ANNEX 3 OUTLINE OF LONG/SHORT-LIST PROJECTS

ANNEX 3 OUTLINE OF LONG AND SHORT LIST OF PROJECTS

A3.1 LONG LIST PROJECTS

A3.1.1 OBJECTIVES AND SELECTION OF LONG LIST PROJECTS

The objective of the long listing is to identify candidate projects for pre-feasibility study (Pre-FS), which could be implemented under the official development assistance of the Government of Japan (GOJ), for the road network improvement to address serious traffic congestion in Greater Kampala Metropolitan Area. This is intended to support the National Transport Master Plan including Greater Kampala Metropolitan Area (NTMP/GKMA) as well as the National Development Plan (NDP).

The following Figure A3.1.1 shows the flow of selection of long and short list of projects for Pre-FS.

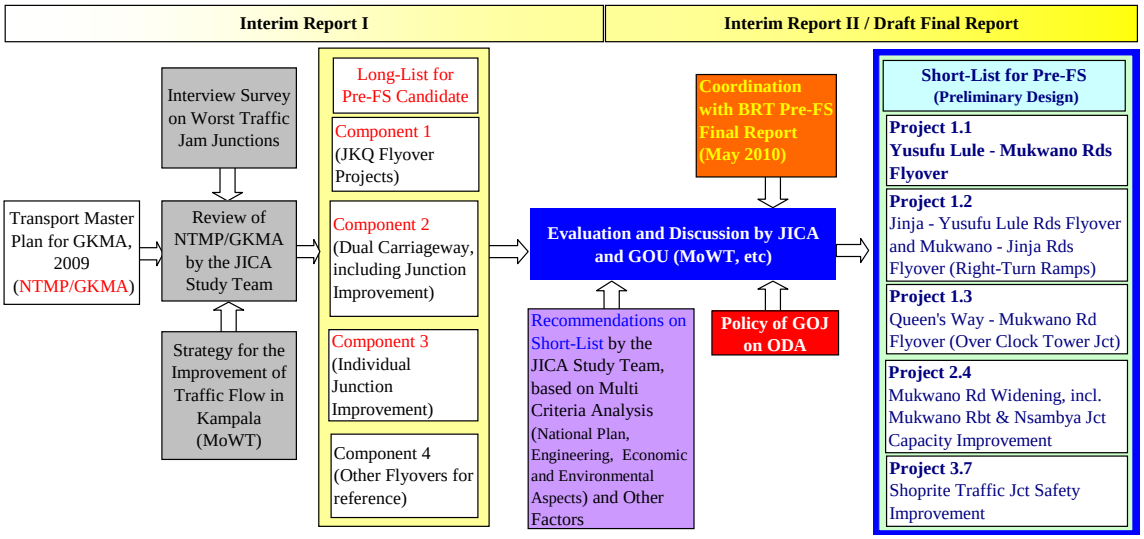


Figure A3.1.1 Flow of Selection of Long and Short List Projects for Pre-Feasibility Study

A3.1.2 SELECTION OF LONG LIST OF PROJECTS IN THE INTERIM REPORT I STAGE

The Study Team considered the following for long listing of the Pre-FS candidate projects:

- Interview results regarding the worst traffic jam junctions;
- Priority junction improvement list, dual carriageway programs and dual carriageway with railway viaduct in NTMP/GKMA;
- Kampala Urban Traffic Improvement Plan (KUTIP), KCC, June 2003 and assistance of the World Bank for Kampala Institutional and Infrastructure Development Project (KIIDP);
- Strategy for the Improvement of Traffic Flow in Kampala, MoWT, December 2009; and
- Other plans and studies

The Study Team selected the long list of projects in Table A3.1.1 and Figure A3.1.2 from which the Pre-FS shortlisted projects would be selected at the Interim Report I stage in March 2010.

Table A3.1.1 Long List of Projects for Pre-Feasibility Study at Interim Report I Stage

Project Component	Project No.	Project Name	Origination of Project				Special Consideration by Study Team
			NTMP/ GKMA	KUTIP	MoWT Strategy	SC & Stakeholder Interview*	
1. Jinja - Kampala Rds - Queen's Way Flyover (JKQ)#	1.1 Phase 1	Jinja - Kampala Rds Flyover	Part			Yes (No.4)	Yes (Flyover)
	1.2 Phase 2	Jinja - Yusufu Lule Rds Flyover (Right-turn Ramp Flyover)	Part			Yes (No.4)	Yes (Flyover)
	1.3 Phase 3	Kampala Rd - Queen's Way Flyover				Yes (No.1&4)	Yes (Flyover)
2. Combination of Dual Carriageway, Flyover and Junction Improvement	2.1 (Phase 1)	Jinja Road (Port Bell Jct - Banda/Northern Bypass Section), including Ntinda/Spear Motor	Yes		Yes	Yes (No.2)	
	2.1a (Phase 2)	Jinja Road (Banda - Northern Bypass Section), including Kireka Jct	Yes		Yes		
	2.2	Bombo Road (Makerere Rbt - Northern Bypass Section), including Makerere Rbt Flyover	Yes			Yes (No.10)	Yes (Flyover)
	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	Yes	Yes	Yes		
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement		Yes	Yes		
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road) - Single Carriageway Paving	Part		Yes (Part)		Yes (South Inner Ring Road)
3. Individual Junction Improvement	3.1	Hoima Rd - Kimera/ Masiro/ Kawala Rd Jct (Kasubi Jct)	Yes		Yes		
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	Yes				
	3.3	Kira Rd - Ntinda Rd	Yes		Yes		
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	Yes				
	3.5	Jinja Rd - Lugogo Bypass	Yes				Yes (Safety)
	3.6	Ben Kiwanuka Rd - Luwum St			Yes	Yes (No.3)	
	3.7	Shoprite & Clock Tower Traffic Safety		Yes	Yes	Yes (No.1)	Yes (Safety)
4. Other Flyovers (For Reference)	4.1	Queen's Way - Kevina/Mutebi Rd	Yes				
	4.2	Yusufu Lule - Mulago Rbts Kira/Haji Kasule	Yes				
	4.3	Yusufu Lule - Fairway Rbt.Sezibwa/Kafu Babiha	Yes				
	4.4	Kibuye Rbt - Masaka Rd Flyover				Yes (No.7)	Yes (Flyover)
	4.5	Wandegeya Jct Flyover				Yes (No.6)	Yes (Flyover)
	4.6	Equatoria & Pioneer Mall Jcts Flyover (Kampala Rd - Ben Kiwanuka St / Kampala Rd - Burton		KIIDP (Signalization)	Yes	Yes (No.5)	Yes (Flyover)
	4.7	GKMA Inner Ring Viaduct (Motorway)					Yes (Long-long Term Plan)

Notes: 1. # Kampala Rd - Queen's Way Flyover crossing over the railway station was planned to divert part of the traffic on Entebbe Rd and Shoprite Jct.
2. * The worst ten (10) traffic jam junctions. Rank No.8 (Bwaise Jct) and No.10 (Pride Theater Jct) are not in this list as these are improved by KIIDP.

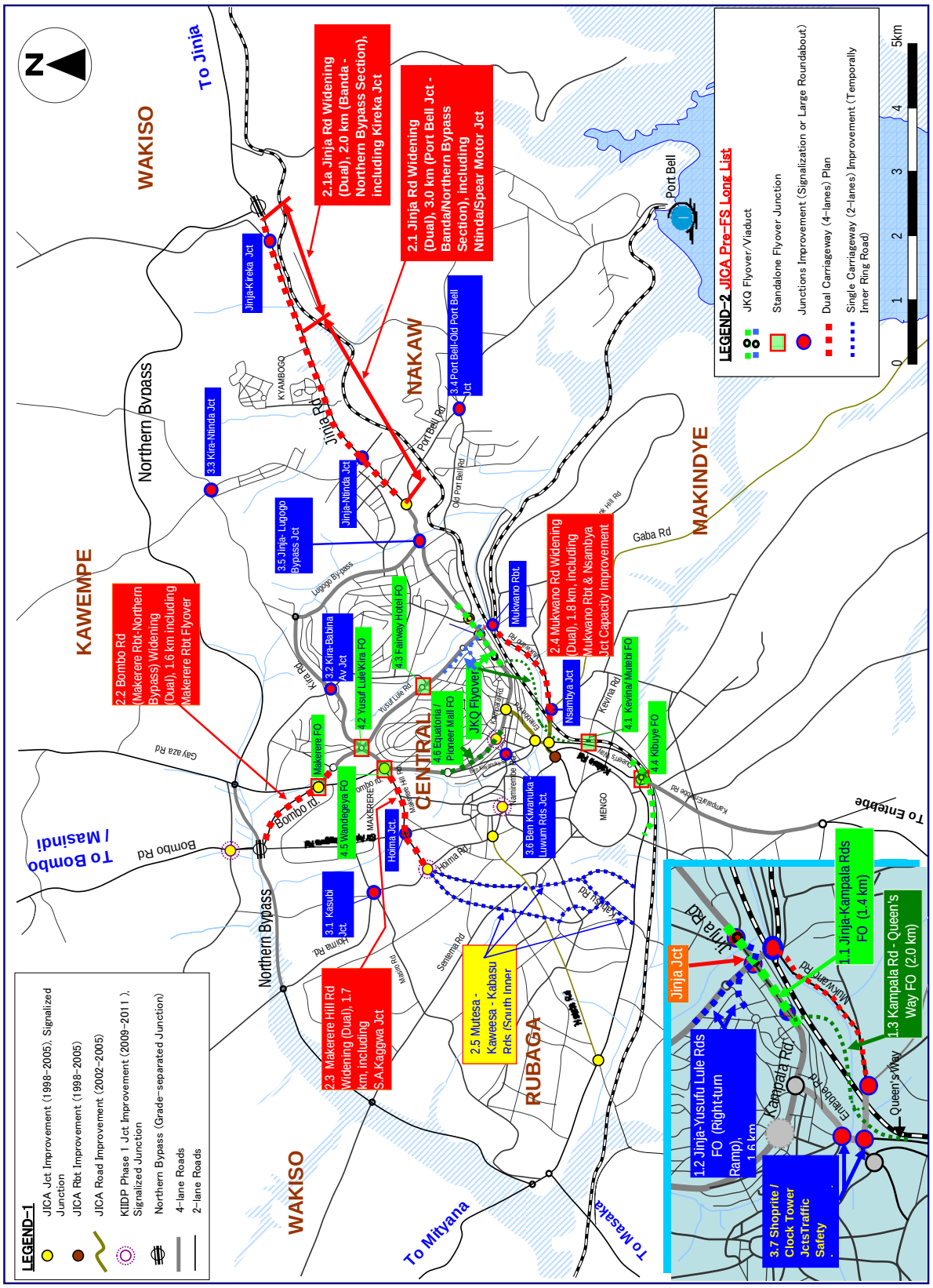


Figure A3.1.2 Location Map of Long List Projects at Interim Report I Stage

The long list of projects in Interim Report I comprised of the following four components.

Component 1: Jinja - Kampala Road- Queen's Way Flyovers: 3 sub-projects (Phases 1, 2 and 3)

Component 2: Combination of Dual Carriageway, Flyover and Junction Improvement: 5 sub-projects

Component 3: Individual (standalone) Junction Improvement: 7 sub-projects

Component 4: Other Flyovers (For Long Term): 7 sub-projects.

Component 1 includes flyover construction at Jinja – Kampala Road, Jinja – Yusufu Lule Road and Kampala Road – Queen's Way, in three phases.

Table A3.1.2 Component 1: Jinja Rd – Kampala Rd – Queen's Way Flyovers

Project No	Project Name	Administrative Status (of Road)	Project Concept			ADT / Current Condition of Traffic Congestion
			Project Length (km)	Viaduct/ Flyover Length (km)	Carriageway & Number of Lanes	
1.1 (Phase 1)	Jinja - Kampala Rds Flyover	KCC	1.4	1.1	Dual Carriageway (two-ways 2 lanes), crossing over Africana, Jinja & Siad Barre Ave Jcts	Jinja Rd ADT: 53,000 - 71,000 Very Severe (Jinja, Africana & Siad Barre Ave Jcts)
1.2 (Phase 2)	Jinja - Yusufu Lule Rds Flyover (Right-turn Ramp)	KCC	1.6	1.3	Single Carriageway (one-way 1 lane), crossing over Jinja and Nine Ave Jcts.	Yusufu Lule Rd ADT: 41,000 Very Severe (Jinja Jct & Nile Ave Rbt)
1.3 (Phase 3)	Kampala Rd - Queen's Way Flyover	KCC	2.0	1.9	Single Carriageway (one-way 2 lanes)	Kampala Rd ADT: 52,000, Shoprite Jct ADT: 99,000 Very-very Severe

Component 2 is a group of road capacity improvement by dual carriageway construction, except for Bombo Road which is planned to be constructed with a flyover between Yusufu Lule North Rd and Bombo Rd, over Makerere Roundabout (Rbt).

Table A3.1.3 Component 2: Combination of Dual Carriageway, Flyover and Junction Improvement

Project No	Project Name	Administrative Status (of Road)	Project Concept			ADT / Current Condition of Traffic Jam
			Project Length (km)	Flyover Length (km)	Carriageway & Number of Lanes	
2.1 (Phase 1, 3.0 km)	Jinja Road (Port Bell Jct - Banda/Northern Bypass Section), including Ntinda/Spear Motors Jct	N	3.0	-	Dual Carriageway (Add. 2 lanes) & Junction improvement at Ntinda Jct	ADT: 49,000 Very Severe (Port Bell & Ntinda Jcts)
2.1a (Phase 2, 2.0 km)	Jinja Road (Banda - Northern Bypass Section), including Kireka Jct	N	2.0	-	Dual Carriageway (Add. 2 lanes) & Junction improvement at Kireka Jct	ADT: 39,000 Very Severe (Kireka Jct)
2.2	Bombo Road (Makerere Rbt - Northern Bypass Section), including Makerere Rbt Flyover	N	1.6	0.5	Dual Carriageway (Add. 2 lanes) & Flyover (two-ways 2 lanes)	ADT 36,000 Very Severe (Makerere Jct)
2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	KCC	1.7	-	Dual Carriageway (Add. 2 lanes) & Junction improvement at Sir Apollo Kaggwa Rd Jct	ADT: 49,000 Severe
2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	KCC	1.8	-	Dual Carriageway (Add. 2 lanes) & Junction improvement at Mukwano Rbt and Nsambya Jct	ADT: 20,000 - 40,000 Severe, Very Severe at Mukwano Rbt & Nsambya Rbt
2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	KCC	3.2	-	Single Carriageway improvement (from Gravel to Paved Road)	ADT: 5,000 Low

Component 3 is an individual (stand-alone) junction improvement mostly by signalization. Of these, the Study Team paid special attention to Project No.3.5, Jinja Rd – Lugogo Bypass, and No.3.7, Shoprite and Clock Tower Junctions, where many accidents have been reported.

Table A3.1.4 Component 3: Individual (Standalone) Junction Improvement

Project No	Project Name	Administrative Status (of Road)	Project Concept		ADT / Current Condition of Traffic Congestion
			Length (km)	Improvement Method	
3.1	Hoima Rd - Kimera/MasiroKawaala Rd Jct (Kasubi Jct)	N	-	Roundabout (Large Diameter)	ADT 31,000 Medium
3.2	Kira Road - Acacia/ Babiha Av/Kayunga Rd	KCC	-	Signalization	ADT 37,000 Severe
3.3	Kira Rd - Ntinda Rd Jct	KCC	-	Signalization	ADT 37,000 Medium
3.4	Port Bell (Nakawa) - Old Port Bell Rd Jct	N	-	Signalization	ADT 22,000 Severe
3.5	Jinja Rd - Lugogo Bypass Jct	KCC	-	Signalization and Pedestrian Bridges	ADT 44,000 Medium (Many Accidents)
3.6	Ben Kiwanuka Rd - Luwum St Jct	KCC	-	Signalization	ADT 21,000 Very Sevier
3.7	Shoprite & Clock Tower Jcts Traffic Safety Improvement	KCC	-	Pedestrian Bridges, Separated Left-turn Lanes and Traffic Management	ADT 99,000 Very-very Severe (Many Accidents)

Component 4 consists of flyover/viaduct projects for the junctions planned in NTMP/GKMA and as recommended by the Study Team, which is supposed to address current serious traffic congestion at major junctions. These projects would require implementation in the long term (2023) or long long-term in the case of Project 4.7, Inner Ring Road Viaduct (motorway).

Table A3.1.5 Component 4: Other Flyovers/Viaducts for Reference

Project No	Project Name	Administrative Status (of Road)	Project Concept			ADT / Current Condition of Traffic Jam
			Project Length km	Viaduct/ Flyover km	Carriageway & Number of Lanes	
4.1	Queen's Way - Kevina/Mutebi Rd	KCC	2.0	0.3	Dual Carriageway (two-ways 2 lanes)	ADT 56,000 (one-way road) Medium
4.2	Yusufu Lule - Mulago Rbts Kira/Haji Kasule Rds	KCC	0.6	0.3	Dual Carriageway (two-ways 2 lanes)	ADT 42,000 Severe
4.3	Yusufu Lule - Fairway Rbt.Sezibwa/Kafu Babiha Rds	KCC	0.6	0.3	Dual Carriageway (two-ways 2 lanes)	ADT 42,000 Severe
4.4	Kibuye Rbt - Masaka Rd Flyover or Kibuye Rbt (Queen's Way) to Entebbe Rd Flyover	N	0.6	0.4	Dual Carriageway (Two ways 2 lanes)	ADT Entebbe Rd 60,000, ADT Masaka Rd 29,000 Very Severe
4.5	Wandegeya Jct Flyover	KCC	0.6	0.4	Single Carriageway (One-way 2 lanes) or Dual Carriageway (Two ways 2 lanes)	ADT 49,000 Very Severe
4.6	Equatoria & Pioneer Mall Jcts Flyover (Kampala Rd - Ben Kiwanuka St / Kampala Rd - Burton St)	KCC	0.9	0.7	Dual Carriageway (two-ways 2 lanes)	ADT 52,000 Very Severe
4.7	GKMA Inner Ring Viaduct (Motorway)		15.0	15.0	Dual Carriageway (two-ways 4 lanes) with interchanges	

A3.1.3 REVIEW OF LONG AND SHORT LIST OF PROJECTS AT INTERIM REPORT II / DRAFT FINAL REPORT STAGE

A pre-feasibility study for Bus Rapid Transit (BRT) has been conducted in parallel with the JICA Study since November 2009, to address serious traffic congestion in GKMA. Draft Final Report of the BRT Pre-FS was submitted in April 2010 and accepted by MoWT accordingly. As the BRT project is one of the priority projects in the NDP and NTMP/GKMA, the introduction of BRT is a given condition for JICA Pre-FS. Hence, it is required to plan the JICA Pre-FS projects, well coordinated with the BRT plan.

It has become clear that the long and short list of projects in Interim Report I are either directly or indirectly affected by the BRT introduction since all five shortlisted projects are located on the planned BRT routes, especially the three projects which is on the BRT pilot project route. The Study Team conducted a traffic simulation of traffic flows for the CBD area and identified that the traffic main flow at Jinja Jct will be diverted from Jinja – Kampala Rds (East-West) direction to Yusufu Lule – Mukwano Rds (North – South) direction, as Kampala / Entebbe Rds Jct is closed for general traffic. The flyover requirement was changed from the East-West direction in the Interim Report I, to the North – South direction in Interim Report II.

On this situation, the Study Team reviewed the long and short list of projects in the Interim Report II / Draft Final Report stage, as in the following table.

Table A3.1.6 Review of Long List of Projects in Interim Report II/ Final Report Draft Stage

No.	Sub-projects in Long List of Interim Report I	Review of Sub-projects in Interim Report II/ Final Report Draft	Reason of Review
1.1	Jinja-Kampala Rds Flyover	Changed to Yusufu Lule – Mukwano Rds Flyover	Diversion of main traffic flows from Jinja – Kampala Rds to Yusufu Lule – Mukwano Rds Flyover by BRT introduction
1.2	Jinja - Yusufu Lule Rds Flyover (Right-turn)	• Jinja - Yusufu Lule Rds Flyover (Right-turn) as in Interim Report I • Provide Mukwano – Jinja Rds Flyover (Right-turn)	Construct flyovers to accommodate right-turning traffic, and reduce conflicts with the BRT from Mukwano Rd to Jinja Rd at Jinja Road Jct.
1.3	Kampala Rd – Queen's Way Flyover	Change to Mengo Hill - Nsambya / Mukwano Rds or Queen's Way – Nsambya / Mukwano Rds Flyover Clock Tower Jct	Since the Kampala/Entebbe Rds Jct is closed for general traffic and a BRT station is anticipated at the starting point of the K-Q flyover, the original plan conflicts with the BRT plan.
2.1	Jinja Road (Port Bell Jct - Banda/Northern Bypass Section)	Omitted	Omitted since this is on BRT Pilot Project
2.1a	Jinja Road (Banda - Northern Bypass Section)	Omitted	Omitted since this is on BRT Pilot Project
2.2	Bombo Road (Makerere Rbt - Northern Bypass Section), including Makerere Rbt Flyover	Omitted	Omitted since this is on BRT Pilot Project
2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	Dual carriageway from 4 lanes to 6 lanes	2 lanes x 2-way general traffic and 2 dedicated lanes for BRT
2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	No change in principle	
2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	No change	
2.6		Widening of Queen's Way and Flyover on Kibuye Rbt	Additional scope taking request of MoWT into account
3.1	Hoima Rd - Kimera/ Masiro Kawaala Rd Jct (Kasubi Jct)	No change in principle	
3.2	Kira Road - Acacia/ Babiha Av/Kayunga Rd	No change in principle	
3.3	Kira Rd - Ntinda Rd Jct	No change in principle	
3.4	Port Bell (Nakawa) - Old Port Bell Rd Jct	No change in principle	
3.5	Jinja Rd - Lugogo Bypass Junction Improvement	Omitted	Omitted since this is on BRT Pilot Project
3.6	Ben Kiwanuka Rd - Luwum St Jct	No change in principle	
3.7	Shoprite & Clock Tower Jcts Traffic Safety Improvement	No change in principle	

The Study Team has modified or changed the plans of the flyover and other shortlisted projects in Interim Report II, submitted in June 2010, to coordinate with the BRT plan (Draft Final Report, April 2010) as shown in Table A3.1.7 and Figure A3.1.3. As Jinja Road Widening (Port Bell Jct – Banda) and Lugogo Bypass Junction improvement are located on the BRT Pilot Project route, of which the FS and detailed design will commence in early 2011, the Study Team omitted these

two shortlisted projects from the Pre-FS list.

Table A3.1.7 Summary of Coordination of Pre-FS Projects with BRT Plan in Interim Report II

Short List Project in Interim Report I	BRT Route	Affect of BRT Plan in DFR on Short List Projects	Coordination Method in Interim Report II
1.1 Jinja-Kampala Rds Flyover	A1and A2 (On BRT Pilot)	• As Entebbe Jct is closed for general traffic, main traffic flow at Jinja Junction will be diverted from the east-west to the north-south direction • BRT stations between Jinja Jct and Africana Rbt • New bottleneck at Jinja Jct due to BRT Plan	• Instead of the original intention, a flyover will be constructed to accommodate the north-south direction. Hence, Yusufu Lule and Mukwano Rds Flyover (Y-M) will be constructed to accommodate the change of main traffic flow due to BRT • Crossing two railways lines
1.2 Jinja - Yusufu Lule Rds Flyover (Right-turn)	A1and A2 (On BRT Pilot)	• Not much influence by BRT	• Jinja - Yusufu Lule Rds Right-turn Flyover as in Interim Report I • Provide Mukwano - Jinja Rds Right-turn Flyover to reduce conflict with BRT
1.3 Kampala Rd - Queen's Way Flyover	B1, B2 and B3	• As Entebbe Jct is closed to the general traffic, not much traffic on this flyover • Anticipated BRT station at the front of railway park, where J-K FO in-ramp was originally planed • New bottleneck at Clock Tower Jct by BRT Plan	• Plan a flyover to accommodate new traffic flows affected by BRT. This could be either Mengo Hill – Nsambya/Mukwano Rds Flyover or Queen's Way - Nsambya/Mukwano Rds Flyover, over Clock Tower Jct
2.4 Mukwano Rd Widening, including Mukwano Rbt and Nsambya Jct Capacity Improvement	B3	• Substantial traffic volume increase by rerouting the general traffic from Entebbe Road to Nsambya,/ Kibuli/ Mukwano Rds	• Dual carriageway to accommodate Mengo Hill (or Queen's Way) – Nsambya/Mukwano Rds Flyover and Yusufu Lule – Mukwano Rds Flyover
3.7 Shoprite / Clock Tower Jcts Traffic Safety Improvement	B1 and B2	• BRT stations at Shoprite Junction • Substantial Traffic Volume increase for Mengo Hill (or Queen's Way) – Mukwano Rds through Clock Tower Jct	• Plan pedestrian bridges which do not conflict with the anticipated BRT stations at Shoprite Jct • Plan a flyover to accommodate new traffic flows affected by BRT. This could be either Mengo Hill – Nsambya/Mukwano Rds Flyover or Queen's Way - Nsambya/Mukwano Rds Flyover, over Clock Tower Jct

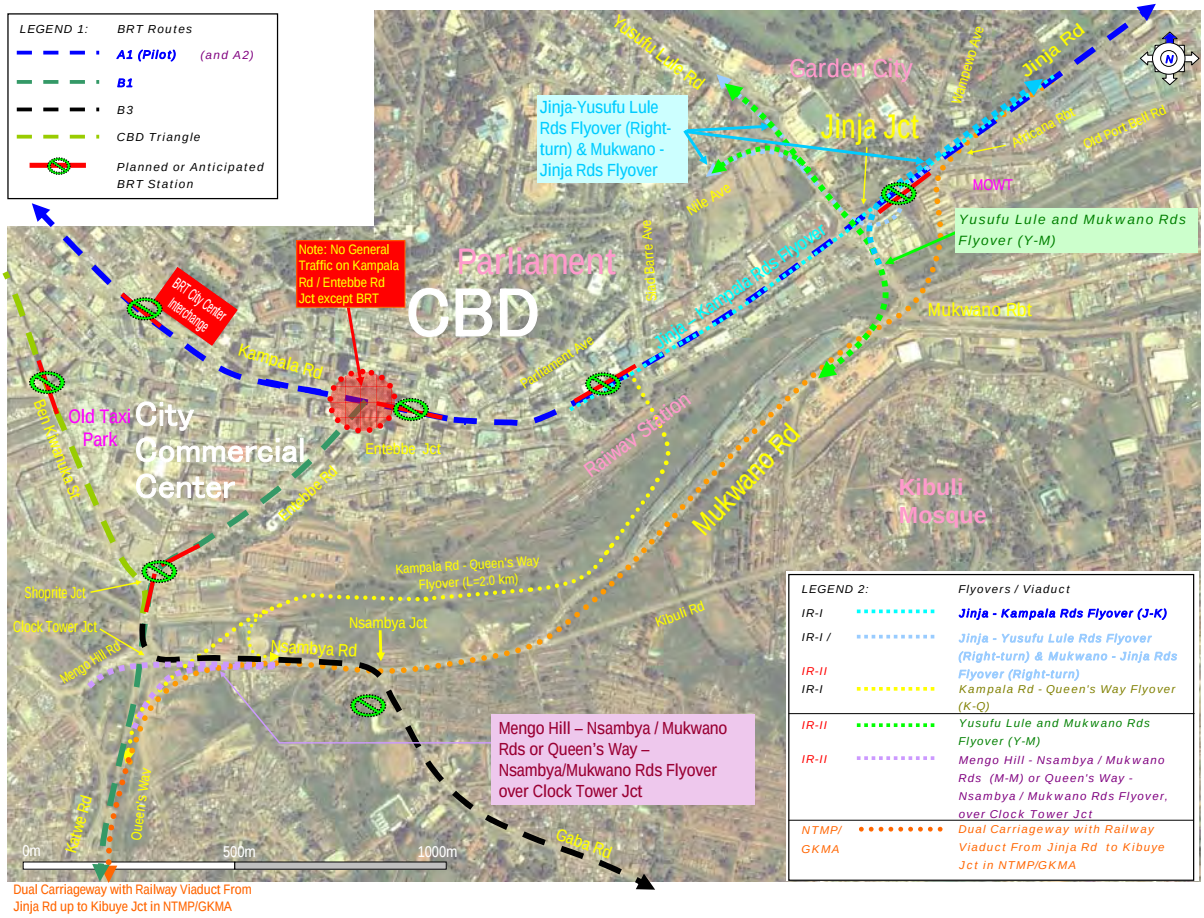


Figure A3.1.3 BRT Plan and Coordination of Flyovers for Pre-FS

A3.1.4 FINAL SHORTLISTED PROJECTS FOR PRE-FS

Table A3.1.8 and Figure A3.1.4 summarize the shortlisted projects finally agreed between GOJ and the GOU, and subjected to Pre-FS.

Table A3.1.8 Final Shortlisted Projects for Pre-FS

Project No	Project Name	Basic Project Concept			Implementation Period	Priority by Multi Criteria Analysis
		Project Length (km)	Viaduct/ Flyover Length (km)	Carriageway & Junction Improvement		
1.1 (Phase 1)	Yusufu Lule and Mukwano Rds Flyover	1.7	1.5	Dual Carriageway (two-ways 2 lanes)	Medium Term (2018)	2
1.2 (Phase 1)	Jinja - Yusufu Lule Rds Flyover (Right-turn) & Mukwano - Jinja Rd Flyover (Right-turn)	2.3	1.9	Single Carriageway	Medium Term (2018)	4
1.3 (Phase 2)	Mengi Hill - Nsambya / Mukwano Rds Flyover (Right-turn)	0.6	0.5	Single Carriageway	Long Term (2023)	1
2.4	Mukwano Rd Widening, including Mukwano Rbt and Nsambya Jct Capacity Improvement	1.8	-	Dual Carriageway (Add. 2 lanes) & Mukwano Rbt and Nsambya Jct improvement	Medium Term (2018)	5
3.7	Shoprite & Clock Tower Jcts Traffic Safety	-	-	Pedestrian Bridges & Separated Left-turn	Medium Term (2018)	3

Note: A preliminary planning of a flyover on Kibuye Roundabout was included in the Study addressing to the proposal of MoWT in line with Dual Carriageway Railway Viaduct Plan in NTMP/GKMA (refer to Annex 8 as to the plan).

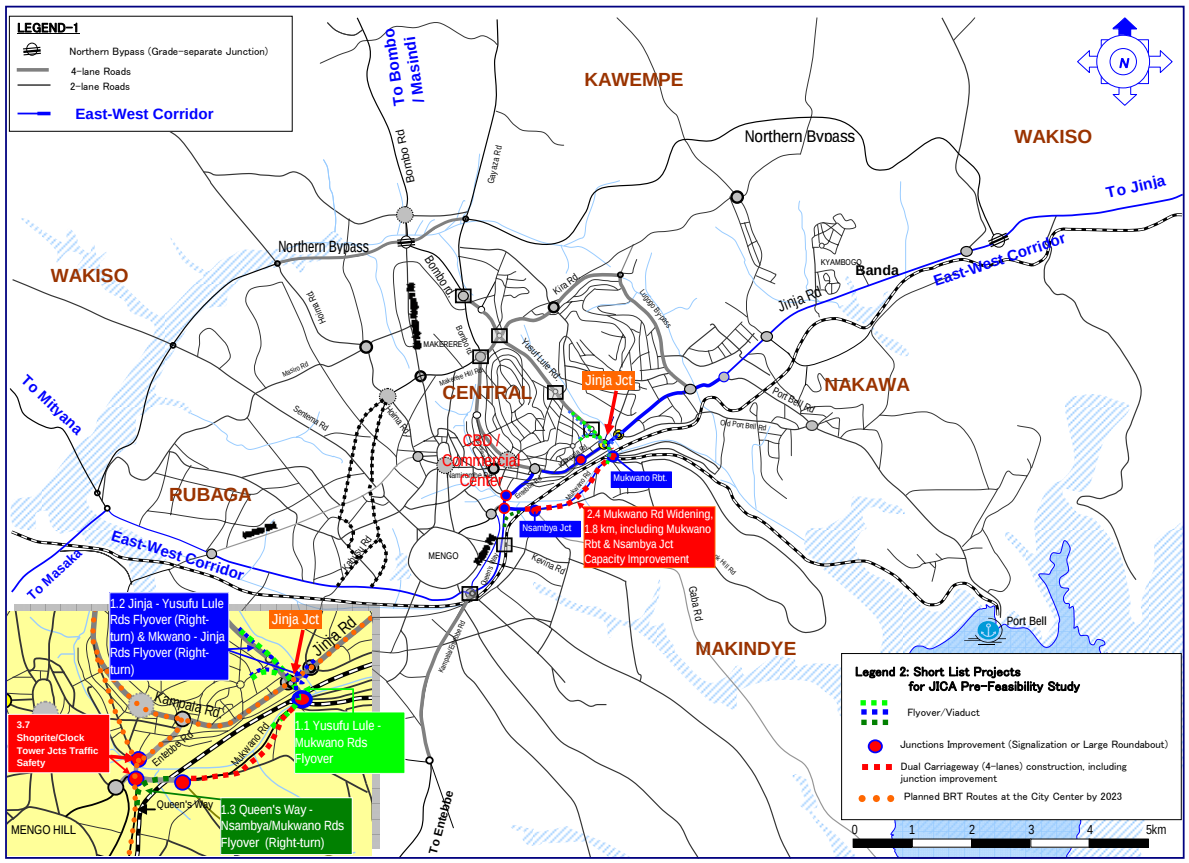


Figure A3.1.3 Final Shortlisted Projects Selected for Pre-FS

A3.2 OUTLINE OF LONG LIST OF PROJECTS IN INTERIM REPORT I

The following sections describe the outline of the long list of projects at the Interim Report I stage.

A3.2.1 COMPONENT 1: JINJA - KAMPALA ROADS – QUEEN'S WAY FLYOVERS

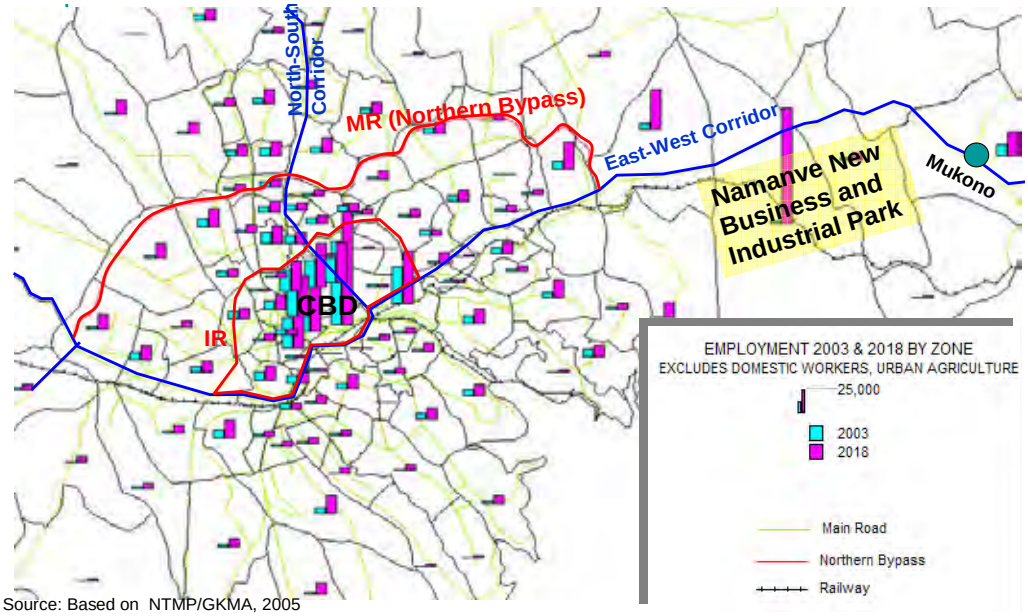
(1) Objectives of the Flyover

A substantial traffic capacity increase is required for the improvement of traffic congestion in the Central Business District (CBD) / City Center and their access bottlenecks at Africana, Jinja and Siad Barre Avenue Junctions from the east side, and Clock Tower, Shoprite, Entebbe Junctions from the south side. Improvements of these junctions were planned under KUTIP in 2003. Jinja, Entebbe, Shoprite and Clock Tower junctions were planned from non-signalized junction or roundabout to signalized junctions, and implemented through a grant aid of the GOJ in 2005-2007. However, as signalization is a limited measure for traffic capacity increase, it has not been able to cope with the recent traffic growth.

The CBD will continue to attract traffic as this area will remain the largest business and commercial center even in the future. Most of the CBD-bound traffic originates from outside the CBD. Thus, this is why severe traffic jams are seen at the CBD area and its gateways. As widening of most of the existing roads are difficult without demolishing buildings, flyovers on major junctions are one of the best solutions for these CBD gateways to secure road capacity, in line with the enhancement of public transport and traffic management.

Poverty reduction is the most prioritized policy in Uganda, which could be achieved by providing business and employment opportunities for the poor based on stable economic growth

strategy. The CBD / commercial center will still remain as the center of major economic growth and employment, although a new business and industrial park at Namanve is expected to create large employment opportunities as shown in the following figure.



Source: Based on NTMP/GKMA, 2005

Figure A3.2.1 Employment in 2003 and 2018 by Zone

The Study Team has planned the following flyovers to solve the east gate traffic congestion (refer to Figure A3.2.2):

- Phase 1: Jinja – Kampala Roads Flyover (Continuous Flyover, Length 1.4 km)
- Phase 2: Jinja Road – Yusufu Lule Road /Nile Avenue Flyover (Length 1. 6km)

The objectives of constructing these flyovers are as follows:

- To solve substantial traffic congestion at Africana Roundabout, Jinja Junction and Siad Barre Avenue Junction
- To contribute to national economy development through a sustainable growth of the CBD, which is the core of service sector in the Ugandan economy
- To contribute to the reduction of poverty through securing accesses to the commercial center and revitalizing commercial activities.

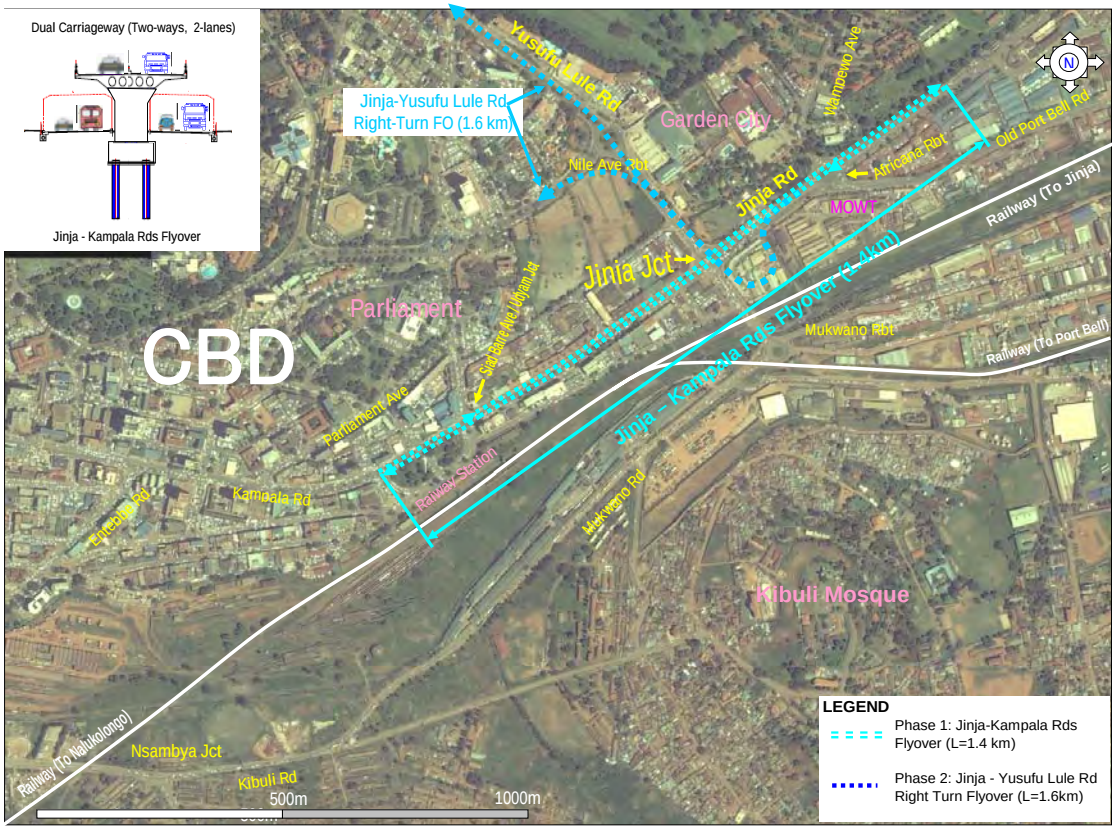


Figure A3.2.2 Concept of Jinja - Kampala Roads Flyover (Phases 1 and 2)

(2) Description of Project No.1.1: Jinja – Kampala Roads Flyover

The Study Team made two alternative plans for the Jinja – Kampala Rds Flyover, as follows:

Alternative 1: The first approach of Jinja – Kampala Roads flyover is about 300 m before reaching Africana Roundabout, and crosses over Africana Roundabout, Jinja Junction and Siad Barre Avenue Junction. Its end approach is on Kampala Road, the central railway station park, where the available space need not require demolition of buildings. The project length is 1.4 km including approach sections of the flyover (refer to Figures A3.2.3 and A3.2.4).

Alternative 2: The first approach is located at the same as in Alternative 1. However, its end approach is at the Jinja Road, just after crossing over Jinja Junction. Its length is 0.8 km including the approach sections of the flyover. However, demolition of buildings along the road for about 150 m in length is required to make a space for on-off approach of the flyover. Besides, the traffic coming through the flyover may cause another severe traffic jam at Siad Barre Avenue Junction, which is minimized under Alternative 1. These are why the Study Team has recommended Alternative 1.

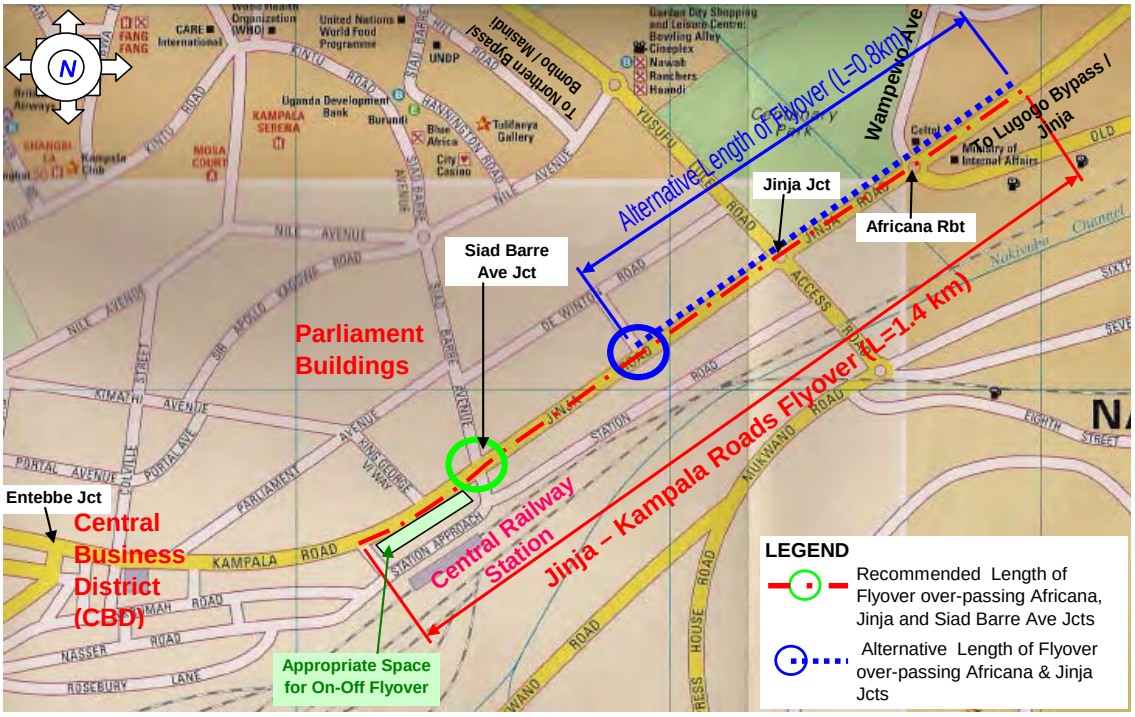


Figure A3.2.3 Location of Jinja – Kampala Road Flyover and Cross Roads

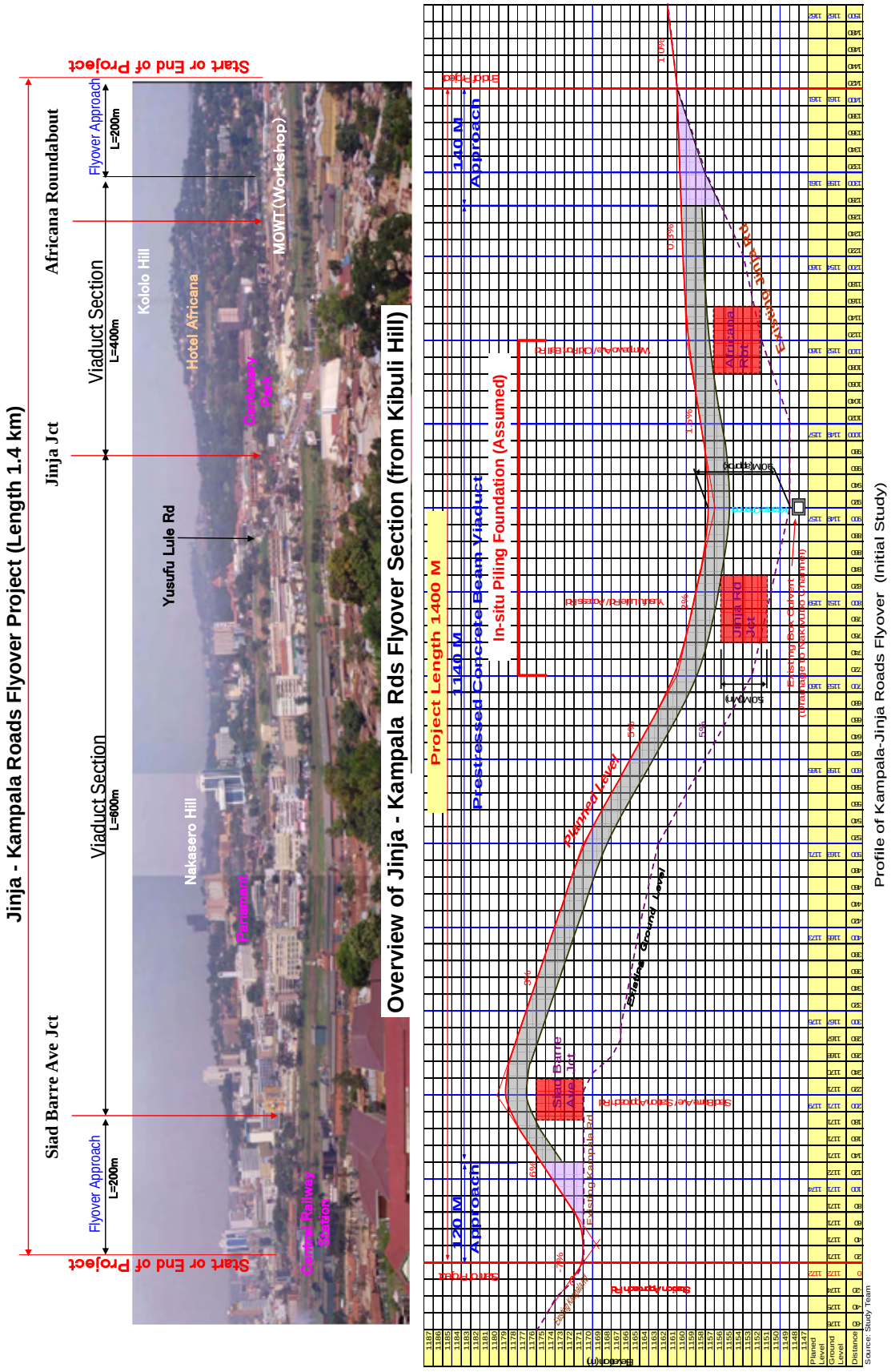


Figure A3.2.4 Overview and Profile of Flyover (Viaduct) and Arterial Roads

The current road and traffic conditions of Jinja Road, Kampala Road and junctions with major cross roads are as follows:

Road	Segment/Junction	Road and Junction Condition	Traffic Condition	Land Use
Jinja Road	Lugogo Bypass Jct – Africana Rbt, Length 1,480 m	• Dual carriageway of 3 lanes for each direction • 3.5 m carriageway width • Mounted sidewalks at both sides	• ADT: Approx.42,000 • AM Peak Hour Traffic • 2,900 Vehicles • Traffic Jam: Medium	• North (Right): ROW and Cemetery • South (Left): • Industrial area / Government Offices (MoWT)
	Africana Rbt (Old Port Bell Rd – Wampewo Ave)*	• 4-arm roundabout • 3.5 m carriageway width • Mounted sidewalks at both sides • Old Port Bell Rd (4 lanes) • Wampewo Ave (2 lanes)	• Traffic Jam: • Very severe	
	Africana Rbt – Jinja Jct, Length 300 m*	• Dual carriageway of 2 lanes for each direction (and right and left turn lanes)	• ADT: Approx.71,000 • AM Peak Hour Traffic • 4,900 Vehicles • Traffic Jam: Very severe	• North (Right): Centenary Park • South (Left): • Government Offices (MoWT, Electoral Commissions Office)
	Jinja Jct (Yusufu Lule Rd - Access Rd Jct)*	• 4-arm signalized junction • Yusufu Lule Rd (dual carriageway of 2 lanes for each direction) • Access Rd (dual carriageway of 2 lanes for each direction)	• Traffic Jam: • Very severe	
	Jinja Jct – Kampala Rd (King George IV Way Jct), Length 720 m.	• Dual carriageway of 2 lanes for each direction • 3.5m carriageway width • Road side curb parking (both sides) • Mounted sidewalks at both sides	• ADT: Approx.53,000 • AM Peak Hour Traffic • 4,100 Vehicles • Traffic jam: Very severe	• North (Right): Commercial Buildings • South (Left): • Commercial Buildings and Railway Station Park
	Jinja Rd – Siad Barre Avenue Jct	• 4-arm non-signalized junction • Siad Barre Ave (2-lane road with narrow median) • Road side curb park (both sides)	• Traffic jam: Very severe	
	King George IV Way Jct	• 3-arm (T) non-signalized junction • King George IV Way (2-lane road without median) • Road side curb park (one side)	• Traffic jam: Severe	
Kampala Road	King George IV Way Jct – Parliament Ave, Length 360m	• Dual carriageway of 2 lanes for each direction • 3.5m carriageway width • Mounted sidewalks at both sides	• Traffic jam: Severe	• North (Right): Commercial Buildings • South (Left): • Station Park

Note: * Improved by grant aid cooperation of the GOJ in 2005-2007.

As the volume of traffic to and from the CBD through Jinja and Kampala Roads is greater than that along Yusufu Lule / Access Roads, a flyover has been planned on Jinja – Kampala Roads. The total project length including approach sections is 1.4 km, and the flyover section (viaduct) section is 1.1 km. The flyover will have dual carriageways (2-lanes) and roadside strips of 1.5 m-width to be used for emergency parking. Arterial roads and sidewalks will be provided as illustrated in the following figure. Lighting for the flyover bridge will be installed at appropriate intervals.

Heavy vehicles should not be allowed to pass above the flyover in daytime, from 7.00 am to 7.00 pm, to minimize the traffic congestion in the CBD area. Bike taxies (boda boda) should not be allowed to use the flyover to avoid accidents. Crossing the flyover shall also not be allowed.

The (BRT could be accommodated on the flyover as a shared traffic, or on the arterial road as exclusive lane use, as shown in the following figure.

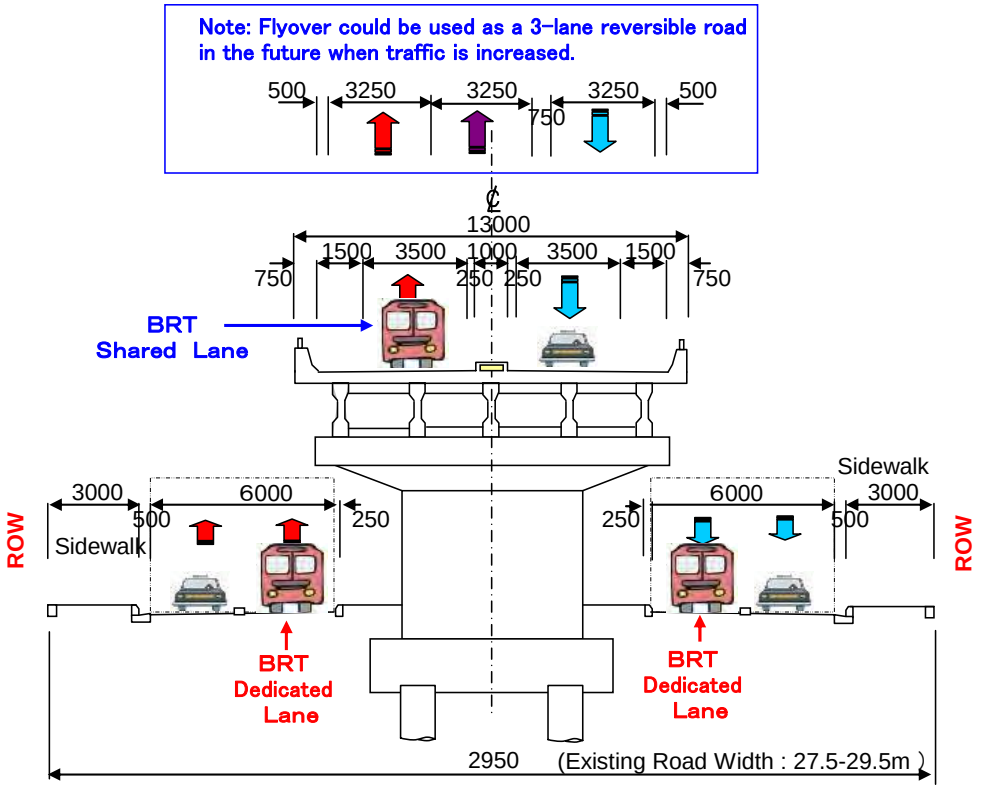


Figure A3.2.5 Typical Section of Flyover and Arterial Roads

Neither private land acquisition nor resettlements will be required for the flyover and associated facility construction, as the land required for said facilities belongs to Kampala City Council and MoWT.

Item	Location	Quantity	Remarks (Classification, etc)
Land Acquisition	Sta.0.00 km – Sta.0.26 km, L=260m, North	3,640 sq.m (0.36 ha)	Existing ROW, Government Land (KCC)
	Sta.0.34 km – Sta.0.57 km L=400m, North	4,000 sq.m (0.40 ha)	Centenary Park (KCC)
	Sta.0.34 km – Sta.0.57 km L=300m, South	3,000 sq.m (0.30 ha)	MOWT Central Workshop
	Sta.1.23 km – Sta.1.40 km L=170m, South	1,700 sq.m (0.17 ha)	Station Park (KCC)
	Total	12,340 sq.m (1.23 ha)	
Resettlement		None	

(3) Description of Project No.1.2, Jinja Road – Yusufu Lule Road/Nile Avenue Flyover (Length 1.6 km)

The right-turning traffic is one of the causes of bottlenecks at signalized junctions. The Study Team has suggested construction of a right-turning flyover branching from and crossing over the Jinja-Kampala Flyover as Phase 2 project in the future. This right-turning flyover might be used as a reversible lane for the evening traffic (left-turning traffic) from Nile Avenue/Yusufu Lule Road bound for Lugogo Bypass/ Nakawa and Jinja as the at-grade left turn lane capacity would become insufficient in the medium – long term.

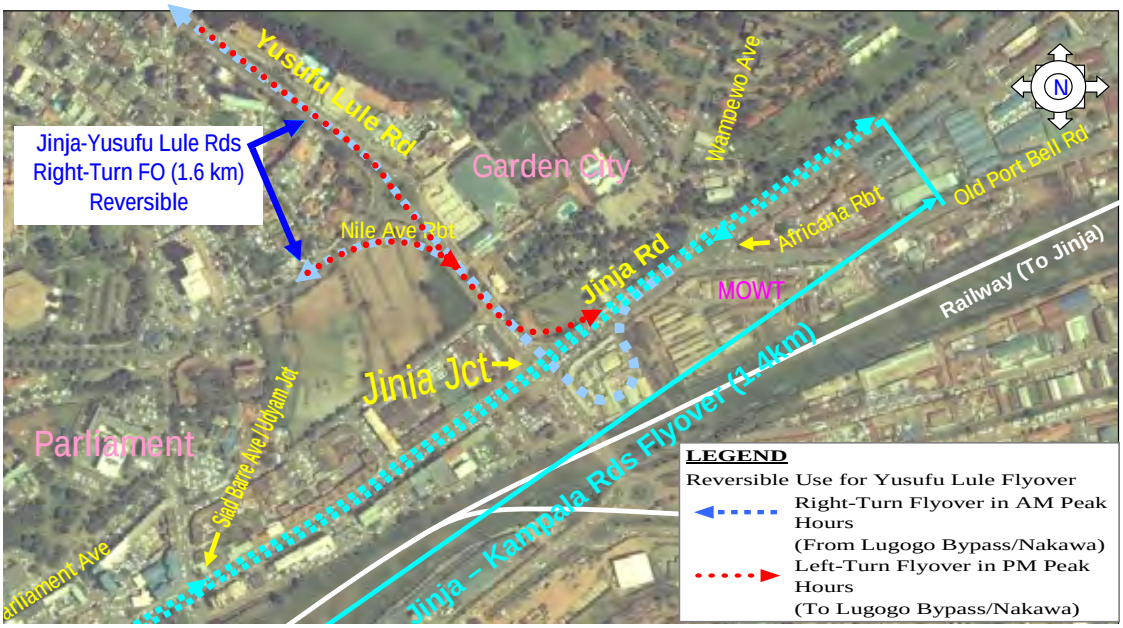


Figure A3.2.6 Location of Jinja Road – Yusufu Lule Road Reversible Flyover

The required section of flyover would be the combination of a one-way one lane and one-way two lanes depending on future traffic demand as illustrated in Figure A3.2.7.

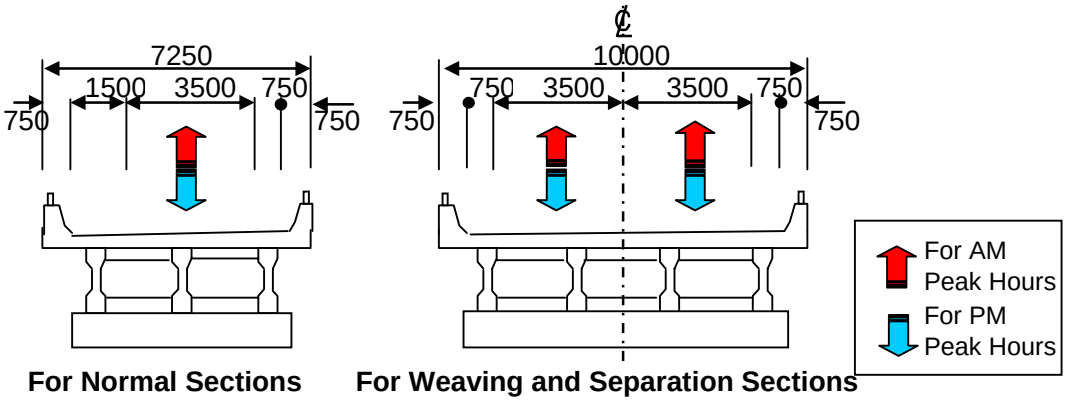


Figure A3.2.7 Typical Sections of Flyover

Neither private land acquisition nor resettlement will be required for the flyover and associated facility construction. However, a part of the government buildings (Electoral Commission Office) and land (100 m x 100 m) are required to be relocated to provide space for the flyover construction.

(4) Description of Project No.1.3: Kampala Road – Queen's Way Flyover (Length 2.0 km)

The Study Team made alternative flyover plans to reduce the traffic congestion at the Southgate by increasing the north – south traffic capacity between Kampala Road and Queen's Way / Katwe Road, as follows:

Alternative	Concept	Issues	Evaluation
1	A flyover between Mengo Hill Road/Queen's Way and Entebbe Road Length 0.6 km (2 lanes x 2 ways)	Construction on these narrow and very large traffic junctions would not be feasible	Technically not feasible
2	A flyover between Kampala Road and Queen's Way, crossing over railway station and railway yard For right-turn traffic (one-way) from Kampala Road to Queen's Way and its reversible use in the morning for inbound traffic Branching to Nsambya Rd for the traffic from/to Gaba Area Length 2.0 km	High voltage electricity transmission towers and lines Peers of flyover on the railways land	Best on technical aspects Might be feasible on economical aspects in the medium term
3	Same as Alternative 2 but branching directly to Nsambya Jct Length 1.5 km	It may cause another traffic bottleneck at Nsambya Jct	Cost is less than Alternative 2 but has technical disadvantage as it creates another congestion

Note: Refer to Figure A3.2.8 as to the alternative flyover route plans

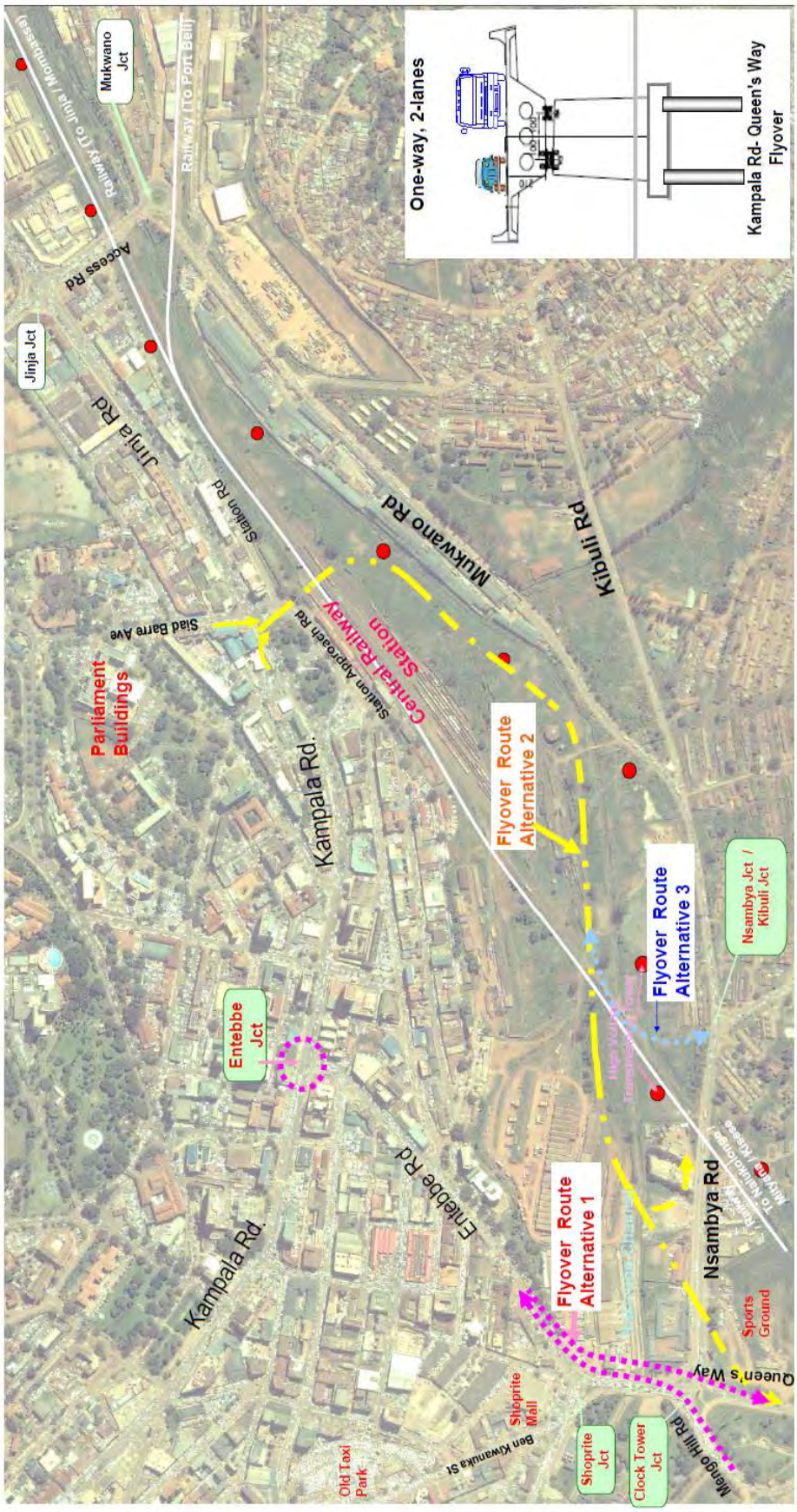


Figure A3.2.8 Alternative Route Plans for Kampala – Queen's Way (K-Q) Flyover

A3.2.2 COMPONENT 2, DUAL CARRIAGEWAY, FLYOVER AND JUNCTION IMPROVEMENT

(1) Description of Project No.2.1: Jinja Road Widening Phases 1 and 2

Project No.2.1 consists of a dual carriageway construction of Jinja Road from Port Bell Junction to Northern Bypass. Its Average Daily Traffic (ADT) is approximately 39,000 – 49,000. It is divided into No.2.1 (Phase 1), Port Bell Jct - Banda/Northern Bypass Section (length 3.0 km) including Ntinda/Spear Motors Junction and No.2.1a (Phase 2), Banda - Northern Bypass Section (length 2.0 km) including Kireka Junction. As only several buildings required to be resettled exist within 3 km from Port Bell Junction, and improvement of the existing Ntinda Junction is urgently required, the Study Team recommended to implement Phase 1 section first. As there are considerable number of houses and buildings required to be resettled between Banda and the Northern Bypass, Phase 2 section should be implemented as soon as after completion of the land acquisition and compensation for resettlement.

The objectives of this project are as follows:

- To increase the traffic capacity and relieve traffic congestion along the road section between Port Bell jct. and Northern Bypass intersection
- To alleviate traffic congestion at Ntinda/Spear Motors and Kireka Jcts.
- To contribution to national economy by improving accesses to inland depots and factories
- To contribute to local economic development through the improvement in terms of convenience, of Nakawa Taxi Park and Nakawa Market located along the road near Port Bell Jct.

View from the Pedestrian Bridge (From Ntinda Jct to Port Bell Jct)

Figure A3.2.9 Starting Point of the Project (Port Bell Jct)

The basic project concept is widening from the current single carriageway road to a dual carriageway with a median of 1-3 m width. The required ROW is 28-30 m or 33-35 m depending on road side condition as shown in the following figure.

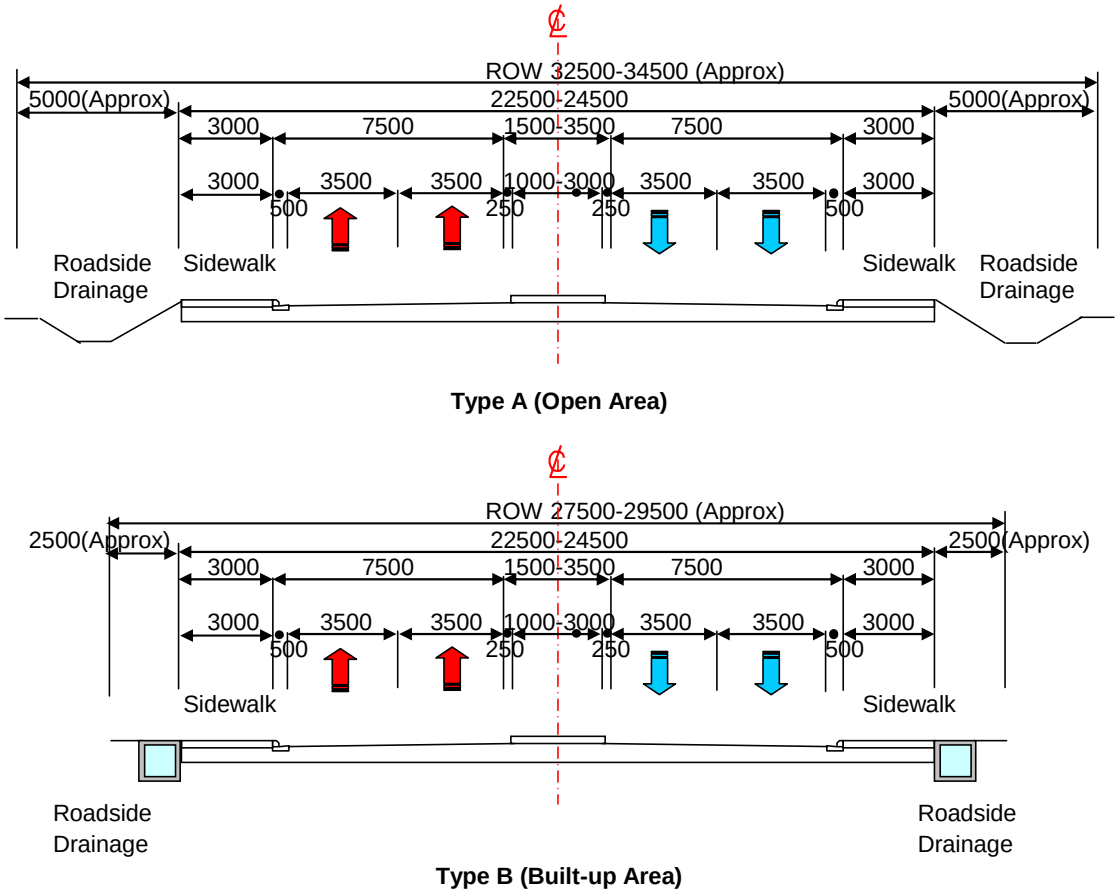


Figure A3.2.10 Proposed Typical Sections of Jinja Road Widening

Ntinda/Spear Motors Junction will be improved to a 4-lane junction with signalization and free left-turning lanes. Taxi (bus) stops are provided at appropriate locations.

The exiting Kireka Junction is an irregular junction with six legs (three T-junctions) in short distance, and thus, the following improvement will be required:

- Realign the existing Kireka Road (North) perpendicular to Jinja Road and meet Mandela National Stadium Bypass with signalized traffic control
- Close the existing local road outlet to Jinja Road. Divert traffic to the signalized Kireka Road
- Close the current Kireka Road (North) outlets for Jinja Road
- Keep the existing mini taxi park without allowing the taxis to directly enter Jinja Road.

Phase 1 (Port Bell Jct – Banda) requires land acquisition of approximately 4.4 ha where seven stores/buildings are affected in its project length of 3 km. Meanwhile, Phase 2 requires land acquisition of approximately 3.1 ha where 18 stores/buildings are affected in its project length of 2 km as shown in the following table. Although it seems that ROW was already preserved for Phase 1 section, its ownership should be confirmed as these are mostly used by private companies. ROW seemed not yet clear for most of Phase 2 section, especially around Kireka Jct.

Phase 1 (Length 3.0 km)

Item	Location	Quantity	Remarks (Classification, etc)
Land Acquisition	Port Bell Jct – Ntinda (Spear Motors) Jct	11,310 sq.m (1.13 ha)	Existing ROW Market, Taxi Park
	Ntinda (Spear Motors) Jct – Banda	48,990 sq.m (4.90 ha)	Existing ROW
	Total	60,300 sq.m (6.03 ha)	
Resettlement	(refer to the following plan)	7	7 stores/private buildings

Phase 2 (Length 2.0 km)

Item	Location	Quantity	Remarks (Classification, etc)
Land Acquisition	Banda – Kireka Jct	25,280 sq.m (2.53 ha)	Existing ROW Market
	Kireka Jct – Northern Bypass Intersection	96,660 sq.m (0.97 ha)	Existing ROW Market, Factories, etc.
	Total	34,900 sq.m (3.49 ha)	
Resettlement	(refer to the following plan)	18	18 stores/private buildings

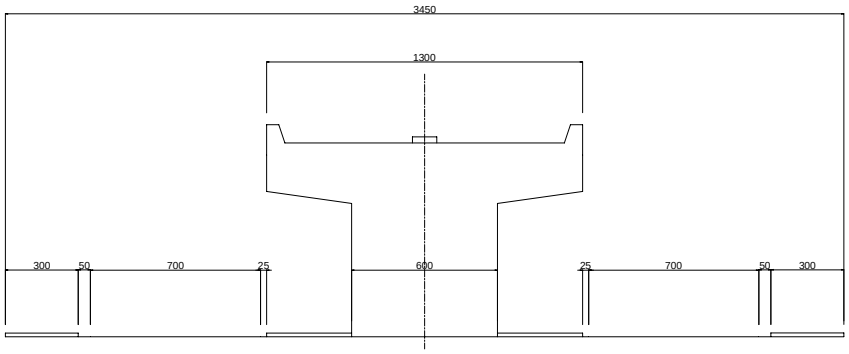
(2) Description of Project No.2.2, Bombo Road Widening (Makerere Rbt – Northern Bypass) including Makerere Rbt Flyover

Bombo Road, which is the main radial road connecting the CBD and northern area, meets Gayaza Road and Yusufu Lule North Road on Makerere Rbt. Aside from the traffic at the roundabout, the traffic volume on these roads has far exceeded the capacity. Hence, the road is congested throughout the day, especially during the morning and evening peak periods.

The project consists of a dual carriageway construction of Bombo Road between Makerere Rbt and Northern Bypass (Grade-separated Junction). As the current traffic on Bombo Road (ADT 36,000) and Gayaza Road (ADT 26,000) has far exceeded the capacity, flyover construction would be one of the applicable methods to improve traffic congestion.

The Study Team planned to widen Bombo Road to dual carriage way with two lanes for each direction in accordance with NTMP/GKMA, a flyover on Makerere Rbt and two pedestrian bridges. The total project length is 1.6 km and the flyover section is 0.3-0.5 km long. Flyover has dual carriageways (two lanes) and roadside strips of 1.5 m. width to be used for emergency parking. Proposed alignment and typical cross sections are as follows:

Figure A3.2.11 Proposed Alignment of Road Widening and Flyover



(Typical Cross Section of Flyover Section)

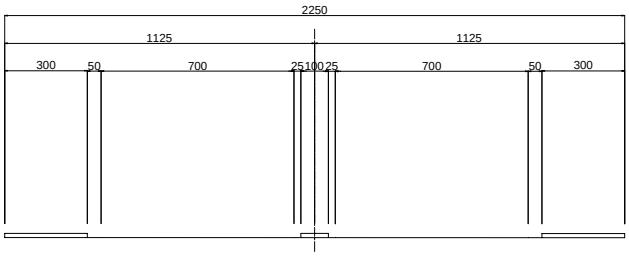


Figure A3.2.12 Typical Cross Section of Bombo Road Widening

Both private land acquisition and resettlements will be required to provide space for the flyover, road widening and associated facility construction.

Item	Location	Land Requirement and No. of Affected Houses/Building	Land Use
Land Acquisition	Makerere Rbt – Northern Bypass	18,600 sq.m	Residential area / Commercial Area/ light industry
Resettlement	Makerere Rbt – Northern Bypass	20	Residential area / Commercial Area

(3) Description of Project No.2.3, Makerere Hill Road Widening

Makerere Hill Road is part of the inner ring road network in NTMP/GKMA. The concept of the Inner Ring Road is to disperse the traffic in combination with the radial roads. Makerere Hill Road is congested throughout the day, especially during the morning and evening peak hours due to insufficient traffic capacity. Under KUTIP, widening of Makerere Hill Road from the current two lanes to four lanes is planned. KCC intends to improve Nakulabye Junction by converting the small roundabout to a signalization intersection under KIIDP.

The Study Team planned the widening of Makerere Hill Road including Sir Apollo Kaggwa Rd Jct improvement to formulate the inner ring road network system in Kampala City. The road will be a dual carriageway (four lanes) for 1.9 km. Since sidewalks in the preliminary design of KUTIP is too narrow when considering the road function and volume of existing pedestrian traffic, 3-m width sidewalks were recommended as shown in Figure A3.2.3.2.

Figure A3.2.13 Plan of Makerere Hill Road Widening

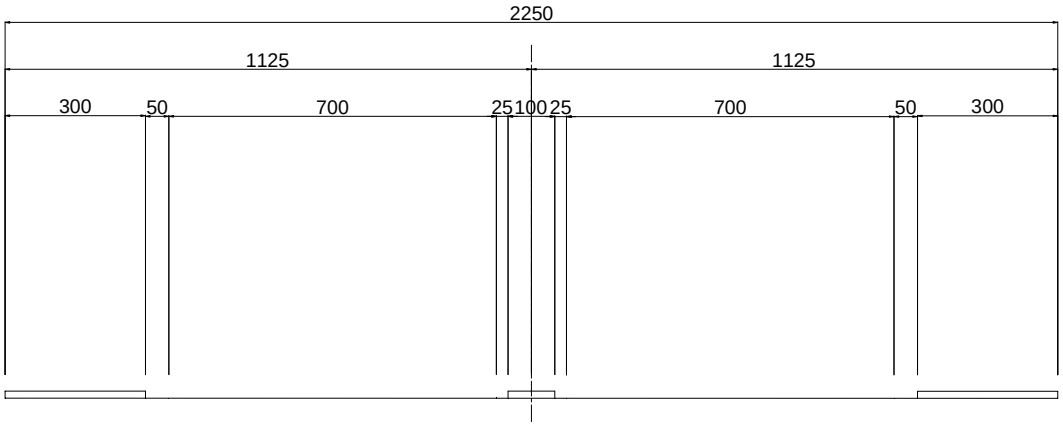


Figure A3.2.14 Typical Cross Section of Makerere Hill Road

Moreover, the Study Team suggested an opinion since the dual carriageway (4-lane widening) will not significantly contribute to the mitigation of serious current traffic congestion at Wandegeya Junction. It thus needs a flyover to substantially improve the current traffic capacity.

Both private land acquisition and resettlements will be required for the road widening and associated facility construction.

Item	Location	Land Requirement and No. of Affected Houses/Building	Land Use
Land Acquisition	Makerere Hill Road	19,950 sq.m	● Residential area ● Educational Zone (Makerere University) ● Commercial Area
Resettlement	Makerere Hill Road	11	- ditto-

(4) Description of Project No.2.4, Mukwano Road Widening

Mukwano Road, also recognized as Bypass Road (A109), diverts the traffic going from/to the CBD area on the east-west corridor and suffers from severe traffic congestion. This situation also occurs at Mukwano Rbt where five roads (Access Road, Mukwano Roads, 6th Road, 7th Road and 8th Road) and railways for Port Bell merge at said roundabout of small diameter. The traffic jam on this roundabout is also directly affecting the neighboring Jinja Road Jct.

The objectives of this project are as follows:

- To alleviate the traffic congestion between Nsambya Jct and Mukwano Rbt.
- To contribute to the national economic development through sustainable growth of the CBD, which is the core of service sector of Uganda
- To contribute to the regional development by improving access for many factories located along 5th, 6th, 7th and 8th streets in Kampala Industrial Area.

The Study Team planned the widening of Mukwano/Kibuli roads from two lanes to four lanes (dual carriageway construction of 1.8 km) as planned under KUTIP, including improvement of Mukwano Rbt and Nsambya Jct. The following figure shows the typical cross sections of Mukwano Road widening.

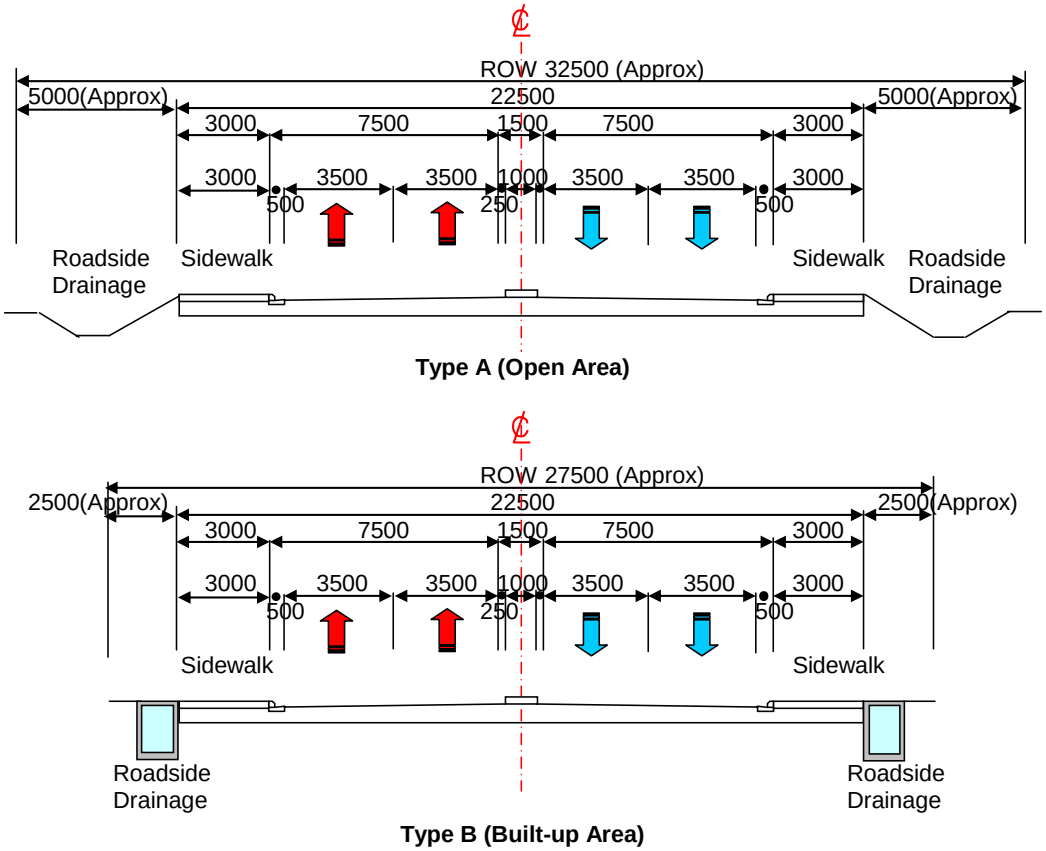


Figure A3.2.15 Proposed Typical Section of Mukwano Road

All drainage structures along Kibuli and Mukwano roads and access road were improved under Nakivubo Channel Rehabilitation Project financed by the World Bank. Of these, the channels located between Mukwano Rbt and Kibuli Jct required relocation.

The following basic concept of the Mukwano Rbt improvement is shown in the following figure (refer to Chapter 7 as to preliminary design):

- Increase the diameter of the roundabout from 25 m to 50-60 m
- Combine the existing T-junction from 8th Road to the new roundabout
- Widen access road to accommodate additional lanes

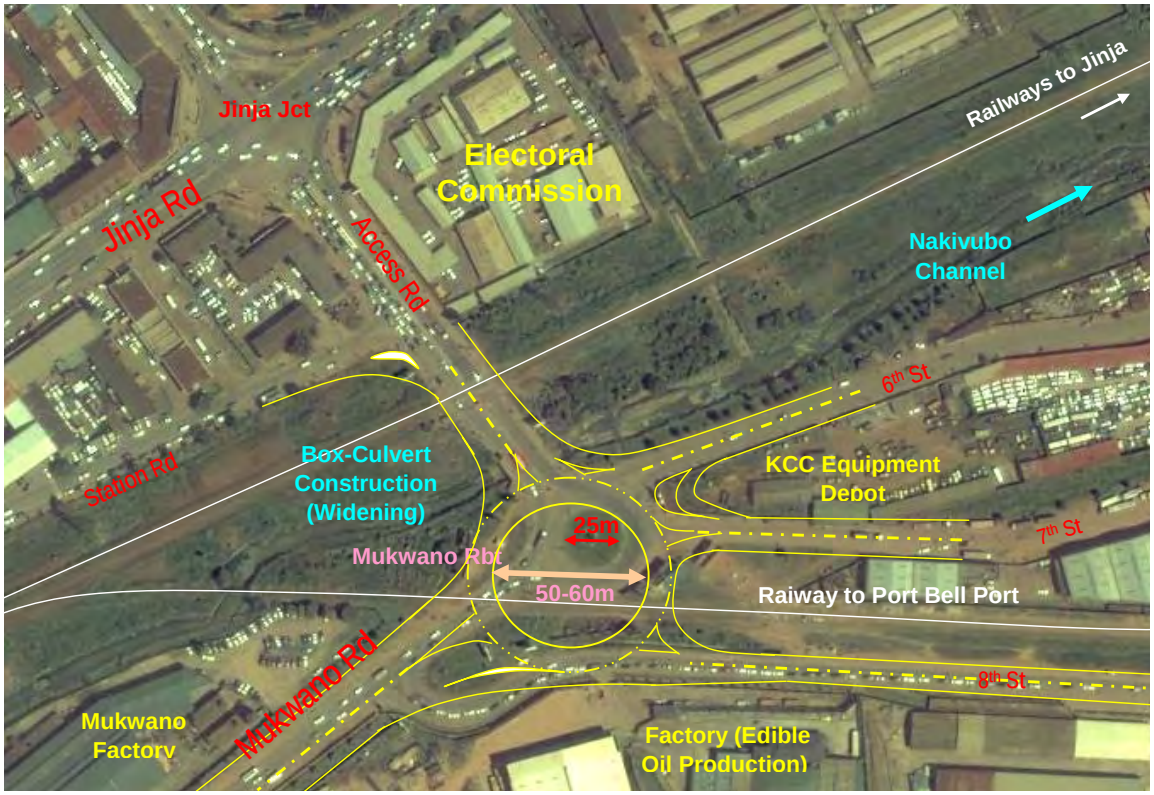


Figure A3.2.16 Mukwano Roundabout Improvement

The Study Team has estimated an area of land acquisition requirements based on satellite photographs and site reconnaissance survey as shown in the following table.

Item	Location	Quantity	Remarks (Classification, etc)
Land Acquisition	Nsambya Jct – Kibuli Jct	8,000 sq.m (0.80 ha)	Existing ROW Railway Corporation
	Kibuli Jct – Beginning of Mukwano factory	5,100 sq.m (0.51 ha)	Existing ROW Railway Corporation
	Beginning of Mukwano factory – Mukwano Rdbt	10,400 sq.m (1.04 ha)	Existing ROW Mukwano factory
	Total	23,400 sq.m (2.34 ha)	
Resettlement	(refer to the following plan)	5	4 Railway Corporation Quarters (belong to MoWT) 1 KCC Equipment Depot

(5) Description of Project No.2.5, Mutesa Road – Kaweesa Road – Kabasu Road (South Inner Ring Road) Single Carriageway Improvement

The project comprises improvement of the existing conditions of single carriageway roads. NTMP/GKMA MoWT planned an inner ring road of which the west-south ring was set between Nakulabye Rbt and Masaka Road through Balintuma Road. However, as widening of these roads to dual carriageway is difficult without large resettlement, the Study Team recommends constructing the following dual ring as suggested in Figure A3.2.16.

Ring-1up: Nakulabye Rbt – Balintuma Rd – Canon Apollo Kivebulaya Rd - Nabunya Rd

/Masaka Rd (Length: 3.6 km).

Ring-1down: Nakulabye Rbt - Mutesa Rd – Kaweesa Rd – Stensera Rd – Kabasu Rd / Masaka Rd (Length: 3.9 km) Metesa Road. Improvement from gravel road to paved road is required between Nakulabye Rbt and Natete Road.

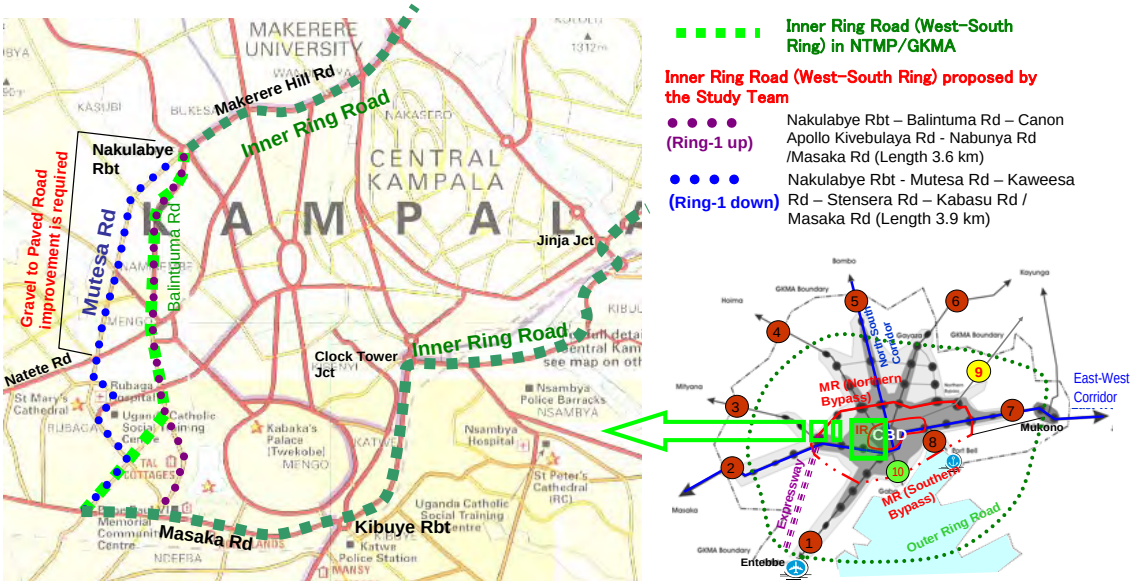


Figure A3.2.16 Proposed Inner Ring (West-South) by the Study Team

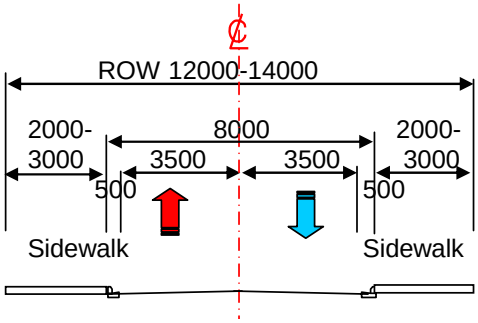


Figure A3.2.17 Typical Cross Section of Inner Ring Road (Single Carriageway)

Both private land acquisition and resettlements are not required in principle because the project only involves improvement of the existing road condition. However, some private land acquisition will be required for associated facility construction.

Item	Location	Land Requirement and No. of Affected Houses/Building	Land Use
Land Acquisition	Mutesa Rd - Kaweesa Rd - Stensera Rd	3,300 sq.m	Residential area
Resettlement	Mutesa Rd - Kaweesa Rd - Stensera Rd	Nil	Residential area

A3.2.3 COMPONENT 3: INDIVIDUAL (STAND-ALONE) JUNCTION IMPROVEMENT

(1) Description of Project No.3.1, Hoima Rd - Kimera/ Masiro/ Kawala Rd Jct (Kasubi Jct)

Hoima Road is one of the main radial roads from Kampala City to Wakiso/Kiboga through Nansana Town. Kasubi Junction is located in the suburbs of Kampala City center, at approximately 3.0 km from the CBD, middle point between the CBD and the Northern Bypass. This is an access point to Kasubi Tombs (a World Heritage site).

There are three basic reasons behind the congestion at this junction: insufficient traffic capacity, irregular junction of five legs and existence of Kawaala Market along/near the junction. KCC intends to improve the market facilities under KIIDP.

The objective of the project is to improve the junction in order to reduce the current traffic congestions. The Study Team recommended a roundabout of large diameter (approximately 50-60 m) since simple signalization would not work well because of the market activities.

Figure A3.2.18 Configuration of Kasubi Junction

Both private land acquisition and resettlements will be required for the improvement of the junction and associated facility construction as estimated in the following table. As the project is located in a residential area of poor people, special attention should be paid for not causing or minimizing negative impacts on their daily living activities and income generation.

Item	Location	Land Requirement and No. of Affected Houses/Buildings	Land Use
Land Acquisition	Kasubi Jct.	1,190 sq.m	● Residential Area ● Kawaala Market
Resettlement	Kasubi Jct.	5	Residential Area

Kasubi Jct, View from Masiro Rd towards Kawaala Market (Kimera Rd) Kasubi Jct, View from Hoima Rd towards Kampala City Center

Figure A3.2.19 Existing Condition of Kasubi Junction and Hoima Road

(2) Description of Project No.3.2: Kira Road - Acacia/ Babiha Avenue/ Kayunga Rd

Kira Road is one of the main radial roads, which was not included in NTMP/GKMA but was suggested by the Study Team, taking recent urban expansion towards the northeast into consideration, and as part of the Inner Ring Road. The existing Kira Road between Yusufu Lule Road Rbt and Lugogo Bypass Rbt is a dual carriageway road of two lanes at each direction. John Babiha Avenue is a short cut road from Kira Road to Yusufu Lule Road through Uganda Golf Club for the traffic to/from CBD/commercial center.

As Kira Rd – Acacia (J. Babiha) Avenue Junction has a large volume of traffic and its capacity has been saturated. This junction has an irregular configuration of 4-legs. The objective of the project is to improve traffic congestion by signalization and alignment improvement. The Study Team made suggested preliminary plans for improving the junction, such as:

- Control traffic flow by installing traffic signals.
- Provision of right-turning lanes using the existing median strip (width is approximately 5-6 m) for smooth and safe traffic flows. Proposed typical cross section and configuration of junction is shown in Figures A3.2.20 and A3.2.21, respectively.
- If land acquisition and resettlement is accomplished, free left-turning lanes should be provided by taking the left-turning traffic demand into consideration (junction traffic survey by direction is required to identify such requirements).

Figure A3.2.20 Plan of Proposed Junction Improvement

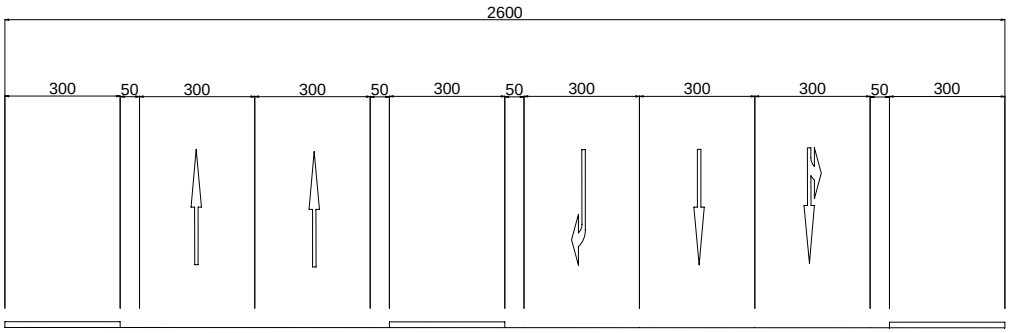


Figure A3.2.21 Typical Cross Section of Junction (A-A)

Both private land acquisition and resettlements will be required for the improvement of junction and associated facility construction as in the following table.

Item	Location	Land Requirement and No. of Affected Houses/Buildings	Land Use
Land Acquisition	Kira Rd-J.Babiha (Acacia) Ave. Jct.	2,450 sq.m	Residential Area
Resettlement	Kira Rd- J.Babiha (Acacia) Ave. Jct.	1	Residential Area

View from Kira Rd (City Center Side) towards Ntinda

View Acacia / J. Babiha Rd towards Kayunga Rd

Figure A3.2.22 Existing Condition of Kira Rd/ J.Babiha (Acacia) Avenue Junction

(3) Description of Project No.3.3, Kira Rd - Ntinda Rd Junction

Kira Road is one of the main radial roads, which the Study Team suggested, taking into consideration the recent urban development towards the northeast direction, connecting Ntinda / Kira and Kampala City center through Inner Ring Road or through Ntinda / Jinja Roads. Ntinda Road is the direct access to Nakawa Industrial Area and inland depots. Kira-Ntinda Junction is located at the center of Ntinda Town and it has become one of the major bottlenecks due to insufficient traffic capacity.

This junction has 4-legs. The concept of the project is to alleviate traffic congestion by signalization and junction improvement. Recommended configuration and typical cross section of the junction is shown in Figures A3.2.23 and A3.2.24, respectively.

If land acquisition and resettlement is accomplished, free left-turning lanes should be provided taking the left-turn traffic demand into consideration (junction traffic survey by direction is required to identify such requirements). It should be noted that these roads are planned to accommodate dual carriageway in the long term.

Figure A3.2.23 Proposed Configuration of Junction Improvement

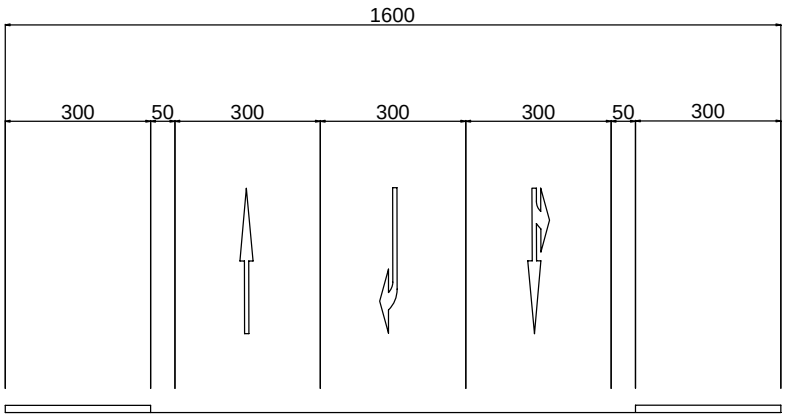


Figure A3.2.24 Typical Cross Section of Junction (A-A)

Both private land acquisition and resettlements will be required for the improvement of junction and associated facility construction as shown in the table below.

Item	Location	Land Requirement and No. of Affected Houses/Buildings	Land Use
Land Acquisition	Kira Rd-Ntinda Rd Jct.	2,440 sq.m	● Residential Area ● Commercial Area
Resettlement	Kira Rd-Ntinda Rd Jct.	4 (House:2, Vender Shop:2)	● Residential Area ● Commercial Area

(4) Description of Project No.3.4, Port Bell (Nakawa) - Old Port Bell Rd Junction

The is a "T" intersection located at approximately 5 km away from the Kampala City Center (CBD) along Old Port Bell Road, and at 3 km from Nakawa Industrial Area along Port Bell Road. Traffic congestion is severe during the morning and evening peak hours since large vehicles pass this junction. Moreover, Bugolobi Market is very near, which is just 200 m away.

View from Port Bells Side towards Nakawa / Jinja Rd

View towards Old Port Bell Rd / City Center

Figure A3.2.25 Existing Condition of Junction of Port Bell and Old Port Bell Junction

The Study Team planned the installation of traffic signals and provision of right-turning lanes to regulate traffic flows and increase capacity. Proposed plan and typical cross section are shown in Figures A3.2.26 and A3.2.27, respectively.

Figure A3.2.26 Proposed Alignment and Configuration of Junction Improvement

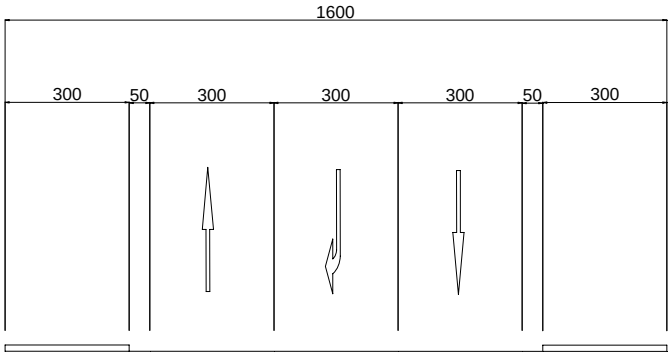


Figure A3.27 Typical Cross Section of Junction (A-A)

If land acquisition and resettlement is accomplished, free left-turning lanes should be provided taking the left-turn traffic demand into consideration (junction traffic survey by direction is required to identify such requirements).

Both private land acquisition and resettlements will be required for the improvement of junction and associated facility construction as shown in below table.

Item	Location	Land Requirement and No. of Affected Houses/Buildings	Land Use
Land Acquisition	Port Bell -Old Port Bell Junction	1,840 sq.m	● Residential Area ● Commercial Area
Resettlement	Port Bell -Old Port Bell Junction	1 (Vender Shop)	● Residential Area ● Commercial Area

(5) Description of Project No.3.5, Jinja Rd - Lugogo Bypass Junction

Jinja Road, which is part of the east-west corridor (International Road A109), has dual carriageway of four to six lanes and meets Lugogo Bypass of four lanes after descending to steep slopes. As the road alignment and pavement condition are good, vehicles tend to run at high driving speed. Consequently, many traffic accidents have occurred at this junction since no traffic signal exists. The geometric feature causes the vehicles moving from Jinja direction toward Upper Kololo direction to take a wide right turn, which further increase accident risks.

Under such situation, the Study Team has planned signalization and appropriate right-turn lanes to reduce traffic accidents by:

- Construction of pedestrian bridges to segregate vehicles and non-motorized pedestrians.
- Provision of right-turn lanes to guide right-turning vehicles from Jinja direction and also from Lugogo Bypass to Jinja Road.

Figure A3.2.28 Existing Condition of Jinja Rd– Lugogo Bypass Junction

Since the existing ROW is sufficient, no private land acquisition and resettlements will be required for the project implementation.

(6) Description of Project No.3.6, Ben Kiwanuka and Luwum Sts Junction Improvement

The Ben Kiwanuka and Luwum Sts Junction is located at the center of the CBD commercial area (downtown). Throughout the day and even at night, this junction and its vicinity are fully filled with mini-buses (taxis), large buses, boda boda, cars, pedestrians and vendors. Both legal and illegal roadside (curb) parking is commonly observed.

Although Kampala City has introduced a one-way operation for part of Ben Kiwanuka Road on Ben Kiwanuka and Luwum Sts in accordance with KUTIP, severe traffic jam has continued throughout the day.

The objective of the project is to alleviate these saturated situations through signalization in

accordance with KUTIP. However, since there are many existing facilities as shown in the following figure and over 10,000 pedestrians per hour cross this junction, signalization would not work well.

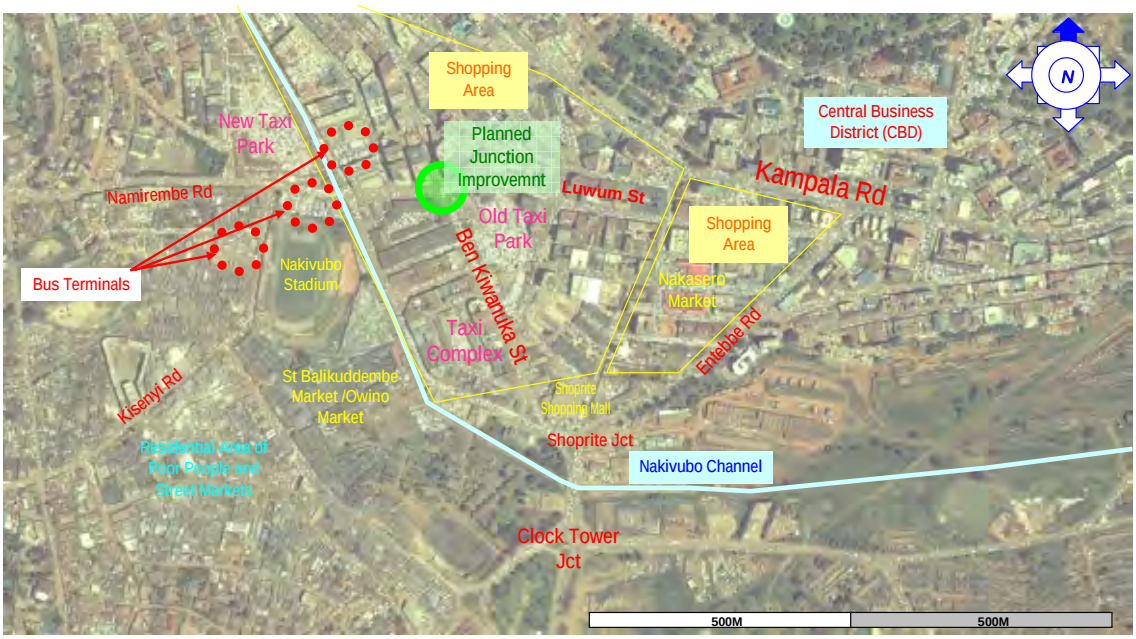


Figure A3.2.29 Location of Ben Kiwanuka and Luwum Sts Junction and Surrounding Environment

The Study Team planned traffic signals and right-turn lanes to regulate traffic flows. Proposed configuration of junction and typical cross sections are shown in Figures A3.2.30 and A3.2.31, respectively.

Figure A3.2.30 Proposed Alignment and Configuration of Junction Improvement

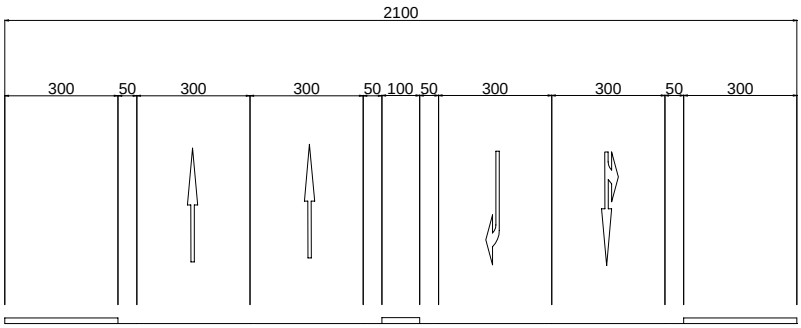


Figure A3.2.31 Typical Cross Section of Junction (A-A)

Both private land acquisition and resettlements will be required for the improvement of the junction and associated facility construction.

Item	Location	Land Requirement and No. of Affected Houses/Buildings	Land Use
Land Acquisition	Ben Kiwanuka St-Luwum St Jct	2,470 sq.m	Commercial area
Resettlement	Ben Kiwanuka St-Luwum St Jct	11 (Vender Shops) and Part of Shopping Mall	Commercial area

(7) Description of Project No.3.7, Shoprite and Clock Tower Junction Traffic Safety Improvement

The average traffic increase on this area is 5.5% per year. Substantial traffic capacity increase is required for Clock Tower, Shoprite and Entebbe junctions, which are the southern main gate of the CBD / commercial center, together with effective traffic management to alleviate the current severe traffic congestion through the day. The current morning and evening peak hour traffic is over 9,000 vehicles/hour and 8,000 vehicles/hour, respectively, on the Nakivubo Bridge of Entebbe Road, which has only five traffic lanes. The traffic volume has far exceeded the capacity which has principally caused very severe traffic jam at these junctions as well as worsens various traffic management problems.

Improvements of these junctions were planned under KUTIP in 2003. Shoprite and Clock Tower junctions were changed from roundabout to signalized junctions through a grant aid of the GOJ in 2005-2007. However, there are many accidents at these junctions as motorized vehicles are mixed with a lot of non-motorized traffic (pedestrians and bicycle taxies). Approximately 48,000 pedestrians pass on these junctions and some of them cross the roads without following the traffic signals. Boda-bodas (motorcycle taxi and bicycle taxi) that run at the front or sides taxies (mini buses), are among the major reasons for high accident rates.

Shoprite Junction **Clock Tower Junction** **Queen's Way**

Figure A3.2.32 Mixed Traffic at Shoprite / Crock Tower Junctions

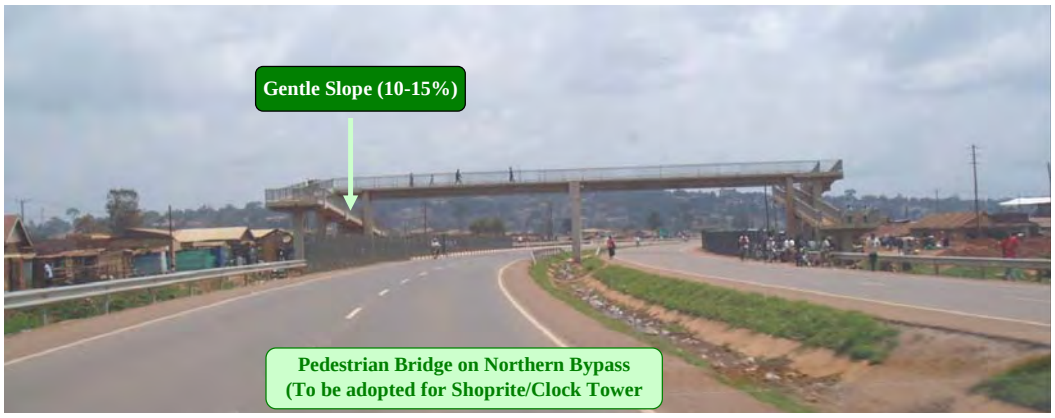
The Study Team has identified several causes of traffic congestion at Shoprite Junction as listed in the following table.

Physical Causes		Traffic Management	
P1	Insufficient Capacity of Junction	M1	3 lanes are occupied by taxies
P2	Two junctions are located too near (180m apart)	M2	Continuous pedestrian crossings not following signals
P3	Only one-left turn lane from the Entebbe Rd	M3	Traffic flow blockage by boda-boda (Motor cycle and bicycle taxies)
P4	Weaving traffic from Nsambya Rd to St Balikuddembe St	M4	Two lanes at Entebbe Rd were used by left-turn traffic
P5	Right-turn lane from Entebbe Rd to St Balikuddembe St though not much traffic	M5	No appropriate timing of signal phases no adjustments were made since start of the operation (maintenance problem)

During the Steering Committee/ Stakeholder Meetings, the Survey Team conducted interviews regarding the most traffic jam junctions. Over 90% feel that the traffic jam at Shoprite / Clock Tower / Entebbe Junctions is most serious. The Study Team and MoWT should address these opinions.

The Study Team planned the improvement of the Shoprite and Clock Tower Junctions to attain the following objectives:

- To reduce traffic accidents by segregating vehicles and non-motorized traffic (pedestrians) by constructing pedestrian bridges.



- To reduce traffic accidents among vehicles by guiding left-turn traffic to separated free left-turn lanes and minimizing weaving traffic.

- To reduce of traffic congestion by increasing traffic capacity by the above two measures and traffic management.

- To contribute to poverty reduction by securing accesses to the largest commercial center in Kampala and revitalizing commercial activities at downtown.

Both private and government land acquisition is required for the project as indicated in the following table. These are estimated based on satellite photographs and site reconnaissance survey.

Item	Location	Quantity	Remarks (Classification, etc)
Land Acquisition	Right (west) of Mengo Hill Rd, Entebbe Rd & St.Balikuddembe St	4,200 sq.m (0.42 ha)	Sport Ground (KCC), Government Land (Fire Brigade HQ), Hindu Temple
	Left (east) of Entebbe Rd and Nsambya Rd	3,000 sq.m (0.30 ha)	Land belongs to Railways Government Land (Telecommunications)
	Left (east) of Queen's Way	1,000 sq.m (0.10 ha)	Sport Ground (KCC)
	Total	8,200 sq.m (0.82 ha)	
Resettlement	(refer to the following plan)	3	1 private buildings (illegal) 1 store (Railways) 1 telecommunication building

A3.2.4 COMPONENT 4: OTHER FLYOVERS (FOR LONG TERM)

There are 62 locations of junctions that require improvements according to NTMP/GKMA. Of these, seven junctions were planned as grade-separated crossings.

However, the Study Team identified that some important flyovers are missing in NTMP/GKMA, including for Wandegeya Rbt, Jinja Jct, Shoprite Jct, Equatoria Jct and Kibuye Rbt as indicated in the following figure. Component 4 covers some of these flyovers which could be prioritized.

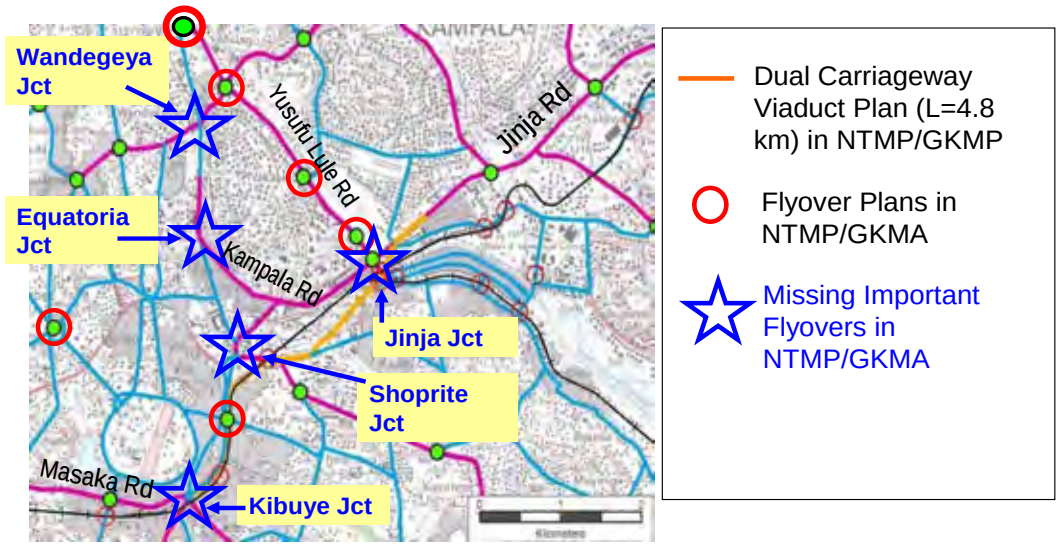


Figure 3.2.33 Grade-Separated Junctions (Flyovers) in NTMP/GKMA and Missing Flyovers identified by the Study Team

(6) Description of Project No.4.1, Queen's Way - Kevina / Mutebi Rods Flyover

Two communities (Katwe 1 and 2) have been separated by railways and Queen's Way (one way road) running between them. Only a steel pedestrian bridge overpass connects them. A flyover was planned in NTMP/GKMA to link these two communities by a road facility. The direct connection between these divided areas will also contribute in reducing traffic congestion at Nsambya Road and Clock Tower as this would function as a new bypass.

Queen's Way, View from Clock Tower Side

View from Katwe 2 (from Kebina Rd)

Figure A3.2.34 Existing Steel Pedestrian Bridge over Queen's Way / Railways

Queen's Way starts at Clock Tower Junction and ends at Kibuye Roundabout. Kevina/Mutebi Roads, which are located 700 m away from Clock Tower Junction and 1.0 km from Kibuye Roundabout.

The planned project aims to upgrade Kevina/Mutebi roads and construct an overpass (flyover) on Queen's Way. The total project length is 1.8 km and the overpass above the railway and Queen's Way is 70 m long. Proposed cross section shows a single carriageway (6.0 m) and sidewalks. Its route and typical cross sections are as follows:

Figure A3.2.35 Proposed Improvement of Kevina/Mutebi Roads and Construction of Flyover over Queen's Way

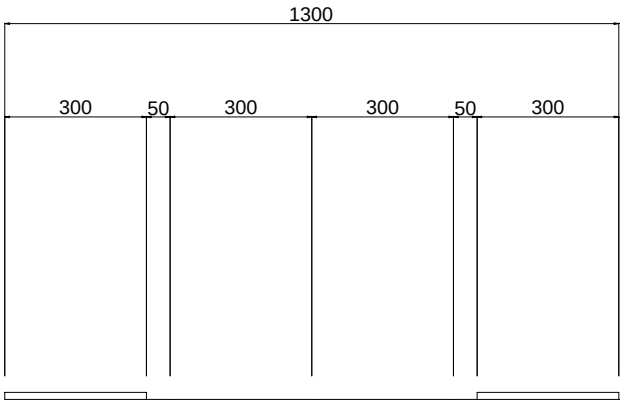


Figure A3.2.36 Typical Cross Section of Kebina/ Mutebi Roads

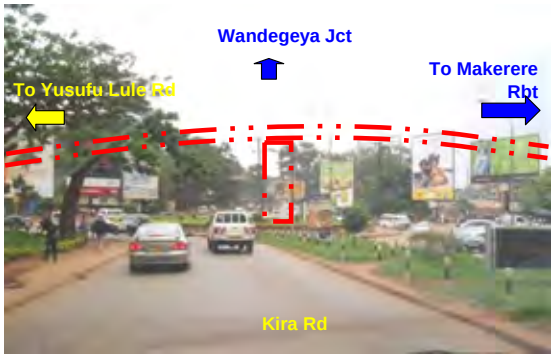
Both private land acquisition and resettlements will be required for the flyover, road improvement and associated facility construction.

Item	Location	Land Requirement and No. of Affected Houses/Buildings	Land Use
Land Acquisition	Kevina/Mutebi Road	20,520 sq.m	Residential area
Resettlement	Kevina/Mutebi Road	23	Residential area

(7) Description of Project No.4.2, Yusufu Lule Rd – Mulago Rbt (Kira / Haji Kasule Roads) Rods Flyover

Mulago Roundabout is located at the intersection of Yusufu Lule Road and Kira Road/Haji Kasule Road, just about 2.0-3.0 km away from the CBD/commercial center, through Kampala Road or Yusufu Lule Road. Yusufu Lule Road is one of the trunk radial roads and part of the north-south corridor. Kira/Haji Kasule Roads are part of the inner ring road network in Kampala City.

NTMP/GKMA planned a flyover at this intersection as the present traffic volume has exceeded its capacity. Hence, it became a major bottleneck, especially during the morning and evening peak periods. The Study Team planned a dual carriageway flyover of two lanes for Yusufu Lule Road over Mulago Rbt. The total project length is 0.7 km and its flyover section spans 0.3 km. The flyover will have dual carriageways (two lanes) and roadside strips of 1.5-m width to be used for emergency parking. Proposed alignment and typical cross section are as follows:



Mulago Rbt, View from Kira Road towards Wandegeya Jct

Mulago Rbt, View from Yusufu Lule Road towards Makerere Rbt

Figure A3.2.37 Existing Condition of Roundabout and Alignment of Planed Flyover

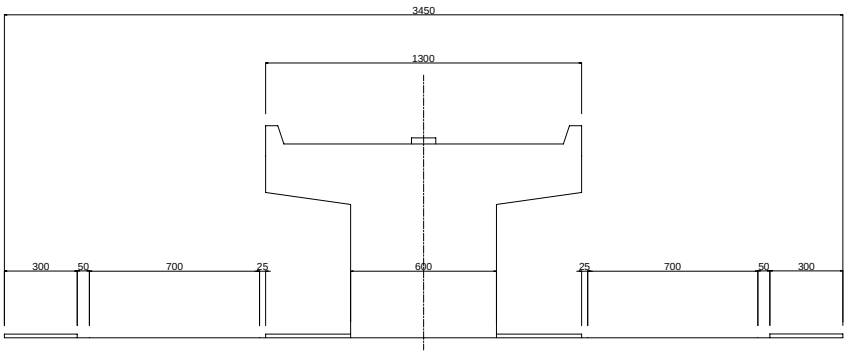


Figure A3.2.38 Typical Cross Section of Flyover Section

Both private land acquisition and resettlements will be required for the flyover and associated facility construction.

Item	Location	Land Requirement and No. of Affected Houses/Buildings	Land Use
Land Acquisition	Mulago Rbt	11,390 sq.m	● Residential area ● Government Offices
Resettlement	Mulago Rbt	1	● Residential area ● Government Offices

(8) Description of Project No.4.3, Fairway Rbt (Sezibwa / Kafu / J. Babiha Rds) Flyover

The Fairway Roundabout is located on Yusufu Lule Road, in front of Fairway Hotel and at the side of Uganda Golf Club. As this roundabout is just 0.9 km away from Nile Avenue Roundabout and 1.2 km from Jinja Junction, the planned flyover should be considered as part of the north-south corridor improvement in Kampala City in the future.

The existing Fairway Roundabout is irregular with four legs (Yusufu Lule Road, Kafu Road and Sezibwa Road) and one "T" junction just 50 m away from the roundabout on Yusufu Lule Road. In addition to its capacity saturation, these irregular geometric configurations have caused traffic congestion, especially in the morning and evening peak hours.

NTMP/GKMA planned construction of a flyover on this roundabout. The Study Team, on the other hand, planned both flyover for the long-term and an alternative plan for the medium-term to alleviate the traffic congestion.

Alternative 1:

Alternative 1 involves a flyover construction on Yusufu Lule Road as shown in Figures A3.2.39 and A3.2.40. The total project length is 0.7 km and its flyover section spans 0.3 km. The flyover has dual carriageways (two lanes) and roadside strips of 1.5-m width to be used for emergency parking.

Figure A3.2.39 Alignment of Proposed Flyover (Alternative 1: Long-Term Plan)

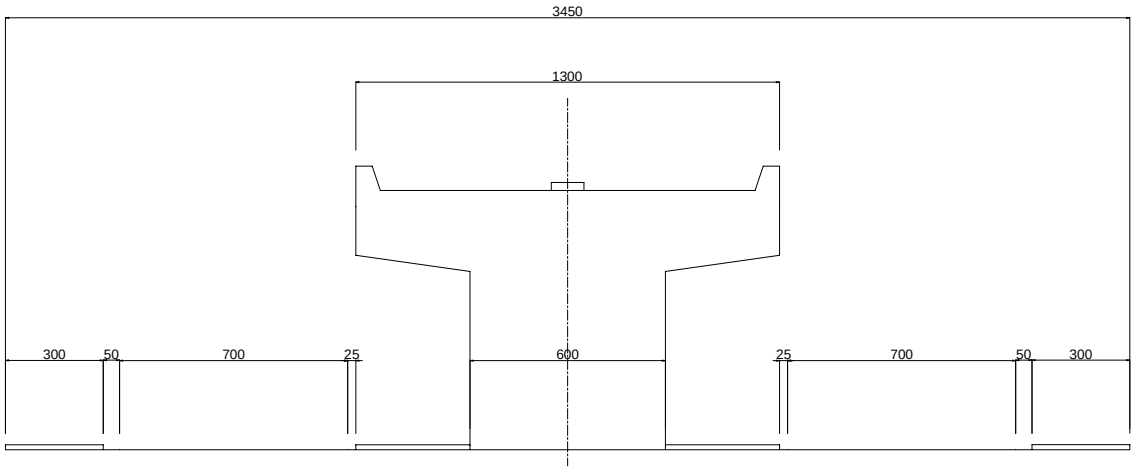


Figure A3.2.40 Typical Cross Section of Flyover Section

Alternative 2:

The Study Team also suggested an alternative plan without flyover for the medium term implementation. This consists of a combination of roundabout improvement, free left-turning lane from/to J. Babiha Avenue and control of U-turn traffic in the morning and evening peak hours (Figure A3.2.41).

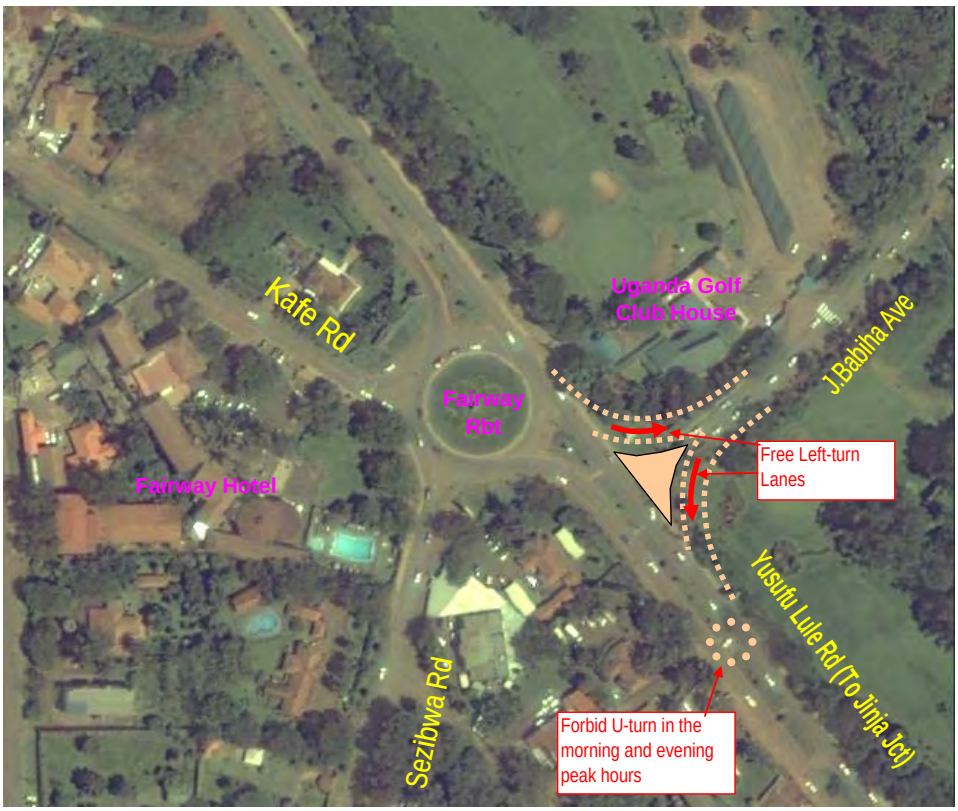


Figure A3.2.41 Alternative 2: Medium Term Improvement Plan for Fairway Roundabout

Both private land acquisition and resettlements will be required for the flyover, left-turn lane and associated facility construction.

Item	Location	Land Requirement and No. of Affected Houses/Buildings	Land Use
Land Acquisition	Fairway Rbt	13,490 sq.m	(ア) Residential area (イ) Golf Course
Resettlement	Fairway Rbt	0	Residential area

(9) Description of Project No.4.4, Kibuye Rbt Flyover

Refer to **Annex 8** as to this flyover plan.

(10) Description of Project No.4.5, Wandegeya Jct Flyover

Wandegeya Junction is an intersection with four legs where Makerere Hill Road, Haji Kasule Road and Bombo Road merge. This junction is just about 2.0 km away from the CBD/commercial center (northern gate). The Wandegeya Jct improvement project was implemented through a grant aid of the GOJ in 1998. However, it has become one of the major bottlenecks on traffic flows in Kampala City because of the recent rapid traffic increase.

The Study Team recommended a flyover construction to improve severe traffic congestion at Wandegeya Jct. Although Makerere Hill Road widening has been planned, it does not significantly alleviate traffic congestion as the bottleneck issue is not addressed.

The Study Team made two alternative flyover plans. Alternative A, which is between Makerere Hill Rd and Haji Kasule Rd., consist of a total project length of 0.7 km and a 0.3 km long flyover section. Said flyover has dual carriageways (two lanes) and roadside strips of 1.5-m width to be used for emergency parking. Alternative B meanwhile is between Bombo Road and Haji Kasule Road which will consist of right-turning flyover to accommodate right-turning traffic from Bombo Road to Haji Kasule Road. The flyover has one-lane and roadside strips of 1.5-m width to be used for emergency parking. Proposed route and typical cross sections are as follows:

Figure A3.2.42 Proposed Plan of Wandegeya Jct Flyover (Alternatives A and B)

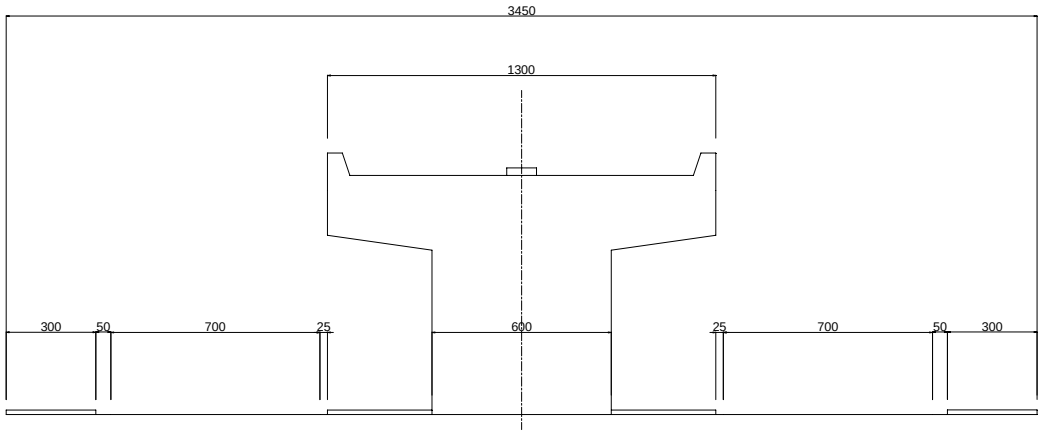


Figure A3.2.43 Typical Cross Section of Flyover Section (Alternative A)

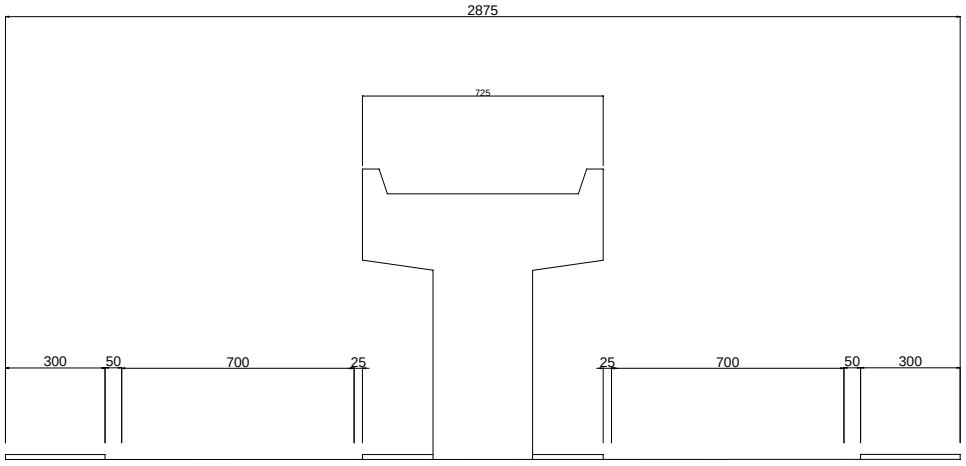


Figure A3.2.44 Typical Cross Section of Flyover Section (Alternative B)

Both private land acquisition and resettlements will be required for the flyover, road widening and associated facility construction.

Item		Location	Land Requirement and No. of Affected Houses/Buildings	Land Use
Alt.-A	Land Acquisition	Wandegeya Jct	13,065 sq.m	● Commercial Area ● Islamic School
	Resettlement	Wandegeya Jct	7	● Commercial Area ● Government Quarters
Alt.-B	Land Acquisition	Wandegeya Jct	6,270 sq.m	● Commercial Area ● Government Quarters
	Resettlement	Wandegeya Jct	2	● Commercial Area ● Government Quarters

(11) Description of Project No.4.6, Equatoria and Pioneer Mall Jcts Flyover

Kampala Road is the main arterial road passing through the CBD/commercial center. However, the traffic volumes at Pioneer Mall, Equatoria and other junctions have exceeded their capacity.

KCC has also been implementing signalization at Pioneer Mall Junction in KIIDP (financed by World Bank) as recommended by KUTIP. However, signalization would not significantly

alleviate traffic congestion since its effects do not differ much from the current manual traffic control by traffic police. As Equatoria Junction has an irregular configuration, its signalization will also not work well.

One of the best solutions is to construct a continuous flyover crossing over Equatoria and Pioneer Mall junctions. Hence, the Study Team planned alternative flyover plans to alleviate traffic congestion at Kampala Road bottlenecks.

Alternative 1:

The total project length is 1.5 km and the flyover section spans 1.1 km, crossing over three large junctions (Dastur, Pioneer Mall and Equatoria Junction). The flyover has dual carriageways (two lanes) and roadside strips of 1.5-m width to be used for emergency parking. Proposed alignment and typical cross sections are shown in Figures A3.2.45 and A3.2.46, respectively.

Figure A3.2.45 Location and Proposed Flyover (Viaduct)

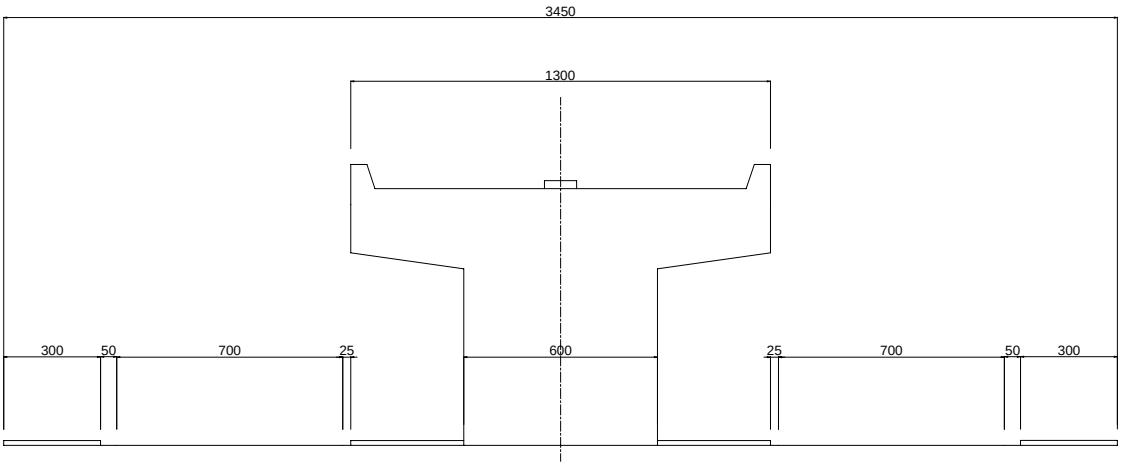


Figure A3.2.46 Typical Cross Section of Flyover Section

Alternative 2:

The total project length in Alternative 2 is 1.1 km and the flyover section spans 0.8 km, crossing over two large junctions (Pioneer Mall and Equatoria Junction). Said flyover has dual

carriageways (2-lanes) similar to that in Alternative 1.

Both private land acquisition and resettlements will be required for the flyover, road widening and associated facility construction.

Item	Location	Land Requirement and No. of Affected Houses/Buildings	Land Use
Land Acquisition	Dastur St Jct - Pioneer Mall Jct - Equatoria Jct	10,500 sq.m	● Commercial Area ● Business Offices
Resettlement	Dastur St Jct - Pioneer Mall Jct - Equatoria Jct	25	Multi-story Buildings

Although the required roadway width is approximately 34.0 – 35.0 m, the existing ROW is approximately only 24.0 – 25.0 m wide between Pioneer Mall Jct and Equatoria Jct. Therefore, flyover construction would be impossible for both Alternatives 1 and 2 unless many buildings along the road are demolished.

Kampala Rd between Equatoria Jct and Pioneer Mall Jct
View from Equatoria Jct to Pioneer Mall Jct to Equatoria Jct

Kampala Rd between Equatoria Jct and Pioneer Mall Jct
View from Equatoria Jct to Pioneer Mall Jct

Figure A3.2.47 Existing Condition between Pioneer Mall Jct and Equatoria Jct

(12) Description of Project No.4.7, GKMA Inner Ring Road Viaduct (Motorway)

At the stage when the population of GKMA reaches 4.5 million in 2023 and approximately 9-10 million in 2040, flyovers at all major junctions would become necessary. Moreover, an elevated motorway (viaduct) system would be one of the effective solutions aside from the introduction of BRT as one of the principal road infrastructures of Kampala City center. A full viaduct inner ring road network (motorway) should be planned for long long-term (target year 2035 - 2040) as shown in Figure A3.2.48.

The Study Team recommends that inner ring viaduct plan should be incorporated in the new GKMA structure plan, which will be established under KIIDP. Furthermore, construction of tall buildings on this route and interchanges must be avoided.

Figure A3.2.48 Inner Ring Viaduct Plan for Urban Motorway Network in Long Long-Term

A3.3 INFLUENCE OF BRT PLAN ON LONG AND SHORT LIST PROJECTS

A3.3.1 OUTLINE OF THE BRT PRE-FS FINAL REPORT

(1) Objectives of the Project and Pre-feasibility Study

BRT could possibly alleviate the serious urban traffic congestion with more economical ways compared with Mass Rapid Transit (MRT) or Light Rail Transit (LRT). Introduction of BRT has become more popular after its success in Curitiba in Brazil and Bogota in Colombia. The GOU has envisaged introducing BRT in GKMA with financial cooperation of WB as a long-term strategy. An investment of US$ 431 million on BRT was allocated in NTMP/GKMA for four routes. Implementation of a Rapid Transport System with BRT is one of the national core projects in NDP launched on 19th April 2010.

A Public-Private Infrastructure Advisory Facility (PPIAF) trust fund of US$ 267,000 was solicited by WB to finance a Pre-FS study for the establishment of a BRT system in GKMA. The GOU appointed Integrated Transport Planning Ltd in association with IBIS Transport Consultant to carry out the for Pre-FS of BRT.

The objectives of Pre-FS are:

- To develop a long term integrated conceptual design of a BRT System for GKMA
- To identify priority transport corridors for the BRT system

- To select one transport corridor for the pilot BRT, which will be subject to detailed engineering and operations design

- To prepare the terms of reference (TOR) for the detailed engineering and operations design of the pilot BRT system on the selected corridor

- Definition of institutional reforms and financial controls necessary for operating the system.

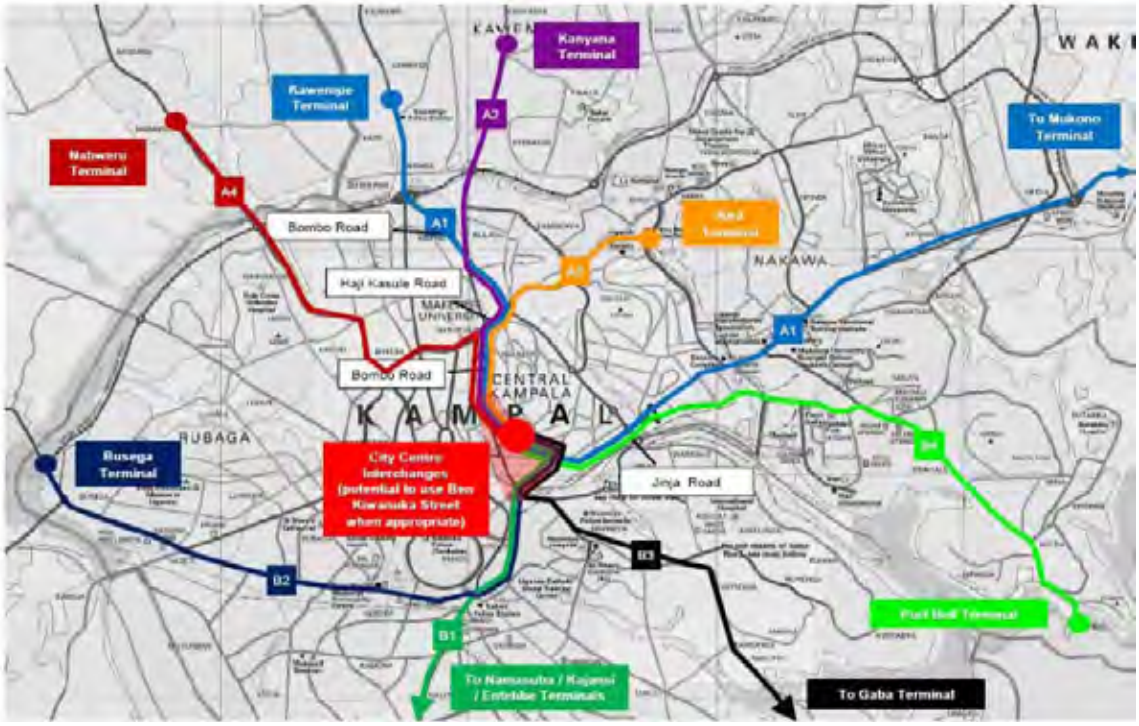
(2) Progress of the Pre-FS

The Pre-FS for BRT commenced in November 2009. The Consultant submitted an Interim Report to MoWT in February 2010, Draft Final Report in April 2010 and Final Report in May 2010.

WB has financed the feasibility study and detailed design of BRT pilot project under its Transport Sector Development Project (TSDP). It includes review of the BRT Pre-FS, feasibility study, the preparation of design and bidding documents, EIA/PC and a Resettlement Action Plan and the necessary institutional set up for the implementation and management of the system for the BRT pilot project. The consultancy services are expected to start early 2011 and will be undertaken for about 12 months.

(3) Outline of BRT Plan in Pre-FS

According to the BRT Pre-FS Draft Final Report, eight BRT routes have been planned for the long-term (2030) as shown in Figure A3.3.1. However, the Draft Final Report and Final Report did not show either the total BRT operation length or investment cost. The Study Team estimated the planned BRT operation length to be approximately 120 km in total (Table A3.3.1) which was measured from the satellite photos. The total investment cost would be approximately US$ 900 million, which include dedicated BRT lane construction and existing road widening for general traffic.



Source: BRT Pre-FS Final Report, May 2010, MoWT

Figure A3.3.1 Planned BRT Routes in GKMA

Table A3.3.1 Summary of BRT Items and Estimated Investment Costs

Route No.	BRT Route	Route Length (km)	Road Length* (km)	City Center IC (No.)	BRT Terminal (No.)	BRT Stations** (No.)	BRT Investment Cost# Mill US$
A1	Jinja Rd - Kampala Rd - Bombo Rd	29.10	29.10	1	3	36	220.6
A2	City Center IC - Makerere Rbt - Northern Bypass - Kanyama Terminal (Gayaza Rd)	5.80	2.40		1	7	16.2
A3	City Center IC Kira Rd (Mulago Rbt - Bukoto/Lugogo Bypass Jct)	4.90	2.50		1	6	14.8
A4	City Center IC - Wandegeya Jct - Nabweru Terminal (Hoima Rd)	9.00	7.10		1	11	48.1
B.1	City Center IC - Entebbe Rd - Queen's Way/(Katwe Rd) - Entebbe Airport Rd	37.60	37.10		2	47	230.8
B.2	City Center IC - Kibuye Rbt - Busega Rbt	10.00	6.50		1	13	44.0
B.3	City Center IC Clock - Tower - Nsambya Road - Gaba	10.60	9.30		1	13	62.9
B.4	Africana Rbt - Old Port Bell Rd - Port Bell	10.40	8.30		1	13	56.2
CBD	CBD Triangle (Ben Kiwanuka St)	1.20	1.20			2	8.1
	Sub-Total	118.60	103.50	1	11	148	701.8
	BRT Bus (12 m long)						180.0
	BRT Feeder System						24.0
	Total						905.8

Notes: * Construction length of the BRT facilities (road widening for 2 BRT dedicated lanes and 4 general traffic), including BRT stations, but not counting the section length duplicated by routes.

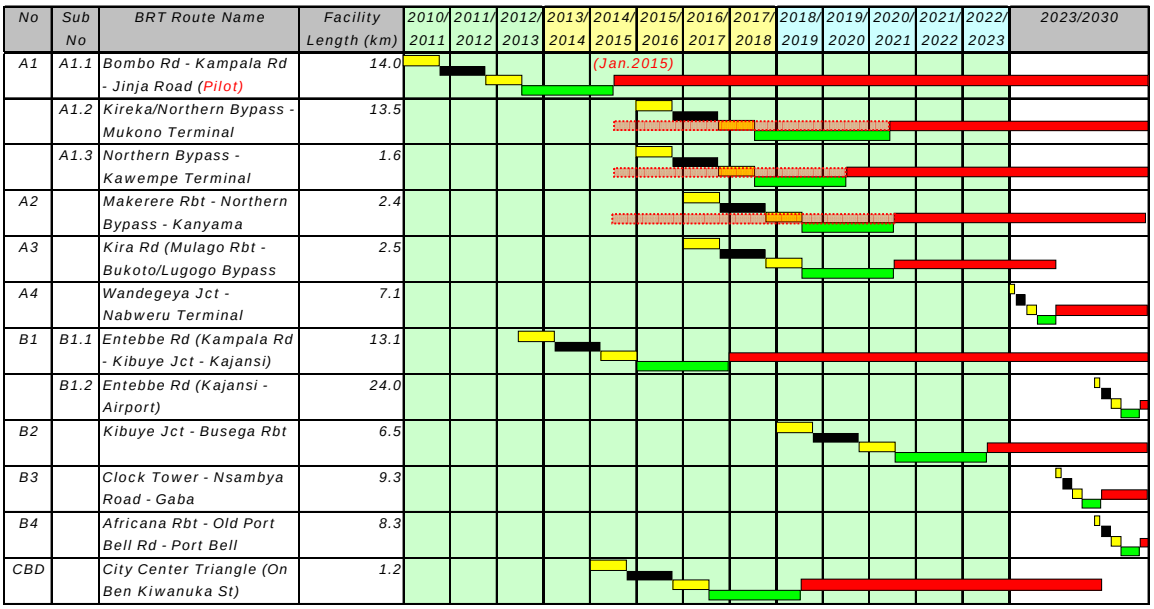
** The number of estimated BRT stations at a average interval of 800 m, including these duplicated by route

BRT investment cost estimated based on unit price of the BRT Pilot Project in the BRT Pre-FS

Source: Assumption by the Study Team based on BRT Pre-FS Draft Final Report (Apr.2010)

(4) Anticipated BRT Project Implementation in Pre-FS

The BRT route length, its configuration including location of bus stations, implementation schedule and costs are unclear even in the BRT Pre-FS Final Report, except for the pilot project. The Study Team assumed two implementation scenarios of the BRT development to estimate the traffic flow and volume on the trunk road network, flyovers, shortlisted road projects and junctions for the Pre-FS projects in 2013, 2018 and 2023 as shown in the following figure (Scenario 1).



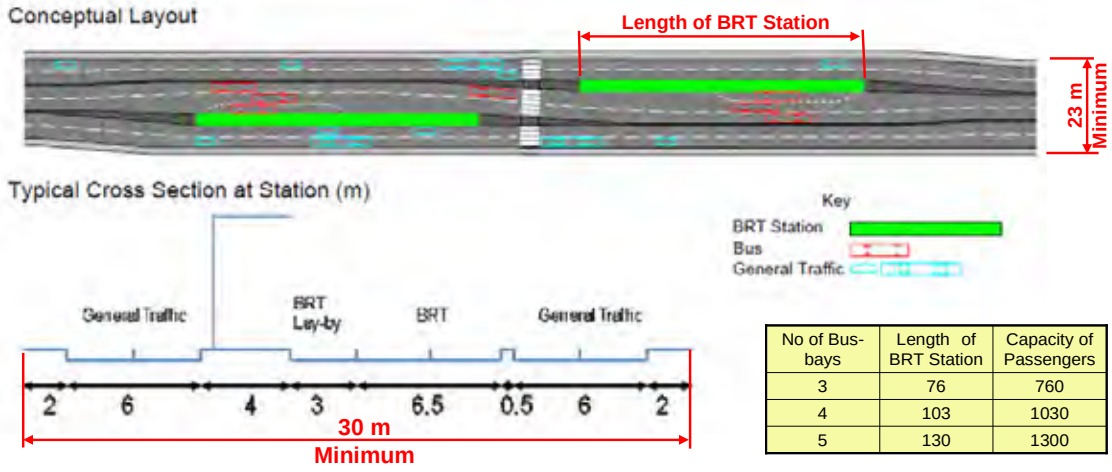
Source: Assumed by the Study Team based on BRT Pre-FS Draft Final Report / Presentation, April 2010

Figure A3.3.2 Anticipated BRT Plan Implementation Schedule (Scenario 1)

The major difference between the two scenarios is the start of operation of B1.2 Kajansi – Entebbe Airport Section (24 km in length) on Entebbe Airport Road, which is after 2023 in Scenario 1, and before 2023 in Scenario 2.

(5) Conceptual Layout and Typical Section of BRT Plan

Figure A3.3.3 shows the conceptual layout plan and typical cross section of BRT station. BRT operates along the median portion on dedicated lanes and its stations are located bilaterally to minimize land acquisition. The road needs a minimum width of 30 m to accommodate BRT lanes, two general traffic lanes and two sidewalks at both sides. The width can be reduced to 23 m at normal sections (non-station sections). The length of BRT station varies from 76 to 130 m depending on required passenger capacity. Pedestrians cross at grade to access the BRT stations.



No of Bus-bays	Length of BRT Station	Capacity of Passengers
3	76	760
4	103	1030
5	130	1300

Source: The Study Team based on BRT Pre-FS Draft Final Report

Figure A3.3.3 Conceptual Layout Plan and Typical Cross Section of BRT Station

However, it should be noted that:

- Roadside drainage spaces are required at both sides in the suburbs
- A minimum of 3-m width sidewalk is required in the city center
- As the existing ROW is mostly 24 – 27 m in the city center, demolition of a lot of buildings is required to allocate four lanes for general traffic
- Not applicable to Ben Kiwanuka Street since its existing ROW is only 14-15m between Mini Price Jct and Equatoria Jct.
- At grade access of passengers at the city center might cause disruption to BRT operation itself

(6) Close of Kampala Road/Entebbe Road Junction to General Traffic

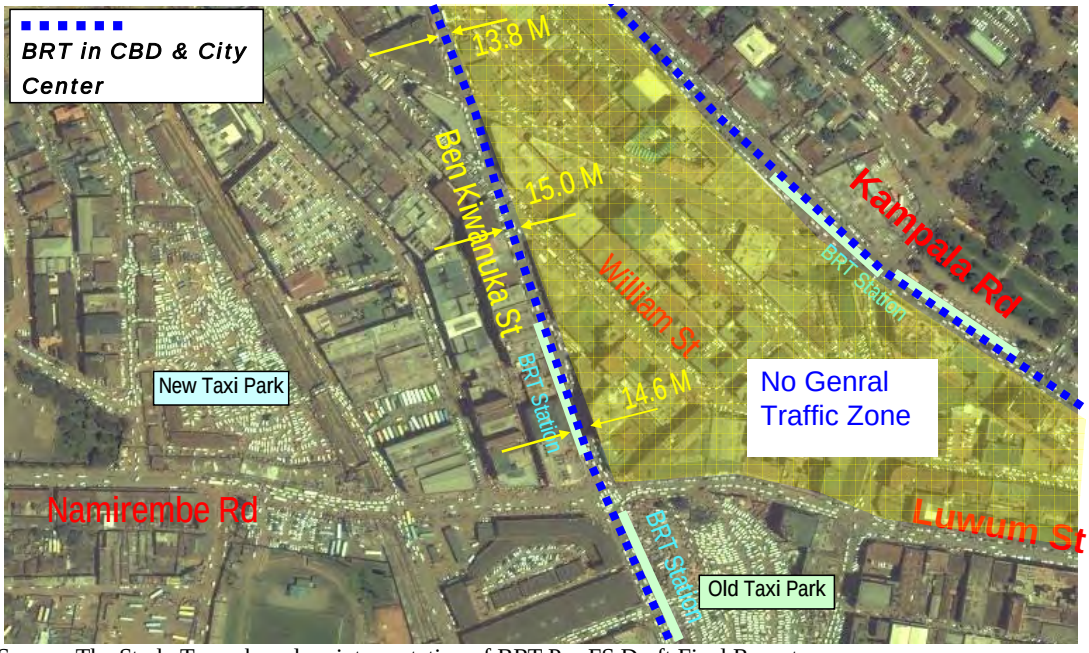
In the Final Report of BRT Pre-FS, it was confirmed that Kampala Road/Entebbe Road Junction will be opened for only BRT (Figure A3.3.4) and closed for general traffic. Although general traffic is allowed at Nasser Road / Nkrumah Road alternatively located along the railways yard in parallel with Kampala Road, the current traffic flow directing to/from the city center (CBD and Commercial Center) would change drastically. In addition, as three BRT stations and one BRT city center interchange are located between Entebbe Jct and Equatoria Jct, it would be difficult for general traffic to pass along Kampala Road except for accessing buildings along said road.

The function of Kampala Road would change into a BRT road and a services road. There seems to be two reasons behind this: one is the physical difficulty to secure 30 m standard ROW along Kampala Road and the other is to discourage use of private cars within the city center to promote use of BRT.

Figure A3.3.4 Close of Kampala / Entebbe Roads Junction for General Traffic

(7) No General Traffic on Ben Kiwanuka Street in CBD Triangle

In the Draft Final Report of BRT Pre-FS, it is not clear how BRT is introduced on Ben Kiwanuka Street as its existing ROW is only 14-15 m wide between Mini Price Jct and Equatoria Jct. As BRT stations were located at Mini Price, no general traffic is physically possible to pass on this road.



Source: The Study Team, based on interpretation of BRT Pre-FS Draft Final Report

Figure A3.3.5 ROW Width of Ben Kiwanuka Street and Location of BRT Stations

(8) Missing Information About BRT in the Draft Final/ Final Reports for the Basic Design of JICA Pre-FS Projects

The BRT Pre-FS did not provide specific information required for the basic design of JICA Pre-FS projects, including:

- Implementation plan for the BRT route, except for the pilot project
- Definite traffic flows (volume) by direction for junctions design, including required number of left and right turn lanes
- BRT operation frequency for signalization planning and traffic capacity check
- Geometric alignments of BRT and crossing scheme on roundabouts
- Specific locations and dimensions of BRT stations
- Passenger access, either by at-grade or pedestrian bridges
- Feeding system (from other transport modes) for passengers of BRT stations

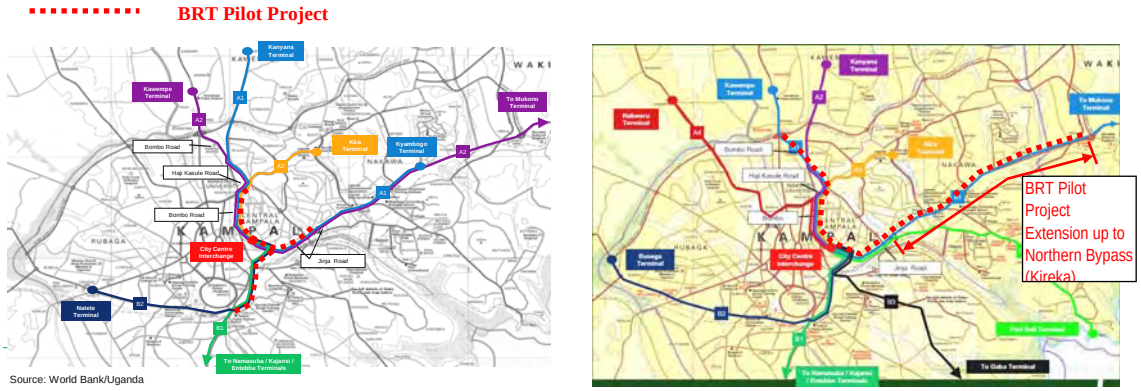
Hence, the basic design for the shortlisted projects would need many assumptions which might be changed in the BRT FS and detailed design stage.

A3.3.2 BRT ROUTES AND STATIONS IN THE DRAFT FINAL REPORT AND EFFECTS ON SHORTLISTED PROJECTS

(1) BRT Pilot Project in the Interim and Draft Final Reports

The BRT pilot project in the Interim Report is 7.6 km. This consists of Mulago Rbt to Africana Rbt through Haji Kasule Road – Bombo Road – Kampala Road and Jinja Road (length 4.6 km) and Entebbe Jct to Kibuye Rbt through Entebbe Road and Queen's Way (length 3.0 km).

However, the BRT pilot project routes were changed in the Draft Final Report to Bwaise Rbt (Northern Bypass) - Kireka Rbt (Northern Bypass) through Bombo Road - Haji Kasule Road – Bombo Road – Kampala Road and Jinja Road (length 14.0 km) as shown in the following figure.



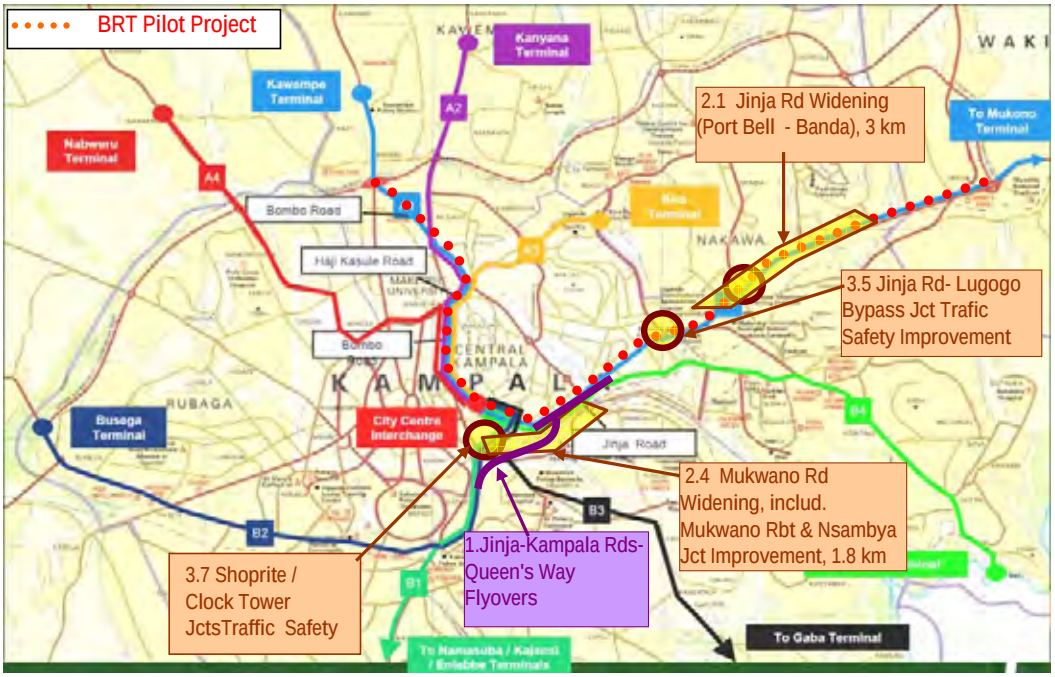
BRT Pre-FS Interim Report (Feb. 2010) **BRT Pre-FS Draft Final Report (Apr. 2010)**

Figure A3.3.6 BRT Pilot Project in Interim Report and Draft Final Report

Three of the five Pre-FS shortlisted projects namely, Jinja – Kampala Rds Flyover, Lugogo Bypass Jct Traffic Safety Improvement and Jinja Road Widening (Port Bell – Banda), are located

on the BRT pilot project as shown in Figure A3.3.7.

The BRT Pre-FS did not show several important configurations/dimensions and implementation schedule of overall BRT plan, which are required for the basic design level pre-feasibility study of the JICA shortlisted projects. These information are left to the feasibility study and detailed design consultant of BRT Pilot Project, which will commence in early 2011 and will be executed for about 12 months. Moreover, the basic concepts of BRT in Pre-FS might even be changed during the BRT FS and detailed design stage as a result of technical and financial reviews or through public consultations.

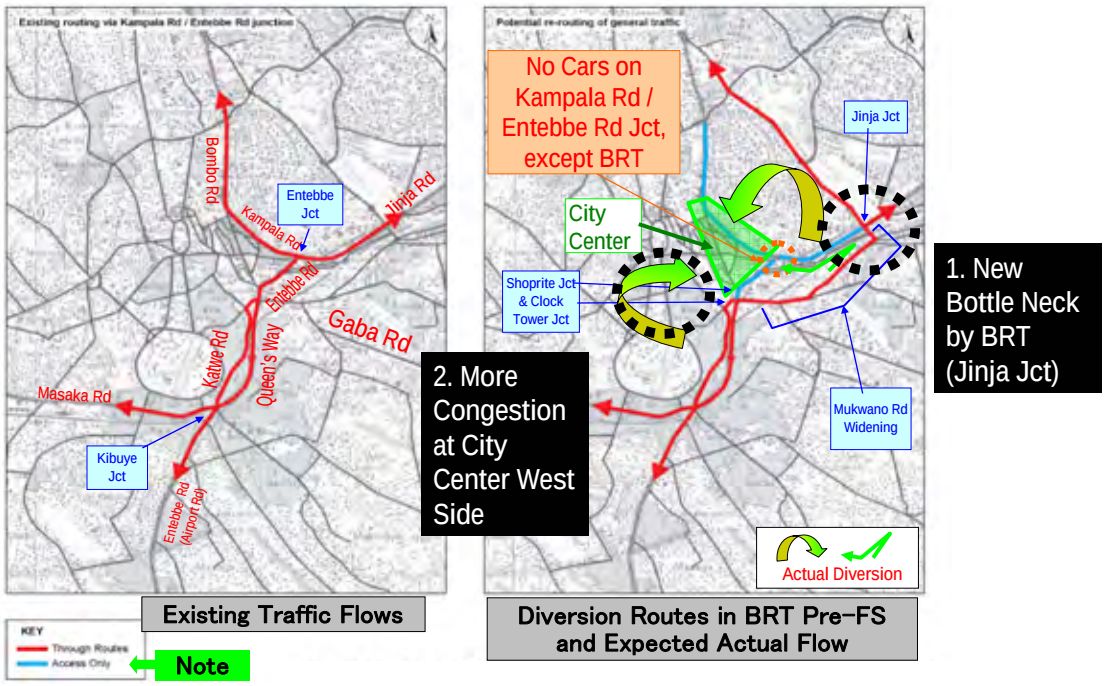


Source: The Study Team based on BRT Pre-FS Draft Final Report, April 2010, MoWT

Figure A3.3.7 Short-List Projects on BRT Pilot Project Route

(2) Close of Entebbe Junction to General Traffic and Change of Traffic Flows

If BRT is introduced, Kampala Rd/Entebbe Rd Junction in CBD will be closed for general traffic, or its passage will be very much limited, according to the BRT Pre-FS Draft Final Report. Said report also suggested rerouting general traffic flows from Entebbe Road to Nsambya/Mukwano/Yusufu Lule Roads and Jinja Road as shown in the following figure.



Source: The Study Team based on BRT Pre-FS Draft Final Report

Figure A3.3.8 Rerouting of General Traffic Flow by Close of Kampala Road / Entebbe Road Junction

As most of the traffic destination is the city center, this rerouting would cause the following problems:

- Traffic congestion at Jinja Road / Yusufu Lule Road Junction (Jinja Jct) will cause a serious bottleneck.
- Access to the city center from the west side will become worse as further congestions are anticipated with the diversion of the general traffic from Katwe/Entebbe Road to Natete Road/Namirembe Road and Kisenyi Road
- The current traffic capacity of Nsambya / Kibuli / Mukwano Roads, including Clock Tower Jct, Nsambya Jct and Mukwano Rbt, will become insufficient.

The main traffic flow on Jinja Jct would be changed from the east - west direction to the north – south direction as shown in Figures A3.3.9 and A3.3.10.

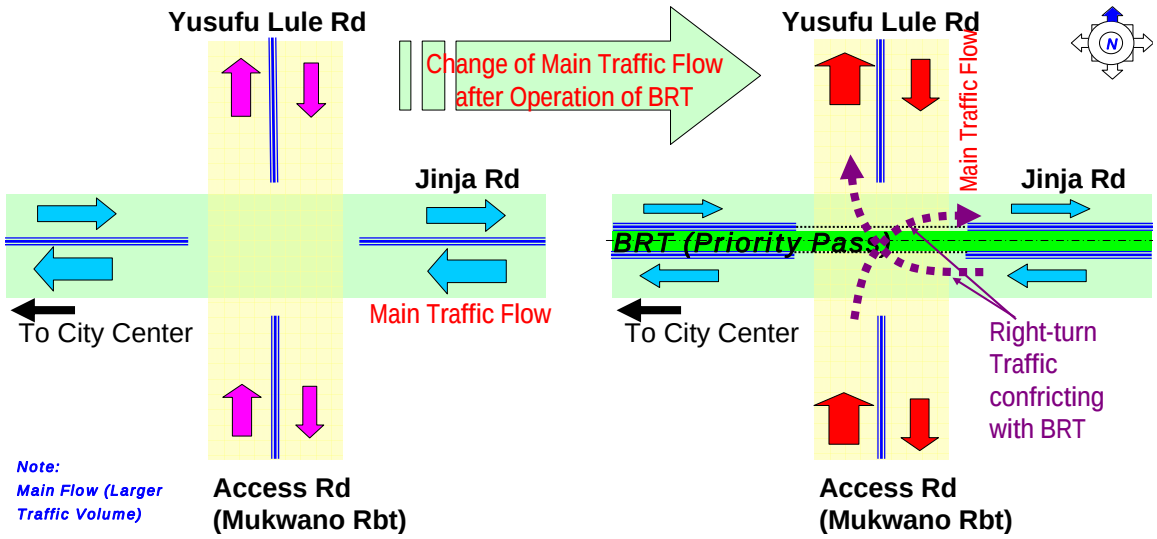


Figure A3.3.9 Change of Main Traffic Flow from East-West (Jinja Road) Direction to North-South (Yusufu Lule – Mukwano Road) Direction

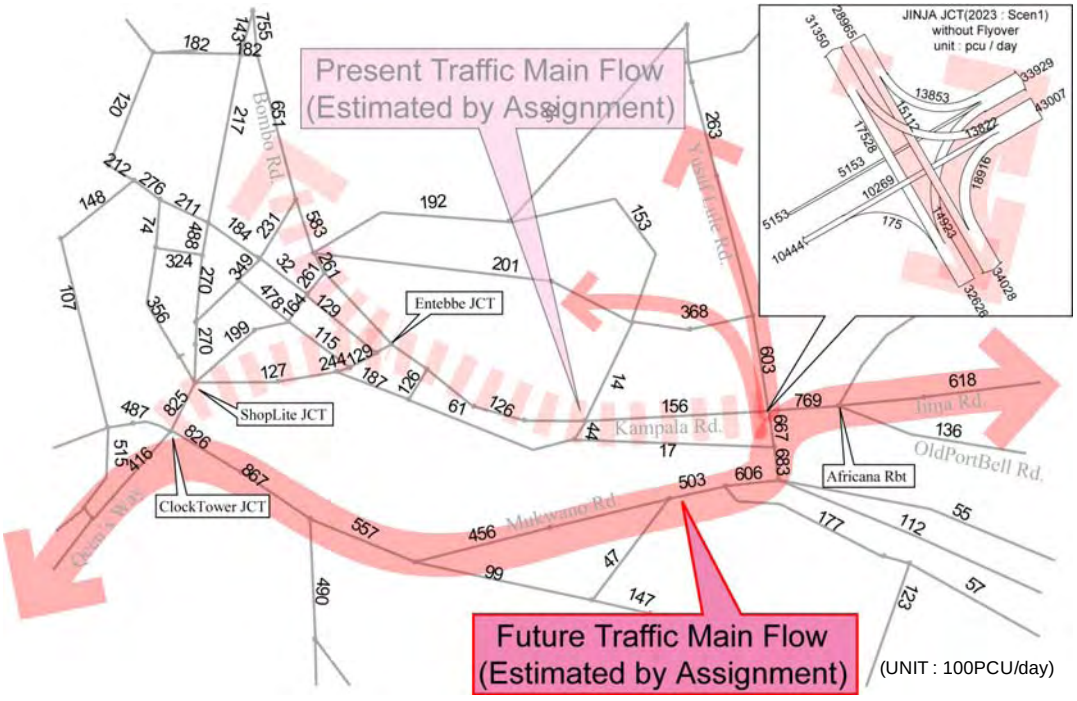


Figure A3.3.10 Change of ADT (PCU) After Close of Entebbe Jct to General Traffic and Operation of BRT

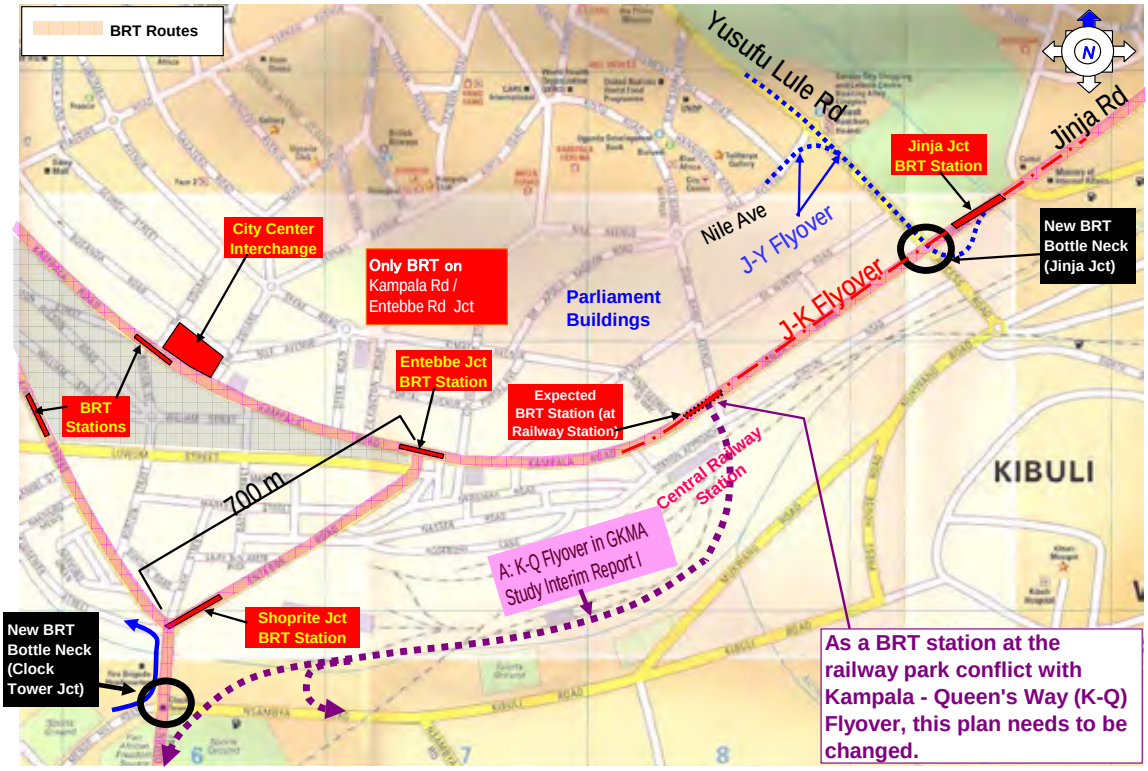
As Yusufu Lule - Mukwano Rds Flyover on the north-south direction would accommodate more traffic (triple) than Jinja – Kampala Rds Flyover, the Study Team has recommended the former in the Interim Report I to reduce traffic congestion at Jinja Junction.

(3) BRT Station at Railway Park conflicting with Kampala Road - Queen's Way Flyover

Locations of some of the BRT stations in the pilot project are not clear in the BRT Draft Final Report, indicating only that stations will be provided at every 500 – 700 m in the city center. Nevertheless, a BRT station would be located on Kampala Road near the railway station. The Kampala Road – Queen's Way Flyover was planned in December 2009 at the time when BRT

configurations were not yet clear. The intention is to relieve serious traffic congestion at Shoprite Junction by diverting the traffic flow from Entebbe Road to Kampala Road – Queen's Way Flyover.

However, since said flyover will conflict with the proposed BRT Station at the railway park as indicated in the BRT Final Report (shown in the following figure), this plan is required to be changed. Alternative flyover plans should address the new traffic bottlenecks at Clock Tower Junction and Jinja /Mukwano Junction.



Source: The Study Team based on BRT Pre-FS Draft Final Report

Figure A3.3.11 Kampala Road – Queen's Way Flyover conflicting with Anticipated BRT Station

A3.4 OUTLINE OF ADDITIONAL OR ALTERNATIVE SHORTLISTED PROJECTS IN INTERIM REPORT II/DRAFT FINAL REPORT

Several projects in the long list presented in Interim Report 1 were located on the planned BRT routes. Moreover, BRT Pilot Project Pre-FS had been conducted in parallel with this Study and completed in May 2010. Thus, as explained in Section A3.1.3, the Study Team modified or changed the basic concept of the long list and short list of projects to coordinate with the BRT plan and based on future traffic flow simulation.

The following is the outline of the final shortlisted projects modified in Interim Report II / Draft Final Report (refer to Chapter 7).

(1) Description of Project No.1.1 & 1.2, Jinja Junction Flyover (Yusufu Lule – Mukwano Roads Flyover, Jinja – Yusufu Lule Roads Flyover and Mukwano – Jinja Roads Flyover)

The objective of Jinja Junction Flyover is basically to substantially sustain the traffic capacity at Jinja Junction and other nearby junctions (Mukwano Rbt, Nine Avenue Rbt or Garden City Rbt

and Africana Rbt). These nearby junctions will be closely related to Jinja Junction with the provision of additional lanes (flyovers) over said junctions. The Yusufu Lule – Mukwano Roads Flyover is the main route and three ramps are provided for right-turning traffic (from Jinja Rd to Yusufu Lule Rd/Nile Avenue and from Mukwano Rd to Jinja Rd) to minimize conflict with the BRT pilot project operation. These flyovers should be constructed together with Mukwano Road Widening (Dual Carriageway) as one package to attain the project objective.

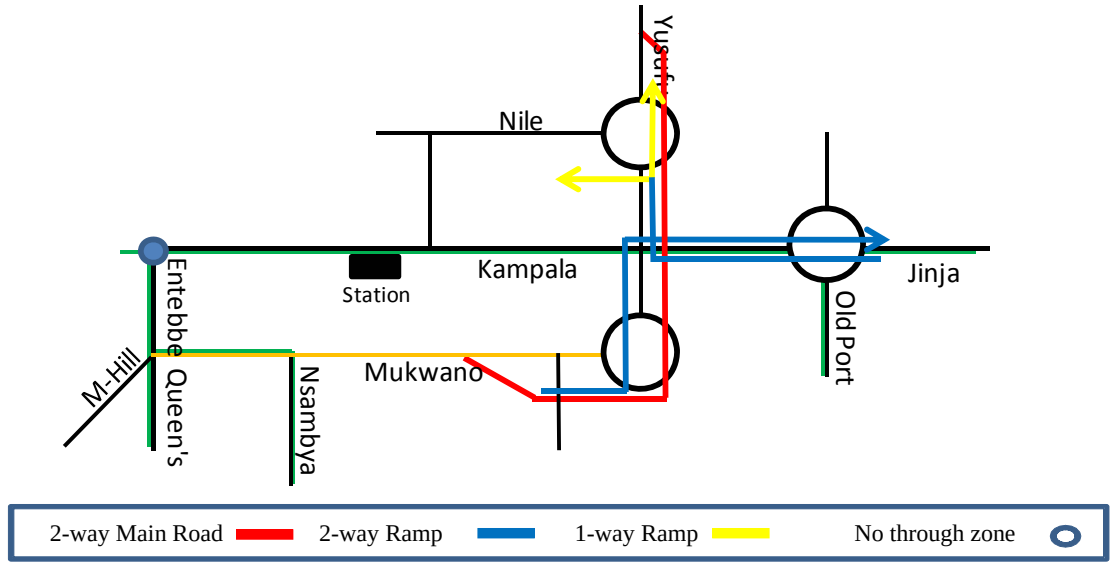
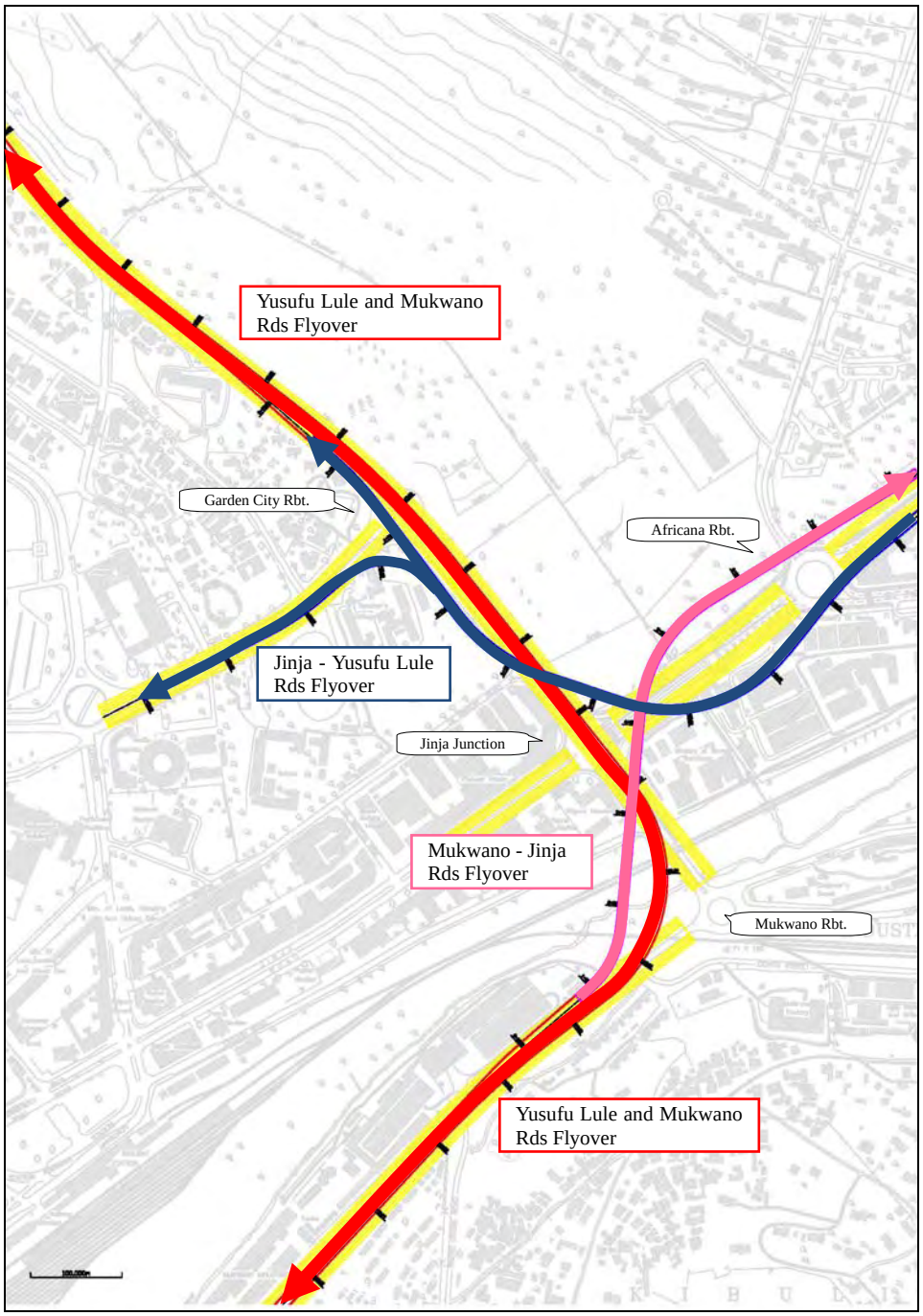


Figure A3.4.1 Basic Configuration of Jinja Junction Flyovers

Yusufu Lule – Mukwano Rds Flyover overpasses Jinja Junction, Garden City Roundabout, Mukwano Roundabout and the railways. In this plan, the north-south line (Yusufu Lule Road-Mukwano Road) is supposed to serve the main traffic flow and is linked by continuous two-lane flyover bridges. The flyover starts in front of Kampala Golf Course and ends on the widened Mukwano Road, just after crossing Press House Road Junction. The project length is 1,660 m, including the total length of the flyover and retaining wall section, which is 1,550 m.

Jinja – Yusufu Lule ramp overpasses Africana Roundabout, Jinja Junction and Garden City Roundabout, then meets Yusufu Lule – Mukwano Rds Flyover. Yusufu Lule Rd – Nile Avenue ramp diverges from Jinja – Yusufu Lule ramp and lands on Nile Avenue. Mukwano – Jinja Rds ramp diverges from Yusufu Lule – Mukwano Flyover and overpasses Mukwano Roundabout, railways, Jinja Junction and Africana Roundabout. The project length is 2,245 m, including the total length of flyover and retaining wall section, which is 2,190 m.



Source: The Study Team

Figure A3.4.2 Jinja Junction Flyover Plan

(2) Description of Project No.1.3: Clock Tower Flyover

The Study Team planned Kampala Road – Queen's Way Flyover, passing over the railway station and yards, branching to Nsambya Road as per Interim Report I. This is intended to relieve the most seriously traffic congested Shoprite Junction. However, as said flyover will conflict with the BRT station located in front of the railway station, this was changed to a simple flyover at Clock Tower. This is supposed to address the new traffic flow bottleneck in the long term (by 2023) in Interim Report II/ Draft Final Report.

Clock Tower Flyover accommodates the traffic flow from the west to the east of Clock Tower Intersection. It starts from Mengo Hill Road and overpasses Clock Tower Intersection and then

lands on Nsambya Road. The project length is 550 m including the total length of the flyover and retaining wall section which is 300 m.

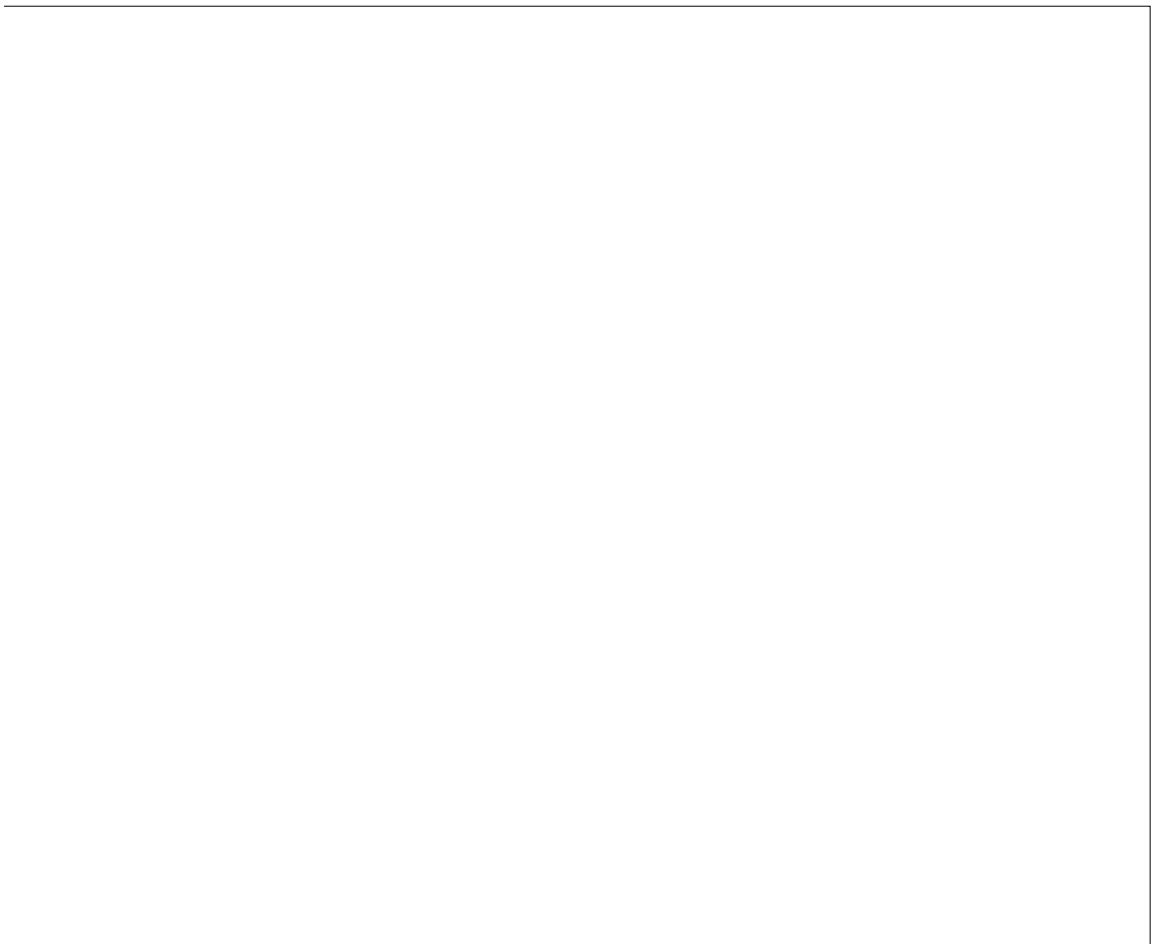


Figure A3.4.3 Clock Tower Flyover Plan

The Study Team planned an alternative flyover for the right-turning traffic from Queen's Way to Nsambya Road. Since these are closely related with the urban policy and transport sector, further study and discussions on the following are required during the feasibility study stage:

- Route of BRT B1 and B2: Which road will be used for BRT, whether Queen's Way or the narrow Katwe Road.

- What function should be given to Queen's Way and Katwe Road; and widening of Queen's Way in relation with the Kibuye Junction Flyover plan.

- Resume railways operation for Kasese, and any passenger services between the city center and Busega (Masaka Road). If passenger services in the Kampala city center are planned, the Clock Tower Flyover should be extended to Kibuli/Mukwano Roads by crossing over the railways.

A3.5 LAND ACQUISITION AND RESETTLEMENT REQUIREMENTS FOR FINAL SHORT-LISTED PROJECTS

(1) Summary of Land Acquisition and Resettlement Requirements Estimate

The Study Team estimated the land acquisition and resettlement requirements for the final shortlisted projects based on the preliminary design drawings and site reconnaissance survey. For the land acquisition, about 6.14 ha of government-owned land, 2.59 ha private land, and resettlement are required prior to the implementation of the Pre-FS projects as shown in Table A3.5.1. The government (or public) land acquisition includes part of the MoWT Central Mechanical Workshop, Electoral Commission Office, Telecommunication Office, Postal Office, National Railways and parks (KCC).

Table A3.5.1 Estimated Land Acquisition and Resettlement Requirements

Project No.	Project Name	Land Acquisition			Resettlement		
		Area of Land required (ha)	Secured ROW (estimate)	ROW to be acquired (ha)	Number of Buildings (number)	Resettlement (estimate) (household)	Remarks
1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	0.52	79%	0.11	1 (0)	1	Government (Railways, Electoral Commission, Park)
1.2 (Phase 1)	Jinja - Yusufu Lule Rds Flyover & Mukwano - Jinja Rds Flyover	2.50	74%	0.65	11 (2)	17	Private and Government (MoWT, MoLHUD, Electoral Commission, Park)
1.3 (Phase 3)	Mengo Hill - Mukwano Rds Flyover (over Clock Tower) or Clock Tower - Mukwano Rd Flyover	0.60	100%	0.00	4 (0)	4	Park
2.4	Mukwano Rd Widening	3.94	70%	1.19	9 (2)	15	Private & Government (Railways Quarters, Police Quarters)
3.7	Shoprite & Clock Tower Jcts Traffic Safety Improvement	1.17	45%	0.64	4 (0)	4	Private & Government (Railways, Telecommunications, Post Office)
Total		8.73		2.59	29 (4)	41	

The Study Team obtained information that there is no difficulty to use the above government lands since they are not currently much actively used, except for the Electoral Commission Office portion required for the Jinja Junction Flyover construction. The MoLHUD informed the Study Team that relocation of the Electoral Commission Office to the suburb is under planning stage. The availability of these lands and schedule of acquisition should be confirmed during the FS. Compensation for land acquisition of the private property should be based on market prices.

The Study Team estimated the number of households as one household per government building (the family of housekeeper) and four households per private house or building. The compensation should also include illegal occupancy of the land although this is currently not found.

The backup data for these land acquisition and resettlement (buildings/houses) estimates by sub-project are shown below.

(1) Project No.1.1 & 1.2, Jinja Flyover Project

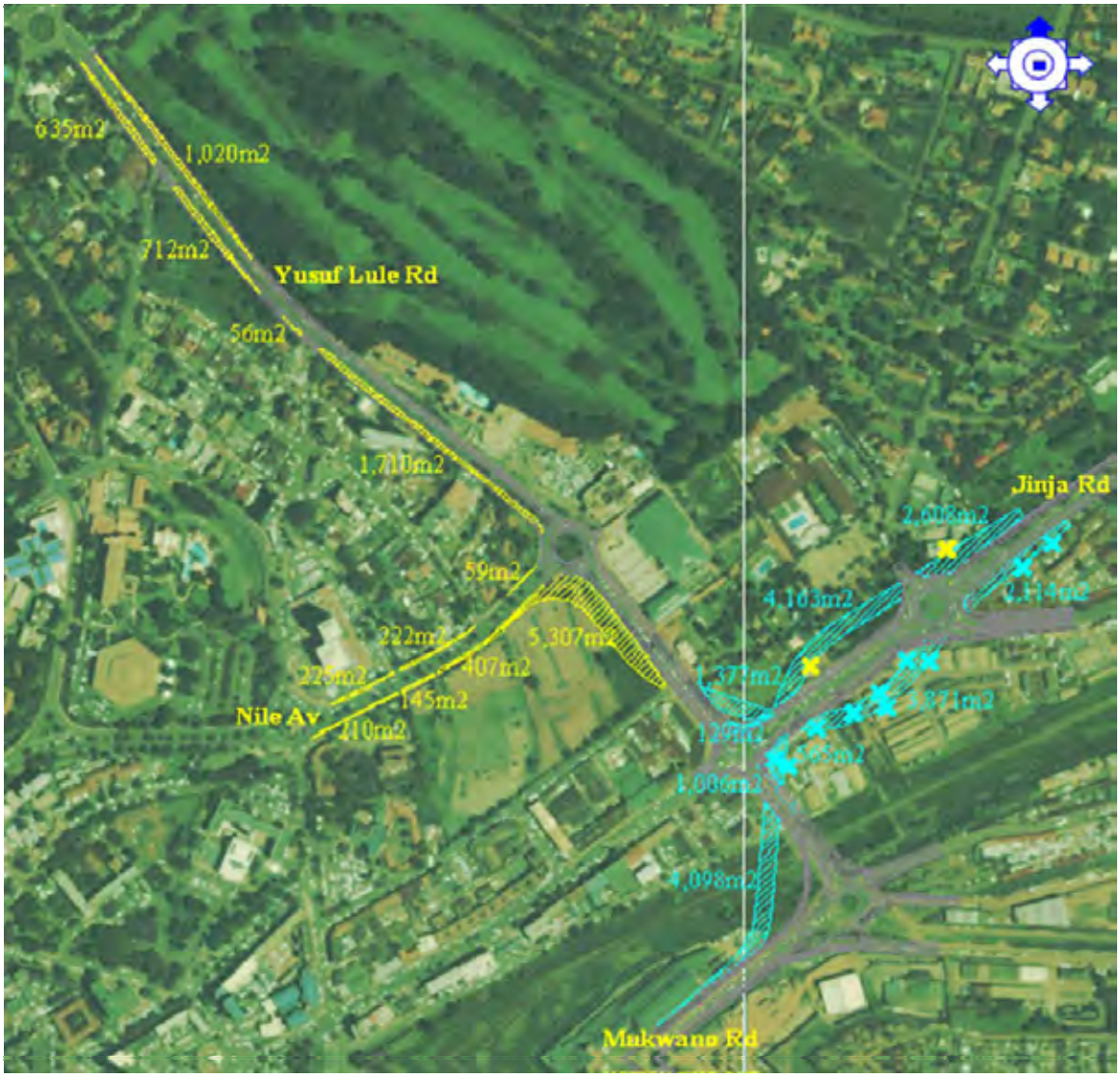


Figure A3.5.1 Affected Areas and Properties

Table A3,5.3 Affected Areas and Properties

Property Type		Area (m^2)	No.	Remarks
Land	Private	7,600	-	
	Public	22,600	-	
Buildings	Private	-	2	
	Public	-	10	

(2) Project No.1.3, Clock Tower Flyover Project

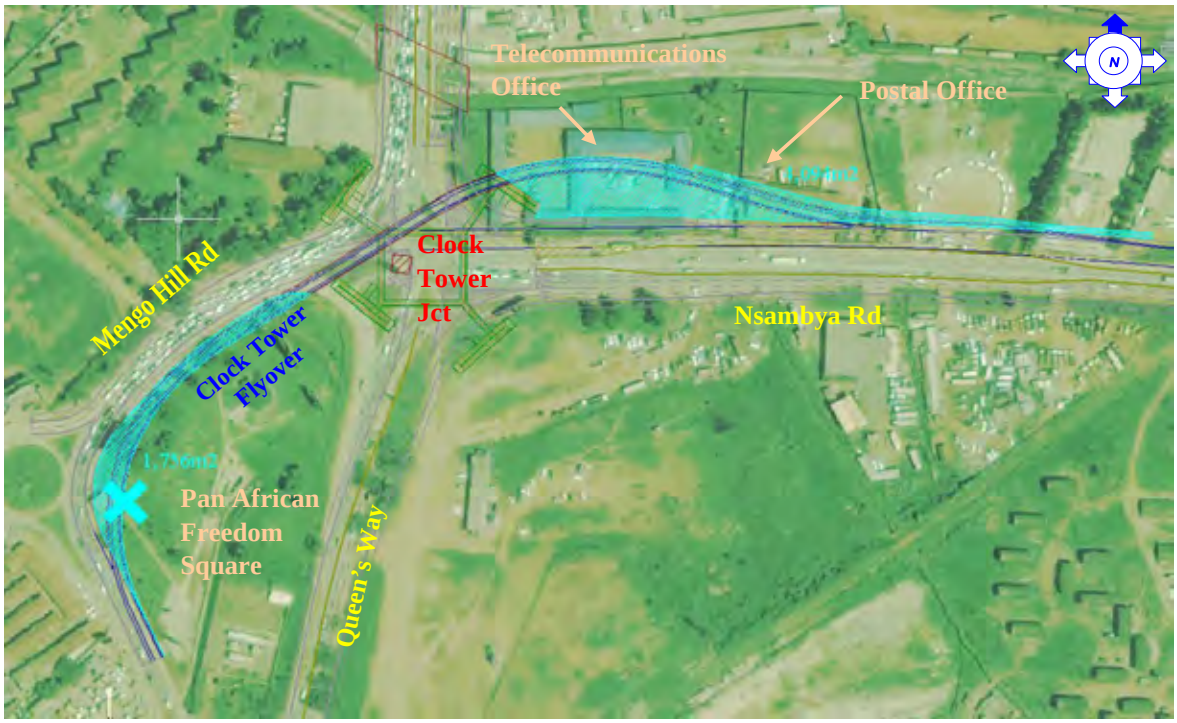


Figure A3.5.2 Affected Areas and Properties

Table A3,5.3 Affected Areas and Properties

Property Type		Area (m^2)	No.	Remarks
Land	Private	0	-	
	Public	6,000	-	
Buildings	Private	-	0	
	Public	-	4	

(3) Mukwano Road Widening Project

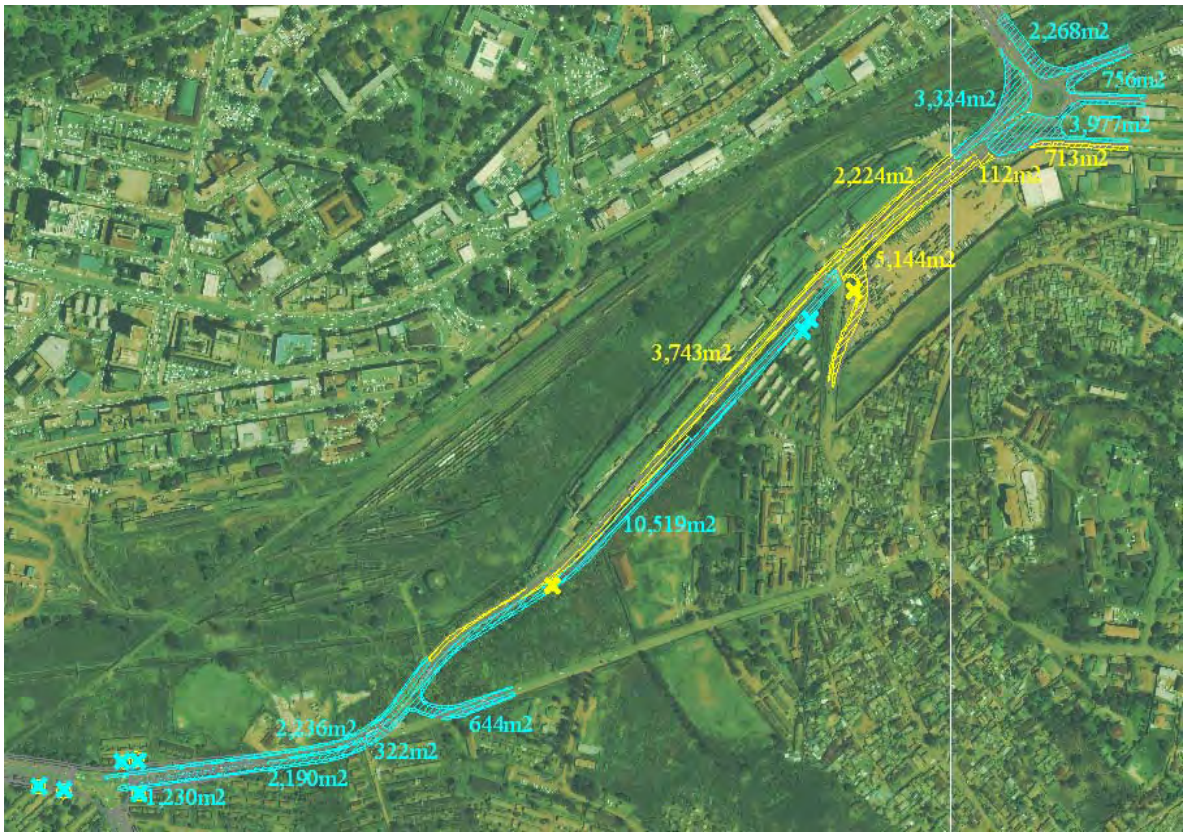


Figure A3.5.3 Affected Areas and Properties

Table A3,5.4 Affected Areas and Properties

Property Type		Area (m^2)	No.	Remarks
Land	Private	11,900	-	
	Public	27,500	-	
Buildings	Private	-	2	
	Public	-	7	

(4) Shoprite and Clock Tower Junctions Traffic Safety Improvement Project

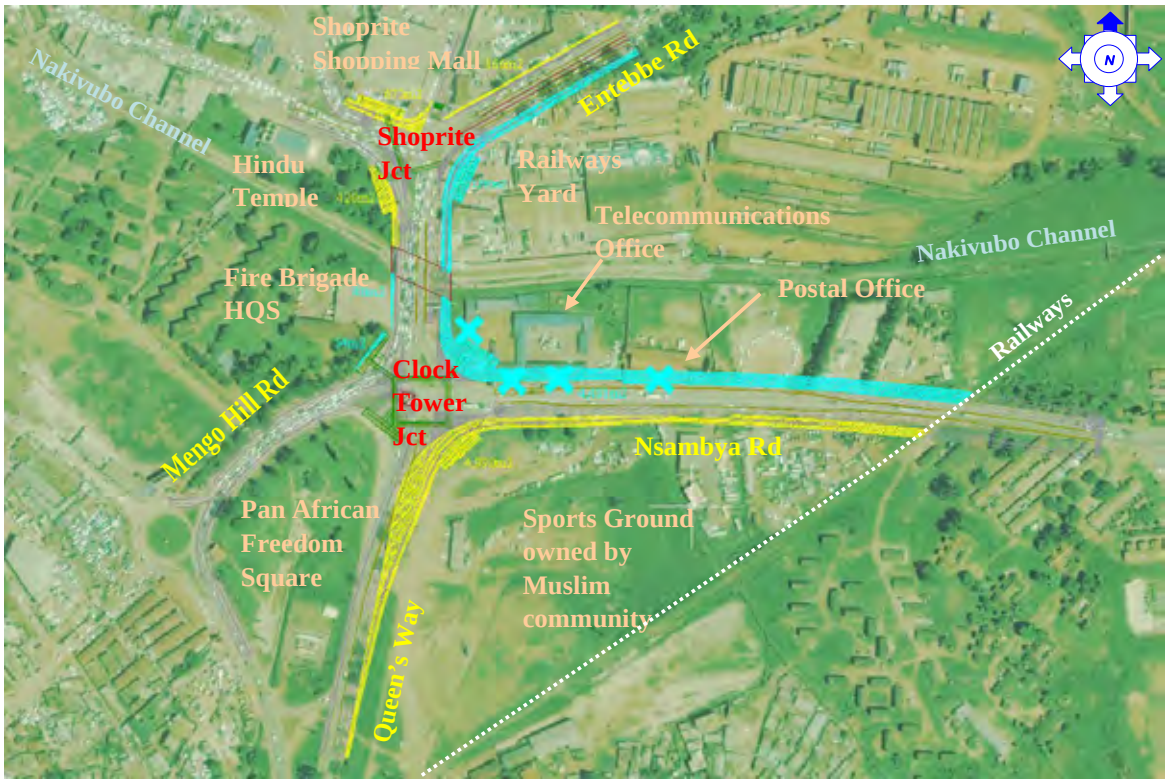


Figure A3.5.4 Affected Areas and Properties

Table A3.5.5 Affected Areas and Properties

Property Type		Area (m^2)	No.	Remarks
Land	Private	6,400	-	
	Public	5,300	-	
Buildings	Private	-	0	
	Public	-	4	

ANNEX 4 EVALUATIONS OF LONG LIST PROJECTS AND SENSITIVITY TESTS

ANNEX 4 EVALUATION OF LONG LIST PROJECTS AND SENSITIVITY TESTS

A4.1 LONG LIST PROJECTS

The Study Team selected 23 long list projects as candidates for the Pre-FS at the Interim Report stage in March 2010. The Study Team conducted screening (IEE) for 16 projects which could be implemented in the medium-term by 2018.

The Study Team recommended five short list projects, flyovers for preliminary design and other four projects for the basic design level Pre-FS, based on multi-criteria analysis (MCA) and other considerations in the Interim Report I submitted to MoWT in March 2010.

A pre-feasibility study for BRT had been conducted in parallel with the JICA Study since November 2009. The Draft Final Report and Final Report of BRT Pre-FS were submitted in April and May 2010, respectively, and accepted by MoWT accordingly. Since the BRT project is one of the priority projects in the National Development Plan (NDP) and NTMP/GKMA, the introduction of BRT is a given condition for the JICA Pre-FS, thus it is required to plan the JICA Pre-FS projects in good coordination with the BRT plan.

However, it became clear that the short and long list projects in the Interim Report I were directly or indirectly affected by the introduction of BRT. Taking the latest development from the BRT study, the Study Team reviewed the long list projects again during the Interim Report II stage. The sub-projects in the initial long list but are located on the BRT pilot project routes were omitted from the long list for improvement, including road widening and junction improvement, which shall be undertaken during the BRT FS/detailed design.

The Study Team conducted screening for **the revised long list of 13 projects** in Table A4.1.1.

Table A4.1.1 Revised Long List Projects for Screening in Interim Report II/Draft Final Report

Project No	Project Name	Basic Project Concept			ADT and Traffic Congestion
		Project Length (km)	Viaduct/ Flyover Length (km)	Carriageway & Junction Improvement	
1.1	Yusufu Lule and Mukwano Rds Flyover	1.7	1.5	Dual Carriageway (two-ways 2 lanes)	Jinja Jct ADT: 53,000 - 71,000, Very Severe
1.2	Jinja - Yusufu Lule Rds Flyover (Right-turn) & Mukwano - Jinja Rd Flyover (Right-turn)	2.3	1.9	Single Carriageway	Yusufu Lule Rd ADT: 41,000 , Very Severe
1.3	Mengo Hill - Nsambya / Mukwano Rds Flyover (Right-turn)	0.6	0.5	Single Carriageway	Long Term (2023)
2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	1.7	-	Dual Carriageway (Add. 2 lanes) & Junction improvement	ADT: 49,000 Severe
2.4	Mukwano Rd Widening, including Mukwano Rbt and Nsambya Jct Capacity Improvement	1.8	-	Dual Carriageway (Add. 2 lanes) & Mukwano Rbt and Nsambya Jct improvement	ADT: 20,000 - 40,000 Very Severe
2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	3.2	-	Single Carriageway improvement (from Gravel to Paved Road)	ADT: 5,000 Low
2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	2.5	0.5	Dual Carriageway (Add. 4 lanes) for Queen's Way and Flyover on Kibuye Rbt	ADT: 40,000, Very Severe at Kibuye Rbt
3.1	Hoima Rd - Kimera/MasiroKawaala Rd Jct		-	Roundabout (Large Diameter)	ADT 31,000 Medium
3.2	Kira Road - Acacia/ Babiha Av/Kayunga Rd		-	Signalization	ADT 37,000 Severe
3.3	Kira Rd - Ntinda Rd Jct		-	Signalization	ADT 37,000 Medium
3.4	Port Bell (Nakawa) - Old Port Bell Rd Jct		-	Signalization	ADT 22,000 Severe
3.6	Ben Kiwanuka Rd - Luwum St Jct		-	Signalization	ADT 21,000 Very Severe
3.7	Shoprite & Clock Tower Jcts Traffic Safety Improvement		-	Pedestrian Bridges & Separated Left-turn	ADT 99,000, Very-very Severe (Many Accidents)

A4.2 METHODOLOGY OF EVALUATION FOR SHORTLISTED PROJECT SELECTION

The MCA methodology was adopted in the prioritization of the above long list projects.

The analytical procedure is as follows:

i) Selection of factors to be evaluated

ii) Allocation of weights and 5-grade scoring

iii) Normalization of scores and calculation of weighted scores

iv) Calculation of weighted scores and ranking (prioritization) of projects

v) Sensitivity test for weight allocation by factor

The following were chosen as evaluation factors:

Main Factor	Sub-Factor	Remarks
Consistency with Overall Plans	Consistency with NTMP/GKMA	Whether listed in NTMP/GKMA
	Policy of Government of Uganda	Whether listed in the "Strategy for the Improvement of Traffic Flow in Kampala", MoWT, December 2009
Engineering Factors	Function of Road	
	Technical Effectiveness to Traffic Jam Improvement Method	
Socio-Economic Factors	Traffic Volume (Current) / Project Cost	As Economic Internal Rate of Return (EIRR) is not available at this stage, traffic volume and project cost, which are key factors for EIRR calculation, are used instead.
	Contribution to CBD / Commercial Center Development Sustainability	The projects which are contributory to traffic jam improvement in the CBD/commercial center are given higher scores. The sustainability of development of the CBD/commercial center is prerequisite for both national economy and reduction of the poor.
	Interview Ranking by Stakeholders on Traffic Jam	The result of interview surveys at the Steering Committee Meeting on November 20, 2009 and Stakeholder Meeting on December 8, 2009 is reflected.
Environmental Impacts (negative)	Land Acquisition	Area of both public and private lands
	Resettlement Requirements (Households)	If there is a possibility that the number of resettlement is over 50 households, the project will be listed as a long-term implementation candidate.

The weights and 5-grade scoring criteria for each factor are as shown in the following table. An equal weight of 25% was given to the consistency with overall plans and engineering factors. Socio-economic factors and environmental negative impacts were given 30% and 20%, respectively. These were tested for sensitivity as will be discussed hereunder:

Table A4.1.1 Evaluation Factor and Weight

Grade	Consistency with Superior Plans (25%)		Engineering Factors (25%)		Socio-Economic Factors (30%)				Environmental Impacts (20%)	
	Consistency with NTMP/GKMA	Policy of Government of Uganda [a)]	Function of Road	Technical Effectiveness to Traffic Jam	Traffic Volume (Current)	Project Cost	Contribution to CBD/C.Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam [b)]	Land Acquisition	Resettlement Requirements (Households) [c)]
Weight	12.5%	12.5%	12.5%	12.5%	7.5%	7.5%	7.5%	7.5%	10.0%	10.0%
5	Yes (in NTMP/ GKMA)	Superior Priority (Flyovers if budget is available)	East-West Corridor / North-South Corridor	Very-very High	Very Large	Small	Very High	The 1st - 3rd	None	None
4	Not Applicable	High Priority	Inner Ring Road/ Middle Ring Road	Very High	Large	Medium	High	The 4 th - 6th	Small	Very Small (Less than 10)
3	No (in NTMP/GKMA but very important)	Priority	Major Radial Roads	Medium	Medium	Large	Medium	The 7th - 10th	Medium	Small (10-20)
2	Not Applicable	Not Applicable	Other Arterial Roads	Low	Small	Very Large	Low	The 11th - 15th	Large	Medium (20 - 50)
1	No in NTMP/GKMA and not much urgent	Not Applicable	Local Roads	Very Low	Very Small	Very-very Large	None	Over 15th or not listed	Very Large	Large (More than 50)

Notes: a) "Superior Priority" for Jinja-Kampala Rds Flyover, "High Priority" for the junctions/roads listed in "Strategy for the Improvement of Traffic Flow in Kampala", MOWT, Dec.2009 and "Priority" for others.
b) Based on the result of Interview Surveys at Steering Committee Meeting on 20th November 2009 and Stakeholder Meeting on 8th December 2009.
c) If possibility of the number of resettlement is over 20 families, the project will be listed for the medium term implementation candidates.

The following are supplemental explanations or notes on the basis of the scoring method for some factors:

● Technical Effectiveness:	Flyover/viaduct construction on Jinja-Kampala Roads was given the highest score of 5.
	Dual carriageways construction with flyover junction was given the highest score of 5.

	Dual carriageways construction without flyover junction was given the higher score of 4.
	Very useful measures for roads safety, like a combination of pedestrian bridges and signalization or left-turn lane, were given the highest score of 5.
● Traffic Volume:	5: Main Road ADT is more than 50,000
	4: Main Road ADT is 40,000 – 50,000
	3: Main Road ADT is 30,000 – 40,000
	2: Main Road ADT is 20,000 – 30,000
	1: Main Road ADT is less than 20,000

The factors of project cost, land acquisition and resettlement (number of household) were scored at five levels based on preliminary estimate as in Table A4.1.2. Evaluation of the project cost was based on International Competitive Bidding (ICB). Right of way (ROW) acquisition area was estimated by deducting the existing ROW area from the required new land area projected in the preliminary plan. The number of households, which might be moved (resettlement requirements), was estimated based on the number of buildings/houses existing within the required new ROW in the preliminary plan and multiplying by a factor of one for the public buildings and four households per building/house for private properties.

Table A4.1.2 Five Levels Scores for Project Cost, Land Acquisition and Resettlement Evaluation

Project Component	Project No.	Project Cost		Land Acquisition				Resettlement		
		ICB (Estimate)	5-Grade Score	Area of Land required	Secured ROW (estimate)	ROW to be acquired	5-Grade Score	Number of Buildings	Resettlement (estimate)*	5-Grade Score
Weight		(US$ Mill)		(ha)		(ha)		(number)	(household)	
Yusufu Lule - Mukwano Rds Flyover	1.1 (Phase 1)	49.83	2	0.52	79%	0.11	4	1 (0)	1	4
	1.2 (Phase 1)	37.67	2	2.50	74%	0.65	3	11 (2)	17	3
	1.3 (Phase 3)	7.08	4	0.60	100%	0.00	5	4 (0)	4	4
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	7.19	4	4.00	10%	3.60	1	22	>50	1
	2.4	5.39	4	3.94	70%	1.19	2	9 (2)	15	3
	2.5	5.95	4	0.33	90%	0.03	4	0 (0)	0	5
	2.6	13.44	3	5.80	80%	1.16	2	15 (15)	>50	1
Individual Junction Improvement	3.1	0.87	5	0.12	20%	0.10	4	5 (5)	10-20	3
	3.2	0.87	5	0.24	20%	0.19	4	1 (1)	5	4
	3.3	0.87	5	0.24	20%	0.19	4	2 (1)	10	4
	3.4	0.71	5	0.18	70%	0.05	4	1 (1)	5	4
	3.6	0.87	5	0.25	0%	0.25	4	5 (5)	20-50	2
	3.7	4.20	4	1.17	45%	0.64	3	4 (0)	4	4
Average Value		10.38				0.63				
Max Value		49.83				3.60				
Note: Evaluation Criteria at 5-levels	1	Over 50 V.Very Large				Over 1.5 Very Large			>50 Large	
	2	20-50 Very Large				1.0-1.5 Large			20-50 Medium	
	3	10-20 Large				0.5-1.0 Medium			10-20 Small	
	4	3-10 Medium				0 - 0.5 Small			up to 10 Very Small	
	5	Up to 3 Small				0 None			0 (none) None	

Note: Total number of buildings (Number of private buildings)

A4.2 EVALUATION RESULTS (WITH STANDARD WEIGHT ALLOCATION)

Tables A4.2.1 and A4.2.2 show the MCA results to be used as prioritization of long list projects for Pre-Feasibility projects selection (short-listing) together with other considerations.

Table A4.2.1 "5-Grade" Scoring of Long List Projects

Grade Scoring at Five Levels (5: Highest, 1: Lowest)

Project Component	Sub-Component No.	Sub-Component Name	Consistency with Superior 25%		Engineering Factors 25%		Socio-Economic Factors 30%			Environmental Impacts 20%		Total (evaluated score with weight)	Order of Priority	Remarks (Estimated number of households required resettlement)
			Consistency with NTMP-GKMA	Policy of Government of Uganda on Priority	Function of Road	Technical Effectiveness to Traffic Jam	Traffic Volume (Current)*	Project Cost*	Contribution to CBD/C.Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam	Land Acquisition	Resettlement Requirements			
Weight			12.5%	12.5%	12.5%	12.5%	7.5%	7.5%	7.5%	7.5%	10.0%	10.0%	100.0%		
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	5	5	5	5	4	2	5	3	4	4	4.35	2	Resettlement (less than 10)
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-turn)	5	5	5	4	4	2	5	3	3	3	4.03	4	Resettlement (10-20)
	1.3 (Phase 2)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-turn)	4	4	5	4	5	4	5	5	5	4	4.45	1	Resettlement (less than 10)
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	5	4	4	4	4	4	3	4	1	1	3.45	9	Resettlement (more than 50)
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Canacity Improvement	3	5	5	5	4	4	4	3	2	3	3.88	6	Resettlement (10-20)
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	3	3	4	3	1	4	2	1	4	5	3.13	13	No Resettlement
	2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	5	5	5	5	5	3	4	3	2	1	3.93	5	Resettlement (more than 50)
Individual Junction Improvement	3.1	Hoima Rd - Kimera/ MasiroKawala Rd Jct (Kasubi Jct)	5	4	3	3	3	5	1	1	4	3	3.33	12	Resettlement (10-20)
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	5	3	4	4	3	5	2	1	4	4	3.63	8	Resettlement (less than 10)
	3.3	Kira Rd - Ntinda Rd	5	4	4	4	3	5	1	1	4	4	3.68	7	Resettlement (less than 10)
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	5	3	3	4	2	5	2	1	4	4	3.43	10	Resettlement (less than 10)
	3.6	Ben Kiwanuka Rd - Luwum St	3	4	3	2	2	5	5	5	4	2	3.38	11	Resettlement (20-50)
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	3	4	5	4	5	4	5	5	3	4	4.13	3	Resettlement (less than 10)
Average			4.31	4.08	4.23	3.92	3.46	4.00	3.38	2.77	3.38	3.23	3.75		

Note: * Instead of EIRR (Economic Internal Rate of Return), traffic volume and project cost, which are key factors for EIRR calculation, are used.

Table A4.2.2 Final (MCA) Scores and Ranking of Long List Projects

Multi Criteria Analysis (MCA) Results with Weighted Index

Project Component	Sub-Component No.	Sub-Component Name	Consistency with Superior Plans 25%		Engineering Factors 25%		Socio-Economic Factors 30%			Environmental Impacts 20%		Total (evaluated score with weight)	Order of Priority by MCA	Remarks (Estimated number of households required resettlement)
			Consistency with TMP-GKMA	Policy of Government of Uganda on Priority	Function of Road	Technical Effectiveness to Traffic Jam	Traffic Volume (Current)	Project Cost	Contribution to CBD/C.Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam*	Land Acquisition	Resettlement Requirements			
Weight			12.5%	12.5%	12.5%	12.5%	7.5%	7.5%	7.5%	7.5%	10.0%	10.0%	100.0%		
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	14.5	15.3	14.8	15.9	8.7	3.8	11.1	8.1	11.8	12.4	116.4	2	Resettlement (less than 10)
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-turn)	14.5	15.3	14.8	12.7	8.7	3.8	11.1	8.1	8.9	9.3	107.1	4	Resettlement (10-20)
	1.3 (Phase 2)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-turn)	11.6	12.3	14.8	12.7	10.8	7.5	11.1	13.5	14.8	12.4	121.5	1	Resettlement (less than 10)
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	14.5	12.3	11.8	12.7	8.7	7.5	6.6	10.8	3.0	3.1	91.0	10	Resettlement (more than 50)
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	8.7	15.3	14.8	15.9	8.7	7.5	8.9	8.1	5.9	9.3	103.1	5	Resettlement (10-20)
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	8.7	9.2	11.8	9.6	2.2	7.5	4.4	2.7	11.8	15.5	83.4	13	No Resettlement
	2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	14.5	15.3	14.8	15.9	10.8	5.6	8.9	8.1	5.9	3.1	103.0	6	Resettlement (more than 50)
Individual Junction Improvement	3.1	Hoima Rd - Kimera/ MasiroKawala Rd Jct (Kasubi Jct)	14.5	12.3	8.9	9.6	6.5	9.4	2.2	2.7	11.8	9.3	87.1	12	Resettlement (10-20)
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	14.5	9.2	11.8	12.7	6.5	9.4	4.4	2.7	11.8	12.4	95.5	8	Resettlement (less than 10)
	3.3	Kira Rd - Ntinda Rd	14.5	12.3	11.8	12.7	6.5	9.4	2.2	2.7	11.8	12.4	96.3	7	Resettlement (less than 10)
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	14.5	9.2	8.9	12.7	4.3	9.4	4.4	2.7	11.8	12.4	90.4	11	Resettlement (less than 10)
	3.6	Ben Kiwanuka Rd - Luwum St	8.7	12.3	8.9	6.4	4.3	9.4	11.1	13.5	11.8	6.2	92.5	9	Resettlement (20-50)
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	8.7	12.3	14.8	12.7	10.8	7.5	11.1	13.5	8.9	12.4	112.7	3	Resettlement (less than 10)

Notes: The priority projects recommended for the pre-feasibility study. The projects for which resettlement is estimated more than 50 households and EIA is required in accordance with the environmental guideline of JICA.

A4.3 SENSITIVITY TESTS

A sensitivity test was carried out by changing the weights allocated to the evaluation's main and sub-factors as indicated in Table A4.3.1. Case 1 gave 50% to the engineering factors, Case 2 gave 50% to the socio-economic factors, Case 3 gave 40% to the consistency with overall plans and Case 4 emphasized the environmental impact allocating 40%.

Table A4.3.1 Sensitivity Factors for Multi Criteria Analysis

Evaluation Main Factor	Sub-Factor	Evaluated Rank with Weight (%) Change				
		Standard	Case 1	Case 2	Case 3	Case 4
Consistency with Superior Plans	Consistency with NTMP/GKMA	12.5%	10.0%	10.0%	20.0%	10.0%
	Policy of Government of Uganda	12.5%	10.0%	10.0%	20.0%	10.0%
	Sub-Total	25.0%	20.0%	20.0%	**40.0%**	20.0%
Engineering Factor	Function of Road	12.5%	25.0%	10.0%	10.0%	10.0%
	Technical Effectiveness to Traffic Jam Improvement method	12.5%	25.0%	10.0%	10.0%	10.0%
	Sub-Total	25.0%	**50.0%**	20.0%	20.0%	20.0%
Socio-Economic Factors	Traffic Volume (Current)	7.5%	5.0%	12.5%	7.5%	5.0%
	Project Cost	7.5%	5.0%	12.5%	7.5%	5.0%
	Contribution to CBD / Commercial Center Development Sustainability	7.5%	5.0%	12.5%	7.5%	5.0%
	Interview Ranking by Stakeholders on Traffic Jam	7.5%	5.0%	12.5%	7.5%	5.0%
	Sub-Total	30.0%	20.0%	**50.0%**	30.0%	20.0%
Environmental Impacts	Land Acquisition	10.0%	5.0%	5.0%	5.0%	20.0%
	Resettlement Requirements	10.0%	5.0%	5.0%	5.0%	20.0%
	Sub-Total	20.0%	10.0%	10.0%	10.0%	**40.0%**
	Total	100.0%	100.0%	100.0%	100.0%	100.0%

Tables A4.3.2 to A4.3.9 show the results of Sensitivity Tests of MCA for Cases 1 to 4.

Table A4.3.2 Sensitivity Test Case 1 (Engineering Factors: 50%), "5-Grade" Scores

Grade Scoring at Five Levels (5: Highest, 1: Lowest) Case 1

Project Component	Sub-Component No.	Sub-Component Name	Consistency with Superior 20%		Engineering Factors 50%		Socio-Economic Factors 20%			Environmental Impacts 10%		Total (evaluated score with weight)	Order of Priority	Remarks (Estimated number of households required resettlement)
			Consistency with NTMP-GKMA	Policy of Government of Uganda on Priority	Function of Road	Technical Effectiveness to Traffic Jam	Traffic Volume (Current)*	Project Cost*	Contribution to CBD/C.Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam	Land Acquisition	Resettlement Requirements			
Weight			10.0%	10.0%	25.0%	25.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	100.0%		
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	5	5	5	5	4	2	5	3	4	4	4.60	1	Resettlement (10-20)
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-turn)	5	5	5	4	4	2	5	3	3	3	4.25	5	Resettlement (10-20)
	1.3 (Phase 2)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-turn)	4	4	5	4	5	4	5	5	5	4	4.45	2	Resettlement (less than 10)
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	5	4	4	4	4	4	3	4	1	1	3.75	8	Resettlement (more than 50)
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	3	5	5	5	4	4	4	3	2	3	4.30	4	Resettlement (10-20)
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	3	3	4	3	1	4	2	1	4	5	3.20	12	No Resettlement
	2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	5	5	5	5	5	3	4	3	2	2	4.40	3	Resettlement (more than 50)
Individual Junction Improvement	3.1	Hoima Rd - Kimera/ MasiroKawala Rd Jct (Kasubi Jct)	5	4	3	3	3	5	1	1	4	3	3.25	11	Resettlement (10-20)
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	5	3	4	4	3	5	2	1	4	4	3.75	8	Resettlement (less than 10)
	3.3	Kira Rd - Ntinda Rd	5	4	4	4	3	5	1	1	4	4	3.80	7	Resettlement (less than 10)
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	5	3	3	4	2	5	2	1	4	4	3.45	10	Resettlement (less than 10)
	3.6	Ben Kiwanuka Rd - Luwum St	3	4	3	2	2	5	5	5	4	2	3.10	13	Resettlement (20-50)
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	3	4	5	4	5	4	5	5	3	4	4.25	5	Resettlement (less than 10)
Average			4.31	4.08	4.23	3.92	3.46	4.00	3.38	2.77	3.38	3.23	3.89		

Note: * Instead of EIRR (Economic Internal Rate of Return), traffic volume and project cost, which are key factors for EIRR calculation, are used.

Table A4.3.3 Sensitivity Test Case 1 (Engineering Factors: 50%), MCA Scores & Ranking

Multi Criteria Analysis (MCA) Results with Weighted Index **Case 1**

Project Component	Sub-Component No.	Sub-Component Name	Consistency with Superior Plans 20%		Engineering Factors 50%		Socio-Economic Factors 20%			Environmental Impacts 10%		Total (evaluated score with weight)	Order of Priority by MCA	Remarks (Estimated number of households required resettlement)
			Consistency with TMP-GKMA	Policy of Government of Uganda on Priority	Function of Road	Technical Effectiveness to Traffic Jam	Traffic Volume (Current)	Project Cost	Contribution to CBD/C.Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam*	Land Acquisition	Resettlement Requirements			
Weight			10.0%	10.0%	25.0%	25.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	100.0%		
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	11.6	12.3	29.5	31.9	5.8	2.5	7.4	5.4	5.9	6.2	118.5	1	Resettlement (10-20)
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-turn)	11.6	12.3	29.5	25.5	5.8	2.5	7.4	5.4	4.4	4.6	109.1	6	Resettlement (10-20)
	1.3 (Phase 2)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-turn)	9.3	9.8	29.5	25.5	7.2	5.0	7.4	9.0	7.4	6.2	116.3	2	Resettlement (less than 10)
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	11.6	9.8	23.6	25.5	5.8	5.0	4.4	7.2	1.5	1.5	96.0	8	Resettlement (more than 50)
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	7.0	12.3	29.5	31.9	5.8	5.0	5.9	5.4	3.0	4.6	110.3	5	Resettlement (10-20)
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	7.0	7.4	23.6	19.1	1.4	5.0	3.0	1.8	5.9	7.7	81.9	12	No Resettlement
	2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	11.6	12.3	29.5	31.9	7.2	3.8	5.9	5.4	3.0	1.5	112.1	3	Resettlement (more than 50)
Individual Junction Improvement	3.1	Hoima Rd - Kimera/ MasiroKawala Rd Jct (Kasubi Jct)	11.6	9.8	17.7	19.1	4.3	6.3	1.5	1.8	5.9	4.6	82.7	11	Resettlement (10-20)
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	11.6	7.4	23.6	25.5	4.3	6.3	3.0	1.8	5.9	6.2	95.5	9	Resettlement (less than 10)
	3.3	Kira Rd - Ntinda Rd	11.6	9.8	23.6	25.5	4.3	6.3	1.5	1.8	5.9	6.2	96.5	7	Resettlement (less than 10)
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	11.6	7.4	17.7	25.5	2.9	6.3	3.0	1.8	5.9	6.2	88.2	10	Resettlement (less than 10)
	3.6	Ben Kiwanuka Rd - Luwum St	7.0	9.8	17.7	12.7	2.9	6.3	7.4	9.0	5.9	3.1	81.8	13	Resettlement (20-50)
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	7.0	9.8	29.5	25.5	7.2	5.0	7.4	9.0	4.4	6.2	111.1	4	Resettlement (less than 10)

Notes: The priority projects recommended for the pre-feasibility study. The projects for which resettlement is estimated more than 50 households and EIA is required in accordance with the environmental guideline of JICA.

Table A4.3.4 Sensitivity Test Case 2 (Socio-Economic Factors: 50%), "5-Grade" Scores

Grade Scoring at Five Levels (5: Highest, 1: Lowest) Case 2

Project Component	Sub-Component No.	Sub-Component Name	Consistency with Superior 20%		Engineering Factors 20%		Socio-Economic Factors 50%			Environmental Impacts 10%		Total (evaluated score with weight)	Order of Priority	Remarks (Estimated number of households required resettlement)
			Consistency with NTMP-GKMA	Policy of Government of Uganda on Priority	Function of Road	Technical Effectiveness to Traffic Jam	Traffic Volume (Current)*	Project Cost*	Contribution to CBD/C.Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam	Land Acquisition	Resettlement Requirements			
Weight			10.0%	10.0%	10.0%	10.0%	12.5%	12.5%	12.5%	12.5%	5.0%	5.0%	100.0%		
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	5	5	5	5	4	2	5	3	4	4	4.15	3	Resettlement (10-20)
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-turn)	5	5	5	4	4	2	5	3	3	3	3.95	5	Resettlement (10-20)
	1.3 (Phase 2)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-turn)	4	4	5	4	5	4	5	5	5	4	4.53	1	Resettlement (less than 10)
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	5	4	4	4	4	4	3	4	1	1	3.68	7	Resettlement (more than 50)
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	3	5	5	5	4	4	4	3	2	3	3.93	6	Resettlement (10-20)
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	3	3	4	3	1	4	2	1	4	5	2.75	13	No Resettlement
	2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	5	5	5	5	5	3	4	3	2	1	4.03	4	Resettlement (more than 50)
Individual Junction Improvement	3.1	Hoima Rd - Kimera/ MasiroKawala Rd Jct (Kasubi Jct)	5	4	3	3	3	5	1	1	4	3	3.10	12	Resettlement (10-20)
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	5	3	4	4	3	5	2	1	4	4	3.38	9	Resettlement (less than 10)
	3.3	Kira Rd - Ntinda Rd	5	4	4	4	3	5	1	1	4	4	3.35	10	Resettlement (less than 10)
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	5	3	3	4	2	5	2	1	4	4	3.15	11	Resettlement (less than 10)
	3.6	Ben Kiwanuka Rd - Luwum St	3	4	3	2	2	5	5	5	4	2	3.63	8	Resettlement (20-50)
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	3	4	5	4	5	4	5	5	3	4	4.33	2	Resettlement (less than 10)
Average			4.31	4.08	4.23	3.92	3.46	4.00	3.38	2.77	3.38	3.23	3.69		

Note: * Instead of EIRR (Economic Internal Rate of Return), traffic volume and project cost, which are key factors for EIRR calculation, are used.

Table A4.3.5 Sensitivity Test Case 2 (Socio-Economic Factors: 50%), MCA Scores & Ranking

Multi Criteria Analysis (MCA) Results with Weighted Index **Case 2**

Project Component	Sub-Component No.	Sub-Component Name	Consistency with Superior Plans 20%		Engineering Factors 20%		Socio-Economic Factors 50%				Environmental Impacts 10%		Total (evaluated score with weight)	Order of Priority by MCA	Remarks (Estimated number of households required resettlement)
			Consistency with TMP-GKMA	Policy of Government of Uganda on Priority	Function of Road	Technical Effectiveness to Traffic Jam	Traffic Volume (Current)	Project Cost	Contribution to CBD/C.Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam*	Land Acquisition	Resettlement Requirements			
Weight			10.0%	10.0%	10.0%	10.0%	12.5%	12.5%	12.5%	12.5%	5.0%	5.0%	100.0%		
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	11.6	12.3	11.8	12.7	14.4	6.3	18.5	13.5	5.9	6.2	113.2	3	Resettlement (10-20)
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-tum)	11.6	12.3	11.8	10.2	14.4	6.3	18.5	13.5	4.4	4.6	107.7	5	Resettlement (10-20)
	1.3 (Phase 2)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-tum)	9.3	9.8	11.8	10.2	18.1	12.5	18.5	22.6	7.4	6.2	126.3	1	Resettlement (less than 10)
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	11.6	9.8	9.5	10.2	14.4	12.5	11.1	18.1	1.5	1.5	100.2	8	Resettlement (more than 50)
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	7.0	12.3	11.8	12.7	14.4	12.5	14.8	13.5	3.0	4.6	106.6	6	Resettlement (10-20)
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	7.0	7.4	9.5	7.6	3.6	12.5	7.4	4.5	5.9	7.7	73.1	13	No Resettlement
	2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	11.6	12.3	11.8	12.7	18.1	9.4	14.8	13.5	3.0	1.5	108.7	4	Resettlement (more than 50)
Individual Junction Improvement	3.1	Hoima Rd - Kimera/ MasiroKawala Rd Jct (Kasubi Jct)	11.6	9.8	7.1	7.6	10.8	15.6	3.7	4.5	5.9	4.6	81.4	12	Resettlement (10-20)
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	11.6	7.4	9.5	10.2	10.8	15.6	7.4	4.5	5.9	6.2	89.1	9	Resettlement (less than 10)
	3.3	Kira Rd - Ntinda Rd	11.6	9.8	9.5	10.2	10.8	15.6	3.7	4.5	5.9	6.2	87.8	10	Resettlement (less than 10)
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	11.6	7.4	7.1	10.2	7.2	15.6	7.4	4.5	5.9	6.2	83.1	11	Resettlement (less than 10)
	3.6	Ben Kiwanuka Rd - Luwum St	7.0	9.8	7.1	5.1	7.2	15.6	18.5	22.6	5.9	3.1	101.9	7	Resettlement (20-50)
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	7.0	9.8	11.8	10.2	18.1	12.5	18.5	22.6	4.4	6.2	121.0	2	Resettlement (less than 10)

Notes: The priority projects recommended for the pre-feasibility study. The projects for which resettlement is estimated more than 50 households and EIA is required in accordance with the environmental guideline of JICA.

Table A4.3.6 Sensitivity Test Case 3 (Superior Plans: 40%), "5-Grade" Scores

Grade Scoring at Five Levels (5: Highest, 1: Lowest) Case 3

Project Component	Sub-Component No.	Sub-Component Name	Consistency with Superior 40%		Engineering Factors 20%		Socio-Economic Factors 30%				Environmental Impacts 10%		Total (evaluated score with weight)	Order of Priority	Remarks (Estimated number of households required resettlement)
			Consistency with NTMP-GKMA	Policy of Government of Uganda on Priority	Function of Road	Technical Effectiveness to Traffic Jam	Traffic Volume (Current)*	Project Cost*	Contribution to CBD/C.Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam	Land Acquisition	Resettlement Requirements			
Weight			20.0%	20.0%	10.0%	10.0%	7.5%	7.5%	7.5%	7.5%	5.0%	5.0%	100.0%		
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	5	5	5	5	4	2	5	3	4	4	4.45	1	Resettlement (10-20)
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-turn)	5	5	5	4	4	2	5	3	3	3	4.25	4	Resettlement (10-20)
	1.3 (Phase 2)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-turn)	4	4	5	4	5	4	5	5	5	4	4.38	2	Resettlement (less than 10)
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	5	4	4	4	4	4	3	4	1	1	3.83	7	Resettlement (more than 50)
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	3	5	5	5	4	4	4	3	2	3	3.98	6	Resettlement (10-20)
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	3	3	4	3	1	4	2	1	4	5	2.95	13	No Resettlement
	2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	5	5	5	5	5	3	4	3	2	1	4.28	3	Resettlement (more than 50)
Individual Junction Improvement	3.1	Hoima Rd - Kimera/ MasiroKawala Rd Jct (Kasubi Jct)	5	4	3	3	3	5	1	1	4	3	3.50	10	Resettlement (10-20)
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	5	3	4	4	3	5	2	1	4	4	3.63	9	Resettlement (less than 10)
	3.3	Kira Rd - Ntinda Rd	5	4	4	4	3	5	1	1	4	4	3.75	8	Resettlement (less than 10)
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	5	3	3	4	2	5	2	1	4	4	3.45	12	Resettlement (less than 10)
	3.6	Ben Kiwanuka Rd - Luwum St	3	4	3	2	2	5	5	5	4	2	3.48	11	Resettlement (20-50)
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	3	4	5	4	5	4	5	5	3	4	4.08	5	Resettlement (less than 10)
Average			4.31	4.08	4.23	3.92	3.46	4.00	3.38	2.77	3.38	3.23	3.84		

Note: * Instead of EIRR (Economic Internal Rate of Return), traffic volume and project cost, which are key factors for EIRR calculation, are used.

Table A4.3.7 Sensitivity Test Case 3 (Superior Plans: 40%), MCA Scores & Ranking

Multi Criteria Analysis (MCA) Results with Weighted Index **Case 3**

Project Component	Sub-Component No.	Sub-Component Name	Consistency with Superior Plans 40%		Engineering Factors 20%		Socio-Economic Factors 30%				Environmental Impacts 10%		Total (evaluated score with weight)	Order of Priority by MCA	Remarks (Estimated number of households required resettlement)
			Consistency with TMP-GKMA	Policy of Government of Uganda on Priority	Function of Road	Technical Effectiveness to Traffic Jam	Traffic Volume (Current)	Project Cost	Contribution to CBD/C.Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam*	Land Acquisition	Resettlement Requirements			
Weight			20.0%	20.0%	10.0%	10.0%	7.5%	7.5%	7.5%	7.5%	5.0%	5.0%	100.0%		
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	23.2	24.5	11.8	12.7	8.7	3.8	11.1	8.1	5.9	6.2	116.0	2	Resettlement (10-20)
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-tum)	23.2	24.5	11.8	10.2	8.7	3.8	11.1	8.1	4.4	4.6	110.5	3	Resettlement (10-20)
	1.3 (Phase 2)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-tum)	18.6	19.6	11.8	10.2	10.8	7.5	11.1	13.5	7.4	6.2	116.7	1	Resettlement (less than 10)
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	23.2	19.6	9.5	10.2	8.7	7.5	6.6	10.8	1.5	1.5	99.2	7	Resettlement (more than 50)
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	13.9	24.5	11.8	12.7	8.7	7.5	8.9	8.1	3.0	4.6	103.8	6	Resettlement (10-20)
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	13.9	14.7	9.5	7.6	2.2	7.5	4.4	2.7	5.9	7.7	76.2	13	No Resettlement
	2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	23.2	24.5	11.8	12.7	10.8	5.6	8.9	8.1	3.0	1.5	110.3	4	Resettlement (more than 50)
Individual Junction Improvement	3.1	Hoima Rd - Kimera/ MasiroKawala Rd Jct (Kasubi Jct)	23.2	19.6	7.1	7.6	6.5	9.4	2.2	2.7	5.9	4.6	88.9	11	Resettlement (10-20)
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	23.2	14.7	9.5	10.2	6.5	9.4	4.4	2.7	5.9	6.2	92.7	10	Resettlement (less than 10)
	3.3	Kira Rd - Ntinda Rd	23.2	19.6	9.5	10.2	6.5	9.4	2.2	2.7	5.9	6.2	95.4	8	Resettlement (less than 10)
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	23.2	14.7	7.1	10.2	4.3	9.4	4.4	2.7	5.9	6.2	88.2	12	Resettlement (less than 10)
	3.6	Ben Kiwanuka Rd - Luwum St	13.9	19.6	7.1	5.1	4.3	9.4	11.1	13.5	5.9	3.1	93.1	9	Resettlement (20-50)
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	13.9	19.6	11.8	10.2	10.8	7.5	11.1	13.5	4.4	6.2	109.1	5	Resettlement (less than 10)

Notes: The priority projects recommended for the pre-feasibility study. The projects for which resettlement is estimated more than 50 households and EIA is required in accordance with the environmental guideline of JICA.

Table A4.3.8 Sensitivity Test Case 4 (Environmental Impacts: 40%), "5-Grade" Scores

Grade Scoring at Five Levels (5: Highest, 1: Lowest) Case 4

Project Component	Sub-Component No.	Sub-Component Name	Consistency with Superior 20%		Engineering Factors 20%		Socio-Economic Factors 20%				Environmental Impacts 40%		Total (evaluated score with weight)	Order of Priority	Remarks (Estimated number of households required resettlement)
			Consistency with NTMP-GKMA	Policy of Government of Uganda on Priority	Function of Road	Technical Effectiveness to Traffic Jam	Traffic Volume (Current)*	Project Cost*	Contribution to CBD/C.Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam	Land Acquisition	Resettlement Requirements			
Weight			10.0%	10.0%	10.0%	10.0%	5.0%	5.0%	5.0%	5.0%	20.0%	20.0%	100.0%		
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	5	5	5	5	4	2	5	3	4	4	4.30	2	Resettlement (10-20)
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-turn)	5	5	5	4	4	2	5	3	3	3	3.80	4	Resettlement (10-20)
	1.3 (Phase 2)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-turn)	4	4	5	4	5	4	5	5	5	4	4.45	1	Resettlement (less than 10)
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	5	4	4	4	4	4	3	4	1	1	2.85	13	Resettlement (more than 50)
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	3	5	5	5	4	4	4	3	2	3	3.55	8	Resettlement (10-20)
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	3	3	4	3	1	4	2	1	4	5	3.50	9	No Resettlement
	2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	5	5	5	5	5	3	4	3	2	1	3.35	11	Resettlement (more than 50)
Individual Junction Improvement	3.1	Hoima Rd - Kimera/ MasiroKawala Rd Jct (Kasubi Jct)	5	4	3	3	3	5	1	1	4	3	3.40	10	Resettlement (10-20)
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	5	3	4	4	3	5	2	1	4	4	3.75	6	Resettlement (less than 10)
	3.3	Kira Rd - Ntinda Rd	5	4	4	4	3	5	1	1	4	4	3.80	5	Resettlement (less than 10)
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	5	3	3	4	2	5	2	1	4	4	3.60	7	Resettlement (less than 10)
	3.6	Ben Kiwanuka Rd - Luwum St	3	4	3	2	2	5	5	5	4	2	3.25	12	Resettlement (20-50)
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	3	4	5	4	5	4	5	5	3	4	3.95	3	Resettlement (less than 10)
Average			4.31	4.08	4.23	3.92	3.46	4.00	3.38	2.77	3.38	3.23	3.66		

Note: * Instead of EIRR (Economic Internal Rate of Return), traffic volume and project cost, which are key factors for EIRR calculation, are used.

Table A4.3.9 Sensitivity Test Case 4 (Environmental Impacts: 40%), MCA Scores & Ranking

Multi Criteria Analysis (MCA) Results with Weighted Index **Case 4**

Project Component	Sub-Component No.	Sub-Component Name	Consistency with Superior Plans 20%		Engineering Factors 20%		Socio-Economic Factors 20%				Environmental Impacts 40%		Total (evaluated score with weight)	Order of Priority by MCA	Remarks (Estimated number of households required resettlement)
			Consistency with TMP-GKMA	Policy of Government of Uganda on Priority	Function of Road	Technical Effectiveness to Traffic Jam	Traffic Volume (Current)	Project Cost	Contribution to CBD/C.Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam*	Land Acquisition	Resettlement Requirements			
Weight			10.0%	10.0%	10.0%	10.0%	5.0%	5.0%	5.0%	5.0%	20.0%	20.0%	100.0%		
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	11.6	12.3	11.8	12.7	5.8	2.5	7.4	5.4	23.6	24.8	117.9	2	Resettlement (10-20)
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-turn)	11.6	12.3	11.8	10.2	5.8	2.5	7.4	5.4	17.7	18.6	103.3	5	Resettlement (10-20)
	1.3 (Phase 2)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-tum)	9.3	9.8	11.8	10.2	7.2	5.0	7.4	9.0	29.5	24.8	124.1	1	Resettlement (less than 10)
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	11.6	9.8	9.5	10.2	5.8	5.0	4.4	7.2	5.9	6.2	75.6	13	Resettlement (more than 50)
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity Improvement	7.0	12.3	11.8	12.7	5.8	5.0	5.9	5.4	11.8	18.6	96.3	9	Resettlement (10-20)
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	7.0	7.4	9.5	7.6	1.4	5.0	3.0	1.8	23.6	31.0	97.2	8	No Resettlement
	2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	11.6	12.3	11.8	12.7	7.2	3.8	5.9	5.4	11.8	6.2	88.7	12	Resettlement (more than 50)
Individual Junction Improvement	3.1	Hoima Rd - Kimera/ MasiroKawala Rd Jct (Kasubi Jct)	11.6	9.8	7.1	7.6	4.3	6.3	1.5	1.8	23.6	18.6	92.2	10	Resettlement (10-20)
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	11.6	7.4	9.5	10.2	4.3	6.3	3.0	1.8	23.6	24.8	102.4	6	Resettlement (less than 10)
	3.3	Kira Rd - Ntinda Rd	11.6	9.8	9.5	10.2	4.3	6.3	1.5	1.8	23.6	24.8	103.3	4	Resettlement (less than 10)
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	11.6	7.4	7.1	10.2	2.9	6.3	3.0	1.8	23.6	24.8	98.5	7	Resettlement (less than 10)
	3.6	Ben Kiwanuka Rd - Luwum St	7.0	9.8	7.1	5.1	2.9	6.3	7.4	9.0	23.6	12.4	90.5	11	Resettlement (20-50)
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	7.0	9.8	11.8	10.2	7.2	5.0	7.4	9.0	17.7	24.8	109.9	3	Resettlement (less than 10)

Notes: The priority projects recommended for the pre-feasibility study. The projects for which resettlement is estimated more than 50 households and EIA is required in accordance with the environmental guideline of JICA.

A4.4 CONCLUSION

The results are summarized in Table A4.4.1. As it is quite stable in ranking from the 1st to 5th, the evaluation ranking with the standard weight allocation will be used for prioritization of the long list projects for Pre-Feasibility projects selection (short listing) together with other considerations.

Table A4.4.1 Summary of Sensitivity Tests of MCA

Component	Project No.	Evaluation Items	Evaluated Rank with Weight (%) Change					Average Case 1 - Case 4
			Standard	Case 1	Case 2	Case 3	Case 4	
		Consistency with Superior Plans	25%	20%	20%	40%	20%	
		Engineering Factors	25%	50%	20%	20%	20%	
		Socio-Economic Factors	30%	20%	50%	20%	20%	
		Environmental Impacts	20%	10%	10%	20%	40%	
		Total	100%	100%	100%	100%	100%	
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	2	1	2	1	2	1
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-turn)	4	6	5	4	4	4
	1.3 (Phase 2)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-turn)	1	2	1	2	1	1
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggwa Rd Jct	10	8	13	7	13	10
	2.4	Mukwano Rd, including Mukwano Rbt and Nsambya Jct Capacity	5	5	9	6	8	6
	2.5	Mutesa Rd - Kaweesa Rd - Kabasu Rd (South Inner Ring Road)	13	12	8	13	9	12
	2.6	Widening of Queen's Way and Flyover on Kibuye Rbt	6	3	12	3	11	7
Individual Junction Improvement	3.1	Hoima Rd - Kimera/ MasiroKawala Rd Jct (Kasubi Jct)	12	11	10	10	10	10
	3.2	Kira Road - Acacia/ Babiha Av/ Kayunga Rd	8	9	6	9	6	8
	3.3	Kira Rd - Ntinda Rd	7	7	4	8	5	5
	3.4	Port Bell (Nakawa) - Old Port Bell Rd	11	10	7	12	7	9
	3.6	Ben Kiwanuka Rd - Luwum St	9	13	11	11	12	13
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	3	4	3	5	3	3

Notes: The priority projects recommended for the pre-feasibility study.