

CHAPTER 5 TRAFFIC SURVEY AND TRAFFIC DEMAND FORECAST

5.1 TRAFFIC SURVEY

The Study Team conducted a traffic survey in January 2010 to identify the current traffic condition and to forecast the future traffic demand. A supplemental traffic survey was also conducted on major junctions in June 2010 to study the current intersection condition and problems.

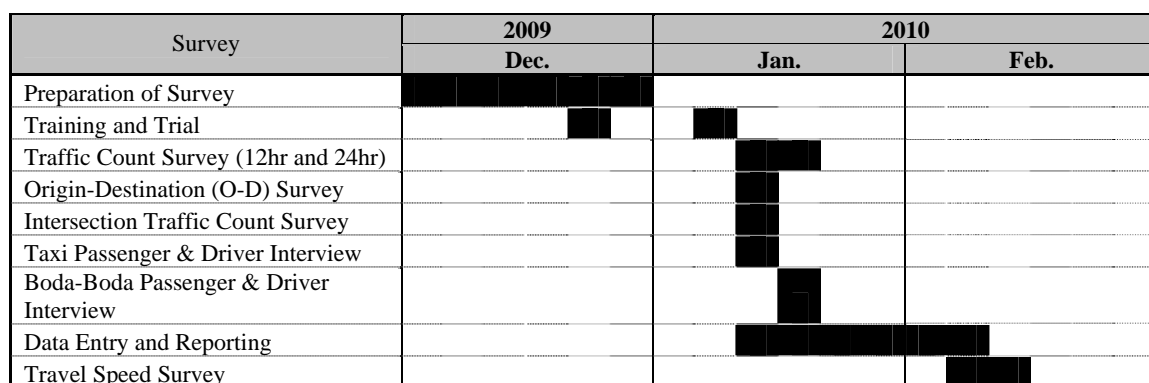
The objective, method and coverage of six types of traffic survey are summarized as below:

Table 5.1.1 Outline of Traffic Survey

Survey	Objectives	Method	Coverage
Traffic Count Survey	To obtain traffic volumes on major roads	Vehicular Traffic Count	12 locations (12hr) 2 locations (24hr)
Origin-Destination (O-D) Survey	To capture trip information of vehicles	Interview with drivers at roadsides	9 locations
Intersection Traffic Count Survey	To obtain traffic volumes and movement at major intersections	Vehicular Traffic Count	2 locations
Taxi (Minibus) Passenger and Driver Interview Survey	To collect information about public transport driver and users, and their opinions	Interview with taxi drivers and users	5 major taxi parks
Boda-Boda (Bike Taxi) Passenger and Driver Interview Survey	To collect information about boda-boda drivers and users, and their opinions	Interview with boda-boda drivers and users	6 areas on major roads
Travel Speed Survey	To collect information on present traffic situation on major roads	Actual driving survey by passenger car	

Source: JICA Study Team

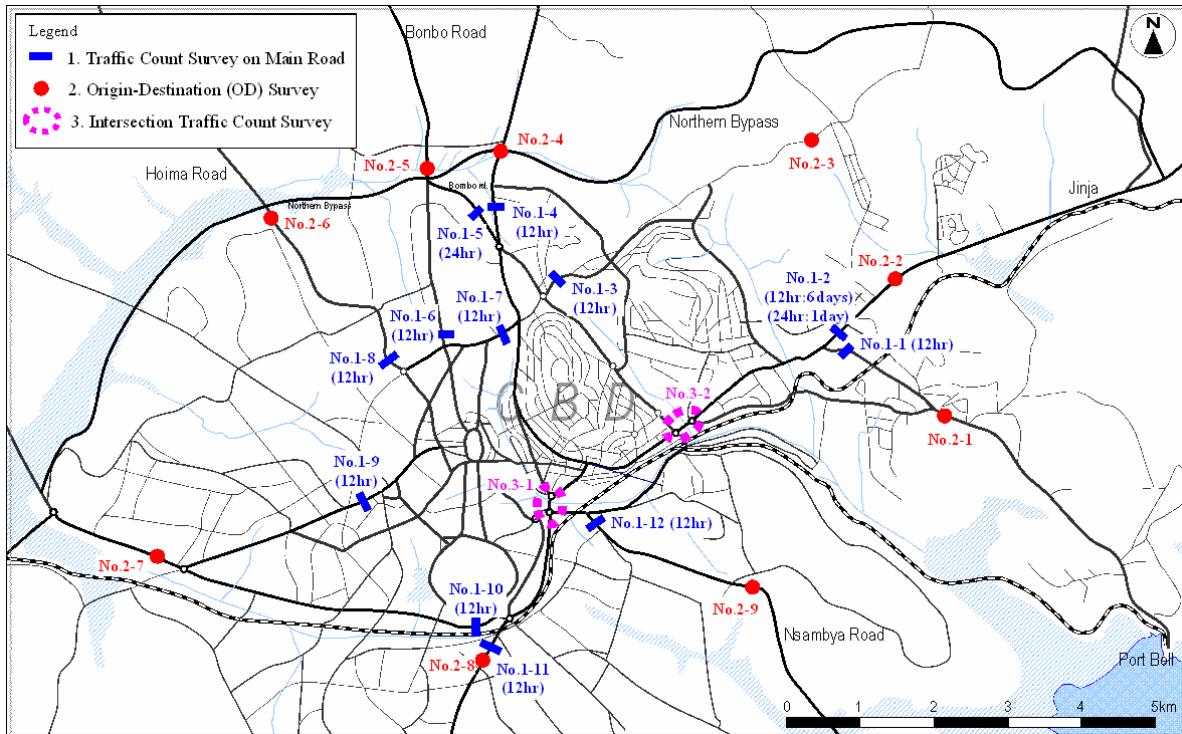
Actual traffic survey was conducted from January to February 2010. Each type of survey schedule is shown in below figure:



Source: JICA Study Team

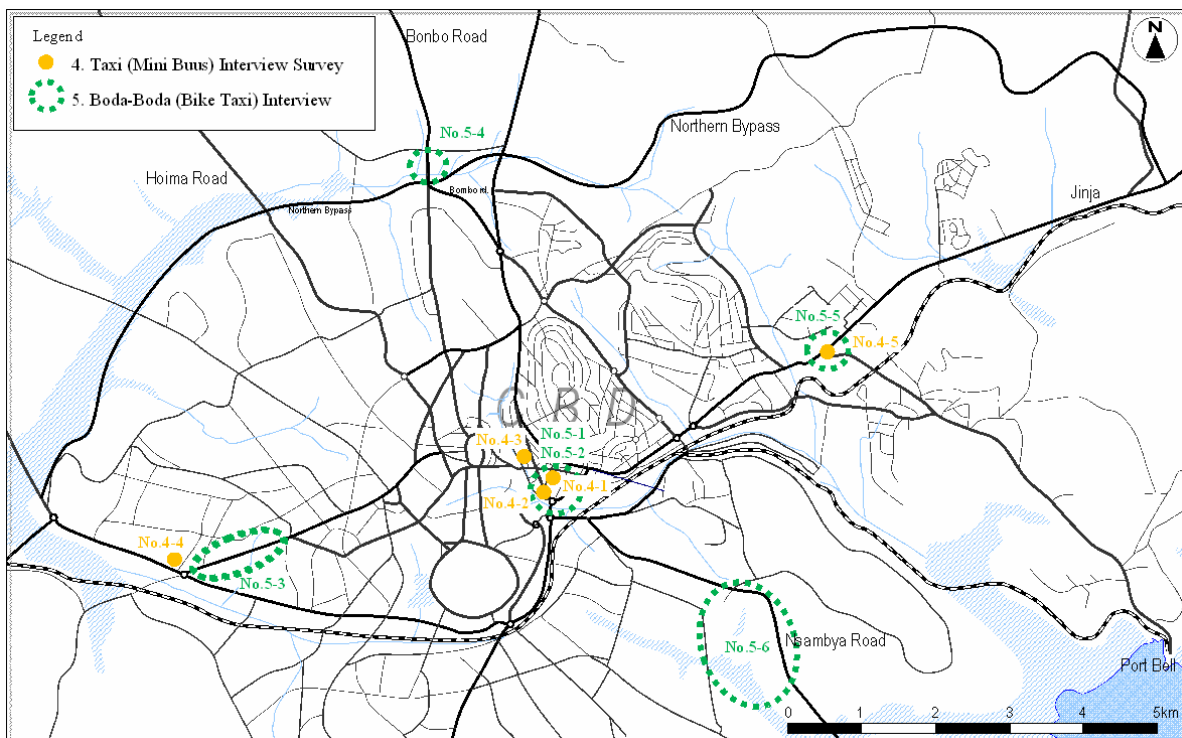
Figure 5.1.1 Schedule of Traffic Surveys

The locations of the traffic surveys are shown below. Two groups of intersections consisting five intersections were selected in consideration of existing traffic problems. One group is Jinja and Africana junction and the other group is Shoprite and Clock tower junction. The contents of the traffic count survey are as follows.



Source: JICA Study Team

Figure 5.1.2 (1) Location of Traffic Survey (Traffic Count and O-D Survey)



Source: JICA Study Team

Figure 5.1.2 (2) Location of Traffic Survey (Interview Survey)

5.2 PRESENT TRAFFIC CONDITIONS

(1) Traffic Volume and Vehicle Composition

The traffic count results were analyzed from various views such as vehicle type, hourly or daily variation and large vehicle rate to figure out the traffic trend in the study area. The 12-hour flows obtained by this study are converted to Annual Average Daily Traffic (AADT) volumes using the conversion factor of 1.39 which was obtained from 24 hour traffic count survey.

Figure 5.2.1 shows the 12 hour traffic volume at each location, by vehicle type. The highest traffic volumes are observed at Entebbe Road (1-11), followed by Jinja Road (No.1-2). Both Entebbe Road and Jinja Road are major accesses to the CBD from the southern and eastern areas of Kampala, respectively. The third highest is observed on Gaba Road that has the capacity problem because of the dual carriageway.

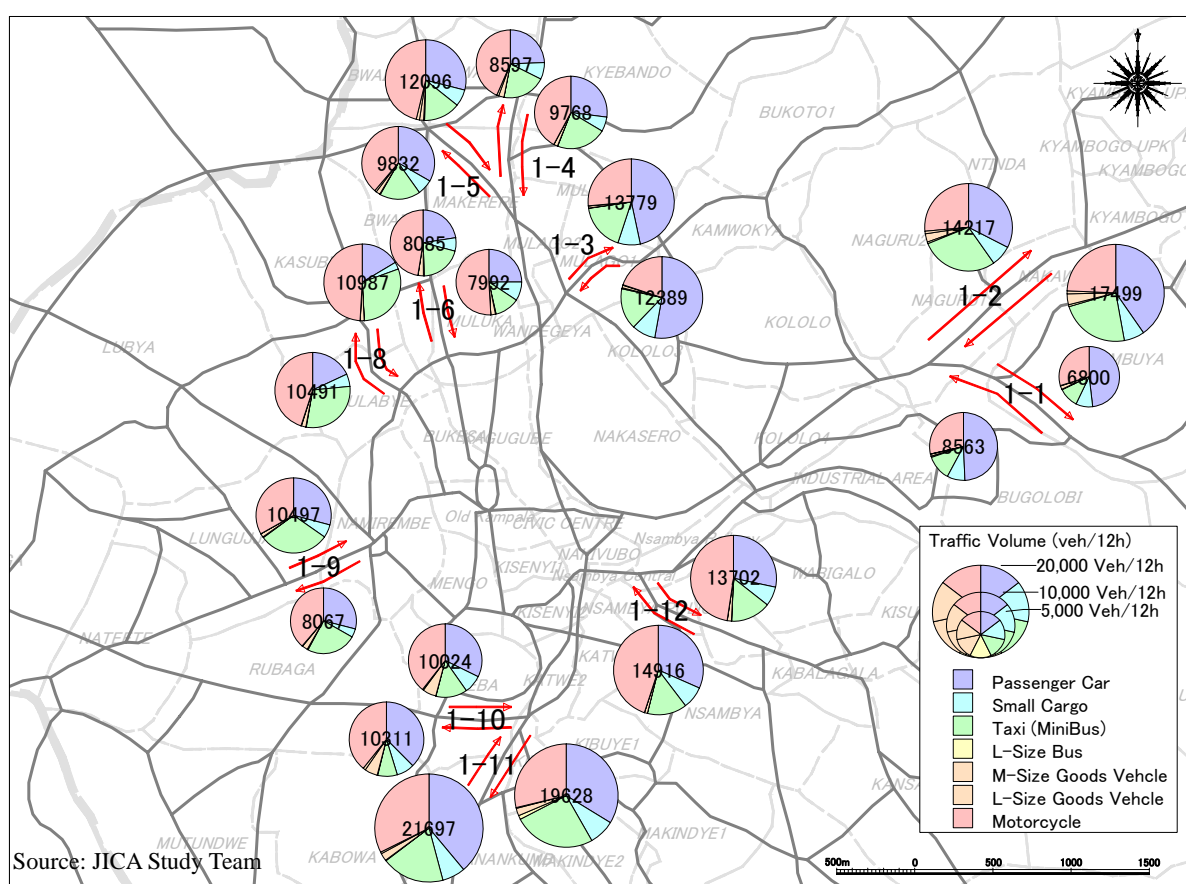
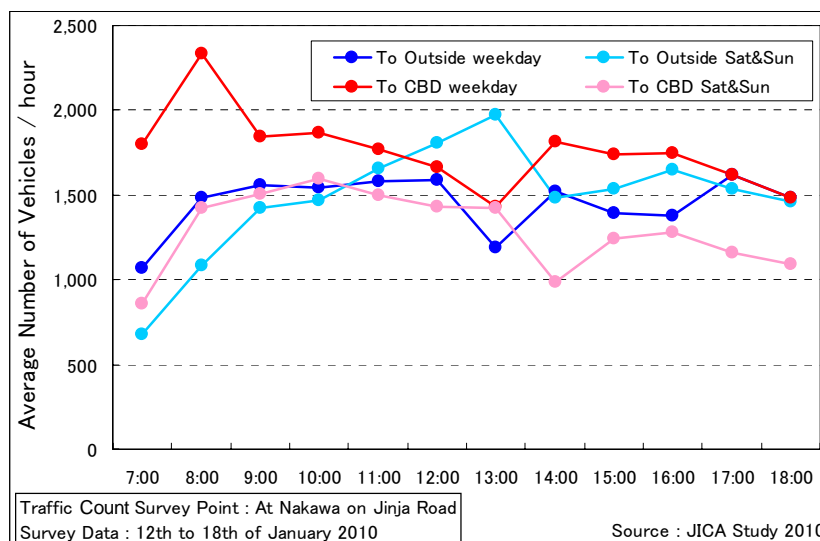


Figure 5.2.1 Distribution of Traffic Volume

In the view of vehicle composition, the proportion of motorcycle including bike taxi (boda-boda) is highest (36.7%) followed by passenger car (35.1%). This is because boda-boda is the current major transportation mean in the city. The share of minibus is at 18.5%.

Figure 5.2.2 shows the hourly profiles over the 12-hour period at Nakawa Road (No.1-2). The weekday peak hour traffic volume to the CBD occurs in the morning between 8.00 a.m. and 9.00 a.m. And evening peak hour to outside direction appears between 17:00 and 18:00. Other data displays relatively flat profiles and do not have the specific features.



Source: JICA Study Team

Figure 5.2.2 Hourly Variation by Directions

The traffic survey for seven days from Sunday to Saturday is also carried out at Nakawa Road to obtain data of daily variation. The traffic volume on Monday was greater than other days on both inflow and outflow directions. Meanwhile, the lowest volume is on Sunday. Compared to Sunday, traffic on Saturday is not low. Therefore all the traffic surveys were conducted on the days excluding Monday and Sunday.

(2) Traffic Growth on Major Arterial Roads

Table 5.2.1 shows the traffic increase trend of major road by utilizing traffic data of past studies. The average annual growth is at 13.3%. The highest growth rate is observed on Hoima Road along which land development is proceeding rapidly. Since the traffic volume has already reached the capacity, Jinja Road shows the lowest growth rate.

Table 5.2.1 Daily Traffic Volume on Major Roads from 1992 – 2010 (unit: vehicle/day)

Road	1992	1997	2001	2008	2010	Annual Growth (1997-2010)
Jinja Road	8,692	18,260	21,844	42,718	44,809	7.8%
Entebbe Road	11,322	8,627	19,579	33,395	39,347	13.5%
Masaka Road	4,188	8,027	19,162	23,836	24,953	9.9%
Hoima Road		3,728		26,637	30,761	19.2%
Bombo Road		7,175	14,290	19,522	28,982	12.3%
Gayaza Road		7,329	10,582	17,544	21,485	9.4%
Ggaba Road		9,226	15,892	23,401	41,300	13.3%
TOTAL	-	62,372	-	187,053	231,637	11.6%

1992: Kampala City Council in KUTIP, 2003

1997: JICA Study in KUTIP, 2003

2001, 2008: Traffic Census

2010: JICA Study 2010, BRT Pre-FS, 2010

(3) Junction Traffic

1) Shoprite and Clock Tower Junctions

The traffic count survey for Shoprite-Clock Tower Intersection was conducted at four roads (Ben Kiwanuka St, Mengo Hill Rd, Nsambya Rd and Entebbe Rd). All survey points were located at inflow side of the intersection. The peak hour in this intersection occurs in the morning between 7.00 a.m. and 8.00 a.m. The inflow traffic from Mengo Hill Rd is largest, followed by Entebbe

Rd. In view of vehicle type, minibus shows the highest share. In the evening, inflow traffic from Mengo Hill Rd and Entebbe Rd is almost same in number. The peak traffic volume of 11,000 veh/hr far exceeds the capacity of the intersection. In addition, traffic flows at this intersection are often disturbed by irregular vehicle movements which further worsen traffic congestion. Serious traffic congestion is observed throughout the day.

2) Jinja-Africana Intersection

The traffic count survey for Jinja-Africana Intersection was conducted at six roads (Jinja Rd, Kampala Rd, Yusufu Lule Rd, Old Port Bell Rd, Access Rd and Wampewo Rd). All survey points were located at the inflow side of the intersection. The peak hour traffic flow at this intersection occurs in the morning between 8.00 a.m. and 9.00 a.m. Traffic flow from Jinja Road to Kampala Road is distinguished in the morning. Comparing morning peak and evening peak, principal direction of traffic flow does not change in spite of reversing traffic from inflow to outflow. The peak traffic volume of 7,000 – 8,000 veh/hr far exceeded the intersection capacity and serious traffic congestion is seen, especially during morning and evening peak hours.

(4) Results of Origin-Destination (O-D) Survey

The O-D survey was conducted at nine locations to grasp the origin, destination, number of passengers, frequency of journey, type of cargo and weight of cargo.

The location of origin or destination of almost 97% of vehicles is in Kampala City, and 53% of trips are inside trips of Kampala City. The remaining 3% is through traffic which originates and travels outside of Kampala City. Inner trip of motorcycle shows a large share because travel distance for motorcycles is not so long. On the contrary, large-size bus, medium goods vehicle and heavy goods vehicle show a small share because of their long trip distance.

The Kampala City center (inner side of Masaka Rd., Entebbe Rd., Jinja Rd. and Northern B.P.) and outer side have a strong link through Entebbe Road, Bombo Road and Jinja Road as illustrated in Figure 5.2.3.

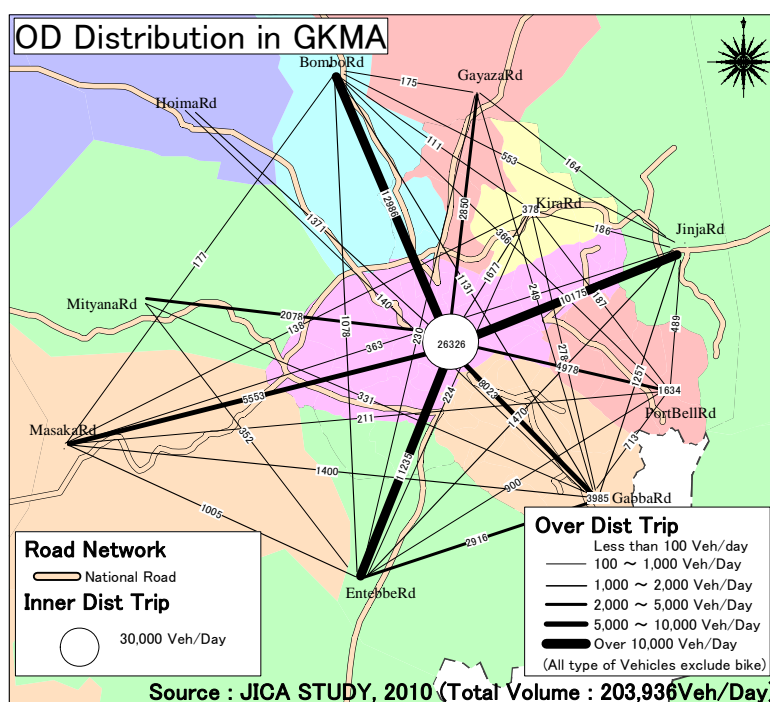


Figure 5.2.3 Estimated Inter-Area Traffic Volume excluding Motorcycle

Figure 5.2.4 illustrates the trip desire line diagram at Parish level. In this figure, characteristics of strong relationship between the city center and other areas are presented. Besides, although places with markets or taxi parks such as Nakawa, Bwaise and Natete also have a relationship with other areas, such relationship is not much strong. Relation to the area within 4 km is not strong and major destinations are outside of 4km radius. Outside the Kampala city area, connection with Nabweru area followed by Kira, Entebbe and Busiro is strong. Except for GKMA and adjacent districts, connection with Masaka district is strong.

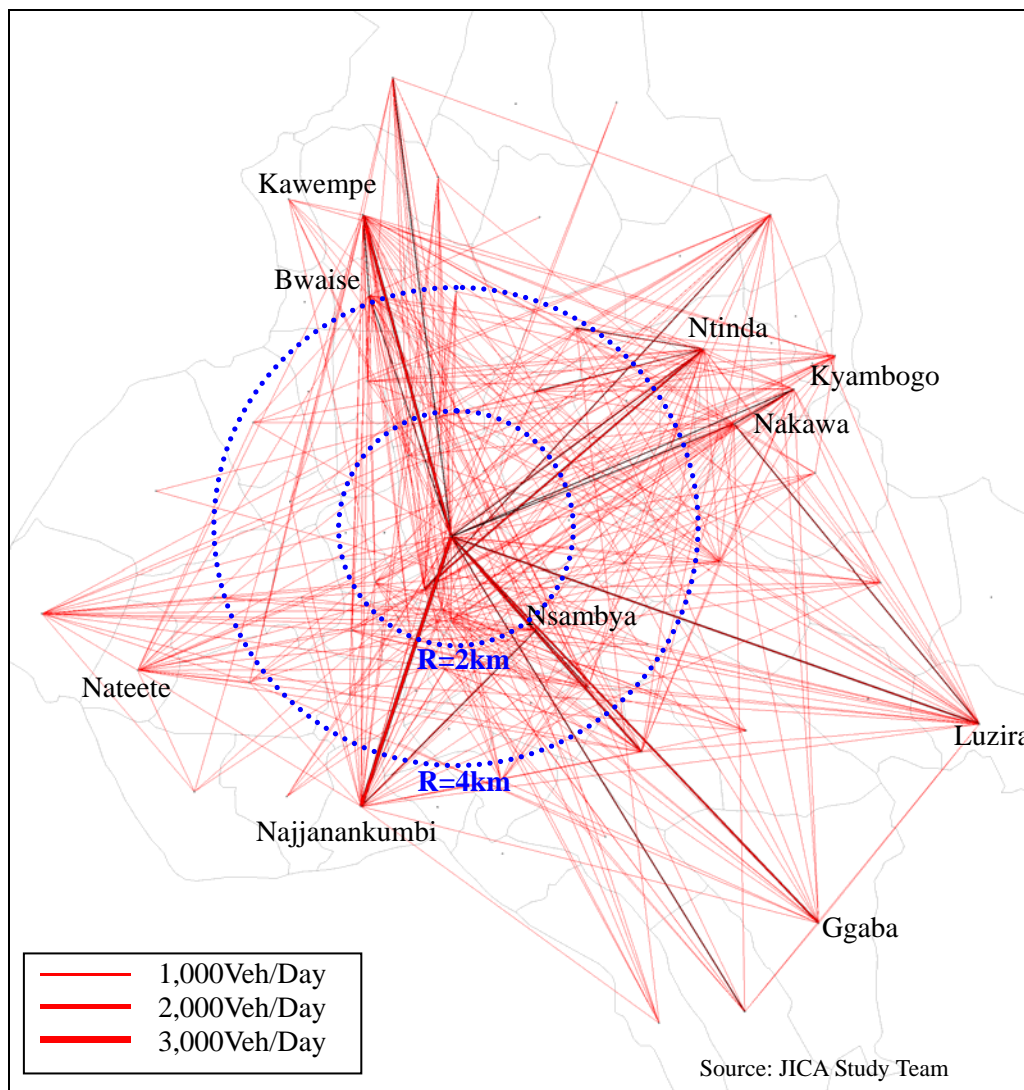


Figure 5.2.4 Diagram for Trip Desire Line (Parish Level of Kampala)

(5) Travel Speeds on Major Roads

Travel speeds survey was conducted on 19 main roads around CBD in the morning and evening peak hours. The congested sections appear around Clock Tower, Shoprite, Jinja Junction and Africana Roundabout. Travel speeds between current situation and previous records, which were provided by NTMP/GKMA in 2003 to 2004, were compared. Throughout the compared period, travel speed is generally slow along the surveyed routes. In addition, the sections with less than 15 km/h travel speed are increasing in the access roads to the CBD. Queen’s Way has been operated as one-way traffic since the end of 2004. Consequently, based on the result of evening survey, travel speed largely surpassed the previous record.

(6) Taxi (Minibus) and Boda-Boda (Bike taxi)

At five major taxi parks and major boda-boda stages on major road sides in Kampala, the interview survey for public transport drivers and passengers was conducted to understand the present situation of public transport service.

Table 5.2.2 shows the distribution of sampled origin and destination of passengers. About 82% of the boda-boda passengers have both their origins and destinations in Kampala City. In contrast, only 39% of the minibus passengers have their origins and destinations in Kampala City. Origins and destinations of passengers of minibus are distributed in wider area.

Table 5.2.2 O-D Distribution of Boda-Boda and Mini-bus Passenger

		Destination										
		Kampala		Wakiso		Mukono		Other		Total		
		Samples	Rate	Samples	Rate	Samples	Rate	Samples	Rate	Samples	Rate	
Origin	Kampala	BodaBoda	731	82.3%	67	7.5%	7	0.8%	-	0.0%	805	90.7%
		MiniBus	1,626	39.2%	661	15.9%	105	2.5%	819	19.7%	3,211	77.4%
	Wakiso	BodaBoda	56	6.3%	5	0.6%	1	0.1%	-	0.0%	62	7.0%
		MiniBus	190	4.6%	144	3.5%	6	0.1%	192	4.6%	532	12.8%
	Mukono	BodaBoda	16	1.8%	-	0.0%	-	0.0%	1	0.1%	17	1.9%
		MiniBus	29	0.7%	14	0.3%	2	0.0%	32	0.8%	77	1.9%
	Other	BodaBoda	3	0.3%	-	0.0%	-	0.0%	1	0.1%	4	0.5%
		MiniBus	136	3.3%	62	1.5%	4	0.1%	129	3.1%	331	8.0%
	Total	BodaBoda	806	90.8%	72	8.1%	8	0.9%	2	0.2%	888	100%
		MiniBus	1,981	47.7%	881	21.2%	117	2.8%	1,172	28.2%	4,151	100%

Source: JICA Study Team

For the travel purpose with time restrictions like business, office or hospital, the use rate of a boda-boda is higher than that of minibus (Figure 5.2.5). For the purpose with less time restrictions like home, the use rate of minibus is overwhelmingly higher than boda-boda. It is noted that boda-boda is used more frequently and reaches destination at less travel time than minibus.

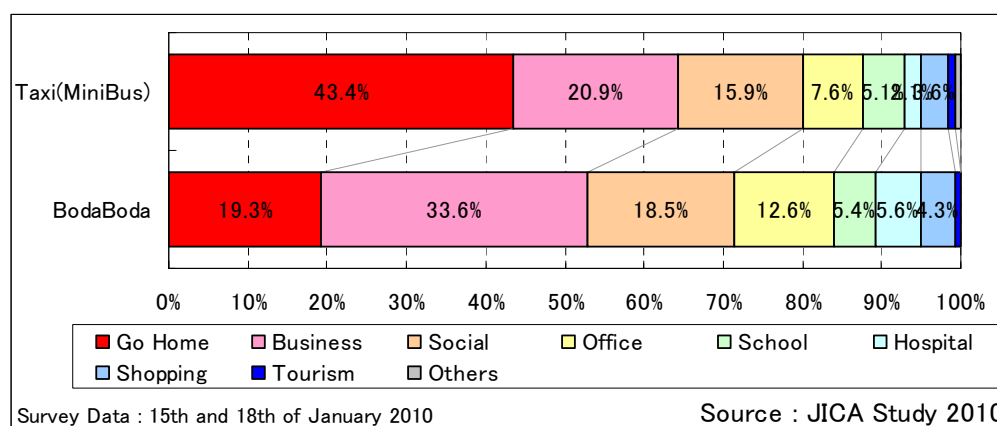


Figure 5.2.5 Comparison of Purpose of Trip

Approximately 30% of boda-boda drivers own the units that they drive. This share is almost double than that of minibuses. Other drivers belong to the companies of operators.

5.3 TRAFFIC DEMAND FORECAST

(1) Basic Condition for Traffic Demand Forecast

There are two basic transport plans for GKMA to be considered for the traffic demand forecast in this Study. One is the NTMP/GKMA (May 2009), with some modifications recommended by the Study Team in Section 4.3, and the other is the BRT plan stated in its Pre-FS Final Report (May

2010).

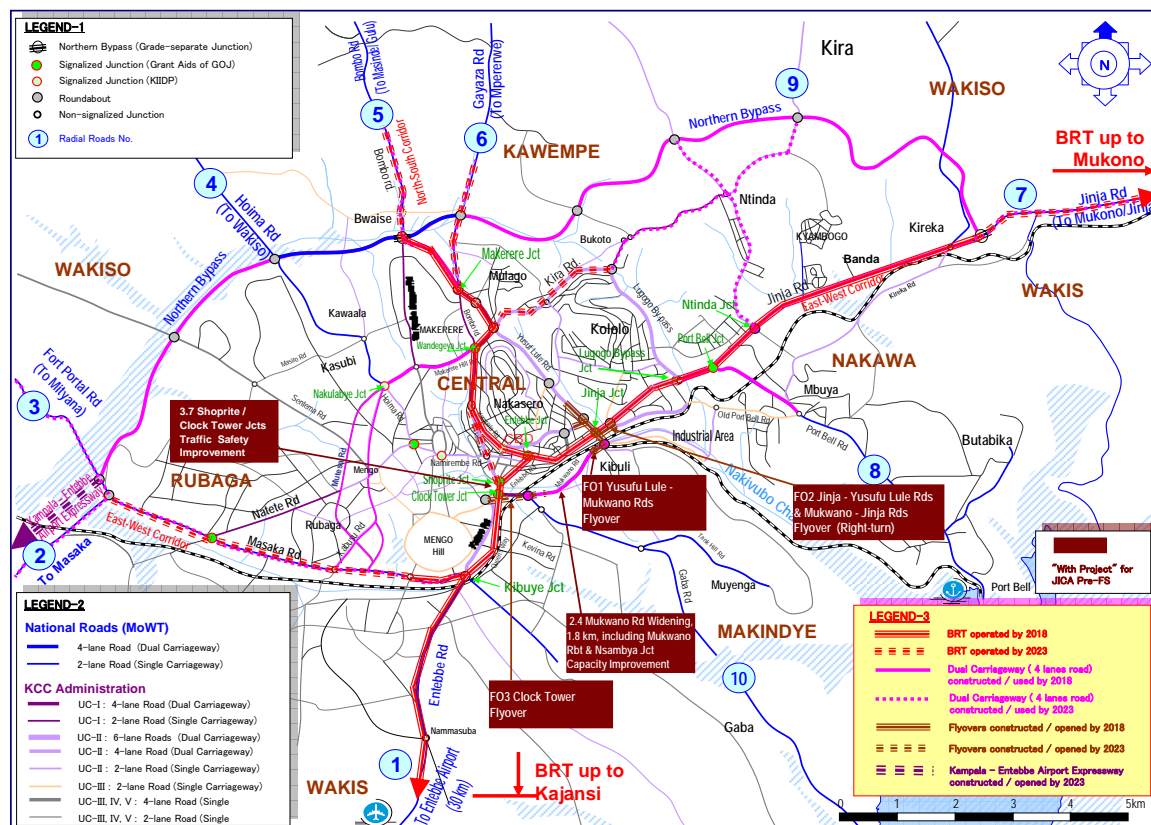
The Study Team has assumed two development scenarios for the future traffic demand forecast in 2018 and 2023, which shall be the basis for road network planning, public transport planning and economic analysis.

Scenario 1 is a standard development scenario for which investment cost is approximately 17% higher than that in NTMP/GKMA in May 2009, taking limited budget availability into consideration. This investment involves a rather affordable approach through planning implementation of some programs after 2023. Instead of the dual carriageway with railway viaduct in NKMP/GKMA, the Study Team included Jinja Junction Flyovers and Clock Tower Flyover. The Study Team also included the Kampala – Entebbe Airport Expressway (US\$ 350 million for 35 km long).

Scenario 2 is an aggressive development plan for which investment cost is approximately 38% higher than that in NTMP/GKMA in May 2009. All roads and approximately 70% of the BRT development planned in the NKMP/GKMA will be implemented by 2023, including Jinja Junction Flyovers, Clock Tower Flyover and the Kampala – Entebbe Airport Expressway.

The Study Team adopted **Scenario 1** since it is a more realistic plan as compared with Scenario 2 which requires large cost and considerable time for land acquisition and resettlement for road network development and BRT introduction. **This Main Report of the Study is therefore based on Scenario 1.**

A future road network in GKMA (refer to Annex 6) was developed by the Study Team as shown in the following figure assuming the introduction of BRT based on the future traffic demand forecast in 2023.



Source: The Study Team based on NTMP/GKMA, MoWT, May 2009

Figure 5.3.1 Road Network Development Plan 2023 in NTMP/GKMA

Introduction of the BRT on the major arterial roads is one of the core projects in the NDP. A Pre-FS for the BRT was completed by the WB assistance in May 2010. The Final report of Pre-FS is stating that the introduction of BRT to nine arterial roads will be completed in 2030. (Figure 5.3.2), but implementation schedule of the BRT routes was not clarified in this stage. The total lengths of BRT operation route and segregated lanes are estimated at 118.6 km and 103.5 km, respectively. The introduction of the BRT with this scale will give a significant impact on traffic flow and volume of the future GKMA road network. Therefore for the traffic demand forecast, the Study Team presumed the implementation schedule of BRT as shown in Figure 5.3.2.

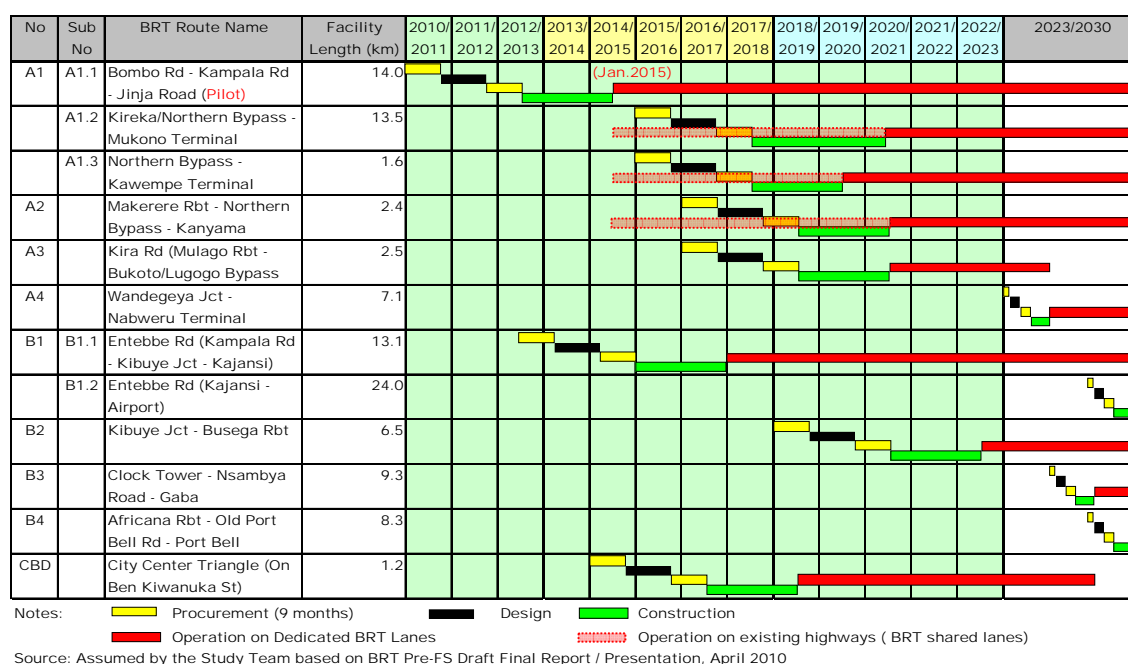


Figure 5.3.2 Anticipated BRT Implementation Schedule

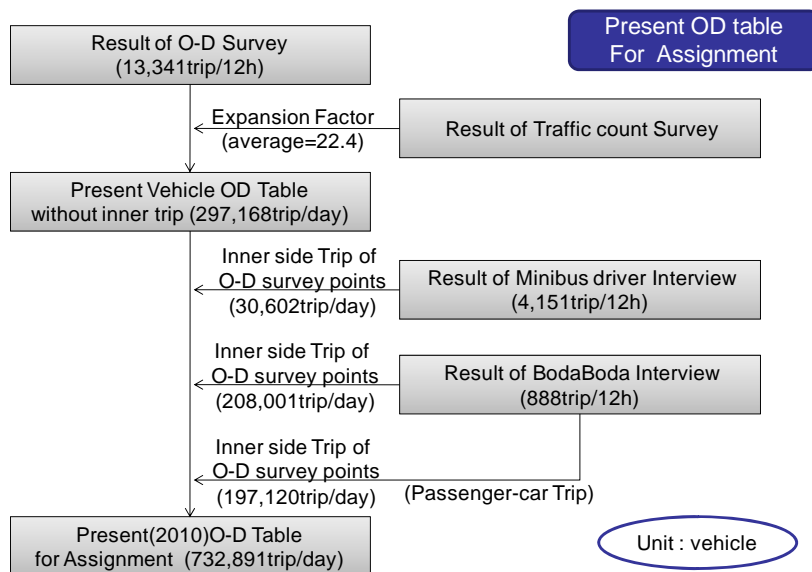
(2) Method of Traffic Demand Forecast

User Equilibrium Assignment Model is adopted to the distribution of the O-D table to road network since it is the most common modeling for traffic demand forecast. The software named JICA-STRADA is used for actual traffic assignment.

(3) Present traffic flow patten

The present O-D matrices in 2010 were processed from O-D survey conducted by the Study Team. As the next step, it is necessary to adjust estimated O-D matrices to observed traffic volume at each survey site. Moreover, seasonal factor should be also considered. As a result of the analysis of adjustment factor, average expansion factor was derived as 22.4, while the seasonal factors were 1.1 for passenger cars and 1.08 for motorcycles. These results were derived from the traveler interview survey (February 2010, BRT Pre-FS Interim Report).

In addition, trips to and from the inner city obtained from the results of minibus (taxi) drivers interview survey and boda-boda interview survey were added to the present O-D table. As a result, a total trip in the study area is estimated as approximately 733,000 trips per day.



Source: JICA Study Team

Figure 5.3.3 Estimation flow of Present O-D Distribution

Figure 5.3.4 illustrates the present traffic volume reproduced through assignment model. It shows that Jinja, Kampala, Entebbe and Bombo road have high demands.



Source: JICA Study Team

Figure 5.3.4 Result of Present Traffic Volume estimated by Assignment Model

(4) Examination of Future Traffic Demand

The target year of the Study is decided as 2018 and 2023, in coordination with the NTMP/GKMA. Traffic demand forecast is prepared for 2013, 2018 and 2023. Future traffic demand is forecasted in the following six cases including 2010.

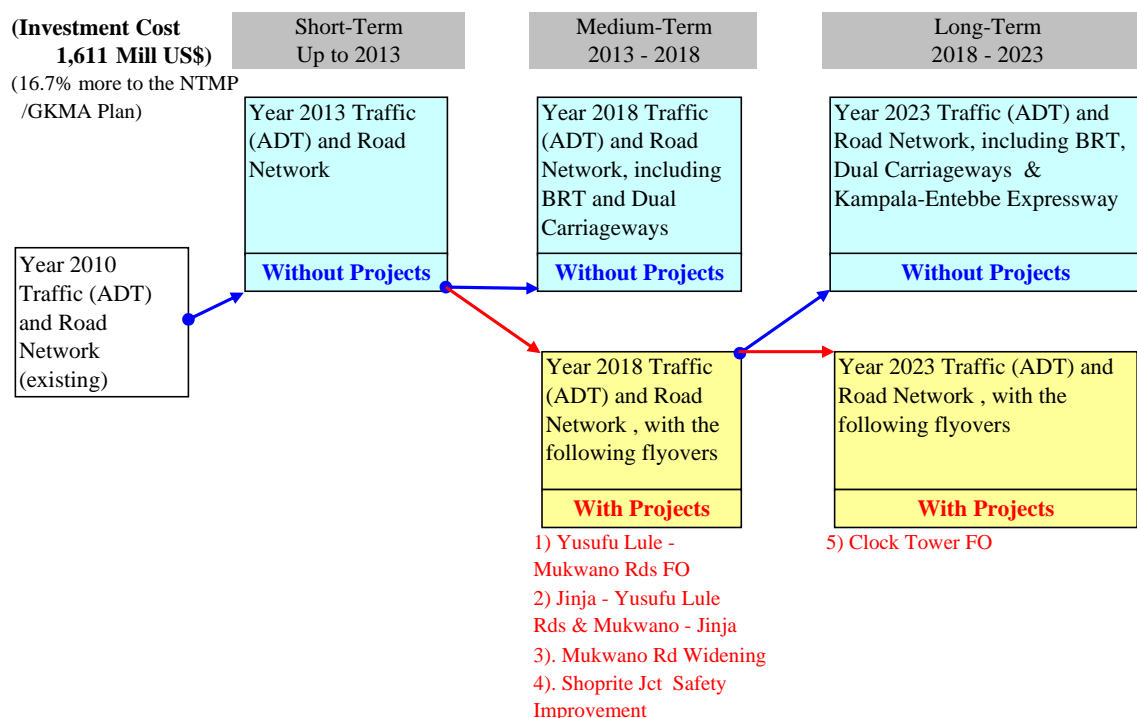
Table 5.3.1 Cases of Traffic Demand Forecast

Scenario	Year	Pre-FS Projects
Case1	2010	without
Case2	2013	without
Case3	2018	with
Case4		without
Case5	2023	with
Case6		without

Source: JICA Study Team

In the above table, “**With Project Case**” means implementation of *the Pre-FS projects* (Jinja Jct Flyovers, Mukwano Road Widening and Shoprite and Clock Tower Jcts Road safety Improvement) by 2018 and construction of Clock Tower Flyover by 2023. “**Without Project Case**” means *the Pre-FS Projects* are not implemented. The Study Team presumed implementation schedule for BRT project as shown in Figure 5.3.3. The conditions regarding BRT are based on the presumption.

The following figure illustrates the relation between “With Project Case” and “Without Project Case” in this Study.

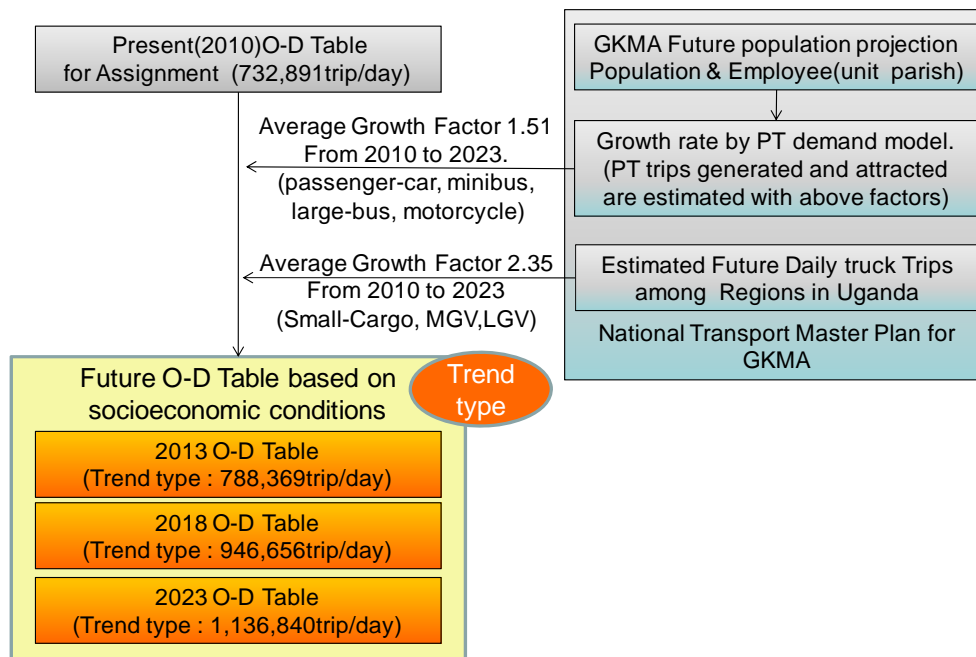


Source: JICA Study Team

Figure 5.3.5 With and Without Project Cases for Traffic Demand Forecast

In this study, forecast of future traffic generation was divided into passenger transport (Passenger car, Minibus, Large size bus, Motorcycle) and cargo transport (Small size cargo, Medium goods vehicle, Heavy goods vehicle). Passenger transport generation within the GKMA area was estimated by the equation model formulated by the NTMP/GKMA IR-4. Applying future population and workforce by zone to the equation model, future traffic generation by zone were estimated. Passenger demand outside the GKMA was estimated using the growth factor for passenger travel in the NTMP/GKMA. Cargo transport generation was forecasted based on the growth rate in each district employed in NTMP/GKMA.

The total number of trips in 2023 was estimated to be approximately 1.1 million per day as shown in Figure 5.3.6.

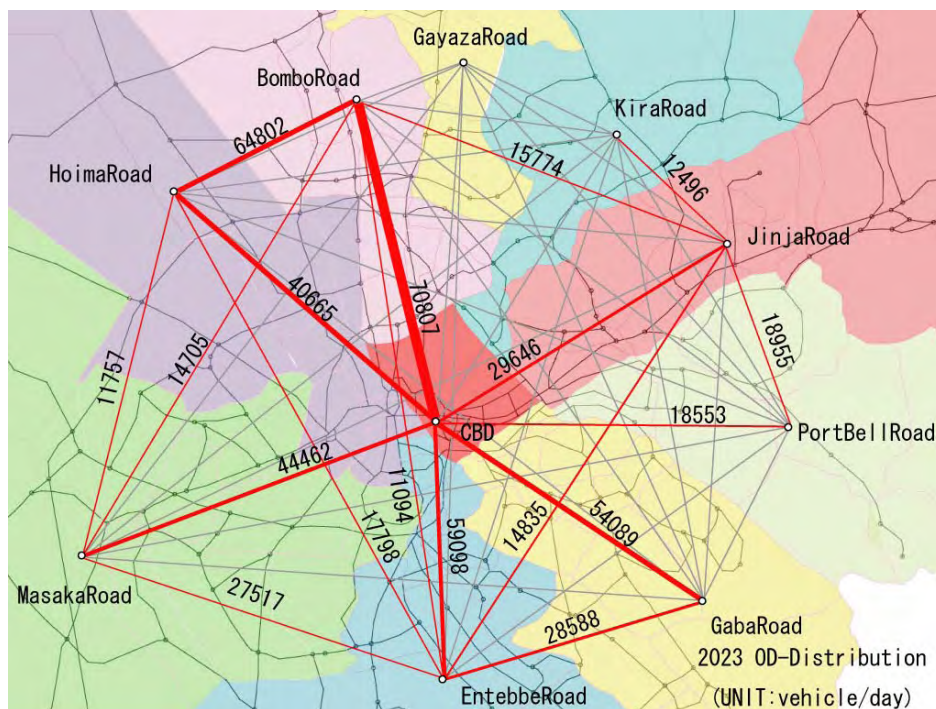


Source: JICA Study Team

Figure 5.3.6 Flow of Future Trip Number Estimation

(5) Outline of Future O-D Distribution Pattern

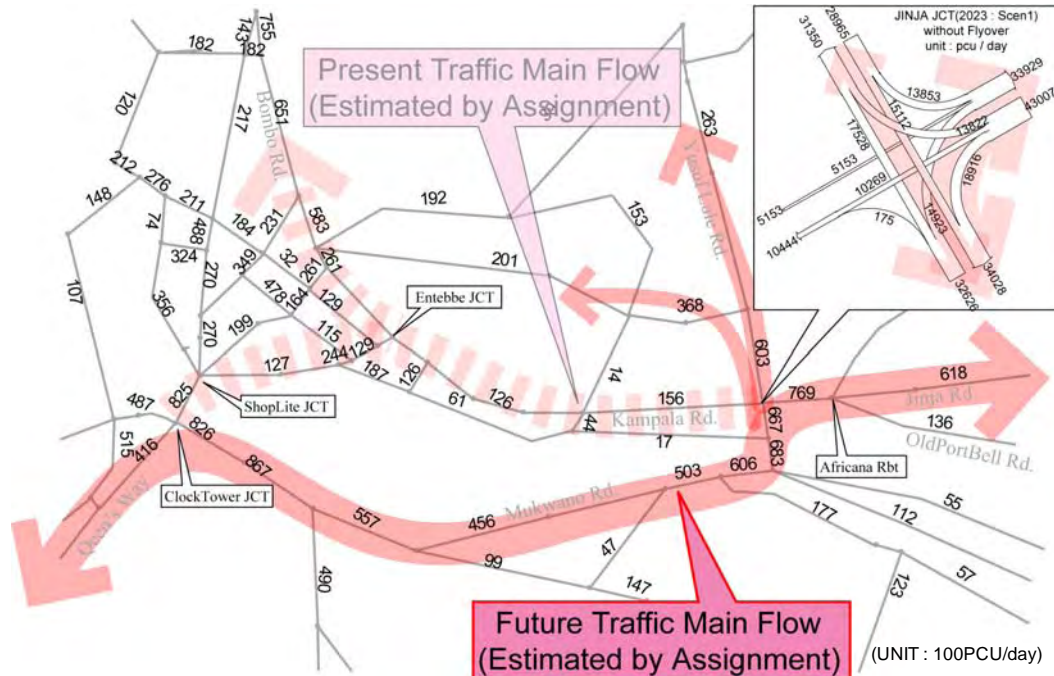
Figure 5.3.7 is a graph comparing the trip distributions of all purposes in 2010 and 2023. These distribution patterns were derived from the O-D table calculated for traffic assignment model. The major trip flows are limited within Kampala City in 2010. Distribution pattern in 2023 is basically the same pattern as that in 2010. Only the share of external trips (through trips) will slightly expand because future population and employment outside Kampala City will increase more.



Source: JICA Study Team

Figure 5.3.7 Estimated O-D Distribution (2023)

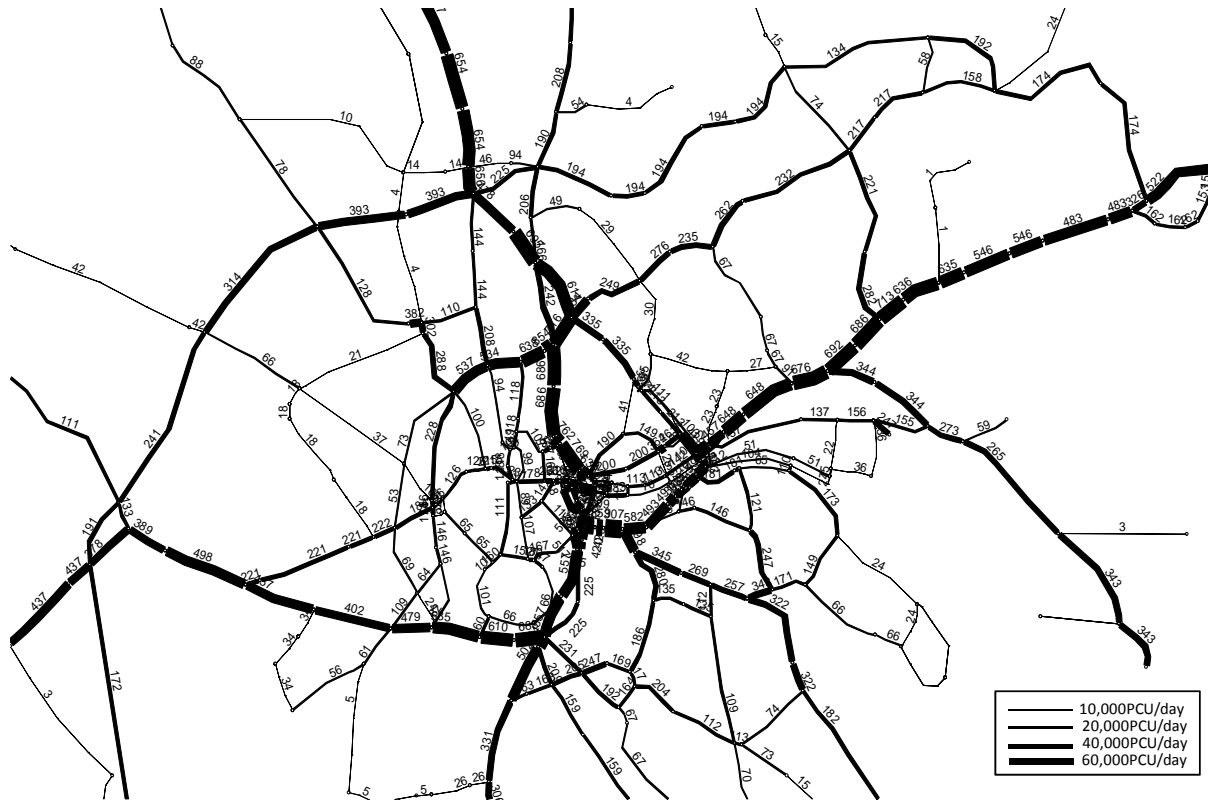
Major impacts to the future road network by the introduction of the BRT will be the decrease in number of lanes for some trunk roads. Especially by the BRT proposals, Entebbe Junction will be closed and Entebbe Road will be narrowed to general traffic. The main traffic flow will shift from Jinja-Kampala roads direction (east-west) to Yusufu Lule - Mukwano Roads direction (north-south) as shown in Figure 5.3.8.



Source: JICA Study Team

Figure 5.3.8 Main Traffic Flow Change after Introduction of the BRT

Figures 5.3.9 and 5.3.10 show the results of traffic assignments in 2023. The road network in the forecast consists of proposed road improvement project and the BRT project.



Source: JICA Study Team

Figure 5.3.9 Result of Future Traffic Assignment in Kampala (2023)



Source: JICA Study Team

Figure 5.3.10 Result of Future Traffic Assignment at City Center (2023)

5.4 SUPPLEMENTAL TRAFFIC SURVEY

A supplemental traffic survey was carried out in June 2010 to identify the problems at nine major junctions, including six intersections signalized through the ODA of the GOJ. The outline of the traffic survey is summarized in the following:

Survey	Objectives	Method	Coverage
Traffic Count Survey	To obtain traffic condition on major junction	Vehicular Traffic Count	9 locations (12 hr)

Source: JICA Study Team

Figure 5.4.1 shows the hourly profile of observed traffic volume at survey points where 12-hr counts were undertaken. From the results obtained at Garden City roundabout, pattern of the peak hour of weekday and holiday was different. The peak hour on holiday is around 13:00 hrs while that on weekday was 7:00 to 9:00 hrs and 15:00 to 17:00 hrs.

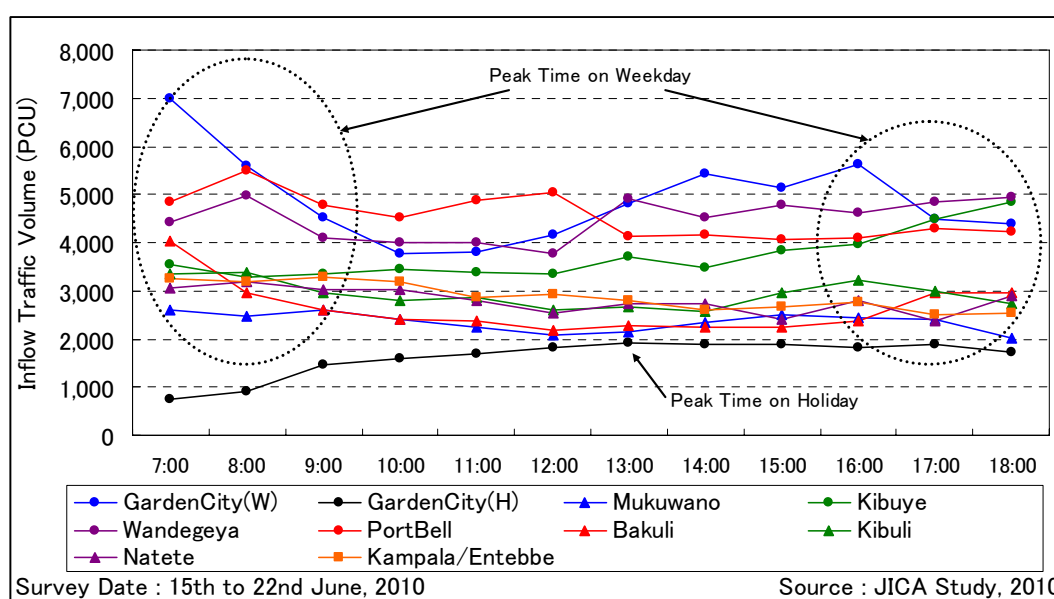


Figure 5.4.1 Hourly Traffic Variation at Major Nine Junctions

5.5 PEDESTRIAN TRAFFIC SURVEY

The Study Team conducted pedestrian and boda-boda traffic count survey between Shoprite and Clock Tower Junctions (on Entebbe Road) to identify volume of the latest non-motorized traffic (NMT) around these junctions. The survey was conducted on 4th August for each peak three hours in the morning and evening, i.e., 6.00 – 9.00 a.m. and 4.00 – 7.00 p.m.

The average morning peak hour pedestrian traffic passing along Nakivubo Channel is 2,180 persons/hr from Clock Tower to Shoprite direction (inflow to the city center). The average evening peak hour pedestrian traffic is 2,600 persons/hr from Shoprite to Clock Tower direction (outflow from the city center). The total three-hour pedestrian traffic is 9,670 persons in the morning and that for the evening three hours is 10,745 persons, passing on Entebbe Road on Nakivubo Channel. The pedestrian traffic has increased to 3.5 times as compared with the data 2001 KUTIP survey (Table 5.5.1).

The Study Team has estimated that approximately 48,000 persons pass at this point daily and over 10 million pass per year. According to the observation, approximately 70% are from Katwe and Nsambya areas, where many poor people stay and travel to the city center to work in the morning and return to their homes in the evening. Most of these pedestrians would be the users

of the pedestrian bridges planned on Shoprite and Clock Tower junctions, which is intended to promote road safety by segregating the pedestrians and vehicles.

Table 5.5.1 Pedestrian Traffic Count Survey Results on Entebbe Road

Date: 4th August 2010 (Wednesday)
 Time: 6.00 - 9.00 am and 4.00 - 7.00 pm

Direction	Station	Classification	Morning Peak Hours (6.00 - 9.00)							Evening Peak Hours (16.00-19.00)							Estimated for 24 Hrs
			6.00-6.30	6.30-7.00	7.00-7.30	7.30-8.00	8.00-8.30	8.30-9.00	Total	4.00-4.30	4.30-5.00	5.00-5.30	5.30-6.00	6.00-6.30	6.30-7.00	Total	
Clock T. to Shoprite (South to North)	P1 (West)	Man	153	326	390	289	497	366	2,021	133	105	140	111	245	141	875	
		Woman	50	137	228	279	175	126	995	61	70	87	89	64	77	448	
	P2 (East)	Man	289	418	335	297	330	342	2,011	198	238	158	235	145	160	1,134	
		Woman	208	259	197	411	240	201	1,516	56	58	72	93	108	101	488	
Sub-Total			700	1,140	1,150	1,276	1,242	1,035	6,543	448	471	457	528	562	479	2,945	22,000
Shoprite to Clock T. (North to South)	P1 (West)	Man	81	130	212	116	326	267	1,132	248	386	346	302	464	710	2,456	
		Woman	16	40	37	50	59	58	260	83	135	117	151	160	263	909	
	P2 (East)	Man	153	253	266	43	329	293	1,337	271	395	541	655	725	715	3,302	
		Woman	38	67	36	80	94	80	395	85	187	160	285	200	216	1,133	
Sub-Total			288	490	551	289	808	698	3,124	687	1,103	1,164	1,393	1,549	1,904	7,800	25,000
Total			988	1,630	1,701	1,565	2,050	1,733	9,667	1,135	1,574	1,621	1,921	2,111	2,383	10,745	48,000

Note:

Comparison of Pedestrian Survey with KUTIP in 2001

Direction: From Shoprite to Clock Tower

Ave. Pedestrian Traffic	KUTIP (2001)	JICA (2010)	Increase
Morning Peak Hour	464	1,041	225%
Evening Peak Hour	597	2,600	436%
Total	1,060	3,641	344%

Source: JICA Survey on 4th August 2010

The Study Team observed that pedestrians are not given appropriate signal period to cross on these very busy junctions. The existing walkway widths are also not sufficient and are not well maintained. The Study Team also identified that a large number of boda-bodas are passing on this point to transport passengers. Since boda-bodas are weaving their way more frequently than cars and motor cycles, they are more subject to very high accident risks.



Overview of Entebbe Road on Nakivubo Channel



Mixed Traffic (Car, Boda Boda & Pedestrian) on Shoprite Jct



Overview of Queen's Way from Clock Tower



Commuters from Katwe and Nsambya Areas

Source: JICA Study Team

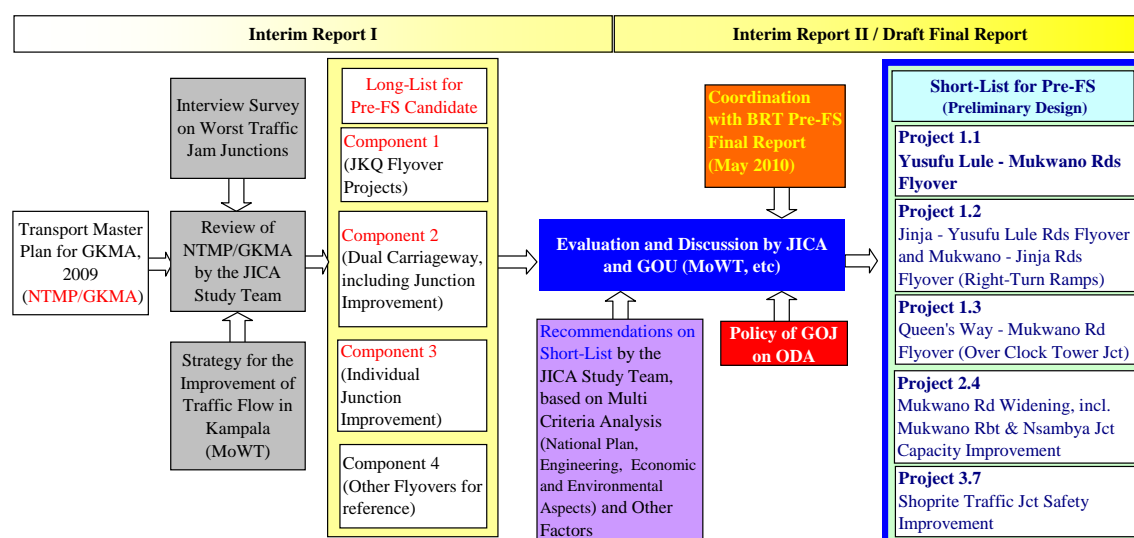
Figure 5.5.1 Photographs of Shoprite and Clock Tower Junctions

CHAPTER 6 LONG LIST AND SHORT LIST OF PROJECTS FOR PRE-FEASIBILITY STUDY

6.1 PREPARATION OF LONG LIST AND SHORT LIST OF PROJECTS FOR PRE-FEASIBILITY STUDY

The objective of the long listing is to identify the candidate projects which may be subjected to official development assistance of the GOJ for road network improvement addressing serious traffic congestion in GKMA to support the NTMP/GKMA as well as the NDP.

The objective of the short listing is to select priority projects for Pre-FS and preliminary design to evaluate them on technical, economical and other aspects. Figure 6.1.1 shows the flow of selection of the long and short list of projects for Pre-FS.



Source: JICA Study Team

Figure 6.1.1 Flow of Selection of Long and Short List Projects for Pre-FS

6.2 LONG LISTING OF CANDIDATE PROJECTS

The Study Team considered the interview results on the worst traffic jam junctions at the Steering Committee and stakeholder meetings for the long and short listing of Pre-FS projects. Of the worst ten junctions, six junctions were those improved with the grant aid of GOJ in 1998-2007. This means that conventional method of standalone junction improvement, either by signalization or roundabout, could not cope with the recent rapid traffic growth for the major junctions near/around the city center without substantial capacity increase or an introduction of area-controlled signalization system. **As the traffic at all these junctions has far exceeded the traffic capacity, flyover construction and/or road and junction widening are required to improve the current severe traffic congestion.**

The Study Team reviewed priority junctions (high priority, medium priority and special flyover projects) in NTMP/GKMA and selected many junctions from that for the Pre-FS long list. The junctions located in the suburbs of Kampala City were not selected as their traffic congestion is less serious compared with these located in or near the city center.

The Study Team reviewed and considered the “Strategy for the Improvement of Traffic Flow in Kampala, MoWT, December 2009” for selection of the long list projects. Of the 21 long-listed projects by the Study Team, 14 projects are consistent with the strategic junctions of MoWT.

The Study Team selected the “Mukwano Road Widening Project including Mukwano Roundabout Improvement” and “Makerere Hill Road Widening Project” from the priority projects of KUTIP for the long list.

6.3 LONG LIST OF CANDIDATE PROJECTS FOR PRE-FEASIBILITY STUDY

Considering the objectives, existing plans, interview results and site conditions, the Study Team prepared the long list of projects from which the Pre-FS short list projects were recommended. The long list was comprised of the following four components and projects as in Table 6.3.1 and Figure 6.3.1.

Table 6.3.1 Long List of Candidate Projects for Pre-FS

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.

Source: JICA Study Team

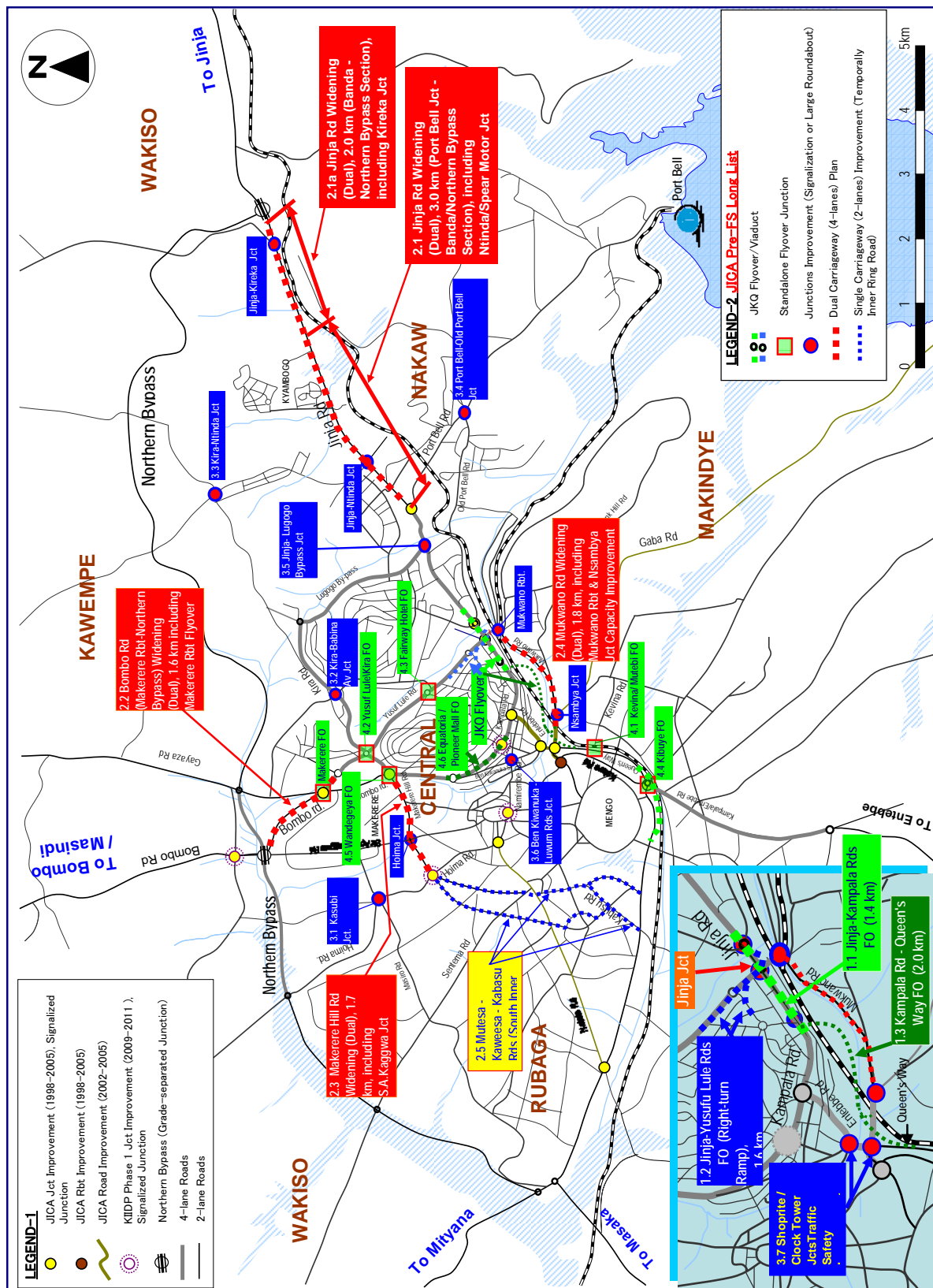


Figure 6.3.1 Location Map of Long List Projects

Source: JICA Study Team

6.4 EVALUATION OF LONG LIST PROJECTS AND RECOMMENDED SHORTLIST OF PROJECTS FOR PRE-FEASIBILITY STUDY

(1) Evaluation Methods and Criteria

The multi-criteria analysis (MCA) methodology was adopted in the prioritization of the 15 projects in the long list for Components 1, 2 and 3. Component 4, which would be implemented in the long-term or long long-term, was not subjected to the evaluation.

The weights and 5-Grade scoring criteria for each evaluation factor are as shown in Table 6.4.1. An equal weight of 25% was given to consistency with overall plans and engineering factors. Socio-economic factors and environmental negative impacts were given 30% and 20%, respectively.

Table 6.4.1 Evaluation Factor and Weight for MCA

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 4th - 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.

Source: JICA Study Team

The final score per project was calculated using the weight allocated for each factor and normalized process.

(2) Evaluation Results

The Study Team had a series of meetings with key-stakeholders (MoWT, UNRA and KCC) and JICA on the long and short listing of Pre-FS projects. Table 6.4.2 shows the evaluation result on the long list. The Study Team recommended to MoWT the short-listed projects for the Pre-FS as presented in Table 6.4.3 based on the evaluation result while ***giving priority on strengthening and bottleneck improvement of the east-west corridor (international trunk road network of AI09)***.

On March 4, 2010, the Steering Committee agreed that preliminary design should be conducted for the Jinja Rd–Kampala Road–Queen’s Way Flyover Project, for which a soft loan of the GOJ or other sources would be applied in the future. The Pre-FS at the basic design level was proposed for the remaining four projects, envisaging application of the Japanese Grant Aid for implementation.

Table 6.4.2 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	Implementation Timing based on Budget Availability and Land Acquisition	Remarks (Estimated number of households required resettlement)	
			Consistency with Policy of Government of Uganda on Priority	Consistency with Policy of TMP-GKMA	Function of Road to Traffic Jan	Technical Effectiveness	Traffic Volume (Current)	Project Cost	Contribution to CBD/C Center Development Sustainability	Interview Ranking by Stakeholders on Traffic Jam*	Land Acquisition	Resettlement Requirements					
JKO Flyover	1.1 Phase 1	Jinja - Kampala Rds Flyover	12.5%	13.9	12.5%	15.9	7.5%	11.1	7.5%	12.2	7.5%	10.0%	14.3	120.9	1	Short Term (2013) or Medium Term (2018)	No Resettlement
	1.2 Phase 2	Jinja - Yusufu Lule Rds Flyover (Right-turn Ramp Flyover)	12.5%	13.9	14.3	12.7	8.9	4.0	9.8	8.6	14.3	112.0	5	112.0	5	Medium Term (2018) or Long Term (2023)	No Resettlement
	1.3 Phase 3	Kampala Rd - Queen's Way Flyover (Right Turn)	12.5%	13.9	14.3	12.7	11.1	2.0	9.8	14.3	11.4	115.0	3	115.0	3	Medium Term (2018) or Long Term (2023)	Resettlement (less than 10)
	Combination of Dual Carriageway, Flyover and Junction Improvement	2.1 (Phase 1)	Jinja Road (Port Bell Jet - Banda/Northern Bypass Section), including Ninda/Spear Motor Jet, Length 3.0 km	12.5%	13.9	14.3	12.7	8.9	8.0	4.9	14.3	3.1	8.6	101.6	7	Short Term (2013)	Resettlement (10-20)
		2.1a (Phase 2)	Jinja Road (Banda - Northern Bypass Section), including Kireka Jet, Length 2.0 km	12.5%	13.9	14.3	12.7	6.7	8.0	4.9	2.9	3.1	2.9	82.2	16	Medium Term (2018)	Resettlement (over 50)
		2.2	Bombo Road (Makerere Rbt - Northern Bypass Section), including Makerere Rbt Flyover	12.5%	13.9	14.3	15.9	6.7	4.0	9.8	5.7	6.3	2.9	89.0	13	Medium Term (2018)	Resettlement (over 50)
	Individual Junction Improvement	2.3	Makerere Hill Road, including Sir. Apollo Kagawa Rd Jet	12.5%	13.9	11.4	12.7	8.9	8.0	7.3	11.4	3.1	5.7	95.4	10	Medium Term (2018)	Resettlement (20-50)
2.4		Mukwano Rd, including Mukwano Rbt and Nsambya Jet Capacity Improvement	12.5%	8.3	14.3	12.7	6.7	8.0	9.8	8.6	9.4	11.4	102.1	6	Short Term (2013)	Resettlement (less than 10)	
2.5		Mutesa Rd - Kaweesa Rd - Kabasuru Rd (South Inner Ring Road) - Single Carriageway Paving	12.5%	8.3	11.4	9.5	2.2	8.0	4.9	2.9	12.5	14.3	83.8	15	Medium Term (2018)	No Resettlement	
3.1		Hoima Rd - Kimeru/Masiro Kawala Rd Jet (Kasubi Jet)	12.5%	13.9	8.6	9.5	6.7	10.0	2.4	2.9	12.5	8.6	88.0	14	Medium Term (2018)	Resettlement (10-20)	
3.2		Kira Road - Acacia/Babina Av/ Kayunga Rd	12.5%	13.9	11.4	12.7	6.7	10.0	4.9	2.9	12.5	11.4	96.1	9	Medium Term (2018)	Resettlement (less than 10)	
Shoprite & Clock Tower Traffic Safety Improvement	3.3	Kira Rd - Ninda Rd	12.5%	13.9	11.4	12.7	6.7	10.0	2.4	2.9	12.5	11.4	96.9	8	Medium Term (2018)	Resettlement (less than 10)	
	3.4	Port Bell - Old Port Bell Rd	12.5%	13.9	8.6	12.7	4.4	10.0	4.9	2.9	12.5	11.4	91.0	12	Medium Term (2018)	Resettlement (less than 10)	
	3.5	Jinja Rd - Lugogo Bypass	12.5%	13.9	14.3	15.9	8.9	10.0	7.3	2.9	15.7	14.3	112.8	4	Short Term (2013)	No Resettlement	
	3.6	Ben Kiwanuka Rd - Luwum St	12.5%	8.3	8.6	6.3	4.4	10.0	12.2	14.3	12.5	5.7	95.4	11	Medium Term (2018)	Resettlement (20-50)	
	3.7	Shoprite & Clock Tower Traffic Safety Improvement	12.5%	8.3	14.3	12.7	11.1	8.0	12.2	14.3	12.5	11.4	117.8	2	Short Term (2013)	Resettlement (less than 10)	

Notes: The projects recommended for implementation in the short term (by 2013) The projects for which resettlement is estimated more than 20 households are not appropriate for implementation in the short term under Grant Aid of the GOI.

Source: JICA Study Team

Table 6.4.3 Recommended Short List Projects for Pre-FS

Component	Project No	Project Name	Priority by Multi Criteria Analysis (MCA)	Basic Project Concept			Implementation Period
				Project Length (km)	Viaduct/ Flyover Length (km)	Carriageway & Number of Lanes & Junction Improvement	
Jinja - Kampala Roads - Queen's Way Flyover (Preliminary Design)	1.1 (Phase 1)	Jinja - Kampala Rds Flyover	1	1.4	1.1	Dual Carriageway (two-ways 2 lanes), crossing over Africana, Jinja & Siad Baree Ave	Medium Term (2018)
	1.2 (Phase 2)	Jinja - Yusufu Lule Rds Flyover (Right-turn)	5	1.6	1.3	Single Carriageway (one-way 1 lane) and reversible lane for the evening traffic	Medium Term (2018) or Long Term (2023)
	1.3 (Phase 3)	Kampala Rd - Queen's Way Flyover	3	2.0	1.9	Single Carriageway or Dual Carriageway	Medium Term (2018) or Long Term (2023)
Dual Carriageway Construction, Junction Improvement and Traffic Safety (Basic Design Level)	2.1 (Phase 1)	Jinja Rd Widening (Port Bell Jct - Banda/Northern Bypass Section), including Ntinda/Spear Motors	7	3.0	-	Dual Carriageway (Add. 2 lanes) & Ntinda Jct improvement	Short (2013)
	2.4	Mukwano Rd Widening, including Mukwano Rbt and Nsambya Jct Capacity Improvement	6	1.8	-	Dual Carriageway (Add. 2 lanes) & Mukwano Rbt and Nsambya Jct	Short (2013)
	3.5	Jinja Rd - Lugogo Bypass Jct	4	-	-	Signalization and Pedestrian Bridges	Short (2013)
	3.7	Shoprite & Clock Tower Jcts Traffic Safety Improvement	2	-	-	Pedestrian Bridges, Separated Left-turn Lanes and Traffic Management	Short (2013)

Source: JICA Study Team

6.5 INFLUENCE OF BRT PRE-FS ON THE SHORT LIST OF PROJECTS

(1) Outline of BRT Pre-FS Draft Final Report

The BRT consultants submitted to MoWT the Interim Report of the BRT Pre-FS in February, the Draft Final Report in April and the Final Report in May 2010.

The World Bank has financed the feasibility study and detailed design of the BRT pilot project under TSDP. It included 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 of the BRT Pilot Project.

The BRT route length and its configuration, including location of bus stations, implementation schedule and costs, are unclear 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 GKMA trunk road network, flyovers, short-listed road projects and junctions for the Pre-FS projects in 2013, 2018 and 2023 as shown in the following figures.

The Study Team assumed that BRT Route B2, Kibuye Jct–Busega Rbt, on Masaka Road should be operated by 2023 since its passenger demand is the third largest, according to the BRT Pre-FS.

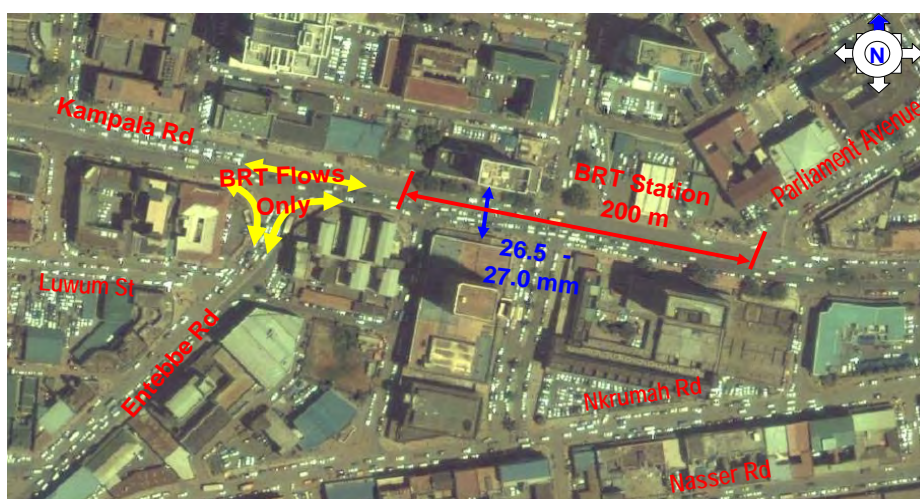
No	Sub No	BRT Route Name	Facility Length (km)	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2030
A1	A1.1	Bombo Rd - Kampala Rd - Jinja Road (Pilot)	14.0					(Jan 2015)									
	A1.2	Kireka/Northern Bypass - Mukono Terminal	13.5														
	A1.3	Northern Bypass - Kawempe Terminal	1.6														
A2		Makerere Rbt - Northern Bypass - Kanyama	2.4														
A3		Kira Rd (Mulago Rbt - Bukoto/Lugogo Bypass	2.5														
A4		Wandegeya Jct - Nabweru Terminal	7.1														
B1	B1.1	Entebbe Rd (Kampala Rd - Kibuye Jct - Kajansi)	13.1														
	B1.2	Entebbe Rd (Kajansi - Airport)	24.0														
B2		Kibuye Jct - Busega Rbt	6.5														
B3		Clock Tower - Nsambya Road - Gaba	9.3														
B4		Africana Rbt - Old Port Bell Rd - Port Bell	8.3														
CBD		City Center Triangle (On Ben Kiwanuka St)	1.2														

Notes:
■ Procurement (9 months) ■ Design ■ Construction
■ Operation on Dedicated BRT Lanes ▨ Operation on existing highways (BRT shared lanes)
 Source: Assumed by the Study Team based on BRT Pre-FS Draft Final Report / Presentation, April 2010

Figure 6.5.1 Anticipated BRT Plan Implementation Schedule (Scenario 1)

(2) Closure of Kampala Road/Entebbe Road Junction to General Traffic

In the Final Report of the BRT Pre-FS, it was confirmed that the Kampala Road/Entebbe Road Junction will be opened for only BRT (Figure 6.5.2) and closed to the general traffic. The current traffic flow direction 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 the general traffic to pass through Kampala Road except to just access the buildings along it.



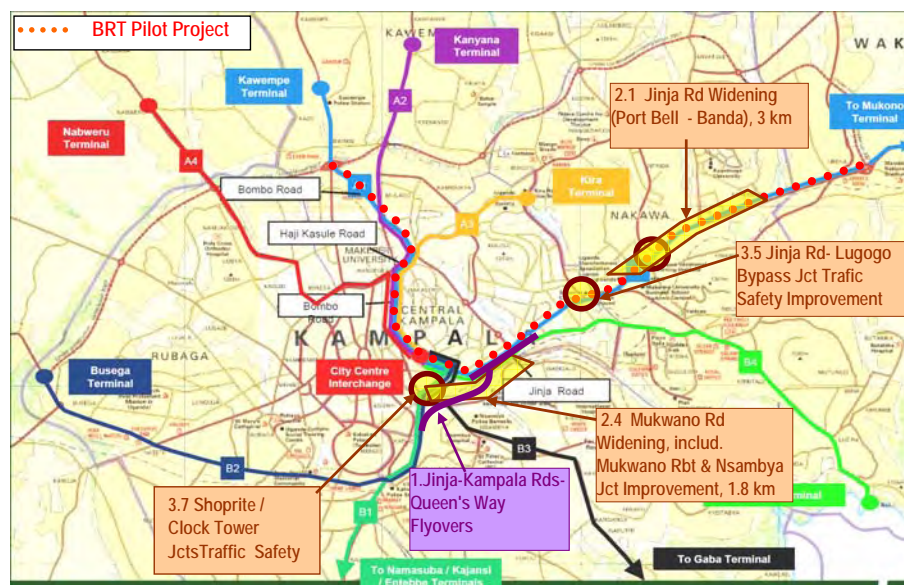
Source: The Study Team based on interpretation of BRT Pre-FS Final Report

Figure 6.5.2 Closure of Kampala/Entebbe Roads Junction to General Traffic

(3) BRT Routes and Stations in the Draft Final Report and Effects on Short List Projects

Three of the five Pre-FS short-listed projects, namely the 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 6.5.3. Other two Pre-FS short-listed projects,

Shoprite/Clock Tower Traffic Safety and Mukwano Rd Widening are also located on the planned BRT routes of B1, B2 and B3. The BRT Pre-FS did not show several important configurations/dimensions of the BRT plan, which are required for the basic design level Pre-FS of the JICA short-listed projects. Those are left to the feasibility study and detailed design consultant of BRT Pilot Project to be commended. Nonetheless, the basic concepts of BRT in the Pre-FS might be changed during the BRT FS and DD stage as a result of technical and financial reviews or public consultations.



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

Figure 6.5.3 Shortlisted Projects on the BRT Pilot Project Route

The BRT Pre-FS suggested rerouting the traffic flows from Entebbe Road to Nsambya/Mukwano/Yusufu Lule Roads and Jinja Road in line with the closing of Entebbe Junction to general traffic. The main traffic flow on Jinja Jct would be changed from the east-west direction to the north-south direction. As a flyover should be constructed on the direction of the traffic main flow, the Study Team recommended the Yusufu Lule - Mukwano Rds Flyover instead of Jinja – Kampala Rds Flyover.

(4) Coordination of Short List Projects with BRT plans

Introduction of BRT is a given condition for this JICA Pre-FS. The Study Team has modified or changed the plans of the flyover and other short list projects in June 2010, to harmonize with the BRT plan in its Draft Final Report of April 2010. As Jinja Road Widening (Port Bell Jct – Banda) and Lugogo Bypass Junction Improvement are located on the BRT Pilot Project route, the Study Team omitted these two short-listed projects from the Pre-FS list.

Table 6.5.1 Summary of Coordination of Pre-FS Projects with the BRT Plan

Shortlisted Project	BRT Route	Effect of BRT Plan on Shortlisted Projects	Coordination Method
1.1 Jinja-Kampala Rds Flyover	A1 and A2 (On BRT Pilot)	<ul style="list-style-type: none"> As Entebbe Jct is closed to general traffic, the main traffic flow at Jinja Junction will change 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 	<ul style="list-style-type: none"> Change to a flyover for the north-south direction, Yusufu Lule and Mukwano Rds Flyover (Y-M) to address the change in main traffic flow due to BRT Crossing two railways lines
1.2 Jinja - Yusufu Lule Rds Flyover (Right-turn)	A1 and A2 (On BRT Pilot)	<ul style="list-style-type: none"> Not much influence by BRT 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> As Entebbe Jct is closed to 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 planned New bottleneck at Clock Tower Jct by BRT Plan 	<ul style="list-style-type: none"> Plan a flyover to accommodate new traffic flows from BRT, 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	<ul style="list-style-type: none"> Substantial traffic volume increase by rerouting of the general traffic from Entebbe Road to Nsambya, Kibuli/ Mukwano Rds 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> BRT stations at Shoprite Junction Substantial traffic volume increase for Mengo Hill (or Queen's Way) – Mukwano Rds through Clock Tower Jct 	<ul style="list-style-type: none"> Plan pedestrian bridges which are not in conflict with the anticipated BRT stations for Shoprite Jct Plan a flyover to meet new traffic flows by BRT, Mengo Hill – Nsambya/Mukwano Rds Flyover or Queen's Way - Nsambya/Mukwano Rds Flyover, over Clock Tower Jct

Source: JICA Study Team

6.6 FINAL SHORT-LISTED PROJECTS FOR PRE-FEASIBILITY STUDY

(1) Review of Multi Criteria Analysis (MCA)

Taking the latest development of the BRT study and in accordance with the original scope of work signed by both governments on March 1, 2007, it was decided to conduct the Pre-FS with preliminary design for three final short-listed projects: Jinja Junction Flyover Projects, Mukwano Road Widening, and the Shoprite/Clock Tower Traffic Safety Improvement.

The Study Team has reviewed the MCA by taking the latest information of the sub-projects into account. The sub-projects in the initial long list that are located on the BRT pilot project routes were omitted from the MCA review list as their improvement, including road widening and junction improvement, shall be undertaken by the BRT FS/DD.

Table 6.6.1 shows the review result through MCA to be used as confirmation of the final short-listing of Pre-FS projects.

Table 6.6.1 Review of Multi Criteria Analysis (MCA) for Final Short Listing for Pre-FS

Project Component	Sub-Component No.	Sub-Component Name	Consistency with Superior Plans		Engineering Factors		Socio-Economic Factors				Environmental Impacts			Total (evaluated score with weight)	Order of Priority by MCA	Remarks (Estimated number of households required resettlement)	
			25%	25%	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	20% Resettlement Requirements					
Flyover / Viaduct	1.1 (Phase 1)	Yusufu Lule - Mukwano Rds Flyover	12.5%	14.5	12.5%	14.8	12.5%	15.9	7.5%	3.8	11.1	8.1	10.0%	9.5	113.5	3	Resettlement (10-20)
	1.2 (Phase 1)	Jinja - Yusufu Lule Flyover (Right-turn) and Mukwano - Jinja Rds Flyover (Right-turn)	14.5	15.3	14.8	14.8	12.7	8.7	3.8	11.1	8.1	8.9	9.5	107.4	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	12.7	8.9	12.7	115.9	2	Resettlement (less than 10)	
Combination of Dual Carriageway, Flyover and Junction Improvement	2.3	Makerere Hill Road, including Sir Apollo Kaggya Rd Jct	14.5	12.3	11.8	12.7	8.7	7.5	6.6	10.8	3.0	3.2	91.1	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	8.9	9.5	106.3	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	15.9	83.8	13	No Resettlement		
Individual Junction Improvement	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	3.2	103.1	6	Resettlement (more than 50)		
	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	9.5	87.3	12	Resettlement (10-20)		
	3.2	Kira Road - Acacia/ Babiba Av/ Kayunga Rd	14.5	9.2	11.8	12.7	6.5	9.4	4.4	2.7	11.8	12.7	95.8	8	Resettlement (less than 10)		
	3.3	Kira Rd - Ninda Rd	14.5	12.3	11.8	12.7	6.5	9.4	2.2	2.7	11.8	12.7	96.6	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	12.7	90.7	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	6.3	92.7	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	11.8	12.7	115.9	1	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.

Source: JICA Study Team

(2) Final Short List of Projects for Pre-FS

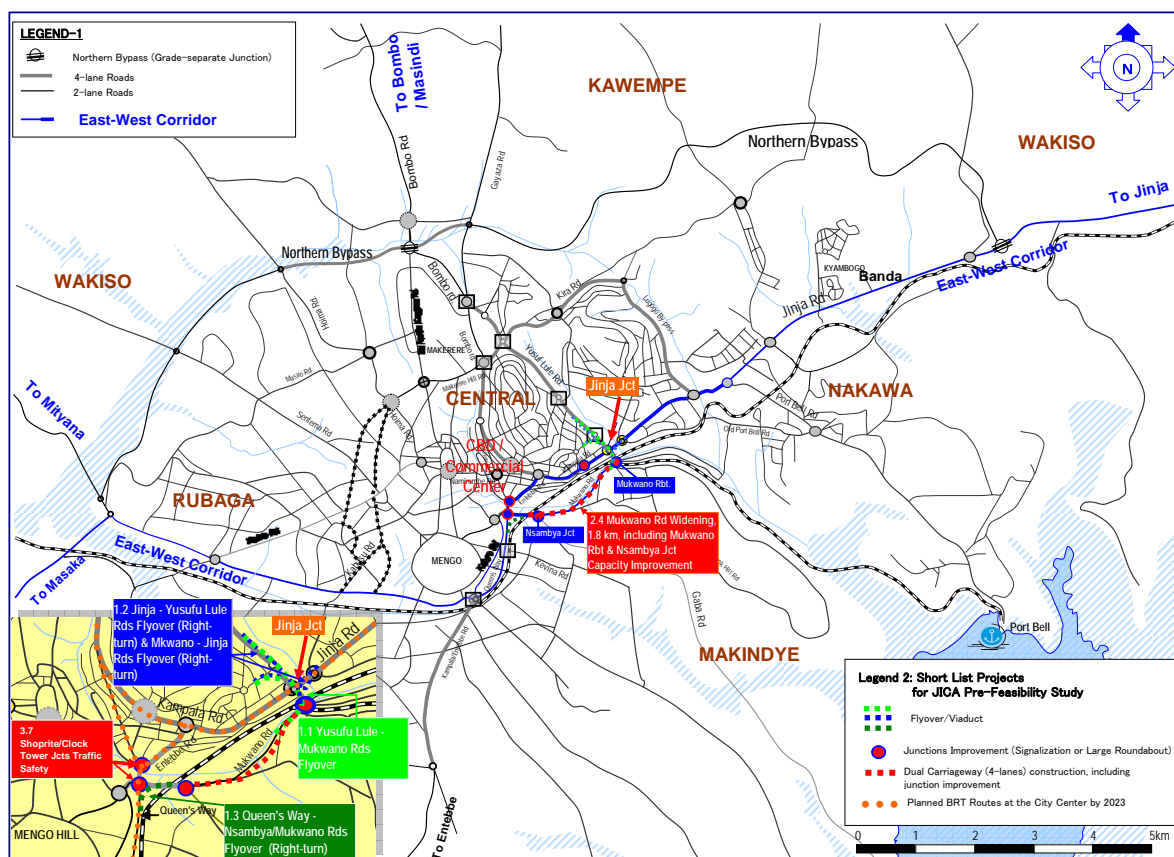
Table 6.6.2 and Figure 6.6.1 summarize the short-listed projects for Pre-FS finally agreed and subjected to Pre-FS.

Table 6.6.2 Final Short List of 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)	3
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)	Queen's Way - Nsambya / Mukwano Rds Flyover (Right-turn)	0.6	0.5	Single Carriageway	Long Term (2023)	2
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)	1

Note: Preliminary planning of a flyover on Kibuye Roundabout was included in the Study addressing the proposal of MoWT in line with Dual Carriageway Railway Viaduct Plan in NTMP/GKMA.

Source: JICA Study Team



Source: JICA Study Team

Figure 6.6.1 Final Short-List of Projects Selected for Pre-FS

