Mukwano road Roundabout next to Sixth Street. A Resettlement Action Plan has been conducted to deal with these impacted people. In the case of the Flower garden attendants, they will be provided with assistance to enable them move to another location or encouraged to move a step backwards to enable the road construction to commence. Although discussions with the KCCA indicate that the authority does not compensate people within road reserves since they are there illegally. Nevertheless this study proposes that such people should get some resettlement assistance to enable them move and adjust accordingly There are a number of infrastructures (mainly utilities including electricity lines, communication cables, water mains and sewerage lines as discussed before. These if disrupted can cause significant disruption to a wider section within the City. The related risk especially with respect to Utilities is estimated to be high (negative).

8.2.3.6 Physical Cultural Resource (PCR)

Places of Cultural Importance

As discussed before, the project area has a number of places of cultural importance which include the following: -

Churches	Shrine;	Pan-Africa Park; and
Temples;	Clock Tower;	Cemetery

Fortunately all these apart from the Clock Tower at the Nsambya Queensway Junction are outside the road design area. A special mention needs to be done in respect of the Clock Tower. There have been a number of proposals as how to handle the clock tower as one of the preferred design options is to remove it. As many respondents are supportive of relocating the Clock tower while an equal number are vigorously against relocation. However discussions with the Department of Museums and Monuments who are the responsible party say that under certain circumstances they can support relocation: In particular the views of the Commissioner include the following: -.

- That the Clock Tower is an important monument which relates Uganda's history
- That the priority of the Department would be not to remove the Clock Tower, however since the department is also supportive of national development, deliberate measures will need to be taken in order to protect the values represented by the monument.
- Hence the design Team can consider relocating the Clock Tower to the Shoprite Junction so that it remains in the public domain since the monument needs to be seen from afar.
- That if the Clock Tower is relocated to the Pan African Park, it is important to note that the monumental trees within the park are still growing and is likely to attain a great height. The monument will then have to be raised such that it is seen through the trees and above the Flyover.
- However if it is in the park, the history of the Clock Tower was likely to be overshadowed by Pan Africanism.

Following the discussions, the Department continued to conduct further investigations and finally came up with a position attached as Annex 7 to this report. Briefly they are of the view that the Clock Tower can be relocated but with conditions which include the following: -

- That all the attributes of the Clock Tower which include the Clock and the bell will be available and kept intact;
- That all the features of the tower will be documented before the relocation including checking of the pH (both the alkalinity and the acidity) of the soils in the new site which will be compared with those at the old site;
- Check the history of the Clock Tower's conservation, for example literature on all repairs, so as to understand whether there were any previous cracks or damages;
- The hired construction firm will have to lift the whole monument and erect it at the new site / location without any adulteration. The Department of Museums and Monuments will provide an oversight role to ensure compliance;

During the relocation, a Conservator shall document all the processes and records will be kept at the Uganda National Museum

In general, the level of negative impacts arising out of disruption of Places of Cultural and Historical Importance is low since the alignment does not cross any of the identified sites. .

8.2.3.7 Air Pollution and Noise

On the FO project the main occupational health concerns relate to noise, dust, working at elevated heights on the Flyover, possible use of explosives and possible accidents at quarries, burrow areas, the crusher area and the construction site. A number of statutory requirements need to be fulfilled especially by the contractor. Air pollution from dust generated by construction and other traffic, quarrying and crushing activities and asphalt plants can be a problem especially during the dry season. Often pollution in local areas and working zones can be severe enough to affect the health of workers and populations nearby.

8.2.3.8 Noise

Noise generated from some of the same sources could locally lift the ambient noise level above the legally permitted threshold especially while using heavy cranes to lift equipment for the Flyover Construction. Noise on construction projects affects not only the machine operator but those close-by, can cause noise-induced hearing loss and mask other important sounds for communication and safety. The risks due to air and noise pollution to both workforce and nearby communities are estimated to be Moderate (negative).

8.2.3.9 Occupational Health and Safety

Public Health with Respect to the Working Condition

There will be no workers camp for this road project, yet the workers themselves due to their access to ready to spend cash could easily be a vehicle through which communicable diseases can impact on the general public. It is strongly recommended therefore that workers should find existing rentable space as an alternative to construction camps. It is known that migrant labour can be a vehicle for transmission of Sexually Transmitted Diseases (STD) including HIV/AIDS with both workers and the general population at risk. Deliberate measures must therefore be taken to ensure that the general public health is not compromised by the activities of the FO project.

Occupational Safety

In specific reference to the FO project, the main concern will be health impacts due to Quarrying activities such as Noise, dust, impact of explosives, as well as possible accidents at the crusher area and in the general project area. Discussions with the Department of Occupational Safety and health indicated that there are a number of statutory measures that need to be fulfilled especially by the

contractor. Moreover, air pollution is likely to arise due to vehicular dust from construction traffic and other main road traffic as well as the quarrying activities. Other sources of the air pollution will be the asphalt plant and haulage traffic especially during the dry season. Exposed road surfaces during the dry season can generate loads of dust that will add to the air pollution loading. In spite of a lower Air Pollution Potential, the pollution in localized places and working zones will be severe enough to affect the health of workers and nearby people. The same sources will generate noise that could be above the allowed decibel limit.

As discussed above, noise is present on construction projects by the very activity of construction. It affects not only the person operating a noise-making machine, but all those close-by and not only causes noise-induced hearing loss, but also masks other sounds that are important for communication and therefore for safety.
The risks due to such Air pollution and Noise to the workforce and nearby communities are estimated to be Moderate (negative). Measures will be taken to ensure that the workers' health and safety are not compromised.

Other issues of occupational safety may overspill into sanitation, security and the treatment of hazardous materials. This road project will include construction of Flyovers as well as an underpass. In this case there will concerns for safety for those working at elevated heights as well as provision of adequate lighting and aeration for the underpass / Tunnel. The Safety Officer must supervise operations and ensure environmental compliance during construction.

Sanitation
The project is within the city and there will be no need to construct a workers camp that would require elaborate sanitation measures. The main sanitation concern for the project will be for the workforce at the worksite, and at burrow and quarry areas as well as at workshops, site offices. The three commonest types of sanitation strategy adopted by the construction industry are;

- Flush toilets in offices and workshops if water is available;
- Mobile or Portable Sanitation facilities along construction sites such as the case of the FO project;
- VIP Latrines at offsite facilities such as Burrow pit areas or crusher site and quarries;

The risk from this impact however is considered to be minimal to moderate (Negative).

8.2.3.10 Landscape

Construction of Flyovers and an underpass as well as rumps for the FOs will be the main issues of concern regarding the aesthetics. There is also a high risk of environmental and aesthetic damage at burrow areas and quarries. This calls for appropriate restitution of these sites on completion of the works.
Present designs show that the FO will be in excess of 8 metres and distance which competes with the Clock Towers along the road. This is bound to negatively impact on the aesthetic value of the road project. The deep cuttings at the underpass for example as well as the exposed FOs above 8 metres above ground could change the aesthetic locally but can also provide a dramatic focus around which aesthetic improvements can be commenced.
There is a possibility of blending the steel bridges with concrete structures especially at the Kitgum House Flyover. These need to be blended in such a way that external look is harmonious. Finally the colour of the Flyovers will affect the aesthetic value of the project. The chosen colour should blend with the environment and yet it should not be too brilliant to be out of character with the environment. The risk for this to happen is estimated to be high especially for the case of quarries.

8.2.3.11 Resettlement Action Planning (RAP)

The number of impacted people in this project is less than 200. Nevertheless a RAP has been conducted which shows that a few properties will be taken and some land will be acquired. The Project Impacted people most affected are the Uganda Railways, Kampala capital City Authority and Uganda Police. Specific measures to reduce resettlement have been taken so as to avoid relocating of people. But due to the high value of land within Kampala city, the actual cost of compensation is high. Subsequently the land take that will be acquired by the road activity was found to be **15.357 Acres valued at Uganda shillings 46,323,650,000/= (Forty Six Billion Three Hundred and twenty Three Million Six Hundred and Fifty thousand. All the land is titled. Otherwise the total cost of crops (including trees) to be compensated was estimated at UGX 9,165,050/= while that of Buildings and structures was UGX 1,553,449,934/=**

The survey has identified the actual area of land and properties to be taken up by the Fly over (FO) Project and works. Based on the findings of the study carried out, the total package to meet compensation and resettlement needs is **Fifty Five Billion, Sixty Nine Million, Two Hundred and Four Thousand, Seven Hundred and Thirty one Uganda Shillings (Shs. 55,069,204,731/=).** This amount is inclusive of 15% Disturbance Allowance.

8.3 Environmental Impacts during Operation Phase

During the operation of GKRIP – the Flyover Project, the main concerns will relate to speeding, potential for accidents off the FO, managing storm water, dumping of waste, climate change impacts and aesthetics. These are described in the following subsections.

8.3.1 Negative Impact on Natural Environment

8.3.1.1 Soils

Soil erosion will not be a major concern during the operational phase of the project. This is because the mitigation measures that were discussed for the construction phase will have eliminated future soil erosion concerns. However, it is possible that soil deposits from outside of the project area could be flushed into road drains during rainfall causing silting downstream. The areas of concern are those where there is some slope which includes the Nsambya Junction area, the slope off the Hotel Africana roundabout towards the Jinja road and the slight slope along Queensway before the clock tower.

8.3.1.2 Hydrology

Storm Water

Weather events are predicted to become more severe due to global warming instability. The potential for storm water damage and drainage related impacts are high during times of severe rain and will impact road operations. Storm water is also expected to increase with time due to the expanding urban fabric. Impacts due to storm water are likely to be low to very low (negative).

8.3.1.3 Climatic Variables

Climate Change

Climate change Impacts such as increased rainfall in the project area are expected to impact on road works in the project area over the next 20 to 30 years. The impacts are likely and without mitigation Medium to High - (negative). Nevertheless because of the design and mitigation measures taken during construction the impacts will be low.

8.3.1.4 Water Quality

Mitigating Nakivubo Channel Water Quality

It is imperative that during the road operation, there should be continuous post construction monitoring.

8.3.1.5 Air and Noise Pollution

Although the traffic volume is increasing over the years, this is not expected to increase the air pollution very much in the short to medium term. The reason is that the higher levels of air pollution observed at the Clock Tower for instance, are due to the traffic jam where many vehicles stay motionless yet they are emitting emissions. They effectively become stationery sources with a higher potential to pollute the air. With reduced traffic congestion this level is expected to reduce in the short term. In the very long term, the air pollution levels could rise again and measures to contain the pollution will be required.

The same argument will not work for noise, since most of the noise is generated by the tires on the tarmac and the higher the speed, the higher the noise. In addition motor vehicle engine noise will be of concern. The attenuation for noise can be high so that the impact will be felt most within the 50 metre distance from the FO.

8.3.1.6 Flora and Fauna

After opening to traffic biological impacts are expected to be minimal except in case of accidents when hazardous material could be spilled onto the road leading to contamination of the water channel which could impact on the bio-diversity therein. The Flyover at 8 meters high may have potential to obstruct some flying birds. But since there was no avifauna migration routes identified in the places where the flyover is located, this impact is expected to be minor.

8.3.2 Negative Impact on Social Environment

8.3.2.1 Waste Management Implications

Solid waste generation during operation and maintenance activities may include road resurfacing waste (e.g. removal of the old road surface material); road litter, illegally dumped waste, or general solid waste from rest areas; animal carcasses; vegetation waste from right-of-way maintenance; and sediment and sludge from storm water drainage system maintenance (including sediment traps and oil / water separation systems). Paint waste may also be generated from road and bridge maintenance (e.g. due to removal of old paint from road stripping and bridges prior to re-painting). Waste management strategies include:

Road Resurfacing

- Maximizing the rate of recycling of road resurfacing waste either in the aggregate (e.g. reclaimed asphalt pavement or reclaimed concrete material) or as a base;
- Incorporating recyclable materials (e.g. glass, scrap tires, certain types of slag and ashes) to reduce the volume and cost of new asphalt and concrete mixes.

Miscellaneous Wastes

- Collecting road litter or illegally dumped waste and managing it;
- . Provision of bottle and can recycling and trash disposal receptacles at parking lots to avoid littering along the road;
- Manage herbicide and paint inventories to avoid having to dispose of large quantities of unused product;
- Obsolete products should be handled as hazardous waste;

- Collecting animal carcasses in a timely manner and disposing through prompt burial or other environmentally safe methods;
- Composting of vegetation waste for reuse as a landscaping fertilizer;
- Managing sediment and sludge removed from storm drainage systems maintenance activities as a hazardous or non-hazardous waste.

Painting Activities

- Management of all removed paint materials suspected or confirmed of containing lead as a hazardous waste;
- Use of a system to collect paint waste when removing old paint containing lead. For a simple scraping operation, ground-covering tarps may be sufficient;
- Grinding of removed, old road surface material and re-use in paving, or stockpiling the reclaim for road bed or other uses;
- Old, removed asphalt may contain tar and polycyclic aromatic hydrocarbons and may require management as a hazardous waste.

Urban Waste

During the study, it was observed that Nakivubo Channel is a major illegal waste dumping area. This has a tendency to block the channel and most of this comes from the road surfaces. Along the roads within KCCA drains tend to be blocked especially after rainfall. This is considered one reason for road failures in Kampala. Provision by KCCA of adequate waste collection is recommended as a priority to eliminate dumping of garbage in drainage channels. UNRA must ensure that road drainage maintenance is carried out correctly to avoid blockages and silting. However, with adequate mitigation, the level of impact is considered to be low.

Aesthetics

During the Operation of the road, the areas around the Flyover and those around the underpass could deteriorate in looks due to corrosion or people writing graffiti on the structures. The lighting should also be adequate to give an acceptable view of the facilities at night.

8.3.2.2 Occupational Health and Safety

Over speeding along the Flyover

The New / Completed FO road project has been designed for speeds of up to 60km/hour. Unfortunately, the present driving culture in Uganda does not fully respect the driving code resulting in Uganda having one of the highest road accident rates globally. There is a high possibility that the accident rate due to irresponsible use of the road will increase. Secondly, the road provides both NMT and Cycle lanes. There is still the possibility that pedestrians will refrain from using the pedestrian lanes. On the other hand boda-boda cyclists will most likely wish to use the FO which is not acceptable. The risk due to increased accidents if measures are not enforced can be moderate to high.

8.4 Cumulative Impacts

The Flyover project covers a relatively small surface area. Its interaction with other activities is necessarily limited. Nevertheless it is important to keep in mind the other development projects that will soon take place as discussed under the Kampala Master Plan. Most of the planned projects will commence after the FO project apart from the BRT which is expected to commence before. The BRT will coincide with the FO project along Queensway and at the Hotel Africana Junction along Jinja Road where the impacts could be increased. Fortunately the BRT is much smaller in width and passes through the middle of the road project hence minimizing the cumulative impacts. Mitigation measures taken in this FO Project will also address the resultant cumulative impacts due to the BRT.

Meanwhile future proposed projects will be required to take into account of existing activities while conducting their specific project environmental assessment.

9 ENHANCEMENT / MITIGATION MEASURES

9.1 Positive Impacts

9.1.1 Job Creation and Related benefits

In order to enhance the positive impacts of job creation and related benefits, the following are proposed to be implemented during the project implementation phase;

- Give priority in employment to the great potential for unskilled labour available in the affected zones which have a high level of unemployment:
- Maximize the hiring of unskilled workers from the local communities and semi-skilled workers from the region;
- Ensure that women are provided with suitable employment on the project in line with what they can perform (such as flag persons, accounts, loggers for murrum trips delivered and any other according to their capability);
- Advertisement for jobs will clearly indicate that both women and men are eligible for appointment;
- Design mechanisms in order to ensure that the hiring and recruitment procedures are carried out in a transparent manner.

9.1.2 Improved Skills for Local Communities

Local labour employed on the construction works would benefit only from increased income but in technical skills training also. These can be enhanced further doing the following:

- Maximize the employment of unskilled labour from local communities (and if those resettled wish to seek employment on the Project, priority to be given to them) taking into account gender concerns as appropriate;
- Carry out capacity-building and training programs for the unskilled workers so that they can increase their employability for other similar jobs.

9.1.3 Tree Planting and enhanced landscape management

Removed trees will be replanted alongside the FO in suitable areas in addition to more beatification of the project area. The following are to be followed:

- Trees to be planted at appropriate intervals (about 5 - 10 meters on either side of the road and at islands or interchanges without compromising driving visibility in consultation with KCCA landscape expert);
- UNRA office to the KCCA in tree planting to ensure sustainability of the tress in the long term;
- In the initial years of the project, a budget for caretaking of the trees to be included in the UNRA estimates before handing over to KCCA for beautification to ensure that trees in their tender years do survive;
- Rehabilitate quarries and Burrow Pits with top soils and re-vegetating the rehabilitated areas with indigenous species will improve the scenic beauty.

The majority of impacts during construction are likely to be negative if only for the construction. Construction works have capacity to impact on the terrain and soil erosion loading, as well as on some of the urban biological environment. Causes of the impacts will include (i) site clearance, (ii) Dislocation of Infrastructure especially utilities, (iii) excavations, (iv) tunnelling if adopted; (v) possible silting of Nakivubo Channel and wetland downstream (vi) operation of burrow pits and quarries (vi) Site rehabilitation

9.2 Negative Impacts during Construction Phase

9.2.1.1 Topography

While excavating the tunnel or underpass, the contractor will ensure that all spoil and debris is removed as soon as it is excavated. In this way the topography will not be changed much apart from the point of contact where the excavation is going on.

9.2.1.2 Geology

Excavation and tunnel / Underpass construction

Excavation and tunnel construction along the proposed route may distort the hydrology and hydrogeology flow patterns of the studied area.

- Although this impact is considered as unlikely (improbable) it will benefit the road project if detailed hydro-geological and hydrological studies coupled with modelling in the area are conducted just of the slight chance of possible flooding that might arise around the underpass and downstream;
- That the Contractor will be required to comply with the recommendations within the acquired NEMA Certificate of Approval for all operations;
- When tunnelling and after use of heavy drilling equipment, the supervisor will inspect the cliffs / walls to ensure that no slope failure is likely and if any loose hanging cliffs / stones are observed, then the supervisor will knock them down and put in place protective measures;
- All erodible areas to be re planted as soon as possible if affected by the road works;
- The underpass / Tunnel will be sealed at the earliest possible time to minimize hydro-geological disturbance.

9.2.1.3 Soils

Soil Erosion

The potential risks of soil erosion, soil pollution, slope failure at the underpass and general degradation resulting from construction activities must be taken into consideration. Replanting exposed slopes with a suitable soil-stabilizing grass such as Bahia grass is recommended.

- Degraded sites including construction material storage points will be restored to as close to their previous condition as possible after road construction. At burrow areas burrow rehabilitation to be done ensuring that exposed areas will be replanted taking into account of the appropriate species in line with the existing flora and fauna;
- All embankments especially where the underpass will be created, trenches and outfalls after construction will be strengthened to limit erosion. This can be done by stone pitching, use of gabions or lining banks with concrete as appropriate as possible and planting of Bahia grass. (Paspalum notatum Flugge) as recommended above;
- Sediment basins/traps will also be used to trap sediments before they enter the Nakivubo Channel and other storm water drains / watercourses. Such facilities will be regularly checked and maintained.
- Replanting exposed slopes with a suitable soil-stabilizing grass such as Bahia grass is recommended. In order to reduce the potential for slope failure during construction the cut slopes will be protected with scaffolding as appropriate.
-

Soil degradation and Pollution

Toxic construction materials used in the road corridor including rock/stone, cement, lime and fuels from vehicles and other equipment which may frequently spill have capacity to, contaminate the soil and may wash down drainage systems to the wetlands and eventually to Lake Victoria. For mitigation, the following should be followed:

- Construction materials to be stored in approved containers and washing areas for site equipment servicing and repair will be carried out in a defined area with a concrete pad draining to oil traps;

- Provide secure stores for hazardous materials and refuse pits to be demolished on completion;
- Abandoned equipment, tyres, batteries, filters, sparkplugs etc. to be removed and carefully disposed of as required by law;
- Routine, systematic sprinkling of the road, work area and crushing site to reduce dust emissions.

9.2.1.4 Hydrology

Mitigating Storm Water
Road drainage should discharge into existing natural water courses to reduce scour. Culvert outlets where constructed should be protected by Reno mattresses or similar. All slopes to be grassed with *Bahia grass* or similar approved to control erosion (including stone pitching as appropriate). Specifically, the following should be done:

- Road drainage to discharge to existing natural water courses;
- Collector systems for cut slopes to be provided to drain to the road drainage system;
- Culvert outlets to be protected with reno-mattresses or similar;
- Embankment slopes to be planted with **Bahia grass** or similar approved to control erosion;
- Measures should be taken to prevent silt deposition from the road into the Nakivubo Channel;
- Burrow pits and quarries to be free draining.

9.2.1.5 Water Quality

Mitigating Nakivubo Channel Water Quality
In order to curb the impacts related to erosion and increased sediment transport in the channel the following should be done:

- Where the road crosses the channel and there is excavation and pitting, the channel banks should be raised and embankments created to block the soil from entering the channel;
- Sedimentation basins should be created between the channel banks and areas where excavation and pitting is taking place so as to trap any sediments that would have otherwise been washed into the channel;
- The sedimentation basins should be regularly de-silted to ensure that they continue providing the sediment trapping functions;
- Continue to monitor the channel from both up and downstream points during construction;
- Apart from actual tests, the sampling should be complemented by visual inspection of the site conditions and any changes should guide/inform or alert the need for actual sampling;
- Sampling should be done following rainfall events or as soon as practicable; such as
    - Two samples per month during periods when rainfall results in any discharge from the site or when discharging from a point source such as controlled sedimentation basin discharges;
    - One sample per month during times when there is no rainfall.

9.2.1.6 Air Quality

In order to minimize air pollution, care shall be taken to ensure that the dust generated or particulate matter is greatly controlled. This will involve:

i) Trucks carrying finer granular materials should be covered at all times;
ii) The Engines whether for trucks or other plant should be well maintained in efficient form to reduce on gaseous emissions;
iii) Where the emissions cannot be effectively controlled, workers should be provided with appropriate respiratory protective gear;

iv) Apply dust suppressant such as water spray trucks for dust suppression on unconsolidated working surfaces will mitigate dust generation from construction traffic;
v) Exposed parts of the service roads should be paved;
vi) Regular monitoring of air quality in the construction area;
vii) Parameters to be monitored: Dust(PM), CO, NO_2, SO_2, Oxygen;
viii) Use low sulphur fuels including diesel fuel with a sulphur content, 15 ppm and propane with negligible sulphur content;
ix) Meet applicable criteria with respect to emission quality on all combustion-related equipment and provide maintenance according to manufactures specifications.

9.2.1.7 Noise levels

i) Ensure that all workers in a noisy place have Full PPE particularly ear muffs and plugs;
ii) Enforcement of exposure duration restrictions;
iii) Ensure Regular monitoring of noise levels in the construction area.

9.2.1.8 Vibration Levels

Good Engineering practice will ensure that the development is secured.

9.2.1.9 Flora and Fauna

Since the project is very close to the CBD, most of the project area has been greatly modified by anthropogenic activities. Subsequently apart from the adapted urban biodiversity there is hardly any indigenous biodiversity in close proximity to the Road project.

Loss of Vegetation and other trees

In order to mitigate the loss of vegetation and trees, the following will be done:

- Clearance of vegetation will be confined to those areas where it is inevitable (within the road corridor);
- Landscape and replant disturbed areas using **Bahia grass** or approved similar and plant trees where suitable;
- All removed tree species have been marked and will be replanted alongside the new road or in other equivalent places as will be advised by the KCCA landscape expert;
- Encourage and adopt MOWT policy of planting trees along the boundaries of the road reserve;
- Conduct a full RAP to ensure all stakeholders are fully consulted and adequately compensated.

Disturbance to Fauna and Avi fauna

The survey identified a few urban Fauna and Avifauna. The main impact would be the destruction of their habitats as well as key crossing points for this urban biodiversity. The following should be undertaken:

- Clearance of vegetation will be confined to those areas where it is inevitable (within the road corridor);
- The Flyovers should be painted with easily visible colours so that they can be more visible to Flying birds;
- Employ a delayed approach to removing of trees to enable birds which might be laying eggs in those trees to hatch them;
- Ensure that the plots around Katwe Flyover, Clock Tower Area, between Mukwano Roundabout and Nsambya Junction all of which have a higher Bio – Diversity are protected;
- Encourage and adopt MOWT policy of planting trees along the boundaries of the road reserve.

Loss of Flower gardens and other Agricultural crops (ornamental Trees)

As discussed before, many areas especially along Mukwano Road have numerous flower gardens that are going to be disrupted by the construction. All flowers to be valued and compensated for and ornamental trees will be compensated for, while their number will be included in the trees to be

replanted along the road to intensify the planted area and enhance the scenery. Where there is some additional space, flower gardens will be encouraged to shift a step backwards to allow for road construction.

9.2.2 Expected Socio-Economic and Cultural Impacts

Positive impacts were highlighted in Section 8.4.1 the majority of them being social impacts. When constructing the Flyovers every effort will be taken to ensure that existing social patterns are not greatly disrupted adequate resettlement assistance provided to impacted individual and communities when required to ensure that no losses pass to the local community. During the design of the project road, measures have been taken to ensure that no structures /Buildings are taken apart from where adjustments could not be made to avoid the structure / building. The project will utilize mostly Road reserve land. In a few cases private land has been taken and a resettlement Action plan has been commissioned to compensate the impacted people. The following paragraphs describe some key social impacts likely to arise from FO project and some mitigation options.

9.2.2.1 Land Use

Land Acquisition

In cases of land take the following measures are recommended: -

- Land acquired will be fully compensated for in accordance with the law. In addition to the relevant environmental sections of the Land Act, 1998 (sections 42, 43, 44, 45, 70, 71, and 72) specific attention will be taken of section 40 of the Land Act which deals with Conditions on Transfer of Land by family;
- In cases of land away from the FO project (say for Burrow pits etc), agreements for land compensation or land take between the land lord and the contractor will be made and "copies of all land agreements are to be submitted to UNRA.";
- For land take for the purposes of BPs, all removed topsoil will be used to restore the BPs after construction. The BPs will be reshaped and re-vegetated by the Contractor;
- All temporary structures will be removed and any waste materials disposed off as described under the section on wastes.

Regarding land take at the quarries, crusher area, asphalt plant area and at other ancillary sites, the following will apply:

- The Contractor will negotiate with the landlord, and will pay him directly for the materials acquired;
- All structures constructed on the sites will be removed at the closure of the project to ensure restoration of the area;

Restoration of the temporarily removed vegetation will be done using the indigenous existing grasses whose seed are naturally occurring in the stockpiled top soil. Otherwise other suitable species include *Cynodon dactylon, Panicum fulgens, Panicum repens* etc.).

9.2.2.2 Service Utilities

Regarding the Utilities, it will be necessary that the contractor works closely with the utility providers to ensure that services to the community are not disrupted during construction and that during the operations of the road project utilities will be accommodated alongside the road.

- When working with Utilities (communications, Power lines, Water mains, sewer lines), it will be done in collaboration with the service provider and a due notice of at least one month is to be given. The same will be done for the relocation of major sign posts and road furniture where they exist;
- The contractor will design ways of working around the utilities so that relocation is minimized;

- Light equipment will be used (as well as manual methods) in the initial stages of excavations taking care to see that utilities underground are not disrupted without warning as is always the practice within Cities and Urban Centres;
- Where the utility line is likely to be disrupted, the contractor will halt the works until the utility provider has advised on the best way forward;
- At all times the community should not be deprived of the service for a prolonged period (in excess of 24 hours) without the service;
- Due notice to the community will be given (by the service provider) to the public in case short disruptions are envisaged.

9.2.2.3 Waste Management Implications

As discussed above, the waste may be categorised under the following which are General Waste (domestic and Construction), Human waste and hazardous waste. **The following mitigation measures are proposed: -**

General waste (domestic and construction): -

- In all cases separate hazardous waste from non hazardous waste.
- Separate bins to be provided for recyclable materials and arrangements for recycling done with a suitable recycling facility to be identified;
- Demolished road structures to be carefully removed and recycled where possible;
- Encourage UNRA provide a disposal areas for excess excavation for future projects;
- Contractor to balance cut and fill if possible;
- Separate bins to be provided for recyclable materials and arrangements for recycling made;
- The task of collecting garbage to be assigned to a project employee Garbage disposal to be in accordance with the law;
- Metal scrap and all other recyclable waste will be collected and recycled.

Human Waste:

- Mobile toilets will be provided at site and garbage bins to be provided at strategic locations;
- Separate male and female toilets and washrooms facilities will be provided;

Hazardous Waste

- Bitumen tanks to be placed away from any drainage, placed on an impermeable surface and surrounded with a bund made from impermeable materials;
- Hazardous waste to be disposed of in accordance with the manufactures specifications and stored in sealed drums before transporting to designated disposal points;
- Road construction materials especially the toxic ones to be stored in approved containers;
- Workshop storage facilities to be licensed by NEMA. Waste oils to be transported to a licensed disposal site, all in accordance with the Waste Management Regulations (1999);
- Washing areas for site equipment, servicing and repair to be in an area with a concrete pad.
-

9.2.2.4 Demographics and Settlement Pattern

Relocation and Compensation

- The design has tried to avoid structures and buildings so as to minimize relocation of PAPs and a resettlement Action plan has been commissioned to provide resettlement assistance to any other who might be impacted;
- When relocating Power lines, it will be done in collaboration with the service provider and a due notice of at least one month is to be given. The same will be done for the relocation of major sign posts and road furniture where they exist;

- Should the RAP identify any vulnerable people, then they treated separately (in line with their vulnerability) from the rest who are not vulnerable**.**

9.2.2.5 **Physical Cultural Resource (PCR)**

Places of Cultural Importance

- No ancillary works, burrow areas within 2km of an identified cultural site of importance;
- The sculpture within Centenary Park will be ring fenced and left intact by the road works. The surveyor to indicate this on the Topographical map and subsequent design;
- The Cemetery off Jinja Road and other Worship places will not be touched by the road project;
- The first priority is that the clock Tower should not be relocated but can be lifted so as not to be dwarfed by the FO;
- Alternatively it may be located at a site where it will be seen from afar such as at the Shoprite pedestrian bridge and such relocation must be done with the cooperation with officials from the Department of Museums and Monuments;
- Awareness of Contractors and workers/staff on identification of archaeological/Paleontological resource materials must be promoted;
- In line with the General Specification for Road and Bridge and WB Physical Cultural Resource Safeguard Policy Guidebook, the Contractor must stop work immediately on discovery of evidence of possible scientific, historical, prehistoric, or archaeological data and notify the Resident Engineer giving the location and nature of the finds; The Resident Engineer must notify DMM of such finds for verification and salvage. In line with the Historical Monument Act 1967, Section 11(1 &4) and section 12b).

9.2.2.6 Occupational Health and Safety

The contractor must provide a qualified Safety Officer to ensure the health and safety of workers is maintained and concerns of local communities addressed. The following will apply: -

- The Contractor must prepare and make available at site on request, a Safety and Health Policy Document;
- The Contractor must have in place a risk assessment and Safety & Health management plan;
- Prior to commencement of work, the Contractor must register with the Department of Occupational Health and Safety;
- The Contractor must notify the Commissioner for Occupational Health And Safety on commencement of the works;
- The contractor must make an inspection requisition of the Commissioner for site plant and equipment to be certified;
- There should be a PPE programme in place such that the following should be recorded:
  - Type of equipment;
  - The date and time supplied;
  - The person to whom it is given (he/she will sign for it);
  - Date of next PPE inspection;
  - Replacement schedule for plant and components.
- Such PPE must include safety harnesses especially for those workers at elevated sites like flyover construction;
- A record of all accidents at site, with monthly disaggregated data on the accident and its treatment, shall be kept with the contractor. Any worker who goes off for three days due to an accident must be reported to the Commissioner;
- An independent safety and health committee, comprised of representatives of the workforce, should be put in place and hold regular/monthly meetings. A copy of minutes of such meeting to be sent to the Commissioner for Occupational Health and Safety;
- The use of child labour on any of the working sites is prohibited;

- Personal Protection Equipment (PPE) (including masks, hard hats, boots, reflective vests, safety harnesses and gloves) for the workforce shall be mandatory, foremen to ensure compliance;
- Quarry and crusher workers to wear ear muffs to reduce ear injuries;
- The contractor shall (a) train workers in the use/purpose of PPE; (b) ensure that PPE items fit the users; and, (c) replace PPE items as needed and in accordance with the manufactures specifications; Disciplinary action to be taken on workers who habitually refuse to use protection gear. They are to be cautioned, fined, and ultimately discontinued in accordance with a defined penalty system;
- First-Aid kits to be provided at every active working site, in offices in site camps and any other location determined by the Project Manager. A clinic supplied and staffed by the Contractor in accordance with UNRA guidelines, to be provided at the contractor's camp. A list of supplies must be kept and displayed at all times in the clinic;
- Visitors to the worksite will be required to use PPE, provided by the contractor, while on site;
- Working areas should be contained to limit access by unauthorized persons and children;
- Explosives will be handled by a qualified person, transported under Police escort in accordance with the Explosives Act, and, stored at a designated place;
- Speed controls to be placed at suitable intervals along haulage routes and within and busy sections;
- Water spray, at least twice a day or as required. To be used for dust suppression at crusher units and dusty road surfaces within and close to busy sections;
- Speed controls to be placed at suitable intervals along haulage routes and within and busy sections;
- Water spray, at least twice a day or as required. To be used for dust suppression at crusher units and dusty road surfaces within and close to busy sections;
- Contractor not to *use community water sources* for road use;
- Trucks transporting any granular material to be covered.

The following noise reduction practices are recommended:

- To limit noise due to haulage/quarry traffic, the construction fleet to be kept in good condition well fitted with efficient silencers. Speed controls (speed humps) at specified intervals (specific to each haul road) will be installed and maintained;
- House the generators if required on sites in a sound proof structure to reduce noise levels;
- Workers to use ear muffs to reduce exposure to noise particularly those working at the quarry and crusher areas to reduce injury to the ears due to prolonged noise pollution ;
- Self-audits to check on noise level.

Public Health with Respect to the Working Condition

- To protect the contractor and local communities in case of disease outbreaks among the workforce, a premedical examination for workers should be conducted, followed by routine medical examination during the works and a final post medical examination.;
- Put a project-specific HIV/AIDS awareness/prevention programme in place as specified in the contract documents;
- If an NGO is to conduct the AIDS and STD Awareness Mitigation Campaign in accordance with to UNRA requirements the contractor will be responsible for identifying and retaining the NGO. The NGO shall carry out the sensitization exercise for both the workers and local communities; run an AIDS testing and counselling clinic and treat AIDS and STD related opportunistic infections among both the workforce and the community;
- A rigorous monitoring regime for this program to be instituted by the Resident Engineer;
- The contractor will operate the clinic;
- Adequate sanitation facilities to be provided at site.

Occupational Safety

- The contractor must employ a fulltime Safety Officer to supervise operations and ensure environmental compliance during construction;
- Sanitation facilities provided at camps, workshop areas, crusher areas and at any other place where groups of workers are likely to concentrate;
- Portable sanitation facilities to be provided where required at site;
- Hazardous wastes to be collected and disposed of in accordance with manufactures' specifications;
- All working areas, to be cordoned off to ensure that intruders do not enter the working area.

Sanitation

Workers will be encouraged to abide by the sanitation guidelines /protocol especially at the worksite and other working areas. In particular the following will apply:

- No contractors camp will be required apart from stores and office facilities where adequate sanitation facilities (VIP as well as flush toilets as appropriate) will be provided;
- Sanitation facilities for men to be clearly separated from those for women to protect their privacy;
- Gender considerations in allocation of sanitation facilities (Toilets and bathrooms) will be observed providing adequate privacy for each gender;
- Bins for solid waste collection to be placed at the contractor's camp and worksites to ensure that any hazardous waste (Torch and Radio Batteries, Oils, and polythene papers and plastic bottles etc.) are separately collected and disposed off in accordance with the law; take note that there are recycling plants for plastics and polyethenes;
- Separate bins to be provided for recyclable materials and arrangements for recycling done with a suitable recycling facility to be identified; Mobile / portable plastic toilets will be provided for workers along the project road (FO) and other working areas that are not permanent.

Automobile Safety

Recommendations to prevent minimize, and control risks to the community from traffic accidents include:

- Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions;
- Setting of speed limits appropriate to the road and traffic conditions;
- Design of roadways to accommodate anticipated traffic volume and flow;
- Maintenance of the road to prevent mechanical failure of vehicles due to road conditions;
- Construction of roadside rest areas at strategic locations to minimize driver fatigue;
- Targeting elimination of at-grade rail crossings;
- Targeting the use of a real-time warning system with signage to warn drivers of congestion, accidents, adverse weather or road conditions, and other potential hazards ahead.

9.2.2.7 Landscape

- To improve aesthetics and reduce noise pollution, it is recommended that trees are planted along the Road project at places along the FO and, visibility permitting, on road Islands;
- The colour of the bridges and flyovers will be chosen in such a way as to blend in with the environment or the sky to enhance aesthetics;
- In this case the colours of light blue have been recommended as it is easy to harmonize with the landscape and trees. Sky Blue is also recommended as it gives a more urban image. A combination of these two colours is therefore recommended;
- The steel and concrete joints of the FO especially at Kitgum House will be blended in such a way as to provide a continuous joint from the outside.

9.3 Negative Impacts during Operation Phase

9.3.1 Expected Natural Impacts

9.3.1.1 Soils

- Regular and frequent inspection and maintenance is required to ensure roadsides soils are not exposed or removed and that any repairs required are carried out promptly. The following are essential,:
    - Cleaning of drainage channels;
    - Erosion traps to be cleared regularly;
    - Replanting exposed soils (in case of roadside works) with approved grass seed must be carried out as soon as possible.

9.3.1.2 Hydrology

- Exposed areas to be replanted with appropriate grass;
- Drain storm water to natural drainage channels to reduce erosion during road side maintenance or related works;
- Ensure self-drainage of burrow areas and quarries used for road maintenance.

9.3.1.3 Climatic Variables

- Ensure that Roadside drains continue to discharge to existing natural water courses or existing culverts;
- Make use of the seasonal Forecast that is produced by the Department of meteorology to know when to clear the drains and prepare for severe weather events such as the El-Niño rains that have tendency to damage road infrastructure;
- Drains to be cleaned regularly especially before the onset of the rains;
- Ensure self-drainage of burrow areas and quarries used for road maintenance.

9.3.1.4 Water Quality

Mitigating Nakivubo Channel Water Quality

It is imperative that during the road operation, there should be continuous post construction monitoring. The following should be done:

- Asses and manage impacts on the receiving waters as the site stabilizes through frequent water sampling;
- If the site hydrology should change after construction, then the sampling sites must change accordingly;
- In the initial stages a monthly sampling frequency is adequate which frequency may change depending on the trends in the water quality. The monitoring may then be increased or reduced depending on the trend.

9.3.1.5 Air and Noise Pollution

- Construct noise barriers along the Flyover as part of the design;
- Replace all the trees that were removed and densify the line of trees along the road wherever there is space to do so;
- Continuously monitor the noise level so that they remain within the permitted levels;
- Limit the maximum speed to comply with the noise standards while ensuring that the motor vehicles are well serviced and maintained.

9.3.1.6 Flora and Fauna

- Ensure road discipline to reduce road accidents especially over the Flyovers and in the underpass areas;
- Care to be taken during maintenance to ensure that asphalt/Bitumen is not spilled into Nakivubo Channel and other sensitive areas;
- The Flyovers should be painted with attractive colours so that they can be more visible to Flying birds;
- All burrow areas and quarries used for road maintenance to be self-draining.

9.3.2 Expected Social Impacts

9.3.2.1 Waste Management Implications

Urban Waste

- Provide awareness rising to inform the community about keeping drainage channels clear and protecting road infrastructure;
- Use radio broadcasts and public meetings to conduct sensitization;
- KCCA should reduce waste at source and encourage reuse and recycling of waste;
- Drains should be regularly cleaned and inspected before rain seasons;
- Use seasonal weather forecasts when programming cleaning operations before heavy rains. UNRA should coordinate the collection, interpretation and dissemination of seasonal forecasts.

Aesthetics

- Noise barriers should be maintained along the Flyover to reduce noise to the surrounding community. This will be in addition to the existing trees on the roadsides;
- Paint the FO as well as the underpass as often as it fades to maintain the beauty of the structures;
- The tunnel and the entire road structure will be well lit to enhance the aesthetic values;
- Measures to discourage people from writing graffiti on the pillars as well as in the underpass will be put in place to include fines as well as restoration measures for offenders.

9.3.2.2 Occupational Health and Safety

Over speeding along the Flyover

- Road furniture must be cleaned and inspected regularly to check its condition;
- The traffic code must be enforced by the police;
- UNRA and the Uganda Road safety Council are recommended to continue sensitizing local communities of the Highway Code;
- Police should give talks and training in good road behaviour at school;
- It is recommended that the FO and the entire road is well lit throughout including in the bypass;
- There should be measures to enforce the use of NMT and pedestrian lanes by those supposed to use them.

10 Environmental and Social Management and Monitoring Plan (ESMMP)

After opening to traffic, the most likely potential hazards identified for FO, are either an accidental oil spill due to petroleum transporting tanker running off the flyway, or a fire hazard due to possible fires from the power Station at Centenary Park. There is also potential for an accident within the underpass / tunnel which could lead to a fierce fire in case the accident vehicle was carrying petroleum products or other hazardous materials Accidents in tunnels /underpasses are a very specific issue for which a specific emergency management plan is required. Depending on the nature of materials involved, tunnel accidents often involve fire which is dangerous not only for those directly involved in the accident but also for rescuers and for the local environment. The transportation of petroleum products and other hazardous materials on the road network of Uganda must be at the top of the country's preparedness agenda. It is recommended therefore that UNRA, working closely with NEMA, the Department of Disaster Preparedness and other security agencies, prepare a flexible contingency plan to handle such emergencies.

Key stakeholders involved for any major hazard would be the following: -

- The Department of Disaster preparedness currently based in the office of the Prime Minister which would be charged as the focal point to lead the operations;
- The Ministry Of Defence (armed forces for rescue and provision of guided support);
- Police (Ministry of Internal Affairs);
- The Polluter in this case the company responsible for transporting hazardous materials on Ugandan roads;
- UNRA to keep the roads open;
- The Local Government Structure;
- The Uganda Red Cross to provide additional logistics.

Although the Department of Disaster Preparedness is the key focal institution for handling major humanitarian disasters, for road accidents however, the Uganda police have been mandated by the National Disaster Preparedness Policy as the lead agency to mobilize emergency operations.
The law provides that the polluter should pay for any pollution that he / she makes. However, sometimes a particular hazard may be such that the owner is unable to comply, having neither the technology required nor the human resources to overcome the hazard.

10.1 ESMMP for the Project

ESMMP is enclosed in the accompanying table below. This summarizes and lists the various impacts considered to date and possible mitigation measures with their location and preferred timing.

The authorities responsible for implementing the mitigations and for monitoring them are identified along with summaries of proposed monitoring indicators. For the most part mitigation must be carried out by the Contractor with the Resident Engineer's input for some mitigation. Monitoring is mostly conducted by the Resident Engineer and Environmental Specialist (or company).

10.2 Implementation Measures of ESMMP

These implementation measures must be read in the context of the ESMMP discussed in the previous paragraphs. Resident engineer will be employed by UNRA during construction phase for implementation of the ESMMP.

Table 10-1: Proposed Environmental and Social management and Monitoring Plan

Item	Environmental Impacts	Environmental Management Plan (Mitigation Measures)	Responsible Party/implementer (Who)	Site of Implementation (Where)	Optimal Timing for Implementation (When)	Monitoring Indicators	Monitoring (Who)
1	Land acquisition and loss of road side trees and ornamental crops	• UNRA safeguard unit prepare Resettlement Action Plan (RAP) for Project Affected People (PAP)s. • Land acquired must be fully compensated for in accordance with the Ugandan laws and JICA environmental guidelines. • As for BPs and Quarries, agreements for land compensation or land take between the land lord and the contractor will be made and "copies of all land agreements are to be submitted to UNRA." • After construction all removed topsoil will be used to restore the BPs. • Planting of trees along the FO roads will be done in consultation with UNRA and KCCA. • Restoration of the temporarily removed vegetation at BPs will be done using the indigenous existing grasses whose seed are naturally occurring in the stockpiled top soil. Suitable species include Cynodon dactylon, Panicum fulgens, Panicum repens etc). • Affected permanent trees, crops, and other private properties inside proposed project area will be compensated based on market price.	• A public relations officer (PRO) who is employed by UNRA. • The PRO coordinates his/her consultations with affected landowners with the Local Government Official. The formal consultations are to be pre-arranged with landowners and notes about the outcomes from the consultations must be recorded by the PRO • UNRA will prepare RAP and submit to NEMA	• Within the affected areas.	• Before the commencement of Activities. • Consultations and agreements regarding land take compensation must be concluded well in advance of the commencement of construction works. They must be conducted at or shortly after mobilization.	• No of complaints recorded. • Amount of money paid out. • Area planted and • species of grasses planted	• Resident Engineer • Environmental Specialist • Road Committees
2	Involuntary Resettlement	• UNRA safeguard unit prepare Resettlement Action Plan (RAP) through field survey and stakeholder meetings. • Relocation cost for target quarters of Uganda Railway Corporation(URC) will	• UNRA Safeguard Unit manage the implementation of resettlement, and • KCCA cooperate with	• Within the affected areas.	• Before the commencement of Activities.	• No of complaints recorded. • Amount of money paid	• Resident Engineer • Environmental Specialist

Item	Environmental Impacts	Environmental Management Plan (Mitigation Measures)	Responsible Party/implementer (Who)	Site of Implementation (Where)	Optimal Timing for Implementation (When)	Monitoring Indicators	Monitoring (Who)
		be paid to URC. • Compensation for lease term of the quarters and lands will be paid to Rift Valley Railways (RVR). • Resettlement families (23 families) will be provided disturbance allowance based on their rental rate. • RVR provide alternative quarters for resettlement families as necessary or three months rent in lieu in addition to disturbance allowance.	UNRA			out. • Resettlement condition of each resettlement families	
3	Soil erosion, Slope failure (soil erosion control measures);	• Degraded sites including construction material storage points will be restored to as close to their previous condition as possible after road construction. • All embankments especially where the underpass will be created, trenches and outfalls after construction will be strengthened to limit erosion. This can be done by stone pitching, use of gabions or lining banks with concrete as appropriate as possible and planting of Bahia grass (*Paspalum notatum Flugge);* • Sediment basins/traps will also be used to trap sediments before they enter the Nakivubo Channel and other storm water drains / watercourses. Such facilities will be regularly checked and maintained to ensure free flow.	• Contractor, and • Resident Engineer	• At the underpass, slopes off Jinja road and any other expose area including at quarry areas, Borrow areas, and along construction sites for drainage structures;	• During quarry and borrow pit operation and at excavations along the batters and drainage structures. Details to be given by the Resident Engineer	• Availability of CoA. • No. of Erosion control structures constructed. • Number of silt traps constructed • No. of sand bags placed	• Resident Engineer • Environmental Specialist
4	Haulage routes and Diversions	• After the works obliterate the routes and diversion scarifying the road as appropriate unless such roads are community roads; • Provide access where necessary, and Diversions as appropriate;	• Contractor, and • Resident Engineer	• In areas where haulage roads and diversions exist;	• At the end of the works for the routes and during the works for dumping and access construction	• Number of routes obliterated, access provided and number of complaints recorded;	• Resident Engineer • Environmental Specialist
5	Excavation for the Tunnel / Underpass	• Contractor will be required to comply with the recommendations within the acquired NEMA Certificate of Approval	• Contractor, and • Resident Engineer	• In the tunnel / underpass environs	• During Construction	• Area replanted • Records of Supervisors'	• Resident Engineer • Environmental

Item	Environmental Impacts	Environmental Management Plan (Mitigation Measures)	Responsible Party/implementer (Who)	Site of Implementation (Where)	Optimal Timing for Implementation (When)	Monitoring Indicators	Monitoring (Who)
		for all operations; • The supervisor will inspect the cliffs / walls to ensure that no slope failure is likely and if any loose hanging cliffs / stones are observed, then the supervisor will knock them down and put in place protective measures. • Replant all erodible areas as soon as possible if affected by the road works; • The underpass / Tunnel will be sealed at the earliest possible time to minimize hydro-geological disturbance				inspection routine;	Specialist
6	Storm Water Disposal	• Channel storm water along already existing drains or channels; • Silt laden storm water to be directed away from wetlands and fragile ecosystems; self-drainage to be maintained within borrow areas and quarries. • • Embankment slopes to be planted with ***Bahia grass*** or similar approved to control erosion. • Measures should be taken to prevent silt deposition from the road into the Nakivubo Channel. • Borrow pits and quarries to be free draining.	• Contractor; • Resident Engineer	• Along the drainage channels	• During the works and after	• Number of Channels constructed, • Complaints recorded;	• Resident Engineer • Environmental Specialist
7	Soil Degradation and Pollution	• Construction materials to be stored in approved containers and washing areas for site equipment servicing and repair will be carried out in a defined area with a concrete pad draining to oil traps; • Provide secure stores for hazardous materials and refuse pits. To be demolished on completion. • Abandoned equipment, tyres, batteries, filters, sparkplug etc to be removed and carefully disposed off as required by law.	• Contractor • Resident Engineer	• At construction sites and washing areas;	• During the construction and especially towards the completion of the project	• Number of containers / stores for storing materials;	• Resident Engineer • Environmental Specialist
8	Air Quality	• Provide dust masks fitted with	• Contractor	• Construction	• During upgrading	• Occurrence of	• Resident

Item	Environmental Impacts	Environmental Management Plan (Mitigation Measures)	Responsible Party/implementer (Who)	Site of Implementation (Where)	Optimal Timing for Implementation (When)	Monitoring Indicators	Monitoring (Who)
	(Increased dust and air pollution)	appropriate filters competent to remove crystalline silica dust from the breathing zone of each worker • All workers to wear full Personal Protection Equipment (PPE) and the Consultant and Contractor to enforce compliance; • Place flagmen in order to control construction traffic at suitable intervals along the haulage routes and within / close to busy areas (during construction) near schools / places of worship. • Dust suppression through wet crushing at crusher units and when appropriate by spraying dusty road surfaces with water to be enforced; • Contractor not to use community water sources for road use • Haulage Lorries carrying crushed material to be covered to reduce flying stones and dust; • Air quality monitoring survey at roadside area will be conducted as necessary		sites and work areas; • Along the haulage routes especially in close proximity to schools. • Along the haulage route especially in the vicinity of settlements	works.	dust in the air. • Complaints from other residents • Number of water bousers in use; • Source of water and holding capacity /tanks at crusher area. • Air quality monitoring results	Engineer • Environmental Specialist
9	Waste Disposal	• Demolished road structures to be carefully removed and recycled where possible; • Encourage UNRA provide a disposal areas for excess excavation for future projects; • Contractor to balance cut and fill if possible • Workshop storage facilities to be licensed by NEMA. Waste oils to be transported to a licensed disposal site, all in accordance with the Waste Management Regulations (1999). • Bitumen tanks to be placed away from any drainage, placed on an impermeable surface and surrounded with a bund made from impermeable materials;	• Contractor during the works period. • Resident Engineer.	• At workshops, • Campsite • Crusher areas • And any other working site	• During construction phase and at decommissioning	• Drums of oil collected; • Presence of drums at site • Presence of mobile toilets; • Presence of impermeable surfaces and bunds	• Resident Engineer • Environmental Specialist

Item	Environmental Impacts	Environmental Management Plan (Mitigation Measures)	Responsible Party/implementer (Who)	Site of Implementation (Where)	Optimal Timing for Implementation (When)	Monitoring Indicators	Monitoring (Who)
		• Hazardous waste to be disposed of in accordance with the manufactures specifications and stored in sealed drums before transporting to designated disposal points; • Washing areas for site equipment, servicing and repair to be in an area with a concrete pad. • Separate bins to be provided for recyclable materials and arrangements for recycling made. • Mobile toilets will be provided at site and garbage bins to be provided at strategic locations. • Separate male and female toilets and washrooms facilities to be provided. • Metal scrap and all other recyclable waste will be collected and recycled.					
10	Disruption of Fauna and Avi-Fauna	• Clearance of vegetation will be confined to those areas where it is inevitable (within the road corridor); • The Flyovers should be painted with easily visible colors so that they can be more visible to flying birds; • Employ a delayed approach to removing of trees to enable birds which might be laying eggs in those trees to hatch them; • Ensure that the plots around the Centenary park, Clock Tower Area, between Mukwano Roundabout and Nsambya Junction all of which have a higher Bio – Diversity are protected; • Encourage and adopt MOWT policy of planting trees along the boundaries of the road reserve;	• Contractor during the works period. • Resident Engineer.	• Along the road project and at the high biodiversity area around Centenary park, Clock Tower Area, between Mukwano Roundabout and Nsambya Junction	• Before commencement of construction and during the construction phase;	• Number of trees replanted; • Identified number of trees that had birds eggs in them;	• Resident Engineer • Environmental Specialist
11	Increased noise levels and vibration	• Limit noise due to haulage/quarry traffic by keeping the construction fleet in good condition, well fitted with efficient silencers. Place flag Persons in order to control construction traffic at specified intervals during construction phase.;	• Contractor	• Workshop area	• During construction and operations.	• Noise levels (Construction vehicles and machine, traffic noise). • Complaints	• Resident Engineer • Environmental Specialist

Item	Environmental Impacts	Environmental Management Plan (Mitigation Measures)	Responsible Party/implementer (Who)	Site of Implementation (Where)	Optimal Timing for Implementation (When)	Monitoring Indicators	Monitoring (Who)
		• House the generators at the Contractor's camp site within a sound proof structure to reduce noise levels; • At workshop areas, workers must use earmuffs (PPE) • Noise insulation (barriers) walls will be installed along the Kitgum FO. • Noise level monitoring as necessary during construction phase and operation phase.				from local residents • Complaints from workers	
12	Road safety during the operation of the road / FO	• The traffic code should be enforced by the police; • Road furniture must be cleaned and inspected regularly to check its condition; • The traffic code must be enforced by the police. • UNRA and the Uganda Road Safety Council are recommended to continue sensitizing local communities of the Highway Code. • Police should gives talks and training in good road behavior at schools • It is recommended that the FO and the entire road are well lit throughout including in the bypass; • There should be measures to enforce the use of NMT and pedestrian lanes by those supposed to use them;	• Contractor for the signposts and Resident Engineer for the sensitization	• Speed controls at approaches to Along the road project	• During construction and operation;	• Presence of road signs • Number of sensitization and training seminars with number of attendance; • No of complaints from local residents • No of traffic mishaps / accidents.	• Resident Engineer • Environmental Specialist
13	Workers Occupational Safety and Health	• The contractor to provide a qualified Safety Officer • The Contractor must prepare and make available at site on request, a Safety and Health Policy Document • The Contractor must have in place a risk assessment and Safety & Health management plan; • The contractor must make an inspection requisition of the Commissioner for site plant and equipment to be certified. • Personal Protection Equipment (PPE)	• The Contractor, • Safety Officer	• At work areas, and along the road	• During construction	• Number of sanitation facilities; • Availability of bins • Presence of a Safety Officer; • Presence of PPE • Record of trainings for workers;	• Resident Engineer • Environmental Specialist

Item	Environmental Impacts	Environmental Management Plan (Mitigation Measures)	Responsible Party/implementer (Who)	Site of Implementation (Where)	Optimal Timing for Implementation (When)	Monitoring Indicators	Monitoring (Who)
		(including masks, hard hats, boots, reflective vests, safety harnesses and gloves) for the workforce shall be mandatory, foremen to ensure compliance; • The contractor shall (a) train workers in the use/purpose of PPE; (b) ensure that PPE items fit the users; and, (c) replace PPE items as needed and in accordance with the manufactures specifications; • First-Aid kits to be provided at every active working site as well as a clinic supplied and staffed by the Contractor in accordance with UNRA guidelines • Place flag Persons in order to control construction traffic at suitable intervals along the haulage routes and within / close to busy areas (during construction) near schools / places of worship. • Water spray, at least twice a day or as required. To be used for dust suppression at crusher units and dusty road surfaces within and close to busy sections. • House the generators if required on sites in a sound proof structure to reduce noise levels; • Sanitation facilities provided at camps, workshop areas, crusher areas and at any other place where groups of workers are likely to concentrate; • Sanitation facilities for men to be clearly separated from those for women to protect their privacy • Bins for solid waste collection to be placed at the contractor's camp and worksites to ensure that any hazardous waste (Torch and radio batteries, oils, and polythene papers and plastic bottles etc.) are separately collected and disposed off in accordance with the law;					

Item	Environmental Impacts	Environmental Management Plan (Mitigation Measures)	Responsible Party/implementer (Who)	Site of Implementation (Where)	Optimal Timing for Implementation (When)	Monitoring Indicators	Monitoring (Who)
		• Separate bins to be provided for recyclable materials and arrangements for recycling done with a suitable recycling facility to be identified; • Mobile / portable plastic toilets will be provided for workers along the project road (FO) and other working areas that are not permanent.					
14	Public Safety	• A premedical examination for workers should be conducted, followed by routine medical examination during the works and a final post medical examination. • Put a project-specific HIV/AIDS awareness/prevention programme in place as specified in the contract documents. • If an NGO is to conduct the AIDS and STD Awareness Mitigation Campaign in accordance with to UNRA requirements the contractor will be responsible for identifying and retaining the NGO. • The contractor will operate the clinic; • Adequate sanitation facilities to be provided at site.	• Contractor • Subcontracted NGO for Sensitization	• At Clinic and selected meeting areas	• During construction and decommissioning	• Presence of Clinic • Number of meetings;	• Resident Engineer • Environmental Specialist
15	Relocation of infrastructure and utilities	• When working with utilities (communications, power lines, water mains, sewer lines), it will be done in collaboration with the service provider and a due notice of at least one month is to be given. The same will be done for the relocation of major sign posts and road furniture where they exist; • The contractor will design ways of working around the utilities so that relocation is minimized; • Light equipment will be used (as well as manual methods) in the initial stages of excavations taking care to see that utilities underground are not disrupted without warning as is always the practice	• Contractor • Resident Engineer; • Service provider	• Wherever the affected infrastructure is located	• Warning at least one month before works begin; • During the works for relocation and management;	• Number of utility lines etc. relocated • Complaints raised	• Resident Engineer • Environmental Specialist

Item	Environmental Impacts	Environmental Management Plan (Mitigation Measures)	Responsible Party/implementer (Who)	Site of Implementation (Where)	Optimal Timing for Implementation (When)	Monitoring Indicators	Monitoring (Who)
		within cities and urban centers. • Where the utility line is likely to be disrupted, the contractor will halt the works until the utility provider has advised on the best way forward. • At all times the community should not be deprived of the service for a prolonged period (in excess of 24 hours) without the service; • Due notice to the community will be given (by the service provider) to the public in case short disruptions are envisaged;					
16	Relocation of historical monument	• Clock Tower monument to be relocated from existing place; • Department of Museums and Monuments agree to relocate it with condition; and • Prepare relocation plan through discussion among relevant authorities (Relocation methods, location, schedule and conditions)	• UNRA safeguard unit, • Department of Museums and Monuments, and • KCCA	• Existing location of Clock Tower monument	• Relocation plan will be prepared during D/D phase, • Relocation will be conducted during construction phase	• Approval for relocation plan by Department of Museums and Monuments • Records of implementation status of the relocation	• Resident Engineer • Environmental Specialist
17	Other Impacts on Physical Cultural resources	• No ancillary works, borrow areas within 2km of an identified cultural site of importance; • The sculpture within Centenary Park will be ring fenced and left intact by the road works. •	• Contractor • Resident Engineer; • Department of Museums and Monuments	• At the affected site	• Before and during construction	• Presence of the stakeholders during relocation • Recorded notes of the materials and status of the monument	• Resident Engineer • Environmental Specialist and • Department of Museums and Monuments

10.3 Implementation Cost

The cost of implementing ESMMP at this preliminary stage is mostly subjective. Subsequently, implementation costs for the ESMMP have been estimated by considering, (1) the restoration of trees that have been removed and filling other areas with additional planting to ensure aesthetic enhancement, planting of grass and enrichment planting where necessary, and, (2) supervision costs, including support to a Safety Officer and an Environmental Specialist. A preliminary cost estimate for the ESMMP is given in the Table below. Measures to implement occupational safety and health are to be included in the BOQ and the cost has not been included in this estimate.

The implementation measures described and their costs must be read in the context of the mitigation measures discussed in the previous paragraphs.

Table 10-2: Estimated Implementation Cost of ESMMP

Item	Area or unit	Rate per unit in UGX	Total cost in UGX	Remark
1 hectare of grass for re-vegetation on roadside and other exposed areas in hectares	Per hectare	*5,000,000*	5,000,000	Estimated cost to be included in the BOQ
Reinstatement of burrow pits (2No have been considered)	2 Burrow areas	15,000,000.00	30,000,000	Engineers' mean estimate per each to be included in the BOQs
Reinstatement of quarries	1	40,000,000.00	40,000,000	Engineers' mean estimate per each to be included in the BOQs
Un specified social facilities and infrastructure -Lump sum	To be identified	Lump sum	20,000,000	Estimated cost to be included in the BOQs
Complimentary Initiatives	Various to be identified	Lump sum	100,000,000	Estimated cost to be included in the BOQs
Removal of storage area facilities, campsites and any other temporary structures	Demolition, Transport and removal of waste	Lump sum	50,000,000	Estimated cost to be included in the BOQs
Introduction of safety measures (Warning signs, Speed humps etc)	Various	*Lump sum*	10,000,000	Estimated cost to be included in the BOQs
HIV/AIDS sensitization and clinic - Lump sum				
Provision of condoms for three years s for 200 people	1800 Boxes of 25 Packages each	*10,000*	18,000,000	Estimated cost to be included in the BOQs
Radio announcements and Notices (about 2,000 Notices and 2,000 Radio Announcements)	2,000	*5,000*	10,000,000	Estimated cost to be included in the BOQs
First AID Kits	10	*100,000*	1,000,000	Estimated cost to be included in the BOQs
Clinic and relevant drugs	Adequate for four years	*Lump sum*	300,000,000	Estimated cost to be included in the BOQs
Others				
PPE for at most 400 people	400	*400,000*	166,000,000	Estimated cost to be included in the BOQs
Planting of trees along the FO and beautification of the selected areas. About 1.5 hectares estimated at 1,500 trees (NFA)	1,500	*15,000*	22,500,000.00	
Management of Road Committees (Monthly) for initial five years	60 moths	*Lump sum*	60,000,000.00	
ESP Management Including Audits	Estimate	*Lump sum*	20,000,000.00	
Cultural Resources management Plan including relocation of Clock Tower	Estimate	*Lump sum*	100,000,000.00	Estimated cost to be included in the BOQs
Environment Specialist for 24 Person moths	24	*3,000,000.00*	60,000,000	

Item	Area or unit	Rate per unit in UGX	Total cost in UGX	Remark
Monitoring Plan (ESMP) inclusive of institutional collaboration - Lump sum The collaborating Institutions include NEMA, KCCA Environment Offices, as well as the Development partner	Perdiem for 1 monitoring officer	*5 days per month for 18 months at 130,000 per day*	11,700,000	
	Fuel costs	*40 litres per day per vehicle*	12,960,000	
	Communication and report production	*Lump sum*	10,000,000	
Total			197,160,000/=	**This Total excludes that amount included in the BOQs**

11 CONCLUSION AND RECOMMENDATIONS

The purpose of the Environmental and Social Impact Assessment (ESIA) was to assess the potential impacts that the proposed road construction / upgrading Project will have on both the bio–physical and social environments.

All baseline biophysical and socio-environmental conditions have been documented giving an indication of a largely urban environment with huge built up areas and few green spaces. Within the project area, the predominant land use is institutional with very few settlements.

The critical environmental aspects that were identified included the following:

- Water quality
- Biodiversity
- Air and Noise
- Vibrations
- Infrastructure and utilities
- Traffic
- Economic Activities amongst others.

Through field assessments and stakeholder consultations a number of environmental and social considerations have been integrated into the design hence reducing the project's footprint considerably. These have included the following:

- Avoiding of buildings, staff quarters for the police and major administrative installations like Electoral Commission in order to reduce the impacts of involuntary relocation and compensation;
- Minimising the impact at Kitante UMEME substation that previously presented high occupational health and safety risks by modifying the design and technology to be utilised.

All these actions have been done with close reference to Uganda's applicable National Environmental and Social Legal Requirements as well as those of Multilateral Lenders especially the JICA Guidelines for Environmental and Social Considerations (as translated) - April 2010 JICA.

After integration of environmental and social considerations into the design, the impacts discussed in this EIS do not present a very high risk as they can be managed during construction, operation and maintenance as already presented through mitigation and enhancement.

An environmental management plan and budget have also been presented for inclusion in the bills of quantities, our recommendation is that environmental resource persons be recruited during the project implementation phase to ensure that these mitigation measures are implemented and progress reported.

13 REFERENCES

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