



**AFRICAN DEVELOPMENT
BANK GROUP**

**PROJECT: KAMPALA CITY ROADS REHABILITATION
PROJECT**

COUNTRY: UGANDA

**ESIA SUMMARY FOR THE PROPOSED SELECTED ROAD LINKS AND
JUNCTIONS/INTERSECTIONS TO IMPROVE MOBILITY IN KAMPALA
CITY**

Date: May 2019

Preparation Team	Team Leader: G. MAKAJUMA, Transport Engineer, RDGE.3
	E&S Team Member: E.B. KAHUBIRE, Social Development Officer, RDGE4 /SNSC

1. INTRODUCTION

1.1. Traffic congestion in Kampala city is fast growing due to a combination of poor roads network, uncontrolled junctions, and insufficient roads capacity which is out of phase with the increasing traffic (vehicular and pedestrian) on Kampala roads. This congestion results into higher vehicle operating costs, long travel times and poor transport services. The overall city aesthetics and quality of life is highly compromised by the dilapidated paved roads and sidewalks, unpaved shoulders and unpaved roads which are sources of mud and dust that hovers over large sections of the City.

1.2. The Government of Uganda through Kampala Capital City Authority (KCCA) with support from the African Development Bank intends to improve mobility in Kampala City through improvement of selected road links and Junctions/intersections. The selected junctions/intersections are to be signalized while the selected roads are to be dualled or reconstructed or upgraded to paved standard.

1.3. The National Environmental Act, CAP 153 requires that an Environmental Impact Assessment (EIA) is undertaken for all projects that are listed under the third schedule of the Act with a view of sustainable development. The proposed project is one of the projects listed under Section 3 (Transportation) of the Schedule. Therefore, to fulfill legal requirements an EIA has been conducted for the proposed project as part of the consultancy services for the preliminary and detailed engineering design of selected road links and junctions/intersections to improve mobility in Kampala City under the Second Kampala Institutional and Infrastructure Development Project.

1.4. The proposed project is proposed to be undertaken within a heavily urbanized environment characterized by built up areas and a few natural areas that could be affected by implementation of the project. Therefore besides fulfilling legal requirements, the ESIA is being undertaken to ensure that the project is implemented in such a way that there is little or no adverse impact on the physical, biological, cultural and socio-economic attributes of the environment of the proposed project area.

1.5. Objective, Scope and methodology of the ESIA: The general objective of the ESIA was to identify and assess the potential environmental and social impacts of the proposed project with a view to eliminate/minimize the negative impacts. The scope of the ESIA was guided by provisions in the first schedule of the EIA regulations for Uganda and the approved terms of reference for the study, as well as international guidelines such as the World Bank Safe Guard Policies.

1.6. A number of methods were applied during the ESIA. These included literature review, stakeholder consultations, field baseline surveys and impact analysis. Literature reviewed included project design reports, Kampala district reports and international guidelines on ESIA. Field baseline surveys covered the physical environment (hydrology, geology and soils, noise and air quality), the biological environment (fauna and flora), the social-economic environment and the cultural environment. The methods used for the field baseline surveys varied with discipline. Stakeholder consultations were done at community, division/sub County, district and national level through meetings, questionnaire guided interviews, and Focus Group discussion with selected stakeholders. The methods used to identify relevant stakeholders included: purposive selection, brainstorming, snow ball method and use of previous projects conducted in the same area.

1.7. The potential positive and negative environmental and social impacts of the proposed project were identified, evaluated and their significance determined. Assessment of the impact significance was based on a combination of the value of the affected environmental component and the magnitude of the potential impact. The value of the affected environment was measured on a scale of low to high. The value scale given was based on established value and conservation criteria as well as indications of regional and local importance. The magnitude of the potential impact was measured on a scale of “large positive” to “large negative”. The magnitude scale given was based on severity, time (duration) and space (site-specific, local, regional, national, international) as well as probability/risk of the impact to occur. The significance level of the impact was then measured on a scale of “very large positive” to “very large negative”.

2. PROJECT DESCRIPTION

2.1. Location: The selected project roads/junctions are divided into Group 1 and Group . Group 1 roads and junctions are to be improved before those under Group II. Except Kabuusi-Kitebi-Bunamwaya road and Ssuna road-2 that are located in Wakiso District in Makindye Ssabagabo Sub County, all the project roads and junctions are located in Kampala District in all the five divisions, Kawempe, Central, Nakawa, Lubaga and Makindye. The location of each selected road/junction.

2.2. Project components: The project comprises the roads and junctions to be improved. Support infrastructure/ancillary components include quarries and borrow areas, sand sources, construction water sources, project equipment/material storage areas, workers’ accommodation sites, access roads, and a traffic control centre linking all signalized intersections.

2.3. Inputs and outputs: Equipment to be used during the project construction period includes graders, rollers, trucks, excavators and asphalt pavers. Materials to be used include Crushed rock for base layer, concrete aggregate and asphalt, Sand for concrete, Gravel for layer works, Water for construction, and Cement. One of the major outputs of the project will be waste generated during the construction activity. Expected waste to be generated will comprise of Concrete and brick rubble, Old pipes, Spoil material (gravel and soils) and Asphalt (mostly reworked into new layer works). Most spoil material will be disposed of at the municipal dump disposal sites.

2.4. Activities: The project will generally involve the following activities;

- Signalisation of selected junctions
- Reconstruction and dualling of selected roads
- Reconstruction (recycling and overlaying/upgrade to concrete) of selected roads
- Upgrading of selected roads to paved standard.
- Ancillary works including street lighting

2.5. Preconstruction activities some of which are already ongoing include Construction Material Investigations, Surveying, Road inventory, Traffic and other data collection, Land Acquisition, Recruitment of labour and Design work.

2.6. Construction activities will include land Clearance, top soil removal , drainage works, earth works, borrow pit operations, quarry operations, road surfacing and ancillary works such as kerbing, pipe laying, hauling, road markings, placing of road signs and guardrails and street lighting.

2.7. Post construction activities involve mainly the roads' operation and maintenance activities carried out by the developer in order to ensure optimization of road operations. It includes both routine and periodic maintenance works. Routine maintenance works include pothole patching, cleaning of drainage items, repairs of broken road items including maintenance of street lights, among others. The periodic maintenance items are carried out after a scheduled period of time. These include re-sealing, re-painting of road markings, among other activities. Other post-construction activities include enforcement of road rules and other control requirements.

2.8. Project Land Requirement: The project will require small amounts of land take outside the existing road corridors for roads to be expanded. The total land take of the project will be established following completion of the detailed engineering design stage of the project. It is a project requirement to take as little land as possible, so as to minimize the cost of land procurement.

2.9. Project Cost: The total cost of the project will be established following completion of the detailed engineering stage of the project and Resettlement Action Plan. However the estimated construction cost for Group I roads that are to be upgraded first is USD 104 940 752.70.

2.10. Project Labor: The project will employ a number of workers both skilled (about 230) and unskilled (about 320) in positions such as, road engineers, project supervisors, Environment Health and safety officers, potters, security guards etc. The actual number of workers will be determined by the selected contractors. Measures are proposed in this report on ensuring equitable access to job opportunities for Ugandans.

3. BASELINE CONDITIONS

3.1. Climate: The selected roads and Junctions are characterized by the climate of Kampala and Wakiso Districts where they are located. Kampala district has a mean rainfall of at least 50mm in every month with January and February being drier than other months. The district has considerably high temperatures with an annual average of 21.9°C. Temperature peaks are in the months of January to March and October to December, the former being higher. The annual rainfall mean in Wakiso District is 1320 mm. The minimum surface air temperature in Wakiso District is 11.0 degrees centigrade while the maximum is 33.3 degrees centigrade.

3.2. Geology, soils and topography : The selected roads and Junctions' area being located in Kampala and Wakiso Districts are characterized typically by Kampala and Wakiso District topography and geology described below. Kampala District is underlain majorly by the pre-cambrian rock system. The soils of Kampala district are ferralitic representing an almost final stage of weathering with little or no mineral reserve left. Wakiso District landscape lies at an approximate range of about 900 to 1340 meters above sea level. The district is characterized by isolated flat-topped hills with steep slopes, often merging abruptly into long and gentle pediments, which are usually dissected by relatively broad valleys. Wakiso District is underlain by both old and recent rock systems, which include Precambrian, Cenozoic and Laterites. The soils in Wakiso District are generally of high productivity and are mainly sandy clay soils. Results from Soil surveys undertaken at the roads indicate that most of the roads comprise fine-grained sandy clays which have Plasticity Indices (PI) between 15 and 20. The materials can generally be classified

as intermediate to low plasticity clays. Penetration rates on Old Port bell, Port bell, Kayemba, Eighth Street, Lukuli and Kulambiro Roads showed several values below 10%, which probably indicate soft spots in the underlying layers.

3.3. Hydrology: Kampala city is built on a number of hills with a topography controlled by differential weathering of various grades of sedimentary bedrock types. The topography results in thin weathered mantles of limited extent which produce shallow, localized groundwater flow systems with relatively short residence times (ARGOSS, 2002). Kampala city has a shallow aquifer from the weathered regolith. The springs that arise from the shallow aquifer are the major source of groundwater supply within the city. Springs supply about 50% of Kampala's population with the majority of these occurring in high-density settlement areas. 16% (32km²) of Kampala district is covered by wetlands. These wetlands are part of the Lake Victoria catchment and the Victoria Nile catchment which encompasses major wetlands like the Lubigi and Nalubaga wetlands. Many of the wetlands in Kampala occupy shallow valleys between the many hills within the district. Wakiso District is generally endowed with adequate surface and sub-surface water reserves with numerous streams, rivers and wetlands both permanent and seasonal. Minor valleys have distinct seasonal swamps and rivers, which contain water especially during the wet season. The water table along these swamps is quite high. They are suitable for sinking shallow wells. Sub surface water reserves occur in fissures and aquifers of the rocks. This is indicated by the number of boreholes, spring wells, tube wells and shallow wells, which have been drilled to harvest water for domestic supply (Mpigi District Local Government, 1997).

3.4. There were wetlands observed along Wamala, Ssuna II, Muzito, Kirombe, Tuba, Kulambiro – Najeera, Port bell, Ntinda-Nakawa and Mugema roads. The wetland by Wamala road joins Nalukolongo stream that flows into Lubigi Wetland. The wetland is still quite intact. The wetlands by Ssuna II road and Muzito road join Lufuka stream, Kaliddubi swamp, Kawagga swamp before joining Lake Victoria. The wetland by Kirombe road drains into Lake Victoria. The wetland by Tuba road is fed by Nalubaga stream crossing the wetland which eventually ends in Lake Victoria. The stream observed on both sides of Nakawa-Ntinda road joins Kinawataka stream that eventually joins Lake Victoria.

3.5. Water quality: The water sources along the project roads that will be affected by the project activities include springs, streams, water channels, wetlands and the Lake Victoria. Almost all the wetlands are already deemed degraded to some extent (Kampala District Local Government, 1997). Protected springs are susceptible to pollution related to anthropogenic activities even when notionally "protected" (KSSMP, 2004). Previous studies undertaken on the protected springs in Kampala indicate widespread faecal contamination (Howard *et al.*, 2003; Barrett *et al.*, 2000 and Barrett *et al.*, 1998). These findings demonstrate microbiological contamination to be most severe during rainy (recharge) season. It is observed that the principal route of contamination of the protected springs is the immediate surrounding area and that localized sources of pollution are the major contributors to groundwater quality deterioration.

3.6. The contamination sources of the springs and surface water sources in Kampala are noted to result from solid waste dumps, low coverage of excreta disposal facilities (pit latrines) resulting in indiscriminate disposal of faecal matter into the environment (drainage channels, solid waste dumps and surface water), stagnant surface water due to inadequate management of storm- water runoff, and domestic animals such as goats, cows, pigs and chicken especially in the low income peri-urban settlements. Rainfall in this case is the primary climatological control factor, as it will aid both the washing in of contaminants to the backfill area and replenishment of the contaminated surface waters.

3.7. An analysis of the physical-chemical and biological water parameters from the identified water sources along the project roads showed that the quality of water from all the water sources except a community spring on Wamala Road, was not good for human consumption because of very high bacterial load and total suspended solids.

3.8. Noise: Results from the noise assessment undertaken along the project roads and junctions indicated that in trading centers and markets, noise levels were above the permissible levels set as per National Environment (Noise Standards and Control) Regulations, 2003. This was mainly due to noise sources such as human conversation around the area, music in the nearby shops and vehicular movement.

3.9. Air quality: Air quality measurements obtained from the air quality assessment at selected points along the project roads and junctions were compared with the air quality standard for World Health Organization (WHO). Generally the concentration of Particles of 2.5µm diameter for most of the sampled points along the roads and junctions, were within acceptable limits and PM levels were above the WHO air quality guidelines thus air quality will definitely deteriorate during construction phase. Particulate emissions for areas around the unpaved roads were above the recommended air quality standards for World Health Organization. This was mainly due to dust generated by moving vehicles on the murrum roads. However, in areas near the murrum roads, for which measurements were taken on a rainy day, particulate levels were within acceptable limits even when the vehicles were moving on the roads.

3.10. Flora: The vegetation of Kampala District has been studied by the National Biomass Study (NBS) within the Uganda Forest Department dividing it into six major classes; Vegetation in Built-up Areas, Subsistence Mixed Farmlands, Woodland, Bush land and Wetland (Kampala District Local Government, 1997).

3.11. One or more and for some roads, all of the above stated vegetation cover types was/were observed during the vegetation survey along the project roads and junctions. “Vegetation in built up areas” that included shade, fence, ornamental, fruit, compound and road edge species was the most common observed on all the roads and junctions. Accordingly plant species falling under this category of vegetation “(Vegetation in built up areas”) were the most common. These included *Persea americana*, *Markhamia lutea*, *Thevetia peruviana*, *Mangifera indica*, *Roystonea regia*, *Ficus benjamina*, *Jacaranda mimosifolia*, *Tabebuia rosea*, *Acalypha wilkesiana*, *Bougainvillea glabra*, *Duranta repens*, *Grevillea robusta*, and *Sapium ellipticum*. With regard to lifeform, majority of the plant species observed by majority of the roads and junctions were herbs. A total 12 Species of conservation concern were observed along the roads and junctions. The species include those appearing on the IUCN red list and NFA reserved species list. These include *Brugmansia suaveolens*, *Jacaranda mimosifolia*, *Canarium schweinfurthii*, *Juniperus procera*, *Canarium schweinfurthii*, *Milicia excelsa*, *Khaya anthotheca*, *Podocarpus* sp, *Maesopsis eminii*, *Hallea rubrostipulata*, *Hallea stipulosa* and *Tamarindus indica*. Some major invasive species were observed on some of the roads and junctions. These included *Lantana camara* and *Mimosa pigra*.

3.12. Fauna: The destruction of good faunal habitat such as big trees, thickets and bushed grassland is a continuing process and this has left limited suitable habitat in the Kampala area. Due to these changes in habitat structure, certain species especially of birds have become more urbanized in recent years and are now established in many Kampala gardens. These include the popular Marabou Storks, cattle Egret, Open-

billed Stork, Woodland Kingfisher, Grey-backed Fiscal, Ruppell's Long-tailed Starling and Red-chested Sunbird among other species (Carswell 1986).

3.13. The Mammals on the other hand have suffered differently with most, if not all, of the large mammal populations disappearing from the area. The modification of the habitat has made it rather suitable for only the smaller mammals to come in, especially the Chiroptera (Bats), Soricomopha (Shrews, moles) and Rodentia (Rodents).

3.14. The fauna survey reported on mammals and birds as per the approved ESIA terms of Reference. No mammals were observed along the roads and junctions. However a number of birds were observed in the surroundings of the project roads and stand-alone junctions except at Kabalagala junction where no birds were observed. The commonest birds observed in the surroundings of the roads and junctions were Hadada Ibis, Pied Crow, Common Bulbul, Ruppel's Starling, Black Kite, Cattle Egret and Red-eyed Dove. A number of Species of conservation concern were observed in the surrounding of the roads. These included the Splendid Starling, Black and White Casqued Hornbill, the African Openbill Stork, White-throated Bee-eater, Grey Parrot, Lizard Buzzard, Little Greenbul, Blue-spotted Wood Dove, Ross's Turaco, Barn Swallow, Black Kite, Woodland Kingfisher, Lizard Buzzard, Red chested Sunbird and White-headed Saw-wing, Shikra, Long-crested Eagle, Ross's Turaco, Black & White Casqued Hornbill.

3.15. Population: According to the provisional results of the Housing and Population Census 2014, the population of Kampala by Division stands at 1,516,210 persons of which 722,638 are males and 793,572 are female. The number of households was estimated at 418,787. Wakiso District has a population of 2,007,700 persons of which 952,781 are male and 1,054,919 are female. Makindye Sabagabo Sub County has a population of 284,067 persons of which 133,079 are male and 150,988 are female. The average household size is 3.5 and 3.9 for Kampala and Wakiso respectively which are both lower than the national average of 4.7. Results of the households survey carried out on all the proposed roads indicated that the average household size along all the roads was 5.5 persons.

3.16. Literacy: The socioeconomic findings further indicated that 82.6% of the households along the project roads could read and write in the English language while 88.3% could read and write in any local language.

3.17. Ethnic composition: The proposed roads and junctions are located in Kampala the capital city of Uganda which is inhabited by ethnic groups from all over Uganda. There are also ethnic groups from other neighboring countries such as South Sudan, Kenya, Tanzania, Rwanda, Burundi and Democratic Republic of Congo among others. The project area is also inhabited by expatriates from other continents other than Africa. However, the most dominant tribe is the Baganda. The Luganda language is widely understood by most of the residents along the project roads.

3.18. Land use and land tenure: Land along all the project roads is mainly used for residential and commercial settlements. Agricultural land use is very limited. Majority (69%) of the households owned titled land with a sizeable number (30%) owning land under Kibanja system. Out of the interviewed households, 0.1% claimed to own land under customary and communal systems.

3.19. Economic activities, income sources and employment: Majority (39.3%) of the households along the project roads are in formal employment while 39.6% are in trading in various items. The rest obtain income from boda boda riding, taxi/special hire driving, artisanal skills (welding, carpentry, tailoring etc.), farming, casual labour, and remittances from rentals, family or pension. With regard to

employment, in Kampala district, the majority of the people are either directly employed in organizations or are self-employed. These organizations range from business conglomerates, construction, financial, energy, food and beverage, manufacturing, foreign exchange bureaus, hotels, mass media, telecommunication, transportation and consultancy among others.

3.20. Settlement Pattern, nature and type of buildings: Kampala is a city with a lot of diversity in settlement patterns and building types. Settlements along the proposed road links and junctions are linear in nature and congested in most of the areas. Most of the buildings in the project areas are of permanent nature. Temporary structures along the road are mainly in form of kiosks and market vending stalls. Settlements are comprised of both residential and commercial buildings.

3.21. Most of the project areas are located in un-planned neighborhoods with disorganized housing patterns. Examples of such areas include Calender Rest 1 junction and Namasole/Busabala junction, Kayemba road, Ssuna II among others. Well planned settlements were found along sections of Sentema road, Nakawa Ntinda and other roads in the Central Business District. Commercial structures are close to the roads while residential structures are located a bit further for most of the roads. Settlements also include public structures like schools and churches.

3.22. Transport and Communication: Both Kampala and Wakiso Districts are vibrant areas with transport facilities including taxis, buses, personal vehicles, motor cycles commonly known as boda bodas and bicycles. The roads are also used by heavy trucks and lorries transporting all kinds of goods. Pedestrians including school children are also a common sight along the Kampala and Wakiso roads. The nearby port at Port bell in Luzira is also a major link for transporting passengers and goods from Kampala to other parts of Uganda and the East African region. Road transport is the main means of transport within the two districts.

3.23. The proposed road links and junctions are currently in fair to poor condition. Some of the roads are paved but will require rehabilitation, others are paved but narrow and will require dualling while others are unpaved and will require upgrading to paved state.

3.24. Communication companies such as MTN, Airtel, Warid Telecom, Smile Telecom, Africell, Telecom etc. provide Kampala and Wakiso residents and visitors with mobile communication services, internet services and all related communication services. Several telecommunication masts were observed along some of the proposed road junctions.

3.25. Water and Sanitation: National Water and Sewerage Corporation is the main service provider of water and sewerage services in the two districts. Some households and institutions also practice rain water harvesting such as St. Peters S.S. Nsambya. A few households were noted collecting water from springs e.g. along Wamala road. NWSC water is accessed through house connections and yard tap connections. Households without house connections access water through buying from those with yard tap connections.

3.26. Poor garbage disposal was noticed on quite a number of the project roads where garbage was littered anyhow along the roads. However, on some roads KCCA trucks or private trucks were noticed collecting the littered or heaped garbage along the roads. 99.8% of the households along the project roads had access to toilet facilities. Out of the households with access to toilet facilities, 45.1% use the traditional pit latrine.

3.27. Education: There are quite many schools located along almost all the roads most of which are private primary school. There are also high institutions of learning that are found on some of the roads e.g. Kampala University of Nursing and Health Sciences along Wamala road, Ndejje University along Sentema road and Multitech Academy along Sir Apollo Kaggwa road.

3.28. Health: Along the project roads, several health facilities mainly privately owned were noted. Some of the health facilities that residents along the roads use include St. Francis Nsambya Hospital in Makindye Division (which is in the vicinity of Hanlon-Nsambya Junction), Mulago National Referral Hospital in Kawempe Division, Mengo Hospital, Kitebi Health Clinic in Lubaga Division, Kampala Capital City Authority Clinic Kisenyi Health Centre in Central Division, Komamboga and Naguru Hospital in Nakawa Division. With regard to diseases, malaria is the most common disease as reported by 54.3% of the households along the project roads.

3.29. Vulnerable groups: Like any other society, there are vulnerable groups along the project roads such as the female headed households, household headed by the disabled, the elderly, children and people living with HIV/AIDS etc. The socioeconomic household survey carried out along the proposed roads showed that 20.3% of the households have an orphan in their homes, 6% of the households have a disabled person in the home, 28.3% of the households are headed by females and 5.5% of the households are headed by the elderly (65 years and above).

3.30. Gender: 74.3% of the male household heads' wives did not own land. However, 41.3% said that their wives were allowed to make decisions on issues regarding land. With regard to different roles of men and women, in the urban areas many women have to a large extent taken up the role of looking after the family in every sense of the word e.g. paying school fees, providing medical care, buying food in addition to household chores. Women have thus taken up all kinds of work in order to fulfil their current family obligations. They are engaged in trade, urban farming, casual labour, wage employment and formal employment.

3.31. Non-Government Organisations: There are quite a number of non-government organisations with offices along the project roads. These include Cornerstone Development Uganda, International Union for Conservation of Nature (IUCN), Africa Centre for Global Health & Social Transformation and Katalemwa Cheshire Home for Rehabilitation Service.

3.32. Physical and cultural resources: The physical cultural resource survey revealed no declared or recorded archaeological sites and paleontological remains within the project area (selected roads and junctions). Cultural related affairs identified within the project area 2 shrines, owned by individuals. One is located at 36N 0452288 UTM 0045015 at Buwambo - Kitezi road (Kawempe) 25 metres from the road. Another found at 36 N 0454894 UTM 0032184 at Kirombe road (Makindye) approximately 15 metres from the road. Other culturally sensitive sites identified within the project area are burial grounds approximately 10 metre distance from Buwambo - Kitezi road.

4. ANALYSIS OF ALTERNATIVES

4.1. There are a number of project design alternatives. The alternatives were analysed in respect to potential environmental and social impacts, financial and technical issues. The principle used in the choice of alternative was to minimize both the environmental and social impacts, technical challenges and the cost of construction. In some cases however the preferred alternative following the analysis was not the alternative proposed for implementation by the design engineer. Justification for not selecting/proposing the preferred alternative following the analysis was given as required under section 4.1.1.2 of the Guidelines for Environmental Impact Assessment in Uganda.

4.2. Pavement material options for higher order roads: Two material options were proposed for the base layer and sub base layers for higher order roads. These are;

Material	Layer
Option 1: G45 gravel (CBR 45%) Vs. Option 2: G80 Crushed aggregate	Sub-base layer
Option 1: Crushed rock vs. Option 2: bitumen base	Base layer

- Option 1: G45 gravel (CBR 45%) is the recommended option because of its minimal environmental and social impact and technical advantage and has been selected for implementation.
- Option 2: bitumen base is the recommended option because of its minimal environmental and social impact and technical advantage over option 1: crushed rock and was proposed for implementation.

4.3. Material thickness for high order roads: Different material thicknesses were proposed for the higher order roads as follows;

Thickness	Material	Layer
150mm (Option 1) Vs. 225-300mm (Option 2)	G45 gravel (CBR 45%)	Sub-base layer
150mm (Option 1) Vs. 175-200mm (Option 2)	Crushed rock	Base layer

Option 1: 150mm for both Sub base layer G45 Gravel (CBR 45%) and Base layer crushed rock are the recommended options since they would have minimal social impact, reduced construction costs and period. They were the options required by the developer. However the design consultant has proposed option 2 for implementation following the Road Design Manual (RDM)

4.4. Traffic Accommodation: Accommodating the high volumes of vehicles on almost all the roads to be upgraded will be a major challenge on this project. Two options have been proposed;

1. Closing off sections of roads to allow for unimpeded construction.
2. Means of stop/go conditions in partial-width construction

“Option 1: Closing off road sections” is the recommended option because of minimal social impact and interruption to construction. However both options are proposed for implementation. Option 2 would be used where option 1 is not possible such as in situations of no road diversions.

4.5. Road classification: Two options of Road classification were proposed for Kayemba road; Arterial Road (4 Lanes) and Local Road (2 lanes). Option 2: Local road (single carriage way)” is the recommended option because of minimal social impact, reduced construction period and cost. It is the option proposed for implementation.

4.6. Typical cross sections: Three options of typical cross sections for the roads’ upgrade have been proposed;

1. Full Typical Cross Sections
2. Reduced (1.5m) Typical Cross Sections
3. Reduced (1m) Typical Cross Sections

“Option 3 Reduced (1m) Typical Cross Sections” is recommended because it would have minimal environmental and social impact, lower construction cost and period. However the final cross section implemented on each of the roads combines features of each of the above three options, based on available roadway width and road user requirements.

4.7. Geometric design elements: Two options were considered for each of the design elements in column 1 of the table below.

Design Element	Urban/Peri-Urban (standard)	Option 1	Urban/Per-Urban Option 2 (revised)
Design speed	50		30-70
Minimum passing sight distance	345		140
Minimum horizontal curve radius	100		60
Maximum super elevation	4		3
Crest Vertical Curve passing	126		20
Shoulder cross-fall	4		2.5

Column 2 presents standards as per the MoWT General Specification for roads and bridge works the design standard required to be used for the project while column 3 presents revisions proposed by the design engineers.

Option 2: Urban/Per-Urban (revised) is the recommended option because it would have minimal environmental and social impact and has a higher technical advantage. The option has been proposed for implementation.

4.8. Number of underpass structures on Kayemba road for upgrade: There are two alternatives, one is to upgrade the two underpass structures on Kayemba road one under queens way and the one under the railway line. The other option is to upgrade only the one under the railway line.

Option 2: Upgrade of only the underpass at the railway line is the recommended option because it would have minimal environmental and social impact and lower construction cost. It is the option proposed for implementation.

4.9. Design options for the upgrade of Kayemba road: A number of design options have been proposed for the upgrade of Kayemba road as follows;

- Design Option 1: Re-grading Kayemba Road under the Rail Line and Queen's Way :This option considers a substantial re-grade of Kayemba Road. The Consultant proposed a vertical clearance standard of 5.2m.
- Design option 2: Re-grading Kayemba Road under the Rail Line and Queen's Way : This option is based on Option 1 above .The proposed vertical clearance standard of 5.2m is reduced to 3.5m.
- Design option 3: Re-grade Kayemba Road over the railway line and Queen's Way: This option entails the re-grading of Kayemba Road over the rail line, as well as over Queen's Way.
- Design option 4: Re-grade Kayemba Road to form an at-grade rail crossing and at-grade intersection on Queen's Way (Option 4)

Design option 4: Re-grade Kayemba Road to form an at-grade rail crossing and at-grade intersection on Queen's Way is the recommended option from an overall perspective (environmental, social, technical and financial). However the option was not considered to be viable due to the following:

- The development of the proposed Bus Rapid Transport (BRT) route on Queen's Way will render the at-grade intersection layout unusable, resulting in fruitless and wasted expense;
- At-grade rail crossings are considered dangerous as road users in Kampala are not known to adhere to the road rules regarding level rail crossings.

The next best option as per the score table above is Design option 2: Re-grading Kayemba Road under the Rail Line and Queen's Way which has been proposed for implementation.

4.10. Bridge design options: Two existing road bridge structures are to be upgraded under the project, the one on Kayemba and the one on Port bell road.

- Bridge structure at Port Bell Road: There are two options for the bridge structure to be constructed on Port bell road;
 - Portal structure
 - Precast Beam and Slab Structure

Option 2: Precast Beam and Slab Structure is the recommended option because of minimal social impact and a higher technical advantage. It is the option proposed for implementation.

- Bridge structure at Kayemba road: There are three options for the bridge structures to be constructed on Kayemba road
 1. Portal structure (Option 1)
 2. Portal structure (Option 2)
 3. Portal structure (Option 3)
- Portal structure (Option 1):This option considers construction of the portal structure on the side of the railway line and to jack the structure into position.
- Portal structure (Option 2): This option will require that the railway line be relocated to a new position next to the existing position. A temporary portal structure will be built next to the existing structure, after which the railway line will be relocated to this structure. The existing structure can

then be safely demolished. Then the new portal structure will be constructed, and when it is finished will the railway line be put back in its place. After that the temporary portal structure will be demolished.

- *Portal structure (Option 3):* This option is based on Option 2. A portal structure will be designed to be built in two halves. The first half will be built in position, after which the railway line will be relocated to this portion of the structure. The existing structure can then be safely demolished. Then the second half of the portal structure will be constructed, and when it is finished will the railway line be put back in its place.

“Option 3 is recommended from an overall perspective (Social, technical and financial). It was the option selected for implementation in consultation with Uganda Railway Corporation (URC).

4.11. Road lighting design options: Solar powered lighting and hybrid-powered system is to be used for the project roads. The battery box housing is to be manufactured from powder-coated corrosion proof 3CR12 steel and shall be of suitable size to house the regulator and battery. Two options have been provided for positioning of the solar battery box housing.

1. Underneath the solar module
2. Underground

Option 1: Underneath the solar module” for positioning of the battery box is the recommended option from a technical point of view and was proposed for implementation. *No action (No project) scenario:* The no project (no-action) alternative was also analysed. It was considered not a desirable alternative. This is because the benefits expected from the project such as employment opportunities, improved mobility of vehicles and reduction in dust levels would not be realized yet the adverse impacts associated with the Action scenario are mitigable.

5. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

A review of policies, laws and institutional framework was carried out. The national policy, legal, regulatory and institutional framework pertinent to the proposed project and to which the developer should comply, as well as International policies, guidelines and standards are discussed. Relevant international agreements and conventions to which Uganda is a signatory are documented.

6. PUBLIC AND COMMUNITY CONSULTATION

6.1. Public consultation and sensitization commenced in the month of May 2015 at the scoping phase and continued throughout the detailed phase of the study i.e. in the months of June, July, August, September and October 2015. Several stakeholders at national, local government and community levels were consulted. At national level some of the stakeholders consulted included Kampala Capital City Authority (Client), Ministry of Gender, Labour and Social Development (MGLSD), UMEME Limited, Uganda Museum, Department of Historical monuments, Ministry of Tourism, Wildlife and Antiquities, Nature Uganda, Department of Wetlands and MTN. At the local government, both the technical and political leaders were consulted. The following are some of them that were consulted Environmental Officers for the respective divisions, Town Clerks for the respective divisions, Mayors for the respective divisions, Deputy Mayors for the respective divisions, Councilors for the respective divisions, Chairperson Eng./Physical Planning & Education/Social Services, Division/Ward Administrators, Community Developmental Officers in the respective divisions, District / Division Engineering Department, KCCA

Environment and Resettlement Action Plan Division, Sub County Chief Makindye Sabagabo, Chairpersons and Vice Chairpersons, LC IIIs etc. In addition, communities along the respective roads, special interest groups such as the women and boda boda riders, non-governmental organisations, health facilities and educational facilities along the roads were consulted.

6.2. A number of issues / concerns were raised by the different stakeholders. These include among others the following;

National stakeholders

- Design of lanes and zebra crossings to allow movements for vulnerable people.
- Development of a safety and health plan by the contractor.
- Proper management of traffic to avoid accidents.
- Provision of water, First Aid kits, resting places to the workers.
- Historical buildings and monuments should be conserved to avoid losing their aesthetic value.
- UMEME infrastructure that will be damaged will require restoration.
- The road reserve should be used for tree planting to conserve the biodiversity and the beauty of the city.
- Community health and safety should be given due respect.
- Notify the Chief Technical Officer about the proposed project roads through formal communication requesting for support before relocation of the cables.
- Work closely with MTN engineers during the relocation process for technical guidance and support to minimize possibilities of damages to the cables.

Local government stakeholders

- Compensation of project affected persons.
- The designs should cater for walkways and pedestrian lands.
- Drainage channels and manholes should be covered to avoid accidents.
- Provide employment opportunities to the local people especially casual labourers.
- Involvement of National Water and Sewerage Corporation and UMEME is key.
- Provide drainage system for the design.
- Good quality materials should be used during the construction of these roads.
- The water logged areas should be taken care of from planning stage.
- Widening of some roads should be given considered for example the Sentema road.
- The roads must be covered with a firm surface for travel such as paving stones or concrete.

Communities along the roads

- There is always undervaluation of affected property.
- Compensation of tenants / kibanja owners versus land owners.
- Impact on water pipes and electricity lines.
- Compensation of deceased PAP's property.
- Should not evict anyone without compensation.
- There is need for formal designation of boda boda stages.
- Install humps to regulate speed.
- Provision of alternative routes during construction.

Institutions (NGOs, education and health institutions)

- Destruction of property, interruption of activities and blocking access to premises close to the road.
- Noise pollution , increased accidents , increased traffic jams and loss of clients are some of the impacts expected that should be mitigated
- Put Zebra crossings and road signs in busy areas especially where there are schools.
- Put humps along the roads to reduce the risk of accidents.
- Contractor should be careful not to destroy underground water pipes.

7. POTENTIAL SIGNIFICANT IMPACTS

7.1. The project will be associated with both positive and negative impacts with varying levels of significance. Measures to enhance the positive impacts and mitigate the negative impacts have been proposed. The table below shows the predicted major positive and negative impacts and the measures proposed to enhance or mitigate them.

Impact	Proposed mitigation/enhancement measures
Socio-economic impacts	
Positive impacts	
Better standards of living	Adequate compensation to enable better standards of living for project affected persons.
Negative impacts	
Anxiety generated by disclosure of information to the Community	To reduce on the anxiety, all information regarding the project and land acquisition and compensation will be thoroughly disseminated to the community especially during the preparation of the Resettlement Action Plan and any other relevant project information throughout other phases of the project so that all fears, anxieties and queries are answered, reduced or eliminated. During the RAP preparation and implementation phases, information about land take and acquisition will be disseminated to the right people e.g. family members – property owners, spouses, children etc.
Biophysical impacts	
Positive impacts	
- (None)	
Negative impacts	
-	
Construction phase	
Socio-economic impacts	
Positive impacts	
Direct employment opportunities	<ul style="list-style-type: none"> • Timely and continuous information dissemination about the existing job opportunities and any other opportunities besides the jobs such as sourcing of materials and supplies. The contractor will use effective communication methods so as to ensure that the message reaches the intended people (See section in Baseline Chapter under communication, with recommendations on communication channels with radio, television networks and newspapers that reach a wider section of the population). • The contractor will present a transparent Worker’s Recruitment Plan. The recruitment procedures must provide equal opportunity for all including females. The Plan will be clear on the working conditions and terms of employment. • Employment opportunities will be extended to the interested people along the different roads. • The Contractor will prepare and implement and Sexual Harassment Policy or Plan so as to avoid any kind of sexual harassment for the workers. • The Contractor will provide fair working conditions and environment as required by the Employment Act e.g. workers will be allowed to rest, take leave e.g. annual, sick leave, provided with fair pay, contracts etc. The implementing agency will have to approve the Worker’s Recruitment Plan including the proposed wages for the workers. • There will be no forced labour at the project site. • There will be no child labour at the project site. All employees will be aged 18 years and above as required by the Children’s Act.
Increased business opportunities	Priority to be given to local companies when outsourcing construction materials.
Skills development	Provision of on-job training for the workers (unskilled and semi-skilled) in various areas of construction. This could be achieved through deliberately placing unskilled workers with semi-skilled personnel and semi-skilled with skilled workers.
Negative impacts	

Impact	Proposed mitigation/enhancement measures
Impact on property	<ul style="list-style-type: none"> • A detailed Resettlement Action Plan will be prepared and implemented in accordance with national laws and international guidelines and principles. The Plan will clearly set out the land acquisition and resettlement procedure highlighting all available alternatives for compensation. • All persons losing land will be promptly and adequately compensated before construction activities begin • Financial literacy among the Project Affected persons will be instituted to avoid mismanagement of earnings from cash compensation
Temporary loss of access to homes and businesses	<ul style="list-style-type: none"> • Handle sections of the road to shorten the period of disruption. • Access to existing businesses will be maintained by creating temporary driveways, and/or providing alternate access points. Accesses will be restored after construction.
Loss of business, decrease in customers and income	<ul style="list-style-type: none"> • Compensate the owners of business premises adequately to enable them replace the buildings before onset of construction activities • Provide ample time e.g. 3-6 months for the business owners, boda-boda and taxi operators to look for alternative business premises.
Disruption of school activities	<ul style="list-style-type: none"> • Wherever practical, the contractor will schedule construction near schools on weekends. • Wherever this risk exists, the contractor will screen off schools to avoid accidents. • The contractor will engage school administrators to sensitize pupils/students about the risks associated with the road construction and necessary precautions they need to undertake. • Disseminate information regarding the work plan for construction activities along sections with schools in a timely manner to enable the school administrations make any necessary plans that they may see fit e.g. sensitization of their pupils and students etc. • Project workers especially drivers will continuously be sensitized and reminded to be extra careful especially when working close to schools. • Use of flagmen at the construction site near schools to control traffic and reduce noise levels
Influx of people	<ul style="list-style-type: none"> • Information dissemination to the interested communities and local leaders along each road about the available jobs. • Recruitment of local people for the less specialized activities, wherever possible. • Put in place an internal control system to curb cases of theft of materials • Collaborate with the local security in the area to ensure safety of project materials • The contractor will have a code of conduct for its workers to minimize some of the risks. • A Grievance Management Plan will be prepared and implemented by the Contractor for use by the concerned parties. Local authorities at Sub County and village levels will be involved in the solving of grievances. As a minimum the Grievance Resolution Mechanism / Plan will consist of a clear point of contact to receive the grievances, responsible persons to solve the different categories of cases and proper and clear channels for feedback. • The contractor will provide adequate sanitation facilities for workers on each road. The project being linear in nature, the distance between these facilities will be short to avoid workers trekking long distances to access them. • A Waste Management Plan will be in place and implemented by the contractor with strict supervision from KCCA. • The Contractor will have a comprehensive HIV/AIDS Management plan for its workers informed by a baseline so as to reduce the risk of spreading the disease e.g. provision of condoms, free testing and counselling services, HIV/AIDS awareness programs etc. • HIV/AIDS awareness programs on radio or television plus any other methodology to disseminate the information to the community. An independent NGO will be procured by KCCA to carry out the awareness. • Minimize stagnant pools of water as much as possible by ensuring that trenches are not left open for a long time. • Prepare and implement a Stakeholder and Citizen Engagement Plan to help in the management of community expectations and any other issues that may arise.

Impact	Proposed mitigation/enhancement measures
	<ul style="list-style-type: none"> • The contractor will have a comprehensive social management plan informed by a baseline and stakeholder engagement to manage social vices both for local and international staff • Contractor will ensure that there are toilet facilities on site for both males and females • Contractor will ensure that no children are employed on site.
Impact on Vulnerable groups	<ul style="list-style-type: none"> • Promote women involvement in all stages of project activities and ensure that vulnerable people are involved in taking decisions on matters that affect them directly. • The affected vulnerable households will be compensated fairly and adequately. • Livelihood restoration strategies will be extended to the vulnerable groups and their income levels monitored closely during the implementation process. • Equal distribution of jobs to all including vulnerable households. • There will be no forced labour or child labour at the project site. All employees will be aged 18 years and above. Furthermore, employment records will be disaggregated by age and sex.
Impact on gender	<ul style="list-style-type: none"> • Jobs will be equitably distributed to both women and men as long as one has the qualification rather than basing on gender to allocate jobs. Employment records disaggregated by sex will be kept by contractor and easily accessed by the monitoring and supervising team. • Information dissemination about dangers of HIV/AIDS to the community will be done all throughout the period of the project. The messages will be passed on using the locally understood language for better understanding and the main means of information access to make them effective. • Workers will be sensitized to desist from any sexual relations with the local people to avoid cases of family break ups. • A Sexual Harassment Policy will be developed by the Contractor before start of the construction and its contents distributed and disseminated to all workers. This plan will include items like; key point of contact e.g. Human Resource Manager, Health and Safety Manager or Community Liaison Office; procedure for reporting, incident referral plan, mitigation measures and penalties to the culprits etc. • Prompt and effective remedial action will be taken after investigating the sexual harassment claims. • Sensitisation of employees and supervisors about sexual harassment will be undertaken at the beginning of the construction so as to avoid any possible sexual harassment. In addition, continuous reminders will be made from time to time. • Display clear and visible posters on reporting channels at the respective construction offices and along the several sections of the roads where construction is taking place.
Disruption of traffic	<ul style="list-style-type: none"> • A Traffic Management Plan (TMP) will be implemented during project construction. Specific elements of the TMP will include but not limited to the following: the use of flaggers and temporary lane realignments to maintain through traffic, concrete barriers, signage to direct traffic movements, and possible reduction of speed limits in construction zones. It will also include a description of measures to be taken to protect pedestrians and community health and safety mitigation measures • Traffic can be accommodated by means of stop/go conditions in partial-width construction wherever possible. • Inform road users about location of road works and advise on use of alternative existing roads • Coordination with traffic police in traffic management • Deployment of flag men to control traffic flow at all project sub component sites
Disruption of public utilities and infrastructure	<ul style="list-style-type: none"> • The Contractor will need to prepare a utility relocation plan and liaise with the utility providers to carry out temporary or permanent relocation, and to protect the utility infrastructure to ensure minimal damage and disruption of services, Damage to the water sources will be avoided wherever possible. If not possible, plans to provide alternative water sources will be made by the implementing agency.

Impact	Proposed mitigation/enhancement measures
	<p>Consultations with the utility service providers will be commenced right from the design stages to ensure that all the utility services within the alignment are relocated before the commencement of the Works</p>
<p>Impact on Occupational Health and Safety</p>	<ul style="list-style-type: none"> • An Occupational Health and Safety Management Plan will be put in place by the contractor before commencement of the project and will implement its provisions. The Safety Plan will put into consideration the safety procedure in case of accidental bursts of sewage pipes. Workers will at all times wear PPE. • Contractor to work in close collaboration with NWSC in the event that sewage pipes break or to minimize the possibility as much as possible. • Disseminating of relevant safe working procedures to all workers • Provision of appropriate Personal Protective Equipment to the workers e.g. ear muffs, overalls, nose masks, helmets, safety boots, safety jackets • Labelling of danger zones and hazardous materials • Restrictions/control of access to potential danger zones or usage of hazardous chemicals • An Emergency Response Plan /Contingency Plan taking into consideration all emergencies will be prepared before the commencement of the project. This will be communicated to all workers. • All construction equipment used for the execution of the project works will be fit for purpose and carry valid inspection certificates and insurance requirements. • Risk assessment will be prepared and communicated prior to commencement of work for all types of work activities on site. • Ensure all plant machines and vehicles are regularly inspected, serviced and maintained. All staff assigned to operate project machines and vehicles will be trained and competent for such a job. • First Aid kits with the relevant medicines and equipment e.g. adhesive bandages, antibiotic ointment, cotton wool, pain killers, non-latex gloves, scissors, thermometer, etc. will be made available by the contractor on site. • An accident log swill be put at each construction site to record and monitor any accidents. • Wear visible apparel to reduce on the risk of accidents due to poor visibility. • Prepare a Site Traffic Management Plan at worker’ camps clearly showing visibly marked pedestrian walkways and parking for project vehicles to avoid any traffic accidents at workers’ camp. • Inform and apply site procedures to visitors to the site. • Regular vision tests for drivers. Regular impairment testing for drivers (drug, alcohol). • Regular inspection to ensure the implementation of the recommendations / provisions of the Management Plans and assessment of compliance with the requirements. • Regular reporting on the health and safety performance onsite in addition to reporting of any accidents, incidents and/or emergencies and the measures undertaken in such cases to control the situation and prevent it from occurring again. • High noise producing machinery will be fitted with silencers • Noise intensive works such as excavation, movement of project vehicles will be scheduled for the least noise-sensitive time of the day (work between 7:00am to 6:00pm) since the noise impact is less felt during day than during the night. • Limit the speed of project vehicles to 30km/hr. to help minimize the increase in noise levels. To ensure adherence to the set speed limit, speed humps will be put in place where necessary along construction routes and penalty systems introduced.

Impact	Proposed mitigation/enhancement measures
	<ul style="list-style-type: none"> • Since the impact of noise increases with increase in exposure time, the work schedules for workers will also be designed to limit the exposure time. No worker will be exposed to noise level greater than 85dB (A) for a duration exceeding 8 hours per day as stated in the National Environment (Noise Standards and Control) Regulations, 2003. • Conduct Environmental Impact Assessments for material extraction activities
Impact on Community Health and Safety	<ul style="list-style-type: none"> • Use of road signs & barriers to show the dangerous areas • Enforce restrictions on unnecessary entry into any protected zones • Follow the mitigation measures prescribed to reduce any dust or noise impacts e.g. regular sprinkling of water along the roads like twice a day etc.). • The Contractor will have an HIV/AIDS Prevention Plan for his workers and also implement it so as to reduce the risk of spreading the disease. • Make provisions for pedestrian and non-vehicular traffic during construction periods. • Use of flagmen to direct the traffic to avoid any accidents. • Constant sensitisations and reminders to workers and drivers about community health and safety e.g. traffic rules etc. • Work in close collaborations with Traffic Police to enforce traffic rules and regulations along the roads under construction. • All project vehicles and trucks will comply with the proposed speed limits i.e. 30-50 based on the road. • The contractor to ensure that all project trucks and vehicles are operated by licensed operators. • The Contractor to be extremely careful when relocating sewage pipes to avoid any accidental sewage bursts and their impacts to communities. • The Contractor will work closely with NWSC so as to ensure that risks associated with breaking of sewage pipes are minimised. • Enhance community liaison for timely gathering of all the related community health and safety issues arising from project implementation • High noise producing machinery will be fitted with silencers • Noise intensive works such as excavation, movement of project vehicles will be scheduled for the least noise-sensitive time of the day (work between 7:00am to 6:00pm) since the noise impact is less felt during day than during the night. <p>Conduct Environmental Impact Assessments for material extraction activities</p>
Biophysical impacts	
Positive impacts	
-	
Negative impacts	
Loss of plant species and degradation of habitats	<ul style="list-style-type: none"> • Before vegetation clearance, the corridors to be cleared will be clearly marked out to avoid unnecessary vegetation clearance. In addition, clearing will be done manually where possible and will not be done indiscriminately. Trees that have to be felled will therefore be marked before clearance commences. • Species of conservation concern will be avoided by designing new road lanes on road sides without the species. However, if they cannot be avoided then permission to clear those listed by NFA will be sought from responsible authorities as stated in the law. Also if cleared, the trees will be replanted by the road or junction sides and their regrowth monitored and enhanced until they are mature. • A deliberate campaign will be made beforehand to sensitize all the construction and other workers on the project about the need to minimize damage on plant species. This awareness raising drive will be carried out prior to any operations in the project area.

Impact	Proposed mitigation/enhancement measures
	<ul style="list-style-type: none"> • New road lanes will be placed on the side of the roads that have no wetland/stream or on wetland sides that are more degraded with human activity such growing of crops, trees, and waste disposal • All persons losing crops and trees will be adequately compensated. • Tree clearance will be compensated by tree planting where space provides an opportunity. • In addition, to avoid the impact from becoming significant beyond boundaries of roads mentioned above, the following will be implemented; ✓ Spilling of bitumen that would damage vegetation will be avoided; ✓ Creation of new diversion roads will be avoided by using existing roads as diversions where possible; ✓ Stone crushing plants will be fitted with dust control devices and operated in accordance with manufacturer's specifications; ✓ Workshops, equipment storage facilities and workers camps, will not be put in areas of special conservation value such as forest reserves and wetlands; ✓ Areas which will minimize vegetation loss will be selected for access routes, construction workshops, equipment and materials' storage sites and workers' camps; ✓ Stockpiles of earth will not be placed where there is vegetation, particularly on young plants which have been planted deliberately. ✓ All areas cleared of grass will be revegetated just after decommissioning.
Proliferation of invasive species of plants	<ul style="list-style-type: none"> • Construction equipment brought in from outside the project area will be cleaned to minimize the risk of introducing invasive species from outside the project area. • All equipment will be cleaned thoroughly before demobilization out of the project area. • Awareness of the workers and neighbouring communities about the dangers and threats invasive species can potentially pose to ecosystem stability will be enhanced. • Any non-paved disturbed areas will be restored immediately after the operations. This should allow natural regeneration to take place so that the disturbed areas may be re-vegetated with natural vegetation immediately after the construction activities • Growth of invasive species of plants within the proximity to the roads will be monitored and any that may grow in the area mechanically removed, preferably before they begin flowering/fruiting stage • During channelization, the flow direction of water within wetlands will as much as possible be maintained • Borrow material from quarry or borrow pits will be obtained from within the project area as much as possible. • Earth for filling during road construction will be obtained from bare/almost bare ground to minimise on the seed banks that would be carried along with it. • Immediately after construction, road edges cleared of vegetation will be planted with plant species indigenous to those areas and their regrowth monitored until they are mature
Reduction in number of fauna species	<ul style="list-style-type: none"> • Cutting down of big trees and draining of wetlands which are main habitats for biodiversity will be minimised. Sensitive areas like woodlots and wetlands and major thickets will be avoided during construction. • In cases where the sensitive habitats cannot be avoided, a plan to create these habitats will be put in place. For example, if for unavoidable reasons, one tree is cut down, three more trees at the road side to replace the destroyed habitat will be planted. And if a wetland is to be drained, a section of it to service the remaining ecosystem will be left. • Recovery of such areas (woodlots and wetlands) if affected during construction will be monitored. • Any roosting or breeding sites encountered during construction will be avoided.

Impact	Proposed mitigation/enhancement measures
Change in geological substructure	<ul style="list-style-type: none"> • The above mentioned activities that would result into a change in the geological structure will be limited to only the areas under operation. • Cuts will not exceed the angle of repose which could lead to rock falls, slips and land slides • Stock piles for each type of material excavated will be separated. This will be done to ensure systematic backfilling of created pits and to maintain a geologic arrangement close to the original. • Exposed slopes will be protected using conventional civil engineering structures (such as stone filled meshed fences) in conjunction with bio-engineering techniques • Newly eroded channels will be backfilled and restored to natural contours • Areas susceptible to erosion will be protected using either temporary or permanent drainage works • Scouring of slopes will be prevented • Ponding will be prevented • If not to continue in use, all borrow pits and quarry sites will be backfilled to as near as possible their original topography • Grouting will be undertaken since it can improve the stability of unstable slopes
Soil erosion and sedimentation (Siltation)	<ul style="list-style-type: none"> • Minimisation of earth works such as excavation, cut and fill, vegetation clearance, and compaction, to only the area that is absolutely necessary • Construction cutoff ditches around stockpiles to prevent materials being washed away by surface runoff • Excavated and stockpiled materials will be covered with fabric or other materials • Stock piling near waterways or on slopes will be avoided • Use of existing roads as access roads to quarry sites, borrow areas, worker's camps, and workshops where possible • Revegetation of any constructed access roads during the decommissioning phase of the project. • Location of stone crushing plants away from water courses • Stone crushing plants will be fitted with approved dust controls and operated in accordance with manufacturer's specifications • Soil erosion checks will be put in place wherever necessary along drains. These checks will include scour checks, silt traps, paving of drains, and stone pitching. In addition, drains will be regularly desilted. • Construction of interception ditches, and settling ponds to prevent muddy water reaching water sources • Water supply sources will be identified and relocated before site clearing and construction. • Excavation and grading activities will be planned during the dry season where possible • After construction, vegetation will be planted in areas where vegetation was removed including areas where soil spoil was previously dumped. • Channelisation will be done in such a way that water continues to flow in a direction as near as possible to its original. • Rock boulders will be placed as the first layer at the bed of swamps when filling swamps to allow continued water flow. • Undertaking works in sloppy areas (catchment areas) will be avoided. However if they must be undertaken there then drainage systems (outfall drains) will be installed to make sure water from the catchment areas maintains its original flow direction/to make sure that water from catchment areas ends up in its usual basins. • Where banks of streams going through the wetlands are erodible, gabions and other measures to minimize erosion will be put in place • Culverts and drainage channels will be constructed/installed taking the peak water levels of streams and swamps into consideration. • Culverts will be leveled appropriately so that they are self-cleaning.

Impact	Proposed mitigation/enhancement measures
	<ul style="list-style-type: none"> • De-silting of road drainage systems will be undertaken regularly. • In addition, individual Environmental Impact Assessments (EIAs) for excavation of material from borrow pits, quarry sites and for the construction of workshops, workers' camps, equipment storage sites, stone crushing plants will be conducted before the excavation of material from borrow pits, quarry sites and before the construction of workshops, workers' camps, equipment storage sites etc. The EIAs will however be spearheaded by qualified and registered EIA practitioners.
Air pollution	<ul style="list-style-type: none"> • To minimize dust emissions caused by movement of vehicles, unpaved roads will be sprinkled with water (using water browsers); • Personal protective equipment such as dust masks will be availed to workers whenever needed; • Regular servicing of vehicles and machinery that are likely to produce excessive gaseous emissions will be undertaken • The speed of haulage trucks and other vehicles will be limited to 30km/hr. to reduce dust emission. To ensure this, speed humps will be put in place, sensitization of drivers about speed limits undertaken and penalties for drivers that do not heed to the speed limits enforced. • All idle equipment or machinery will be turned off to minimize on gaseous emission.
Post-construction phase	
Socio-economic impacts	
Positive impacts	
Improved mobility of vehicles, reduction in travel time and reduced traffic congestion	<ul style="list-style-type: none"> • Strict supervision of the contractor to ensure that all required specifications and standards for construction of a durable road are complied with. • Installation of road signage to control against accidents related to the "new road effect"
Reduced vehicle wear and tear thus reduced maintenance costs	<ul style="list-style-type: none"> • Strict supervision of the contractor to ensure that all required specifications and standards for construction of a durable road are complied with. • Regular post construction road maintenance to avoid the breakdown of the new road infrastructure and return to the initial poor road conditions
Reduction in dust levels	<ul style="list-style-type: none"> • Strict supervision of the contractor to ensure that all required specifications and standards for construction of a durable road are complied with. • All bare surfaces opened during the construction phase will be rehabilitated by way of revegetation • Routine (preferably daily) sweeping of the roads and their sides to reduce on any dust that may accumulate as a result of day to activities of people operating along the different roads. • Enforce speed limits
Improved access to health services	<ul style="list-style-type: none"> • Strict supervision of the contractor to ensure that all required specifications and standards for construction of a durable road are complied with. • Availability of drugs in health facilities • Adequate medical personnel to help save the lives of people.
Increase in value of land and property along the roads	<ul style="list-style-type: none"> • Strict supervision of the contractor to ensure that all required specifications and standards for construction of a durable road are complied with. • Availability of drugs in health facilities • Adequate medical personnel to help save the lives of people.

Impact	Proposed mitigation/enhancement measures
Land development and more business opportunities	None
Improved sanitation and a reduction in related diseases	<ul style="list-style-type: none"> • KCCA will provide dumping bins in designated places for people to dump in their rubbish. These bins will be emptied on a regular basis. • Private garbage collectors will be contracted to collect rubbish along the roads on a regular basis. • Sensitisation campaigns towards change in sanitation practices and proper sanitation could be engineered by KCCA in Kampala in general and along the roads. • Bylaws against littering of rubbish will be developed and disseminated to the people. Fines will be paid by whoever breaks them.
Street lighting	<ul style="list-style-type: none"> • Continuous community awareness on community policing to safeguard the street lights. • The lights will be designed in a way that they will be difficult to be stolen/vandalised
Improved Scenic Beauty/Aesthetics	<ul style="list-style-type: none"> • Daily sweeping of the roads is required • Routine and timely garbage collection by KCCA • Enforce fines to whoever will be found littering garbage anyhow. • Periodic and regulated desilting of drainage channels • Periodic maintenance of the roads and street and junction lights
Tourism attraction	<ul style="list-style-type: none"> • Increase/ promote of archaeo- tourism related activities • Strict supervision of the contractor to ensure that all required specifications and standards for construction of a durable road are complied with.
Negative impacts	
Loss of jobs	<ul style="list-style-type: none"> • Counselling programs for the workers before completion of the construction. • Financial literacy and management trainings may be carried out for the workers to ensure proper and prudent use and investment of their salaries to ensure continued earning even after completion of construction.
Blocking of access to homes and other public places	<ul style="list-style-type: none"> • Ensure that after construction, there are alternative accesses to the blocked homes • Round culverts will be adopted for drainage in the sections where there is a home or business premise in close proximity to the road.
Increase in traffic on some roads	Proper signalization of the proposed junctions like Kabuusu junction and effective use of the traffic lights will help to reduce the anticipated traffic along the affected roads.
Risk of accidents due to over speeding	<ul style="list-style-type: none"> • Proposed speed limits per road will be maintained. • Wherever feasible, humps will be installed to regulate speed. • Road safety campaigns especially among pupils/students will be undertaken by the schools' administrations. Introduction of road safety education curriculum in schools especially primary and secondary levels. • Where feasible especially near schools, zebra crossings will be provided for. • Road safety campaigns in general for road users through radio talk shows. • Placement of traffic officers along areas that may considered most at risk e.g. at junctions. • Constant performance monitoring of the roads to identify any black spots that could lead to accidents.
Biophysical impacts	
Positive impacts	
-	

Impact	Proposed mitigation/enhancement measures
Negative impacts	
-	
Cumulative impacts	
Increased disruption of traffic	The mitigation measures for the independent project impact presented in the report will be implemented.
Increased loss of plant species and degradation of habitats	The mitigation measures for the independent project impact presented in the report will be implemented.
Increased air pollution	The mitigation measures for the independent project impact presented in the report will be implemented.

7.2. Residual impacts: Upon successful implementation of the impact mitigation measures the significance level of the negative impacts will be reduced to either minimal/no or small negative.

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1. An environmental and social management plan to ensure implementation and check on the efficiency of the proposed mitigation measures has been developed. In the plan, monitoring roles are assigned to the Developer and/or his contractors and consultants, NEMA, Local leaders, Police, Utility service providers, Ministry of Works and Transport, Ministry of Gender, Labour and Social Development, Ministry of Lands, Housing and Urban Development, Petroleum Supply Department and Ministry of Tourism and Antiquities (Department of Museums and Monuments).

8.2. **The total cost for monitoring** during the construction phase and liability period has been estimated at **USD 362,754**. The stated cost excludes contractor monitoring costs.

8.3. Roles and Responsibilities

- **Kampala Capital City Authority:** Although the contractors will have the primary roles in delivering on the measures set out in the ESMMP, the Developer (KCCA) will have the ultimate responsibility for ensuring that measures are delivered. In this respect, the developer will review and approve contractor's plans for delivery of the actions contained in the ESMMP and subsequently during the project construction phase, will review contractor performance through monitoring, audits and inspection. The Directorate of Gender and Community Services and Production will be key in ensuring compliance to environmental and social safeguards of the project. During operation, The Directorate of Public Health Services and Environment will take lead in ensuring that discipline in garbage disposal by the communities. It will ensure that garbage is not littered in the newly constructed water drainages.

- The Directorate of Legal affairs will be key in handling of criminal cases during both the construction and operation phases. The Contractor will work in close collaboration with this Directorate to reduce thefts of project materials during construction and any sabotage on built infrastructure during operation.

- KCCA is also expected to ensure planning and implementation of the following:
 - Continuous sensitisations of communities along the project roads in regard to extents of road reserves and acceptable activities therein. This would in future reduce on illegal operations within KCCA's road's reserves.
 - Have and implement anti-theft measures against theft of street lights.
 - Provide adequate notice to vacate to property owners and communities operating within the required land. This should be between 3-6 months or as required by the law.
 - Plan for construction of additional legally recognized markets to reduce on the number of people illegally operating along roads.
 - Improve on the methods of tax collection to redeem the image of KCCA among people operating along the different roads.

- **Supervising Consultant:** During preparation, construction and operation of the project, an Environmental Management Specialist/ environmentalist (EMS) who will be part of the supervising Consultant's Team, will be responsible for ensuring that the overall objectives of the environmental mitigation measures are met. A Sociologist who will also be part of the supervising Consultant's Team will be responsible for overall achievement of socio-economic mitigation and enhancement aspects.
- The supervising consultant's EMS, and Sociologist will report to the supervising consultant's engineer who has the power to stop the work at any time in case the actions established in the ESMP or otherwise required are not adhered to.
- **The Contractor:** The developer will ensure that contractors are reputable, legitimate and have in place an appropriate Environment and Social Management System. During site preparation, construction, operation and decommissioning, the Contractor will be responsible for ensuring compliance with all relevant legislation (highlighted in Chapter 5 of the ESIA Report) as well as adherence to all environmental and socio-economic mitigation measures specified in the ESMP. The Contractor is also responsible under the contract for managing the potential Environmental, socio-economic, safety and health impacts of all project activities whether these are undertaken by themselves or by their sub-contractors.
- The Contractor will also be expected to demonstrate commitment to the ESMP at all levels in the contractor's management structure. The contractor will be required to have in place individuals responsible for overall environment management (including community liaison) and, safety and health management. The team could include Environment, Health and Safety (EHS) Officer and a Community Liaison Officer. The contractor's community liaison team will be required to work with the supervising consultant's Sociologist to implement the social aspects of the ESMP. The Contractor will be required to undertake regular environmental and socioeconomic Inspections and provide reports to the supervising Consultant (EMS) and sociologist to monitor and evaluate performance against the measures and objectives established in the ESMP.
- The contractor's community liaison team will be expected to work closely with KCCA's Directorate of Gender to implement the Stakeholder Engagement Plan.
- **Government Bodies and Utility Service Providers:** Government bodies including NEMA, MoLHUD, MoGLSD, MoWT, MTA (Department of Museums and Monuments), Police, Petroleum Supply Department, Local authorities and utility service providers (NWSC, Telecommunication companies, UMEME) have monitoring roles.

8.4. Stakeholder Involvement: KCCA should continue to engage with the stakeholders throughout the project cycle. A system should be established with the stakeholders to ensure that stakeholders receive information on the progress of work and its implications, employment and others. This structure will be fully established when Resettlement Action Plan (RAP) has been completed and the actual affected people are known as they form the major part of this structure. Grievances will be handled through the structure that will be established by the project and the existing Local Council system. The Contractor shall also be required to have a Stakeholder Engagement Plan and Grievance Management Plan throughout the construction phase. Appendix XVIII presents a sample grievance management plan that the contractor could make reference to and build on during preparation of his.

8.5. Reporting: Annual reports containing all data obtained during the environmental monitoring throughout the year will be submitted to NEMA by the developer up to the end of the construction period. During operation, monthly monitoring reports prepared by the Developer or its consultant will be submitted to NEMA by the developer.

9. CONCLUSION AND RECOMMENDATION

9.1. The project will result into a number of impacts on the environment. These impacts will be both positive and negative. Measures to mitigate each of the identified the negative impacts have been recommended. Once these measures are implemented, then the impacts will be minimized.

9.2. Recommendations: The developer is called upon to ensure that the mitigation measures proposed under this report are implemented. The developer should also ensure that the ESMP presented under this report is available to the relevant parties responsible for implementing it.

9.3. To supplement the ESMP presented under this report, all contractors should be called upon to develop the following Environmental management plans;

- A Spill Prevention and Counter Measure plan
- Waste Management Plan
- Occupational Health and Safety Plan
- HIV/AIDS Prevention Plan
- Erosion and Sediment Control Plan
- Flood Control plan
- Environmental Management Plan
- Environmental Restoration plan
- Traffic management plan
- Utility relocation plan
- Stakeholder and Citizen Engagement (Grievance Management) Plan

9.4. The developer should ensure that on completion of project works, all sites disturbed by the project works are restored to as near as possible their original state before the commencement of the project works as per developed and approved restoration plans.

9.5. Since impacts are site specific, individual Environmental Impact Assessments (EIAs) for excavation of material from borrow pits, quarry sites and for the construction of workshops, workers' camps, equipment storage sites, stone crushing plants and any other ancillary works e.g. creation of road diversions, extraction of water from water sources etc. should be conducted by the developer/contractors,

before the commencement of works. The EIAs should be spearheaded by qualified and registered EIA practitioners.

9.6. The contractor should recruit an Environmentalist, a Community Liaison Officer, Health and Safety Officer, among other staff, who will monitor the implementation of the ESMMP.

9.7. The contractor's environmentalist should produce and submit to the developer/Supervising consultant's Environmentalist monthly reports on how far the project conforms to the statements in the ESIA report.

9.8. The developer should keep records and make monthly and annual reports to NEMA describing how far the project conforms to the statements in the ESIA report.

9.9. As required by the National Environment Audit Guidelines, the developer should carry out environmental audits of the project and submit the first Environmental audit report to the Executive Director, NEMA within a period of not less twelve months and not more than thirty six months after the commencement of the project. Also, environmental audits should be conducted by the developer or the contractors for the project ancillary components including borrow pits, quarry sites, workshops, workers' camps, equipment storage sites, road diversions etc. for which individual EIAs will have been carried out. The audits or the ancillary facilities should be conducted between the first year and the third year after the commencement of the project ancillary operations or after the completion of the ancillary operations or earlier if the operations will run for less than a year)

9.10. The developer should obtain any necessary permits including water abstraction permits, waste discharge permits, fuel transportation and storage permits, permits to cut down reserved species among others.

9.11. The developer or contractors should ensure that impacts not contemplated at this stage are quickly addressed in case they arise.

9.12. If the developer wishes to add any other component onto the project which was not considered under this assessment, a fresh Environmental and/or Social Impact Assessment (as an addendum) for the additional component should be undertaken to determine its compatibility with the immediate environment, its impacts on the environment and to identify appropriate mitigation measures for its adverse impacts.

10. REFERENCES AND CONTACTS

10.1. Reference

GOU/KCCA (2017) Environmental and Social Impact Study for PROPOSED UPGRADING SELECTED ROADS, JUNCTIONS AND INTERSECTIONS IN KAMPALA CITY

10.2. Contacts

For more information, please contact:

FOR AfDB

1. G. A. MAKAJUMA: G.A.MAKAJUMA@AFDB.ORG
2. E.B. KAHUBIRE, Social Development Officer: E.KAHUBIRE@AFDB.ORG