3.3 CURRENT SITUATION AND KEY ISSUES OF THE PUBLIC TRANSPORT SECTOR IN GKMA

3.3.1 OVERVIEW OF THE PUBLIC TRANSPORT

The privately owned Uganda Transport Company (UTC) held the exclusive franchise for bus services in Kampala until its nationalization in 1972. At that time, its only competition came from shared taxis which are saloon or estate cars. Following its nationalization, UTC contracted and focused more closely on its long-distance services. As a result, the market for urban transport services in Kampala became open to private sector operators using small minibus vehicles.

In 1994 a commercial vehicle distributor established City Link as a private-sector large bus operation with some 40 vehicles in service. However, UTODA was able to organize an effective competition to this initiative. City Link meanwhile did not succeed by operating similar to that of minibus services based on fill-and-run principle, rather than operating based on scheduled services. Thus, the company shortly collapsed. Feedback from these results indicates that although City Link was popular, its operations were too thinly spread over the network and were not able to provide a reliable service.

Public transport passengers within Kampala have very limited choice such as minibus services or motorcycle services with the majority as minibus services locally called taxis.

3.3.2 TAXI/MINIBUS

Main supply of public transport in Kampala is now by minibuses, which are known locally as taxi (photographs bellow). KCC estimated that in 2003, there were nearly 7,000 minibuses based in the GKMA. Of these, approximately 5,000 were used for providing local services while the remainder for inter-urban services throughout the country. Majority of the minibuses consist of 14-seaters and a few large size buses.

Taxi (Matatus) in the City Center

Old Taxi Part in the City Center

Source: JICA Study Team

It was estimated in 1997 that 26% of the total vehicle flow was public transport, while 55% private transport. The share of passengers using public transport was 70% while the remaining 30% used private cars and others.

It was also estimated that the maximum daily passenger capacity in 2002 was 4,590,000 passenger trips. However, due to vehicle defects and breakdowns as well as deliberate removal of vehicles from non-profitable services, available capacity is only about 70% of the maximum or 3.2 million passenger trips per day in 2002.

(1) Licensing and Regulation

1) Vehicle Licensing and Route Allocation

New public service vehicles have to be licensed by the TLB under the MoWT. There is however no limits imposed on the number of vehicles which can operate on any route and it seems that vehicles switch between urban and interurban services.

Only those issued with "D License" are allowed to drive public service vehicles including minibuses. Driver must be over 25 years old and must be trained by an instructor licensed by the Director of Transport and Communications to receive lessons in driving this type of vehicle.

2) Route Allocation

TLB has the duty to furnish to the Minister once every year a list of route and packages of routes covering the whole Uganda, selected and assembled so as to provide transport services to meet reasonable passenger demand. This is supposed to determine which means of services will be reasonably efficient and economical from either as listed singly or otherwise for both large and small prospective operators.

TLB therefore has considerable power to determine the routes and scheduled service operated by different operators. However it devotes more effort to monitoring and regulating the inter-urban routes particularly for the large size bus operations than minibus routes in Kampala. License to operate minibuses in Kampala does not specify particular route or frequency of operation.

(2) Operation and Organization

1) Role of UTODA

In 1986 UTODA won a contract from the KCC to manage the two main minibus parks (old and new taxi parks) in the Kampala City center. They have retained this contract since 1986 and presently, they have parks and offices in 27 districts. UTODA have to pay UShs 300 million (UD$ 155,000) to KCC every month, which constitutes a substantial portion of the review of KCC.

On the other hand, UTODA charges the minibus drivers a fixed daily fee on their first entry into the main taxi parks. They also charge an exit fee for each departure that varies depending upon the length of route. Some members estimate these fees to be UShs 17,500 (US$ 9) per day in total.

2) Fares

There is no state control of fares, but UTODA defines standard fares for each route. Such fares are charged at UShs 600-1,000 (US$ 0.30-0.50) to Natete (6km), UShs 1,300-1,500 to Mukono (22km) and UShs 1,500-2,000 to Entebbe (40km) in 2010.

Fares increase during the peak periods and during occasions of high demand, such as just before Christmas when transport services are fewer.

3) Working conditions for Minibus Drivers and Financial Viability of Owner

Drivers hire minibus from owners for a daily charge. The drivers are responsible for providing fuel and paying the charges for using the UTODA terminals. The drivers tend to work long hours although much time is spent waiting to be filled up with passengers at the very congested minibus park. They said that there might be 20 minibuses waiting to load for one route and the

expected queuing time at the terminal could be more than 90 minutes. UTODA estimates that the minibuses on local routes within GKMA make about five round trips per day on average.

It is generally understood that the owners of minibuses at present do not earn sufficiently to make it worthwhile investing on new vehicles. This may be partly because either UTODA is expecting too much fee from drivers or an oversupply of such vehicles. While the whole minibus fleet may be required at the city center during peak hours is very much less occupied by passengers during the rest of the working day. It would almost certainly be more economical and would result in a cheaper service if the supply of minibuses were reduced.

(3) User's Satisfaction

Public transport passengers in Kampala have very limited choice. Unless they can afford to use the motorcycle or normal taxis, they have to take the minibus service. It is confirmed that there is a considerable dissatisfaction with the service offered as shown below:

- Fully loading the minibus prior to departing from taxi terminal. Thus, passengers who want to board at other stops a little distance away from the terminal often cannot do so since the minibuses are already full.
- Passengers also dislike the uncertainty of fare charges. Poor passengers who will travel home after work could not decide whether they can afford to pay the fare or just prefer to walk,
- Female passengers were also concerned about harassment and complained that conductors usually encourage rather than prohibit such behavior when observed.

(4) Direction of Current Development

- In June 2003, the government published the KUTIP. This includes detailed and relatively inexpensive plan to improve the management of traffic in the central area of Kampala,
- The government has also completed a National Transport Plan which includes a Master Plan for the GKMA. This contains longer term and relatively expensive investment plans to improve the coordination between transport and land use planning and develop improved public transport, and requires considerable expenditure on new and improved roads.
- UTODA has also indicated that they have plans to build peripheral minibus terminals in the suburbs to try and restrict the congestion due to increasing number of minibuses entering the city center. UTODA stated that these would consist of modern terminals with shopping arcades, public car parks and petrol stations.

(5) Main Problems

Based on the above mentioned conditions, the following are the main problems and issues to be addressed for the improvement of poor conditions of public transport services in Kampala:

1) Regulation

- Introduce more efficient vehicle inspection system for the safe operation of the public transport
- Review minibus licensing system to allow a certain timetable of operation on fixed route with fixed fare
- Restrict monopoly and open the industry to more applicants for better services

2) Operator and Association

- Road traffic to and from the city center is always congested
- Taxi parks are also congested and much time is wasted for loading
- Congestion and increasing fleets led to ineffective operation and less earnings
- Too much concentration of departure from central parks in the city center leads to more congested traffic in the CBD/City Center; thus, better dispersion of functions to suburbs should be initiated for future expansion of business

3) Users

- Provide better and safe vehicles
- No fixed fare
- No timetable operation
- Fully loading the minibus prior to departing from taxi parks cause difficulty to those intending to ride at other designated stops, even at locations near the taxi parks
- Improve the conductors' behavior against cases of harassment
- Improve travel time caused by the traffic congestion due to insufficient infrastructure.

3.3.3 BUSES

(1) General

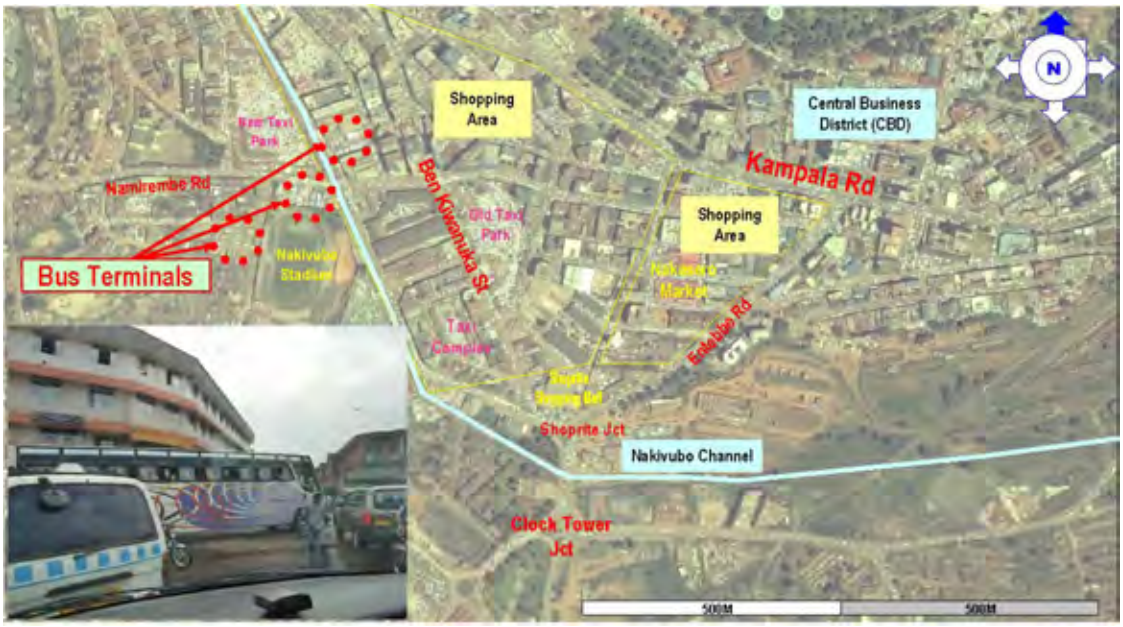
About 400 buses including those with a capacity of more than 25 passengers and those with capacity of 62 or 67 passenger seats, are mainly used for inter-urban and international journeys to neighboring countries. Most of the buses operate from the city center in Kampala to a certain destination.

(2) Regulation and Organization

The official agency for transport licensing and regulation is the TLB. It organizes meetings with the local government and bus operator applicant. After the discussion is made on the level of the proposed services, TLB issues the license to the applicant.

There are mainly two associations serving inter-urban bus transportation, i.e., Uganda Bus Terminal (UBT) and Qualicel Bus Terminal (QBT). Both operate in the very busy city center in Kampala located near the new and old taxi (minibus) parks.

UBT comprises 13 companies operating with 154 buses with either 62 or 67 passenger seats. QBT meanwhile organizes 58 companies with 239 numbers of large size buses in addition to more than ten coaster buses departing from each of the terminal in the city center. This situation accelerates the traffic congestion in the city center.



Source: JICA Study Team

Figure 3.3.1 Concentration of Bus Terminals, Minibus Parks and Shops in the City Center

(3) Operation

Each association regulates bus operations for the west, north, east, west Nile, Malaba and inter-states in terms of route directions with regular fare and time table. For example, the western route charges UShs 15,000 – 20,000 (US$ 8-10). Most of the buses start from Kampala taking passengers with more than a half of its capacity. However, from the region to Kampala, most of the buses leave with less than 20 passengers, and are full before reaching Kampala.

Buses are a high capacity collective mode of transport for medium and long distance journey with well-established boarding points (bus parks), routes, intermediate stops and timetables.

3.3.4 BODA BODA

(1) History and General Information

Boda boda services are known to have originated in the mid-1960s, in the border region with Kenya, such as Busia County of Tororo District in Eastern Uganda. The term itself is derived from English term ‘border-border’. Boda boda mainly provide a passenger taxi service, although they can sometimes be hired to move goods. The boda boda journey has no determined route and can go to any requested destination.

Both bicycle and motorcycle services are often known by the same name boda boda (photographs below). Both types of vehicles offer short distance and low-capacity services that is able to serve low-density demand or at locations where access is restricted by the width or quality of the route. They operate from stands in town, in trading centers, and at the bulk public passenger service vehicle stops along main roads that provide access to feeder routes. On these routes, boda boda are the dominant service in many areas of Kampala.

Boda Boda (Motorcycle)

Boda Boda (Bicycle)

Source: JICA Study Team

(2) Fleet Growth

The size and the growth of the national motor vehicle fleet in Uganda are subjects of considerable uncertainty due to inconsistencies in official statistics. However, it is clear that there was rapid expansion in recent years. Motorcycles appear to have increased in number by a factor of 14%, more than double of other vehicles. The contributory factor to the rapid growth of the industry was ease of entry to the market.

(3) Regulation and Organization

Although it was proved to be difficult for the government to regulate the boda boda industry, some operational discipline is abided by the associations to which the majority of boda boda operators belong. The association represents them in case of harassment by security personnel, traces members in cases of theft, or their relatives if there is an accident through their stage committees that enforce discipline.

Some people say that these associations are transforming from a character providing a welfare service to important business and political entities. This has already been observed in the taxi industry. Taxi and bus operator associations set passenger fares and small goods tariffs, but also allocate, regulate and distribute routes among members.

District authorities have the legal right to request annual contributions from taxi or boda boda associations or collect fees from the association itself on behalf of its members. These fees are payments for their right to use municipal parking facilities and offer services to passengers. Fees are usually significant contributions to municipal finances and it is widely believed that the associations are more efficient at revenue collection than the civic authorities.

(4) Operation and Services

Boda boda primarily provides short-distance services within the main urban areas, such as from feeder routes to the main road, and to urban areas. The area of operation of a boda boda is called a stage. Each one has a stage master appointed by the respective association. In Kampala Central alone, there are 124 stage masters and more than 2,000 operators belong to the Uganda Association of Motorcycle & Bicycle Operators (UAMBO). The majority of boda boda are operating by motorcycles in Kampala.

Charges are normally levied for a particular stage. However, there may be the same charge for a stage varying slightly in length. For example, in 2010, the average fares per passenger for certain distances are USsh 1,400 (US$ 0.7) for 0-1km travel and USsh 1,500-2,000 (US$0.75-1.0) for 2-5 km travel. It is noted that motorcycle boda boda charge fares which are about twice more expensive than minibus fares.

(5) Users

Some interview results show that users of either type of boda boda are mainly workers, business community, students, and health patients. People belonging to the wage and salaried employment group accounts to a little over 43% of users, while the self-employed and students as an important minority accounts to about 38%, and 18%, respectively.

The main reasons for using motorcycle-based services are its mobility (speed), convenience when no taxis available, a door-to-door service is required, or the user is in a hurry.

(6) Main Problems

1) Association

Major issues indicated by the representatives of the association are as follows:

- Accidents,
- Theft of vehicles,
- Lack of access to micro-finance,
- Poaching of members and their fees,
- Operation of members in area outside of the association's jurisdiction.

2) Owners and operators

Owners and operators face a number of problems including the high cost of entry to the industry, lack of credit facilities, difficulty in obtaining spare parts, and poor maintenance of facilities and manpower.

3) Users

There are perceived of risks on the use of boda boda, associated with accidents. Accidents are certainly common due to reckless driving and drunkenness, which are alleged to be the main contributory factors. Youths comprise a significant proportion of boda boda operators, and thus may be a factor for such undisciplined behavior of driving. There is evidence that the casualties due to accident from the use of boda boda involve mostly woman as they prefer to sit at the sidesaddle without wearing helmets. Passengers seating on such position are more easily thrown from the motorcycle.

CHAPTER 4 REVIEW OF TRANSPORT MASTER PLANS

4.1 MASTER PLAN AND FEASIBILTY STUDIES ON THE IMPROVEMENT OF TRUNK ROAD AT KAMPALA URBAN INTERFACE SECTIONS (BY JICA) IN 1997

4.1.1 OUTLINE OF PLAN

In response to a request from the GOU, JICA conducted a master plan study and feasibility studies in 1997 for the improvement of priority roads and junctions in KCC. The study included the following:

- Policy and strategy on the transport sector
- Socio-economic conditions
- Road inventory
- Comprehensive traffic survey
- Analysis on traffic demand base and KCC structure plan (1994)
- Formulation of road development master plan.

Feasibility studies were conducted for the priority projects and implementation plans were recommended targeting the official development aid (grant) from GOJ.

The technical and economical feasibility studies were conducted for roads and junctions as summarized in the following table:

Table 4.1.1 Summary of Priority Projects Conducted with Feasibility Study under JICA 1997

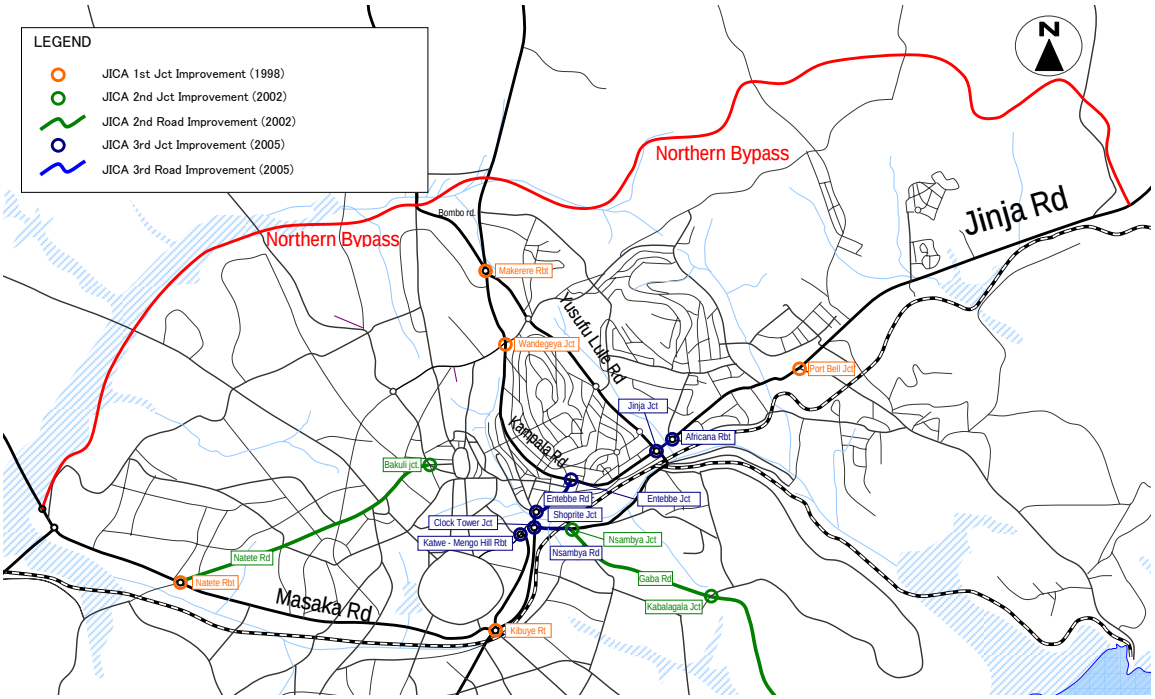
Bottleneck Junction Improvement			Road Section Improvement		
Name of Junction	Type of Improvement	Implementation by	Name of Road	Length / Number of lanes	Implementation by
Natete Jct	Signalized	Grant/GOJ	Natete Road	3.8 km	Grant/GOJ
Makerere Jct	Roundabout	Grant/GOJ	Gaba Road	9.1 km	Grant/GOJ
Kibuye Jct	Roundabout	Grant/GOJ	Port Bell Road	4.8 km	By other finance
Port Bell / Jinja Rd Jct	Signalized	Grant/GOJ	Gayaza Road	4.6 km	By other finance
Wandegeya Jct	Signalized	Grant/GOJ	Hoima Road	8.5 km	By other finance
Jinja Rd Jct	Roundabout (plan)	Grant/GOJ (signalized)			

Source: JICA Study Team

4.1.2 CURRENT PROGRESS

Most of the priority projects conducted with feasibility studies under "Master Plan Study of Improvement of Trunk Roads at Kampala Urban Interface Sections" were already implemented through grant aid of the GOJ in 1998-2007 as shown in Table 4.1.1 and Figure 4.1.1.

Shoprite Junction, Clock Tower Junction and Africana Roundabout, which were not covered by the JICA 1998 Master Plan and Feasibility Study but given priority in KUTIP, were also implemented through grant assistance from the GOJ in 2005-2007.



Source: JICA Study Team

Figure 4.1.1 KCC Trunk Roads and Junctions Improvement undertaken by Grant Assistance of the GOJ (1998-2007)

4.1.3 ISSUES

The Study Team conducted interviews related to junctions with the worst traffic jams, during the Steering Committee/ Stakeholder meetings, and collected 57 replies. Among the worst ten junctions, six were improved through the grant aid from 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 (Traffic Control Center).** As the traffic at all these junctions has far exceeded the traffic capacity, flyover construction and/or road and junction widening are required to alleviate the current severe traffic congestion together with appropriate traffic management.

4.2 KAMPALA URBAN TRANSPORT AND IMPROVEMENT PLAN (KUTIP)

4.2.1 OUTLINE OF KUTIP

(1) Outline of KUTIP

In June 2003, KCC established the KUTIP which included detailed and relatively inexpensive plans to improve the management of traffic in the central area of Kampala City. This was funded by the World Bank and coordinated by KCC and MoLG

(2) Objectives of KUTIP

The objectives of KUTIP were:

- To develop, define and appraise short-term (five years) traffic improvement schemes for Kampala City that consists of:
  - Reduction of traffic congestion and improvement of urban mobility, reduction of time loss, vehicle operating costs, etc. for road users;
  - Improvement of road safety and reduction of road traffic accidents; and
  - Improvement of traffic management and enforcement in the city center.
- To prepare design, specifications and costing for the proposed short-term interventions and evaluate the associated economic, financial and environmental implications.
- To transfer relevant technology to KCC and MoWHC personnel in the course of the study.
- To prepare a traffic education and awareness program for the identified road user categories.

4.2.2 CURRENT PROGRESS OF KUTIP

(1) Proposed Plans

The improvement proposals based on the problem audit in the study were grouped into the following three major categories:

1) **Traffic Management Measures,** including traffic circulation (one-way streets, ban on conflicting movements, closure of median gaps), regulation and enforcement (goods movement management, removal of encroachment and street hawkers), traffic demand management, parking management, pedestrian facilities and street furniture.

2) **Geometric Improvement,** including re-design of junctions, signalization of critical junctions and road widening.

3) **Traffic Safety Education and Awareness Programs**

Consequently, the following interventions were adopted for implementation:

- Area Traffic Management Schemes (without junctions)
  - Queen's Way – Katwe Road Area
  - Old Kampala – Namirembe Road

- Station Area Gyratory
- Central Area

- Junction Improvement
  - Clock Tower – Shoprite
  - Ntinda Road – Jinja Road
  - Hotel Africana Roundabout
  - Jinja Road Roundabout
  - Mukwano Roundabout
  - Pioneer Mall
  - Pride Theater
  - Bakuli
  - Kasubi
  - Bwaise
  - Nakulabye
  - Fairway Hotel Roundabout
- Road Widening Scheme
  - Mukwano Road with Gaba Road Junction
  - Makerere Hill Road with University, Makerere Road and Sir Apollo Kaggwa Road Junctions

(2) Current Progress of KUTIP

KUTIP had proposed the following plans in consideration of economic internal rate of return (EIRR) for each package and its capital cost investment. Current progress of KUTIP is as follows:

Table 4.2.1 Progress of KUTIP

Year	Name of the Project		Rank	Progress	Remarks
1	Area Traffic Management	Queens' Way – Katwe Road Area	1	Completion	2004
		Central Area	2	Completion	2004
	Junction Improvement	Jinja Road Roundabout (signalization)	3	Completion	2005/JICA
		Pioneer Mall	4	On-going	KIIDP Phase-I
2	Area Traffic Management	Old Kampala – Namirembe Road	6	Completion	2004
		Station Area Gyratory	5	On-going	KIIDP Phase-I
	Junction Improvement	Bakuli (signalization)	8	Completion	2002/JICA
		Pride Theater	7	On-going	KIIDP Phase-I
		Bwaise	9	On-going	KIIDP Phase-I
3	Junction Improvement	Clock Tower – Shoprite and Queen's Way (signalization)	10	Completion	2005/JICA
		Hotel Africana Roundabout	13	Completion	2005/JICA
		Nakulabye	11	On-going	KIIDP Phase-I
4	Junction Improvement	Fairway Hotel Roundabout	12	Not yet financed	
		Kasubi	14	Not yet financed	
		Ntinda Road – Jinja Road	16	Not yet financed	
		Mukwano Roundabout	15	Not yet financed	Pre-FS Road in this Study
5	Road Widening	Mukwano Road with Gaba Road Junction	17	Not yet financed	Pre-FS Road in this Study
		Makerere Hill Road with University, Makerere Road and Sir Apollo Kaggwa Road Junctions	18	Not yet financed	

Source: JICA Study Team

Of the above, the GOJ extended grant aids for the improvement of five junctions (Jinja Jct, Hotel Africana Rbt, Bakuli Jct, Shoprite Jct and Clock Tower Jct) in 2002-2007.

4.2.3 ISSUES

The following are noted as to the implementation of KUTIP:

- Delay of implementation due to difference of opinions among various stakeholders and obtaining required approvals from concerned departments/organizations

  - KCC should coordinate and involve all stakeholders from the time of project preparation.

  - A strong inter-departmental or organizational coordination committee should be formed to minimize possible disagreements.

- Availability of funds for implementation

  - KUTIP recommended that the low cost traffic congestion improvement measures be implemented first to make the government and the road users understand the need for providing more funds for traffic improvement.

  - KCC should look into alternative ways such as involvement of various private commercial and industrial sectors' participation in the implementation program.

  - KCC should provide advertisement rights at the junctions and along the road to the private investor.

- ROW acquisition difficulty for road widening (dual carriageway construction).

- Traffic congestion on Queen's Way has been reduced after changing both lanes to one way direction in 2004. However, traffic congestion on Katwe Road, which runs in parallel with Queen's Way, has increased. A review is required by taking the traffic increase on these roads since 2003 and a viaduct plan from Jinja Rd to Kibuye Rbt in NTMP/GKMA (refer to Section 4.3.3).

- As some junction improvement and road widening planned in KUTIP are located along the BRT routes, influence and coordination with the BRT plan should be studied.

4.3 OUTLINES OF NTMP/GKMA

4.3.1 OUTLINE OF NTMP

In May 2009, the MoWT has established NTMP which covers the nationwide transport master plan and NTMP/GKMA, which specifically covers the transport master plan for GKMA in this report. NTMP/GKMA is a comprehensive long-term plan for the transport sector, covering not only investments needs, but also the whole transport framework including policy and strategy, institutions, legal and financial issues, land and environment, stakeholder interests, and capacity building. In NTMP, the GKMA urban transport was treated as a separate 'transport mode' and investment category.

NTMP set out a framework for development of the transport sector over the next 15 years (2008-23) in three five-year phases, namely, short-term (2008-13), medium-term (2013-2018) and long-term (2018-2023). The Cabinet Memorandum for NTMP/GKMA was submitted to the Cabinet for approval in February 2010. MoWT is presently awaiting approval[1]. However, as most of the investment plans in NTMP/GKMA were already incorporated in the NDP (2010/11 – 2014/15), including development of GKMA and BRT introduction, it is expected to be approved soon.

The population of Uganda grew from 16.7 million in 1992 to 24 million in 2002 at a rate of 3.3% per annum. According to UBOS, the population in 2008 was estimated at 29.6 million and the NTMP projection for 2023 is 49.3 million. The economy of Uganda had expanded rapidly since the early 1990s, with an estimated real growth of 7.7% per annum from 2000 to 2007. For further development, adequate infrastructures, including an efficient and reliable transport facility shall be a pre-requisite. The road is estimated to carry 96.5% of goods and over 95% of passengers in the country. In the future, road traffic is expected to grow at around 8% per annum up to 2013, and 7% thereafter.

NTMP includes a set of commonly proposed objectives, strategy and activities within a long-term vision of national development (Visions 2025 and 2035). It is expected to support enhancing the development of agriculture, industry, commerce and other sectors.

The proposed expenditures over 15 years is US$ 10,876 million as summarized in Table 4.3.1, of which 32.9% will be incurred in 2008-2013, 34.8% in 2013-2018 and 32.2% in 2018-2023. Over the whole plan period, road sector investment will account for 81.4% of expenditure, GKMA (excluding national roads) for 10.9%, the rail sector for 4.2%, the air sector for 2.2%, inland water (excluding road bridges) for 1.2% and institutions for 0.2%.

[1] Information of the MoWT at the Transport Sector Working Group Meeting on 21st July 2010.

Table 4.3.1 Summary of Investment Proposals, 2008-2023

Sub -Sector	Investment Costs			
	2008-13	2013-18	2018/23	Total 2008/23
Roads				
- National Roads (a)	2,584.37	2,334.10	2,320.00	7,238.47
- District Urban and Community Roads (b)	624.66	499.75	487.55	1,611.96
Sub-Total	**3,209.03**	**2,833.85**	**2,807.55**	**8,850.43**
Rail sector (c)	**51.67**	**390.66**	**18.67**	**461.00**
Air Sector				
- Entebbe International Airport	37.20	30.20	25.60	93.00
-Other airports	51.00	61.50	29.00	141.50
Sub-Total	**88.20**	**91.70**	**54.60**	**234.50**
Inland Water Transport	**54.50**	**59.00**	**16.50**	**130.00**
Greater Kampala (GKMA)	**156.91**	**413.66**	**610.07**	**1,180.64**
Institutions	**19.38**	**0.00**	**0.00**	**19.38**
Total, (Transport Sector)	**3,579.69**	**3,788.87**	**3,507.39**	**10,875.95**

Notes: (a) Backlog maintenance, routine and periodical maintenance ,rehabilitation, reconstruction and upgrading
(b) Routine and periodical maintenance, and low -cost sealing
(c) Government contribution only (Estimated at 20% of cost)
- Exchange Rate (2008/2009): US$ 1.00 = Ushs 1,650.00

Source: NTMP, May 2009

The total investment excluding routine and maintenance programs' costs for the national roads was estimated at US$ 7,240 million.

Table 4.3.2 shows the summary of proposed investment by financial year. The estimated investment framework is US$ 11,188 million as against the proposed investment of US$ 10,876 million. Although it has a margin of US$ 242 million (a margin of 2.2%) at the end of the plan, there is a significant deficit of available fund in the years 2009-2016, totaling to US$ 969 million over seven years. This is primary due to the high levels of road sector investment scheduled under the UNRA and DUCARIP.

Table 4.3.2 Summary of Proposed Investments and Expenditure Framework, 2008-2023

No	Sub-sector	2008/09 - 2012/13	2013/14 - 2017/18	2018/19 - 2022/23	15 Years, 2008-2023	Remarks (Share)
1	Roads	3,209.03	2,833.85	2,807.55	8,850.43	81.4%
2	Railways	51.67	390.66	18.67	461.00	4.2%
3	Air	88.20	91.70	54.60	234.50	2.2%
4	Inland Water Transport	54.50	59.00	16.50	130.00	0.0% 1.2%
5	Greater Kampala (GKMA) (a)	156.91	413.88	610.07	1,180.64	0.0% 10.9%
6	Institutions	19.38	0.00	0.00	19.38	0.2%
	Total (Transport Sector)	3,579.69	3,789.09	3,507.39	10,875.95	100%

Note: Excluding road investments already counted in the roads program
Source: NTMP, May 2009

4.3.2 OUTLINE OF NTMP/GKMA

The GKMA includes Kampala City, most of Wakiso District and part of Mukono District. Its total area is 970 km^2 and its estimated population was 2.0 million in 2003 and 2.5 million in 2008. The population will reach 3.1 million in 2013, 3.8 million in 2018 and 4.5 million in 2023 at an estimated average increase rate of 4% per annum. It seems that urbanization would progress faster than the forecasted growth rate in NTMP/GKMA. The traffic increase is more than the national average and is over 13% on major arterial roads.

To provide transport infrastructures and services required for such rapidly increasing population, economy and traffic, MoWT has established the NTMP/GKMA as a separate part of the NTMP. NTMP/GKMA comprises the following main elements:

- Establishment of a single GKMA transport authority (MATA)
- Adoption of the transit-oriented development (TOD) concept
- Reorganization and restructuring of the public transport services and fleet
- Improvement of the existing road network to improve traffic flow and safety, including NMT facilities.

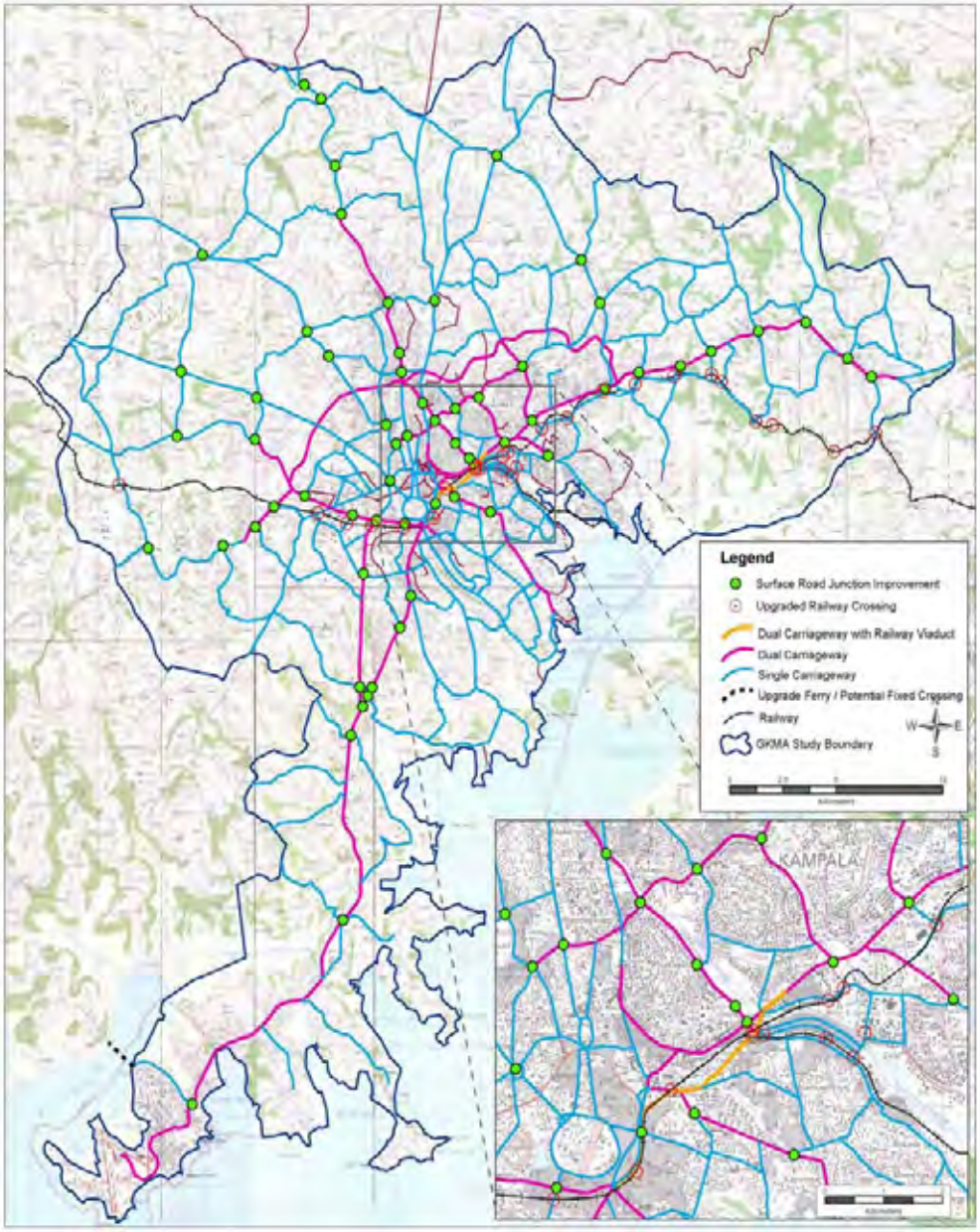
While much of the above elements will require government expenditures, private sector participation is also expected.

Key considerations in addressing the NTMP/GKMA goals include:

- Road configuration and design standards
- Traffic management, traffic flow and road safety
- Traffic signal and road furniture standards
- Dual carriageway viaduct construction, dual carriageway construction, single carriageway improvement, junction improvement including at-grade and grand-separated junctions.
- Railway crossing improvements
- Pedestrian pavement and crossing facilities
- Appropriate balance between different types of public transport.

A 15-year Road Sector Investment Program (Figure 4.3.1) was proposed for a period of 2008-2023, including roads and safety improvements. Road development comprised three types namely, dual carriageway with railway viaduct, dual carriageway construction and single carriageway improvement.

It should be noted that the initial NTMP/GKMA in 2005 did not include introduction of BRT. The final NTMP/GKMA in May 2009 included four BRT routes without any concept. A Pre-FS of BRT had been conducted for the establishment of a concept plan of BRT, selection of a pilot BRT project and TOR preparation for the feasibility study and detailed design for a pilot project, since November 2009. Its final report was submitted in May 2010.



Source: NTMP/GKMA

Figure 4.3.1 Roads Development Components in NTMP/GKMA

The total investment expenditures for NTMP/GKMA were estimated at US$ 1,380 million over 15 years (2008-2023) as summarized in Tables 4.3.3 and 4.3.4. The items are mostly those identified in the 2005 NTMP/GKMA, except the BRT (New Busways and Equipment). The investments will be phased into five-year stages; US$ 182.0 million (13.2%) for 2008-2013, US$ 508.9 million (36.9%) for 2013-2018 and US$ 689.6 million (50.0%) for 2018-2023. The investment is for three components namely, roads (60%), safety improvements (9%) and introduction of Busways (31%).

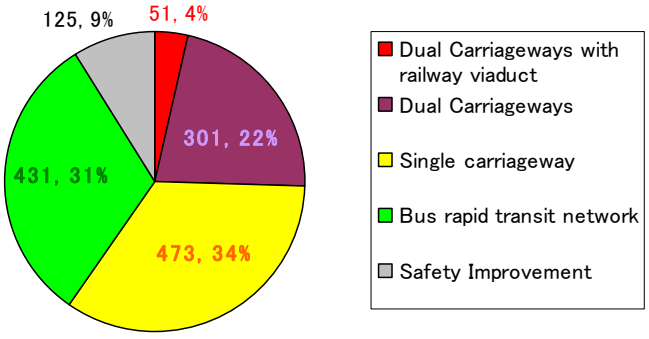


Table 4.3.3 Recommended GKMA Transport Investment (2008-2023) in US$ Millions

No	Investment Type	Length/No of Site	Estimated Investment Cost	Remarks (Unit Cost)
	I. Roads			
1	Dual Carriageway with Railway Viaduct	4.74 km	50.8	10.72
2	Other Dual Carriageways	122.85 km	300.73	2.45
3	Single Carriageway	582.93 km	473.37	0.81
	Total(Roads)	710.52 km	824.90	
	II. Safety Improvements			
1	Junction Improvements	62 locations	81.6	1.32
2	Railway Crossings	27 locations	12.65	0.47
3	Pedestrian Pavements and Crossings	1,053.00 km	30.26	0.03
	Total (Traffic Management, Safety)		124.51	
	III. Proposed Busways (BRT)			
1	New Busways and Equipment	4 Busways	431.00	
	Total (Investment Costs)		1,380.41	

Source: NTMP/GKMA, MoWT, May 2009

However, these investment costs would not be enough when considering BRT Pre-FS cost estimate, dual carriageway viaduct and grade separate junction (flyovers) improvement, planned expressway construction between Kampala and Entebbe International Airport, and land acquisition and resettlement compensation for dual carriageway construction and other planned projects.

Table 4.3.4 Phasing of GKMA Investments by Year, 2008-2023 (US$ Millions at 2008 prices)

Roads	2008/10	2009/10	2010/11	2011/12	2012/13	2008/13	2013/14	2014/15	2015/16	2016/17	2017/18	2013/18
Dual Carriage with railwy viaduct	0.05	1.27	5.08	7.62	7.62	21.64	7.62	10.17	10.17	1.22		29.18
Dual Carriageway	0.31	0.75	7.51	15.04	15.04	38.65	22.56	22.56	30.07	37.59	30.07	142.85
Single carriageway	0.48	2.36	4.73	7.10	7.11	21.78	7.10	7.11	7.10	35.50	47.33	104.14
Bus rapid transit network		1.50	1.50	35.67	35.66	74.33	35.67	35.67	35.67	35.67	35.67	178.35
Total, Roads	**0.84**	**5.88**	**18.82**	**65.43**	**65.43**	**156.40**	**72.95**	**75.51**	**83.01**	**109.98**	**113.07**	**454.52**
Safety improvements												
Junction Improvements	0.41	2.04	4.08	6.12	8.16	20.81	8.16	8.16	8.16	6.94	6.12	37.54
Rialway crossings	0.02	0.12	0.32	0.32	0.63	1.41	0.63	0.95	0.95	0.95	1.26	4.74
Pedestrian pavement and crossing	0.03	0.15	0.15	0.76	2.27	3.36	2.27	2.27	2.27	2.27	3.03	12.11
Total safety improvements	**0.46**	**2.31**	**4.55**	**7.20**	**11.06**	**25.58**	**11.06**	**11.38**	**11.38**	**10.16**	**10.41**	**54.39**
Total Investment Costs	**1.30**	**8.19**	**23.37**	**72.63**	**76.49**	**181.98**	**84.01**	**86.89**	**94.39**	**120.14**	**123.48**	**508.91**

Roads	2018/19	2019/20	2020/21	2021/22	2022/23	2018/23	15-year Total
Dual carriage with railway viaduct							50.82
Dual carriageway	30.07	30.07	30.07	15.04	13.99	119.24	300.74
Single carriageway	59.18	59.18	71.01	75.73	82.36	347.46	473.38
Bus rapid transit network	35.66	35.67	35.67	35.66	35.67	178.33	431.01
Total, Roads	**124.91**	**124.92**	**136.75**	**126.43**	**132.02**	**645.03**	**1,255.95**
Safety Improvement							
Junction improvements	6.12	6.12	6.12	2.45	2.45	23.26	81.61
Railway crossings	1.26	1.58	1.58	1.58	0.49	6.49	12.64
Pedestrian pavements and crossin	3.03	3.78	3.78	3.03	1.18	14.80	30.27
Total Safety Improvements	**10.41**	**11.48**	**11.48**	**7.06**	**4.12**	**44.55**	**124.52**
Total Investment Costs	**135.32**	**136.40**	**148.23**	**133.49**	**136.14**	**689.58**	**1,380.47**

Source: NTMP/GKMA, MoWT, May 2009

4.3.3 REVIEW OF ROAD NETWORK PLAN IN NTMP/GKMA

(1) General

The objective of the review of NTMP/GKMA for this Study does not mean new establishment or revision of the road master plan and organization reforms. The objective of this Study is to identify the candidate projects or programs which would be subject to official development assistance of the GOJ, or co-financed with other international organizations, for the road network improvement in GKMA, to support NTMP/GKMA established by MoWT.

NTMP/GKMA is based largely on the detailed surveys and comprehensive model-based urban transport analysis carried out by a NTMP consultant under the WB finance in 2003/04 (Final Report March 2005). The planned period was for 15 years (2004 – 2018) but approximately a half of the period has passed. MoWT reviewed it in May 2009, which mostly include investment plan, and changed the planned period from 2003-2018 to 2008-2023.

Six years have passed since the original survey was conducted in 2003/04. Traffic increase, economic growth and urbanization have occurred far faster than expected. Traffic congestion at major arterial roads and junctions has really worsened since no new road construction (dual carriageway) was undertaken except the Northern Bypass. Besides, the GOU has decided to introduce the BRT in the NDP as one of the core infrastructure projects and BRT Pre-FS has been competed in May 2010.

The Study Team reviewed NTMP/GKMA based on traffic survey (refer to Chapter 5), road network survey and BRT Pre-FS.

(2) Trunk Road Network System in Long-Term

1) Trunk Road Network System in NTMP/GKMA

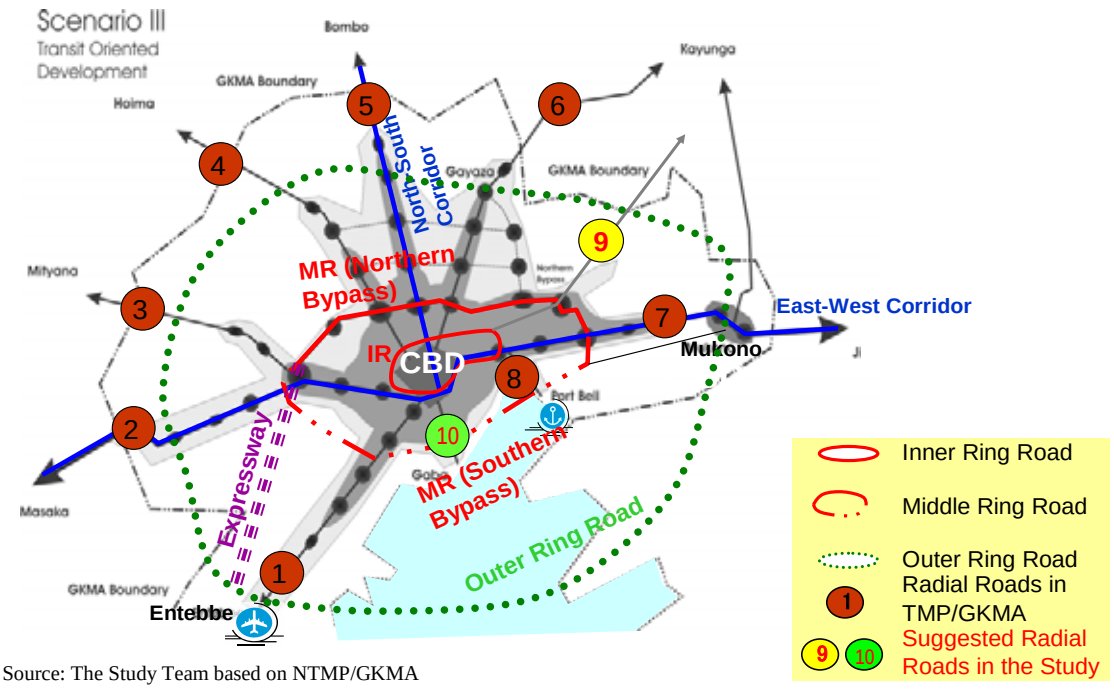
Planned macro-road network system for GKMA in 2008-2023 and ahead to 2050 in NTMP/GKMA comprised of eight radial and three circumferential roads. These are all dual carriageways but would be expanded to six-lane highways later.

Radial Roads		Circumferential (Ring) Roads	
1	Kampala - Entebbe	1	Inner Ring Road
2	Kampala - Mpigi (on Masaka Road)	2	Middle Ring Road (Northern Bypass & Southern Bypass
3	Kampala - Buloba (on Mityana Road)	3	Outer Ring Road (Mukono – Kalagi – Gayaza – Zirobwe – Wobulenzi – Kapeka – Busunju & Mping – Entebbe – Mukono (over lake)
4	Kampala - Wakiso (on Hoima Road)		
5	Kampala - Matuga (on Bombo Road)		
6	Kampala - Kasangati (on Gayaza Road)		
7	Kampala - Mukono (on Jinja Road)		
8	Kampala – Port Bell		

Source: NTMP/GKMA, 2009

2) Suggestion of Study Team on Trunk Road Network System in NTMP/GKMA

The Study Team suggests that Gaba Road and Kira Road should be included in the radial roads, taking the current urban development and population expansion into consideration. In addition, planned expressway (motorway) from Kampala to Entebbe International Airport should be included in the GKMA urban trunk road network system. Hence, a recommended trunk road network system in year 2023 should be configured as shown in Figure 4.3.1.



Source: The Study Team based on NTMP/GKMA

Figure 4.3.2 Trunk Road Network System in GKMA

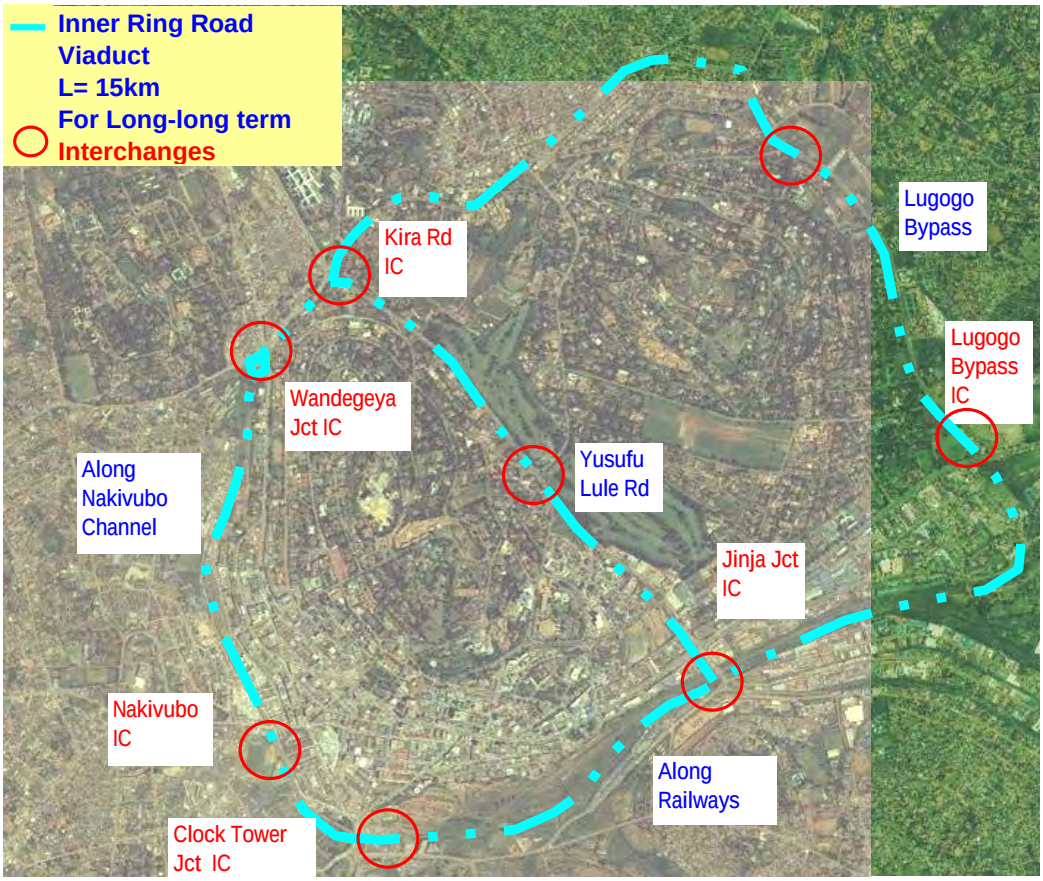
Most of the existing radial roads are two-lane roads and should be widened to four lanes in accordance through the dual carriageway programs of NTMP/GKMA. Compared with radial roads, ring roads are very weak. It should be noted that construction of Southern Bypass is very important for the future GKMA road network system. Therefore, a study should be conducted as soon as possible since the routes planned in the pervious studies would not be applicable anymore when considering required resettlements and recent urban sprawl.

It should also be noted that six-lane road (two dedicated lanes for BRT and four lanes for the general traffic) are required for the planned BRT routes.

(3) Inner Ring Viaduct Plan for Urban Expressway Transport Network in Long-long Term

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 only the solution despite the introduction of BRT as one of the principal road infrastructures of GKMA. The Study Team suggests that a full viaduct Inner Ring Road Network (Toll) should be planned for long-long-term (target year 2035 - 2040) as shown in Figure 4.3.2.

The Study Team recommends that Inner Ring Viaduct Plan should be incorporated in the new GKMA structure plan, which will be established under KIIDP, and construction of toll buildings along this route and interchanges must be avoided.



Source: JICA Study Team

Figure 4.3.3 Inner Ring Viaduct Plan for Urban Expressway Transport Network in Long-long Term

(4) Review of Dual Carriageway with Railway Viaduct

1) Review of Dual Carriageway with Railway Viaduct

NTMP/GKMA planned a dual carriageway with railway viaduct (the **Original Plan**). The viaduct starts just before Africana Roundabout on Jinja Road and crosses over the MoWT Central Workshop and Railways lines to Jinja and Port Bell. Then, it runs along Mukwano Road, Nsambya Road and Queen's Way and ends before Kibuye Roundabout. The **objective of the project is to relieve the congestion in the city center**. However, as the viaduct starts at Jinja Road and ends before Kibuye Roundabout along Queen's Way, and that the direct through traffic between Jinja Road and Queen's Way is not considerable, its effectiveness would also be limited. Thus, it is expected to absorb the traffic from Yusufu Lule Road, Gaba Road and Mengo Hill Road.

The Original Plan is conceived as a 4-lane or 6-lane dedicated motor vehicle routes, which may incorporate BRT on it in the future. The total length is 4.74 km and the project cost was estimated at US$ 50.8 million (US$ 10.7 million/km) in NTMP/GKMA, May 2009. However, this cost seems to be too low when considering the recent market prices. Actual cost at ICB basis would be about double.

The viaduct plan had not yet considered the influence of BRT, especially at Jinja and Africana Junctions (BRT Lines A1 and A2) and between Clock Tower and Kibuye Roundabout (BRT Lines B1 and B2), as no BRT concept plan was studied in NTMP/GKMA.

The Study Team considered repeated requests from MoWT suggesting a plan to overcome the

serious traffic congestion at Kibuye Roundabout, which is the only gateway from/to the Entebbe International Airport. Five approach roads namely, Queen's Way (one-way), Katwe Roads, Entebbe Airport Road, Masaka Road and Mahindye Road, meet at Kibuye Roundabout. Queen's Way was changed to a one-way road in 2004 in accordance with the recommendation of KUTIP. As a result, its congestion was reduced while that at Katwe Road was increased. Katwe Road is a very narrow four-lane road and is always congested. Masaka Road meanwhile is a two-lane road. Although it was planned to be upgraded to accommodate dual carriageway in NTMP/GKMA, ROW acquisition would be very difficult. Entebbe Airport Road was already upgraded to a dual carriageway up to Namasuba, but its traffic volume has almost reached the capacity limit. Railways at the west run parallel to Queen's Way and below Makindye Road and Entebbe Road, near Kibuye Roundabout. Kibuye Market meanwhile located between Masaka Road and Entebbe Road is one of the causes of traffic congestion.

2) Recommended Modification to Dual Carriageway with Railway Viaduct Plan

Taking the above condition into account, the Study Team has planned a modified viaduct plan to overcome the disadvantages in the original plan. The recommended concepts to reduce project costs while keeping better functions and ensuring coordination with the BRT plan are a combination of flyovers and at grade sections with appropriate road widening, as follows:

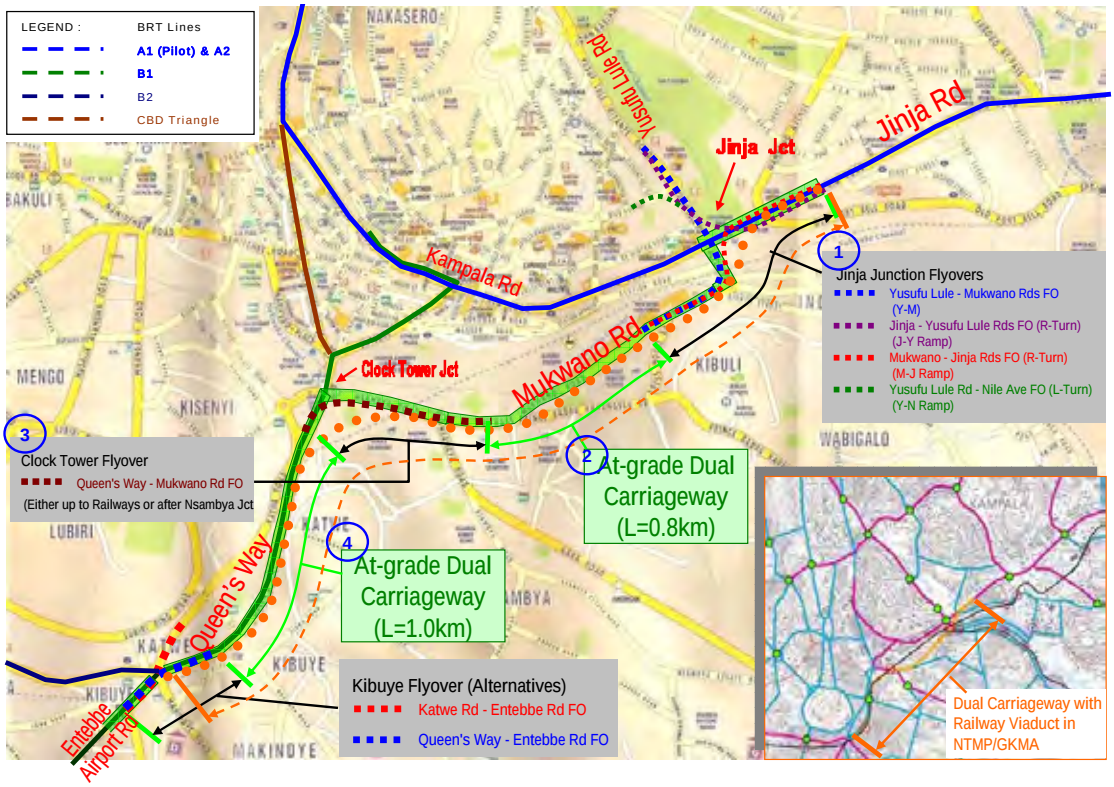
- A combination of flyovers and at-grade sections (refer to Figures 4.3.4 and 4.3.5)

  ① Mukwano Road – Jinja Road Right Turn Ramp Flyover

  ② Mukwano / Kibuli / Nsambya Road Widening at grade

  ③ Clock Tower Flyover (Queen's Way – Nsambya / Mukwano Roads Right Turn Flyover)

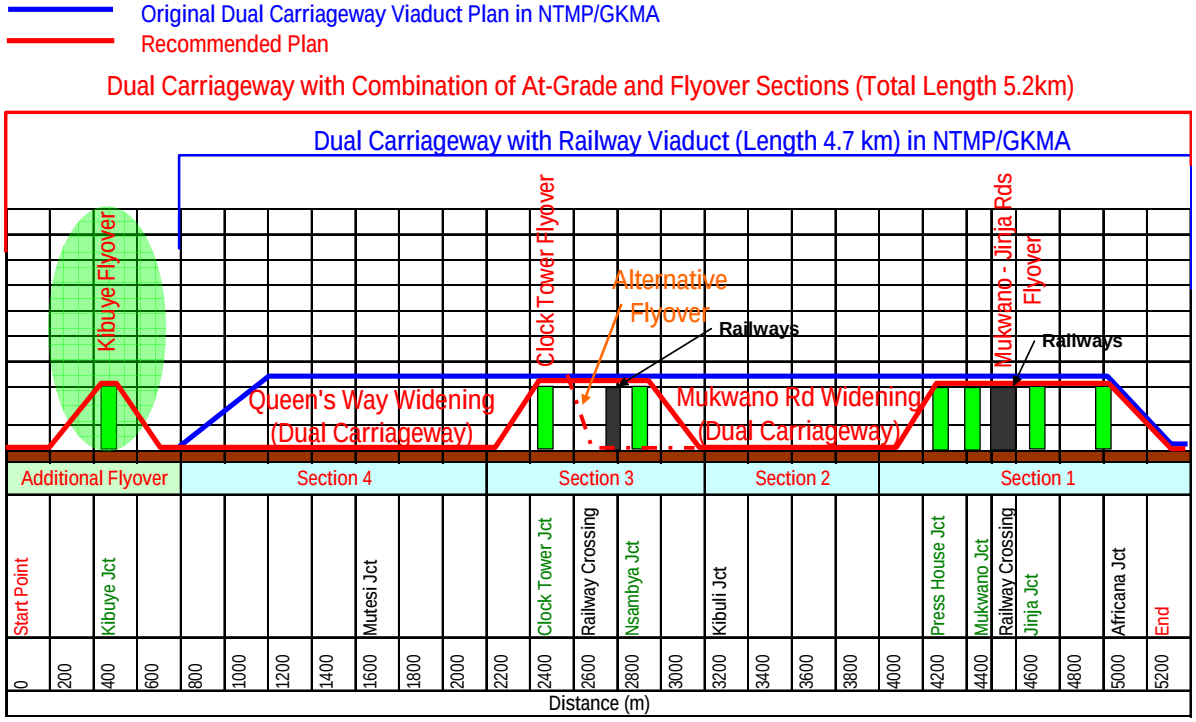
  ④ Widening of Queen's Way (dual carriageway of six or eight lanes)



Source: JICA Study Team

Figure 4.3.4 Alternative Plan for Dual Carriageway with Railway Viaduct Plan

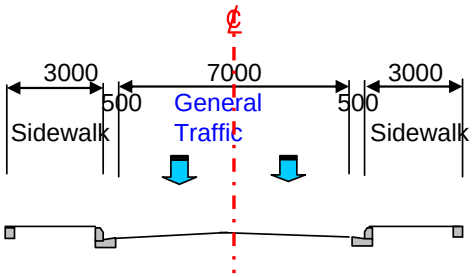
- Flyover on Kibuye Roundabout between Queen's Way and Entebbe Road. It should be noted that resettlement requirements is significant for the implementation of this plan since it also needs dedicated line for the BRT B1.



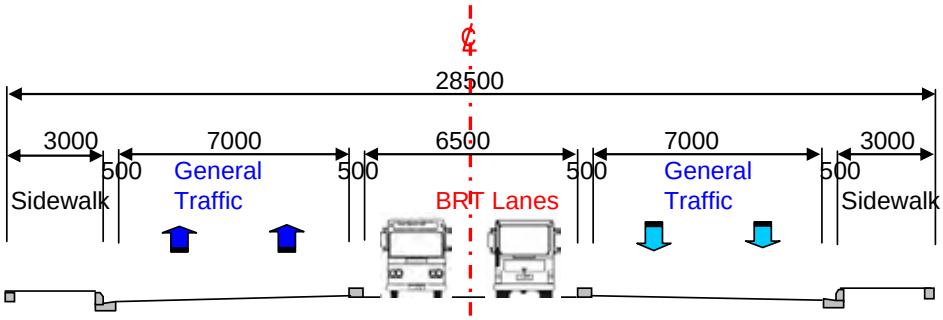
Source: JICA Study Team

Figure 4.3.5 Alternative Plan (Profile) for Dual Carriageway with Railway Viaduct Plan

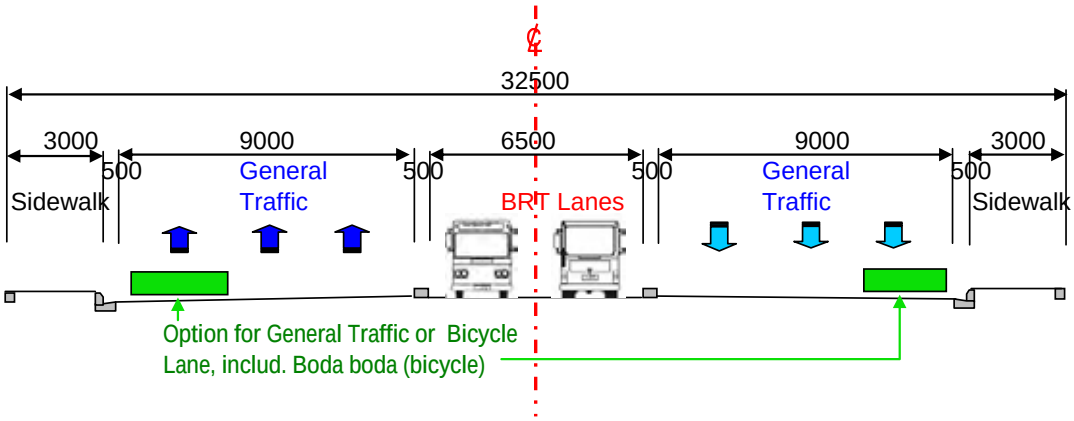
The Study Team suggests the widening of Queen's Way from two to six lanes or eight lanes, including two dedicated lanes for BRT, using the railways' ROW (refer to Figure 4.3.6). Katwe Road is too narrow to accommodate BRT and it should thus be used as an urban service road. The current one-way operation should be restored to two-way operation after the dual carriageway construction.



Existing Road Section



Alternative 1: Dual Carriageways (2 lanes x 2) and Dedicated BRT lanes



Alternative 2: Dual Carriageways (3 lanes x 2) and Dedicated BRT lanes

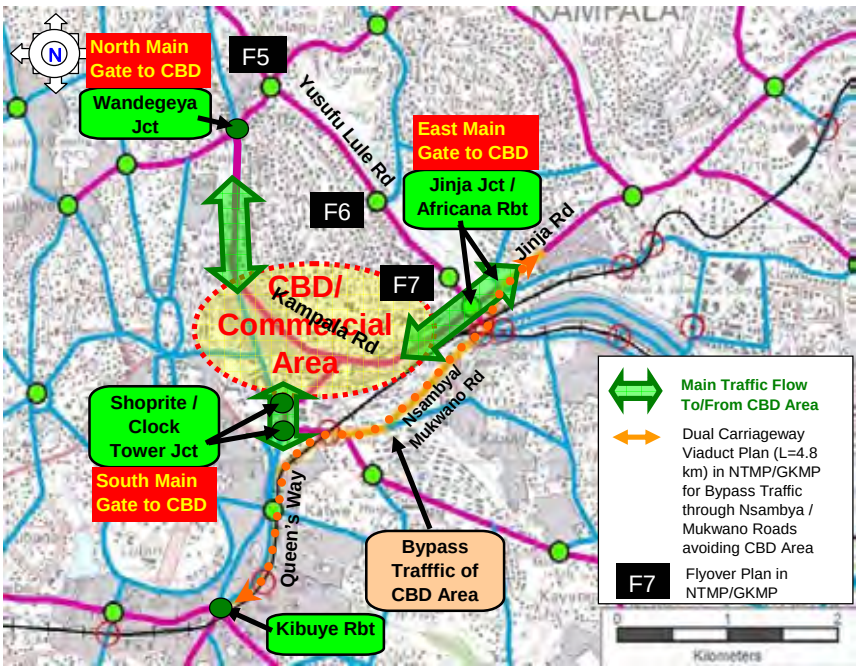
Source: JICA Study Team

Figure 4.3.6 Recommended Dual Carriageway Plan for Queen's Way with BRT

(5) Review of Grade-separated Junctions in NTMP/GKMA

There are 62 locations of junction which are identified to require improvements as per NTMP/GKMA. These locations are depicted with small green circles in Figure 4.3.1. Of these, several junctions were planned as grade-separated crossings although technical and economical feasibility studies are still necessary to be carried out.

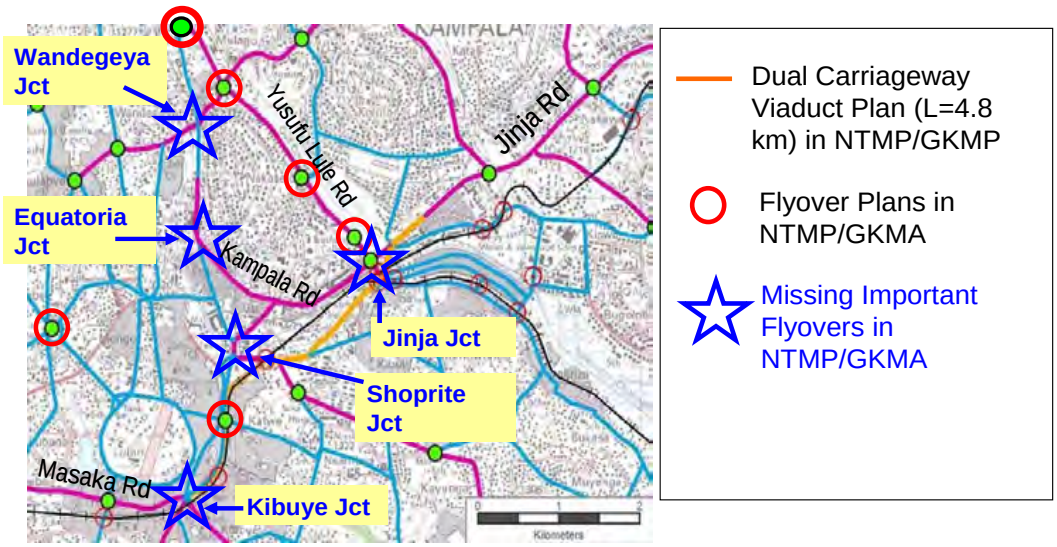
The exiting CBD/City Center will continue to attract the traffic as this area will remain the largest business and commercial center even in the future. Most traffic originates outside the CBD and leads to said location. This is why severe traffic congestions are seen at its gateway junctions in Figure 4.3.7. As widening of most of the existing roads are difficult without demolishing many buildings, provision of flyovers at major junctions would be a solution for these CBD gateways even considering condition after, or when, the BRT is introduced.



Source: The Study Team based on NTMP/GKMA

Figure 4.3.7 Main Gates accessing to CBD/City Center

However, the Study Team identified that some important flyovers are missing in NTMP/GKMA, including those for Wandegeya Rbt, Jinja Jct, Shoprite Jct, Equatorial Jct and Kibuye Rbt as indicated in the following figure. As Kampala Road is a duplicated corridor of all BRT lines, a flyover connecting between the northern part and the southern part segregated by BRT lines would be required around Equatorial Junction.



Source: JICA Study Team based on the plan of NTMP/GKMA

Figure 4.3.8 Grade-Separated Junctions (Flyovers) in NTMP/GKMA and Missing Flyovers identified by the Study Team

(6) Dual Carriageways Program

This classification is conceived as a four-lane or six-lane route, which may include provision of high-capacity public transport service (BRT). Separate pedestrian pavements would be provided and appropriate provisions would also be made for non-motorized vehicles (NMV). The roads in this category include principal radial roads, Northern Bypass (currently only 3.5 km of the 21 km highway has 4 lanes), and other circumferential routes. Around 90 km of the roads in Figure 4.3.1 fall in this category.

The Study Team has recommended Kibuli/Mukwano Roads to be widened from two-lane to 4 lane road, in accordance with the priority program in KUTIP.

Note: The required minimum number of traffic lanes for BRT route is six lanes with two dedicated lanes for BRT and four lanes for the general traffic. Substantial sections subject to dual carriageway programs in NTMP/GKMP duplicate the BRT routes should therefore be implemented under the BRT program.

(7) Single Carriageway Program

A total of 573 km will be upgraded with a minimum width of two motor vehicle lanes, adequate shoulders and proper drainage. They will mostly be paved in the city and inner suburbs. The Study Team understands that this is a very important program, as it can be implemented without land acquisition and resettlement issues, to minimize traffic concentration on primary roads and support of regional economy.

4.3.4 REVIEW OF PUBLIC TRANSPORT PLAN IN NTMP/GKMA

(1) Future Population Growth and Land Use Plan

It is estimated that the population growth rate will remain considerably high as per NTMP/GKMP. The total GKMA population is expected to increase from 2.5 million in 2008, to 3.8 million in 2018, and to 4.5 million in 2023, according to UBOS and NTMP/GKMA projections.

Present Land Use in GKMA, which is developed along radial road patterns extending outwards from the centre, shows considerable urban sprawl. This land use pattern is the base case in envisaging optimal future land use in the plan.

NTMP/GKMA assumed three possible development scenarios for analysis on the coordination of land use and transport.

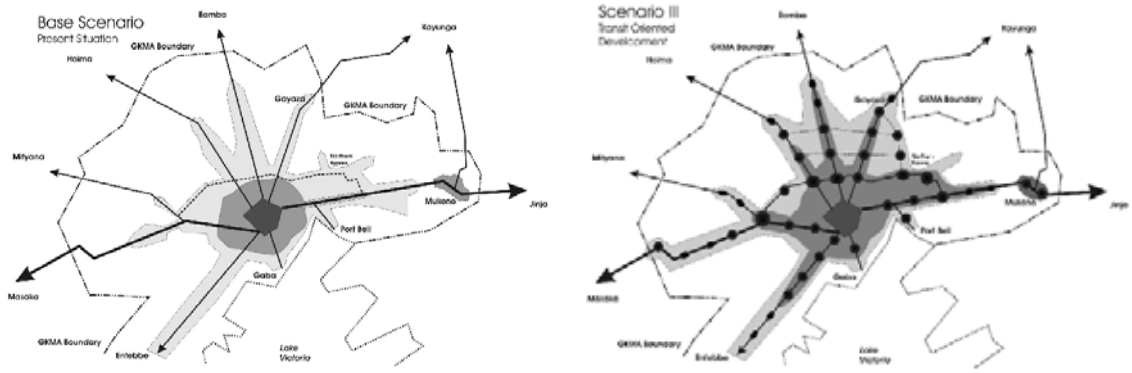
Scenario Ⅰ: 'Business as Usual' (BAU)

Scenario Ⅱ: 'Planned Development' (PD)

Scenario Ⅲ: 'Transit-Oriented Development' (TOD)

Through analysis of three scenarios of land use pattern, NTMP/GKMA recommended TOD as the strategy to guide and control land use and transport development.

The present land use pattern and recommended land use pattern of TOD in NTMP/GKMA are as shown in the following figure.



Present Land Use Pattern **Recommended Land Use Pattern (TOD)**

Source: NTMP/GKMA

Figure 4.3.9 Present and Recommended Land Use Patterns

TOD scenario seeks high quality public transport which can actively promote development of a well-balanced over all land use and transport scenario for the city.

It does provide the opportunity to design the urban form so as to become movement-efficient, facilitating development of high capacity transit modes and services. Low-income residents can thus be served by economical and faster transit services, spending less of their income and time on transportation, and wll have better access to jobs and other urban facilities.

The scenario also envisages that the majority of the population will continue in the foreseeable future to depend heavily on public transport of all forms, from large buses and minibuses to boda-bodas.

(2) GKMA Transport Master Plan

NTMP/GKMA includes elements of public transport improvement, including reorganization and restructuring public transport and fleet. In the section of Proposed Investment Program, Busways plan is described below:

Busways: Under the BRT project to be implemented through World Bank assistance, it is envisaged that four busways will be constructed over the period 2012-2023, with each busway taking three years to construct and operationalize at a cost of US$ 107 million per busway. A pre-feasibility study is supposed to commence in 2009, followed by a full technical and economic study before the start of works in 2011. Over the period 2009-23, provision has been made for the investment expenditure of US$ 3.0 million for feasibility studies in 2009-11, and then US$428.0 million for construction and implementation between 2011 and 2023.

Based on the above plan, a pre-feasibility study for BRT commenced in November 2009 and its Final Report was submitted in May 2010 (refer to Section 4.4.4 in this Chapter).

4.4 GKMA TRANSPORT SECTOR PROJECTS UNDER THE COOPERATION OF INTERNATIONAL DEVELOPMENT PARTNERS

4.4.1 GOVERNMENT OF JAPAN (GOJ)

The GOJ extended grant assistance for the design and implementation of:

- Kampala Urban Interface Project: US$ 8.0 million (completed)
- Urban Road Resealing Project: US$ 2.4 million (completed)

The GOJ also cooperated for "The Master Plan Study and Feasibility Study of Improvement of Trunk Roads at Kampala Urban Interface Project" in 1997. This study was the basis for the above two grant aid projects (refer to Section 4.1).

4.4.2 EUROPEAN UNIONS (EU)

EU, WB and African Development Bank (AfDB) are the three largest development partners supporting Uganda.

The recent cooperation of EU for the GKMA urban road sector is as follows:

- Kampala Northern Bypass: €47.5 million. Construction of 21 km bypass to relive congestion in Kampala City (completed and opened to the public in October 2009).

  Note: The diversion traffic to the Northern Bypass is currently not much as expected in its original plan. The reason could be 1) international through traffic is still required to report to the Uganda Revenue Authority at Nakawa, 2) as all radial roads leading to the city center is congested, there is not much benefit to use other routes through the Northern Bypass, and 3) as the Northern Bypass is a two lane road, except the 3.5 km from Gayaza Rbt – Bombo Jct, actual driving speed is slow due to slow moving heavy vehicles.

- Technical Assistance to RAFU/UNRA: €2.0 million (on-going)

4.4.3 WORLD BANK (KIIDP) AND TSDP

(1) Kampala Institutional and Infrastructure Development Project (KIIDP)

KCC in collaboration with the MoLG developed the KIIDP. This has been designed to address the financial shortfall required to implement the necessary institutional reforms under the Strategic Framework for Reform (SFR). The overall program objective of the KIIDP is to develop a strong governance and management capacity in KCC so as to enhance service delivery and economic development for the City. The KIIDP will assist KCC in addressing the rapidly deteriorating physical infrastructure in the city and improvement of its management and service delivery capacities.

The KIIDP is estimated to cost US$ 100 million. The WB has extended a credit for KIIDP in support of the first phase of the SFR for Kampala Urban Development Program. The credit will be extended in three phases as shown in the following table.

Table 4.4.1 Program Financing Plan for KIIDP

APL	Indicative Financing Plan				Estimated Implementation Period (Bank FY)
	IDA (US$ Mill)	%	GOU (US$ Mill)	Total (US$ Mill)	
APL 1 Credit	33.6	37	3.5	37.1	01/01/2008 – 12/31/2010
APL 2 Credit	40.0	44	4.0	44.0	01/01/2011 – 12/31/2014
APL 3 Credit	17.4	19	1.5	18.9	01/01/2015 – 12/31/2017
Total	91.0	100	9.0	100	

Source: Project Appraisal Document of KIIDP, September 2007, World Bank

In 2005, seven major Uganda's development partners agreed on a Uganda Joint Assistance Strategy (UJAS) that is centered on three principles: supporting implementation of the country owned and led revised PEAP to achieve the MDGs; collaborating more effectively among the development partners and with the government, and; focusing on results and outcomes. UJAS partners agreed to focus on the following certain areas for achieving the PEAP's overarching strategic results:

- Strengthening the budget process and public sector management
- Promoting private sector development and economic growth
- Strengthening governance
- Improving education and health outcomes
- Promoting the resolution of the conflict in the north and fostering the social and economic development of the region.

KIIDP will contribute to the first three strategic results. In terms of the PEAP, the project supports Pillar 1 (Growth) and Pillar 4 (Governance).

The KIIDP Phase I project comprises the following three components:

Component	Works	Project Cost
1	Institutional activities that support organizational development and governance	US$ 5.8 million
2	Project Management and M & E activities	US$ 28.5 million
3	City wide infrastructure and services	US$ 2.8 million

Source: Project Appraisal Document of KIIDP, September 2007, World Bank

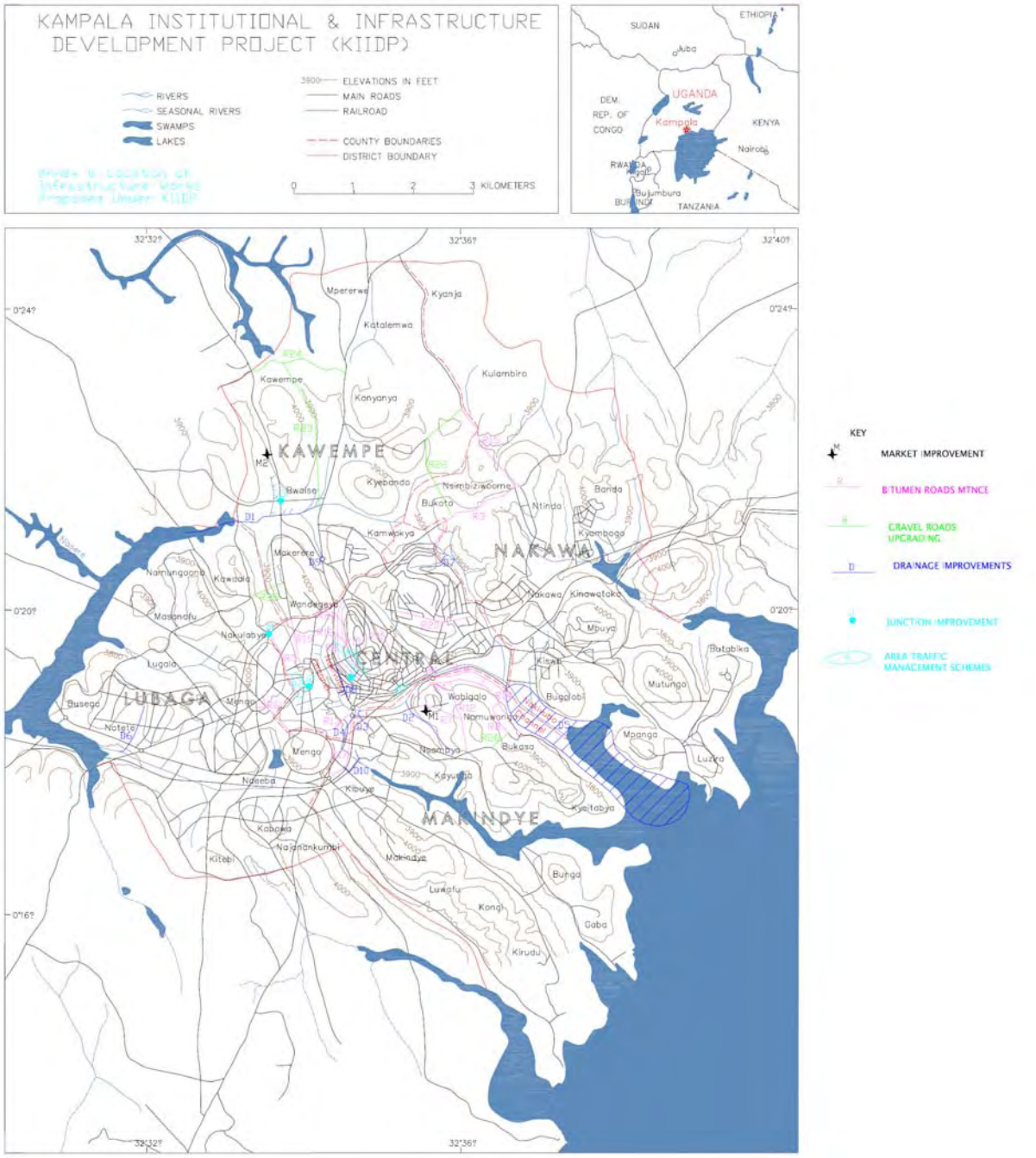
Component 1 is Institutional Development. This component will assist KCC and its stakeholders to expand the SFR into a comprehensive approach to municipal development, consistent with Kampala's central role in the nation's economic and political life, through the sub components namely, i) support to organizational development and governance, ii) support to financial recovery and iii) strengthening service delivery.

Component 2 is a city wide infrastructure and services improvement which will support activities aimed at the provision of critical infrastructure investments, addressing the following priority areas:

- Storm Water Drainage Systems
- Traffic management, road maintenance and upgrading (Figure 4.4.1): This comprised the top priority short term interventions identified in the KUTIP and NTMP/GKMA studies, namely: i) Implementation of Area Traffic Management Schemes; ii) Upgrading and

Signalization of 4 critical junctions; iii) Rehabilitation of approximately 26 km bituminous roads; iv) Upgrading approximately 11 km gravel roads to bitumen standards; v) Technical support in design and construction supervision.

- Solid waste management
- Urban markets infrastructure



Source: Project Appraisal Document of KIIDP, September 2007, World Bank

Figure 4.4.1 Location Map of Institutional and Infrastructure Development Project (KIIDP)

Component 3 covers project implementation support, including the management activities associated with the implementation of the project and the preparation of the next phase of the

program. Activities will include: i) project implementation support; ii) preparation and follow up on annual citizen's score cards; and iv) staff and councilor performance surveys.

(2) Transport Sector Development Project (TSDP)

The WB has agreed on a US$190 million International Development Association (IDA) credit for the TSDP. Said project is also supported with a US$8 million grant from the United Kingdom's Department for International Development (DFID). These funds will support the implementation of NTMP and NTMP/GKMA over a four-year period form 2010/11 to 2013/14.

The objective of the TSDP to improve the connectivity and efficiency of the transport sector through: i) improved condition of national road network; ii) improved capacity for road safety management; and iii) improved transport sector and national road management.

The project consists of the following five components.

- Component A: Upgrading and Rehabilitation of National Roads
- Component B: Enhanced Road Safety
- Component C: Preparation of a Kampala Urban Transport Project
- Component D: Support to MoWT
- Component E: Support to UNRA

Component A: It will finance the paving of Gulu to Atiak and Vurra-Arua to Oraba roads (approximately 160 km) linking northern Uganda with southern Sudan and north-eastern Democratic Republic of Congo (DRC).

Component B: This involves enhancement of road safety. This will be executed by MoWT, and a special stake holder committee will be put in to place to oversee its implementation. In preparation of this component, it is planned that a consultant financed by the Global Road Safety Facility (GRSF) will be employed from October to January 2010.

Component C: This component will be implemented by MoWT/UNRA. This will include feasibility study, and preparation of design and bidding documents for the infrastructure included in the BRT Pilot Project corridor selected through the BRT-Pre-FS. It also includes preparation of draft bidding documents for the bus operators, fare collectors and fund managers, CBD traffic management and ***parking studies, a bicycle path master plan***, as well as a draft law for a Greater Kampala MATA. The implementation of this component is also assisted by the New York based Institute for Transportation and Development Policy (ITDP) which has worldwide experience in the implementation of BRT projects, including the ongoing BRT project in Dar es Salaam.

Component D: This component will assist MoWT to focus on its core functions namely, policy setting, strategic planning, sector oversight and monitoring, and to spin off some of its responsibilities to newly created entities under its umbrella.

Component E: This component aims to support UNRA in its activities, including: El) the improvements/ refurbishment of regional offices of UNRA; E2) provision of additional Technical Assistance (TA) to the one provided under European Commission financing; and E3) the financing of various small scale studies needed by UNRA to enhance its performance, including:

- Traffic accident black spot identification studies;
- Road safety audit studies;

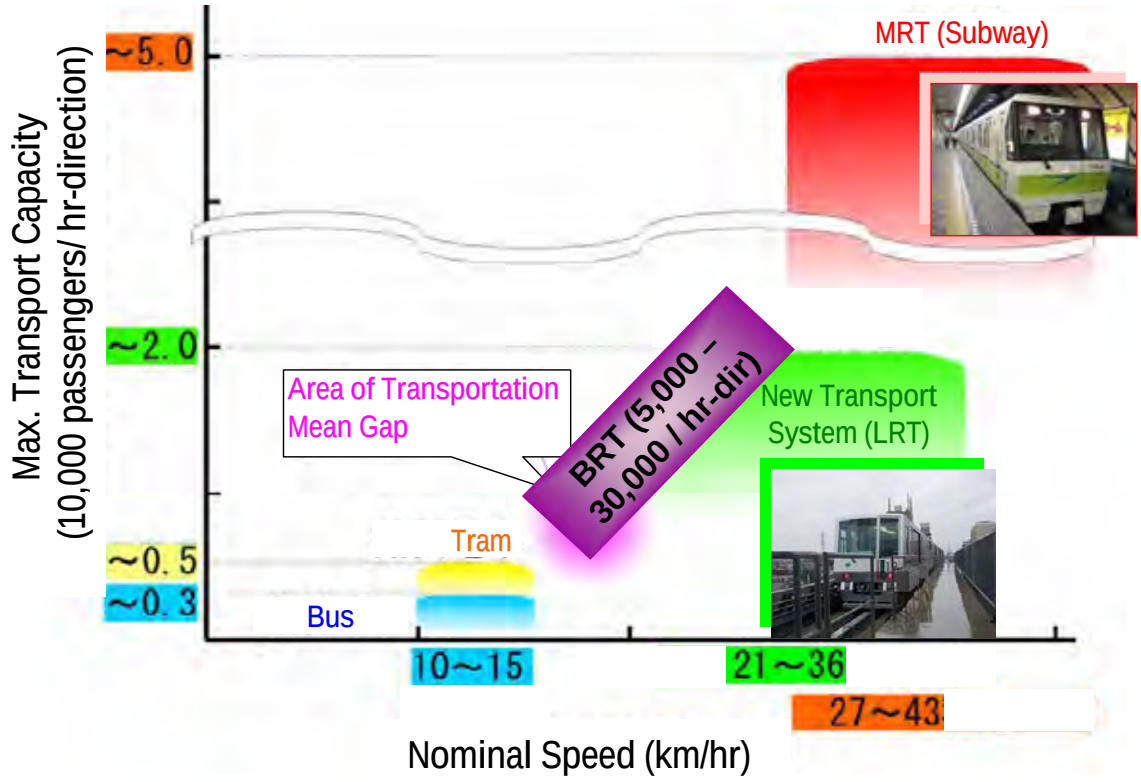
- Technical audit guideline studies;
- Studies to establish cost estimating unit at UNRA;
- Study for preparing standard bidding document for various PPP related project delivery methods, including design-build, build-operate-transfer, build-own-operate-transfer, etc; and
- Environmental and social impact studies (e.g. the impact of road improvement on charcoal production activities and possible mitigation strategies, or archeological surveys along road alignments, etc.).

4.4.4 WORLD BANK (BRT)

(1) Pre-Feasibility Study for BRT

BRT could possibly alleviate the serious urban traffic congestion through more economic means as compared with Mass Rapid Transit (MRT) or Light Rail Transit (LRT). Introduction of BRT has become more popular after the success in Curitiba in Brazil and Bogota in Colombia.

Figure 4.4.2 shows the relationship between the maximum transport capacity and the nominal speed for the various public transport modes. The maximum transport capacity of bus and tram is up to 3,000 – 5,000 passengers/hr per direction with nominal travel speed of 10-15 km/hr as illustrated in the following figure. That of the LRT is up to 20,000 passengers/hr per direction with nominal travel speed of 21-36 km/hr. The MRT can transport up to 50,000 passengers/hr per direction with nominal travel speed of 27-43 km/hr. The BRT is a transport mean which has the transport capacity of between 5,000 and 30,000 passengers/hr-direction with travel speed of 15-25 km/hr.



Source: The Study Team based on guideline of Ministry of Land & Transport (Japan)

Figure 4.4.2 General Transport Capacity by Transport Mode

The GOU has envisaged introducing BRT in GKMA with financial cooperation of the WB as a long-term strategy. Investment of US$ 431 million was planned in NTMP/GKMA for four BRT routes. Implementation of the rapid transport system with BRT is one of the national core projects in NDP launched on April 19, 2010.

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

The objectives of Pre-FS are:

- Pre-FS for the development of a long term integrated conceptual design for a BRT System in GKMA
- Identification of priority transport corridors for the BRT system
- Selection of one transport corridor on which a detailed engineering and operations design for a pilot BRT should be carried out
- Preparation of the Terms of Reference (TOR) for the detailed engineering and operations design for the pilot BRT system on the selected corridor
- Definition of institutional reforms and financial controls necessary for operating the system.

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

(2) Outline of BRT Pre-FS

1) Role and Function of BRT

BRT is a high-quality bus based transit system that delivers fast, comfortable, and cost-effective urban mobility through the provision of segregated right-of-way infrastructure, rapid and frequent operations, and excellence in marketing and customer service. It enhances personal mobility both through reducing travel time, and hence also its cost of provision, and by improving the travel experience.

Its name was derived from the three essential characteristics of the system:

- It employs the **bus** as the means of mechanized mobility, rather than rail transport that is often presumed as the appropriate mode to achieve high capacity. This then results in lower investment costs and greater operational flexibility.
- The system is **rapid** in that it increases travel speeds, both in absolute terms but also in comparison with the general traffic in the highway alongside the system, through segregation of its running ways from that traffic.
- The system provides **transit** that allows high volume movement of people in an urban environment. It becomes appropriate when demand levels reach some 6,000 passengers per peak hour and direction (one 100-capacity bus per minute), and can still handle five times that flow with appropriate specifications and design.

BRT in Bogota, Colombia　　BRT in Dar Es Salaam, Tanzania (Plan)

Figure 4.4.3　BRT in Bogota and Dar Es Sallam

2) Proposed BRT System for GKMA

- Open Route (Externalized) System and Open Bus Stations with on-board revenue collection

Although the closed route system can maximize theoretical passenger capacity, it requires specific infrastructure with significant land-take. On the other hand, the open route system and the open bus station with on-board revenue collection involve an easy operation method. Thus, the latter method is selected as the target system.

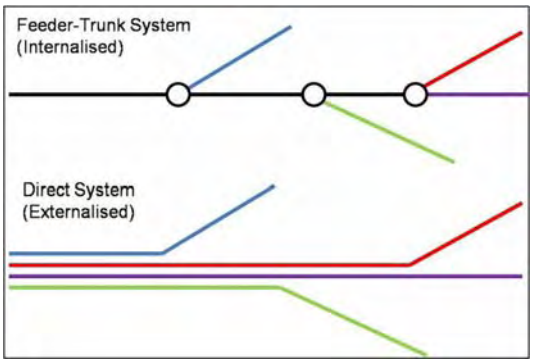
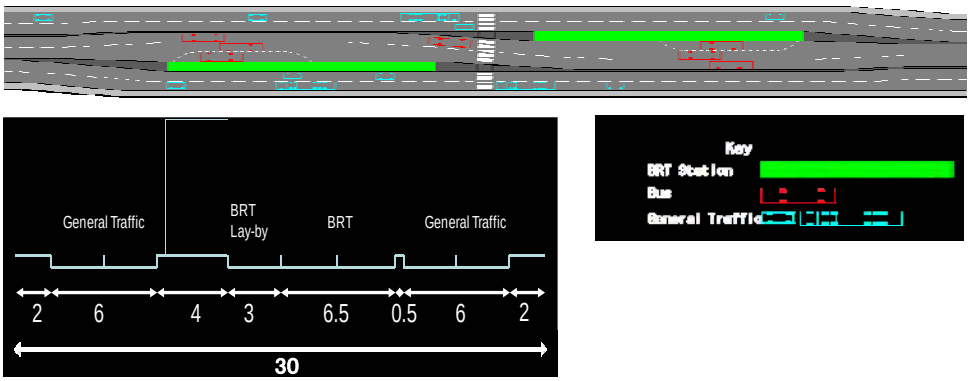


Figure 4.4.4　Open and Feeder-Trunk System

- Median Operation of BRT

The median operation of BRT runway with the bilateral location of stations is introduced due to the advantage of the system under the existing law and regulation in Uganda. Passing lanes at all core stations are necessary for the transportation of different routes of passenger demand.



Source: BRT Pre-FS

Figure 4.4.5　Median Operation and Bilateral Stations with Passing Lane

- High capacity and high quality buses
- Existing minibuses will play as feeder to BRT with less direct service to the city center and no operation of boda-boda alongside BRT trunk routes
- Low-technology system for management and passenger information

3) Selected Priority Routes and Pilot BRT Route

As for the selection of priority BRT routes, the following nine options were identified as the candidate routes based on the passenger travel demand analysis, the existing minibus network and availability of road space for both BRT and general traffic.

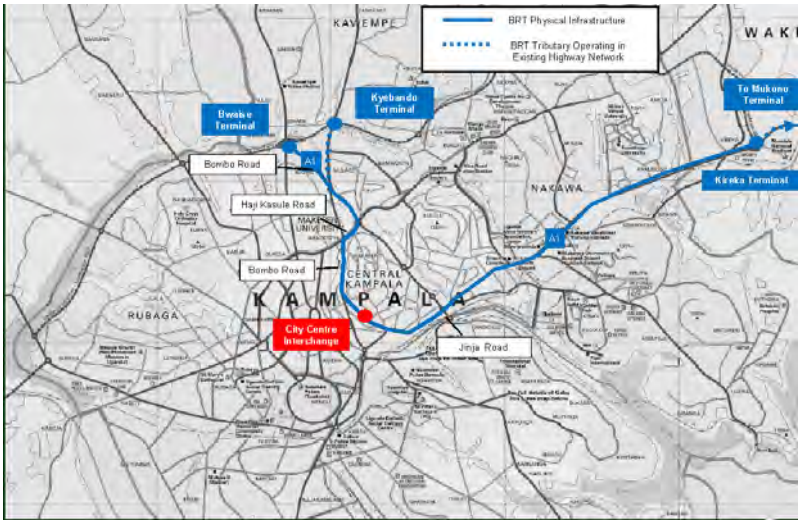
Route 1: Gayaza Road
Route 2: Jinja Road
Route 3: Old Port Bell Road
Route 4: Gaba Road
Route 5: Entebbe Road
Route 6: Masaka Road
Route 7: Hoima Road
Route 8: Bombo Road
Route 9: Kira Road

Source: BRT Pre-FS

Figure 4.4.6 Selected Candidate BRT Routes

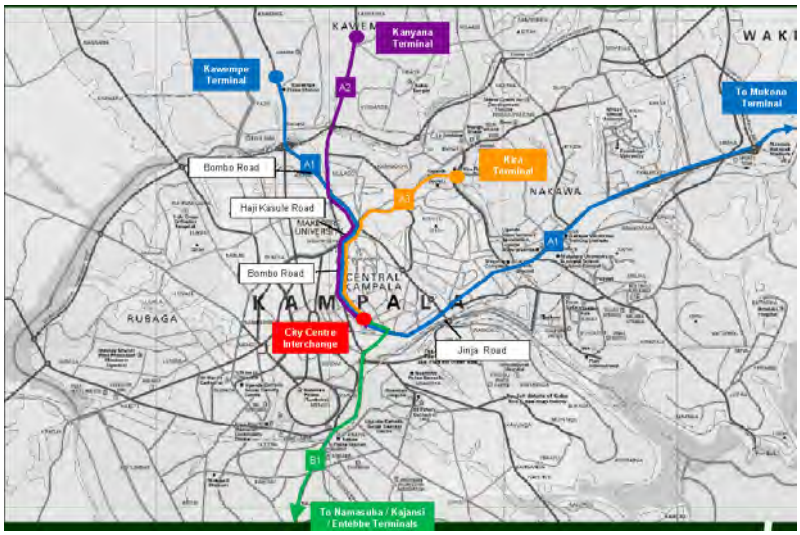
After the estimation of future passenger travel demand as well as the evaluation of the alternative routes, the following nine priority BRT routes with their sequence have been selected base on multi criteria analysis. The evaluation factors for evaluation of alternative routes include potential travel demand, ease of implementation, potential transport impacts for reducing passenger travel time, integration with other transport modes, increased accessibility for low income population, institutional constraints, and environmental and social impacts.

1. Route A1 (Pilot Route): Jinja Rd. to Kireka, Kampala Rd and Bombo Rd to Bwaise,
2. Route A1+: Route A1 + Gayaza Rd. to Kanyana and Jinja Rd. to Mutoni
3. Route B1: Route A2 + Entebbe Rd. to Namasuba
4. Route A2: Route B1 + Gayaza Rd.
5. Route A3: Route A2 + Kira Rd
6. Route A4: Route A3 + Hoima Rd.
7. Route B2: Route A4 + Masaka Rd.
8. Route B3: Route B2 + Gaba Rd.
9. Route B4: Route B3 + Old Port Bell Rd



Source: BRT Pre-FS

Figure 4.4.7 Route 1 (Pilot Project Route)



Source: BRT Pre-FS

Figure 4.4.8 Routes A2, A3 and B1

Source: BRT Pre-FS

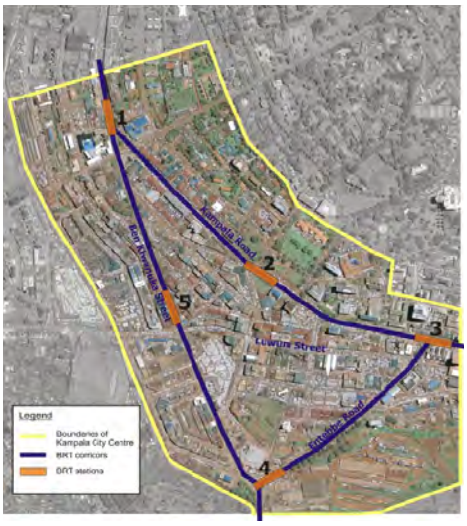
Figure 4.4.9 Routes A4, B2, B3 and B4

Each operation of the priority BRT routes will be conducted by the selected operators through a controlled tendering procedure.

4) BRT Route in the City Center Triangle

The BRT Pre-FS has proposed the BRT routes and stations in the City Center based on an analysis of the existing situation and destination of the passengers. The plan consists of building three BRT routes in the City Center: on Kampala Roads, Entebbe Road and Ben Kiwanuka Street. Five BRT stations are proposed in the City Center.

The routes and stations could be staged in three phases, as follows:



Source: BRT Pre-FS

Figure 4.4.10 BRT Routes and Stations in the City Center

- BRT corridor on Kampala Rd (on BRT pilot Route)
- BRT corridor on Entebbe Road
- BRT corridor on Ben Kiwanuka Street.

BRT system in the City Center, especially on a narrow Ben Kiwanuka Street, will only be successful when sufficient mobility management measures will be implemented.

5) Economic Viability of the Pilot Project

The capital cost and annual operation cost for the BRT Pilot Project were estimated at US$ 118.4 million and US$ 21.4 million, respectively, as shown in Table 4.4.2. Annual net operation surplus was estimated at 10.4 million. Construction cost of US$ 8.5 million/km is almost double compared with the investment plan in NTMP/GKMA.

Table 4.4.2 Economic Viability of Pilot BRT Project

Cost Items and Economic Analysis		Amount (US$ million)
Capital Cost	Preliminaries and Utilities	16.93
	Earthworks, Drainage, Pavement	48.37
	Station, Depot	5.88
	Ancillary Works	5.39
	Junction Upgrades	25.00
	Contingencies	10.16
	Supervision	6.70
	Total Capital Cost	118.43
	Cost per Km	8.46
Annual BRT System Revenue	Operating Costs	11.77
	System Management	0.62
	Annual Repayment for Vehicle Fleet	6.67
	Infrastructure Maintenance	2.37
	Total Operating Costs	21.43
	Annual Revenue	37.42
	Gross Operating Margin	15.99
	Less Operator Overheads & Profit (15%)	5.61
	Net Operation Surplus	10.38
Economic Appraisal	Benefit/Cost Ratio	1.41
	Net Present Value at 12% Discount Rate	87.5
	Internal Rate of Return	18%

Source: BRT Pre-FS Final Report, May 2010

The economic analysis of the pilot project has been conducted and the EIRR indicated 18% and Net Present Value (NP) at US$ 87.5 million.

Applying sensitivity analysis, a simultaneous 20% reduction in travel time savings benefits and a 20% increase in capital costs, the Pilot BRT project will remain economically feasible, with a B/C of 1.08, NPV of US$ 19 million and an EIRR of 13%.

(3) Feasibility Study and Detailed Design for BRT Pilot Project

Following to BRT Pre-FS, consultancy services for feasibility study, detailed design and contract preparation for the BRT Pilot Project will be conducted under the TSDP financed by the WB. It will also make provision for a spur route towards Entebbe.

The scope of work in the draft TOR in the BRT Pre-FS Final Report is as follows;

1. Confirmation of BRT concept design
2. Passenger and revenue forecasting
3. Operational service planning
4. BRT system management and delivery planning
5. Revenue collection strategy
6. Passenger information strategy
7. Vehicle functional specification
8. Vehicle financing under public / private partnership
9. Development and design of BRT running way and parallel highway
10. Development and design of stops and stations
11. Development and design of interchanges and terminals
12. Development and design of depots
13. Environmental / Social impact assessment and mitigation plans
14. Scheme costing and financial / economic appraisal
15. Risk analysis and sensitivity testing
16. Public communication, including branding and identity
17. Preparation of bid documents (including working drawings), construction packages, traffic diversion plans, and program phasing

The Request for Expressions of Interest was advertised on May 6, 2010. The evaluation report on consultancy firms that expressed interest was approved by the Contracts Committee on July 8, 2010. The Evaluation Report was submitted to the WB on July 12, 2010 and short-listed consultants will be invited soon to submit their proposal. The feasibility study and detailed design will commence in early 2011 and completed within 12 – 15 months.

4.4.5 OTHER DEVELOPMENT PARTNERS

Other development partners in support of the road sector are AfDB, NDF, BADEA, DFID and KFW. They have supported national and district roads development and maintenance outside Kampala City.

To addressing the capacity building issues (organizational strengthening, human resources development issues, road safety, road fund, and construction industry development), the WB, EU, DFID and DANIDA will jointly support the transport sector as summarized in Table 4.4.3.

Table 4.4.3 Joint Institutional Effort from Development Partners to Uganda Transport Sector

Institution	Key issues to be addressed	World Bank	European Union	DFID	DANIDA	TOTAL (in millions)
Ministry of Works and Transport (MoWT)	· Sector policy setting · Strategic planning · Sector oversight · Transport regulation · Sector monitoring · Road sector capacity · Adjustment of legal framework	· US$0.4m under RDPP - 3 for TA. · US$7.9m support to MoWT under TSDP. · and US$3.5m for road safety under TSDP.		· £2.5m (US$ 4.0m) support to WB TSDP		US$15.80
District, Urban and Community Access Roads (DUCAR)	· Strategy for District Road Management · Planning, budgeting and expenditure management. · Technical oversight · Monitoring	Support to DUCAR included in the above		Support to DUCAR included in the above	Long term advisor to DUCAR division in MoWT DKK 10m (US$ 2.0 m)	US$2.00
Road Fund (Ministry of Finance)	· Establishment of Road Fund Secretariat · Regulations · Operating procedures · Financial management systems · Monitoring systems		· €1.8m (US$ 2.6m) for TA to work in coordination with DFID support			US$2.60
Uganda National Roads Authority (UNRA)	· UNRA management · Road network management · Procurement · Contract Management · Bridge management · Establishing MIS · Ferry operations · Axle load control	· US$2.60m under RDPP - 3 for TA. · US$12.0m for regional offices, TA, Studies, Training, Equipment and operation costs under TSDP.	· €4.3m (US$ 6.2m) for TA (to work in coordination with DFID & WB support)	· £2.5m (US$ 4.0m) support to WB TSDP		US$24.80
National Road Construction Industry	· Strengthening of contractors & consultant associations · Business development · Technical skills · Contract Management · Code of conduct		· €3m (US$ 4.3m) for TA to work in coordination with DFID support	· £10m (US$ 15.8m) for projects to promote markets for NCI to work in co-ordination with EC support.		US$20.10
Total (in millions)		**US$26.4 m (of which US$3.0 under RDDP-**	**US$13.10**	**US$23.80**	**US$2.00**	**US$65.30**

Note: Source PAD of TSDP, November 12th, 2009, The World Bank

4.5 STRATEGY FOR THE IMPROVEMENT OF TRAFFIC FLOW IN KAMPALA (2009)

(1) Objectives and Study Results

In August 2009, MoWT in partnership with KCC, UPF, MoLG and UNRA, appointed a joint task force comprising of officials from these agencies to prepare short term and medium term measures that will address the worsening traffic situation (traffic jam and traffic accidents) in Kampala City.

The principal objective of this task force is to study selected sections of roads in Kampala, identify critical causes of traffic congestion and propose measures to mitigate the problem in the short term (1-2 years) and medium term (3-5 years).

The task force conducted desktop survey, field visits and discussions. It also identified locations and causes (general and specific) of traffic jams and recommended both general and specific measures to solve the problems, including required costs in the short and medium term. Activity schedules were drawn up by road and junction. These were compiled in a report entitled "Strategy for the Improvement of Traffic Flow in Kampala, December 2009".

(2) General Solutions for Traffic Management

Several simple traffic management measures have been proposed in earlier studies. These measures should be implemented at the earliest opportunity. Below is a list of some of the traffic management measures. Although majority of these measures are low cost, these are expected to cause have a great impact:

- Removal of obstructions such as broken down vehicle repairs, street vendors, markets, shop displays, hoardings, chains and bollards, from the carriageways and footways;
- Improvement and signalization of junctions and upgrading road links that are under-capacity;
- Restrictions of on-street parking on very busy links;
- Restriction of heavy vehicles from specific city center locations during day time;
- Restriction of train crossings at critical road sections during peak hours;
- Reorganizing traffic flow patterns, like banning right turning movements where necessary;
- Introduction of appropriate signing and lining together with extensive publicity;
- Provide convenient taxi loading and unloading stops and ban stopping at undesignated locations;
- Designate parts of the footway where it is possible and acceptable to accommodate street trading, and establish a fee paying permit and enforcement system;
- Reinforce speed limits with physical speed control measures, especially on through roads in trading centers and towns. The most effective speed control measure in Uganda is the use of humps. However, the design of humps is not standardized;
- In situations where humps are undesirable but interactions between NMT and motorized

traffic is inevitable, vehicle speeds must be restricted using prominent road signs. The pedestrian risk of being killed in a road traffic accident has been found to be about 10% for vehicle speeds of 30 km/h and as worse as 40-80% for vehicle speeds of 50 km/h. Therefore, a speed limit of 30 km/h is recommended in all cases when cars and pedestrians/bicyclists interact. In no case that speed exceeding 50 km/h should be allowed;

- Safe night driving depends on the night visibility of pavement markings. High priority should be given to the application of markings which are highly visible at night.

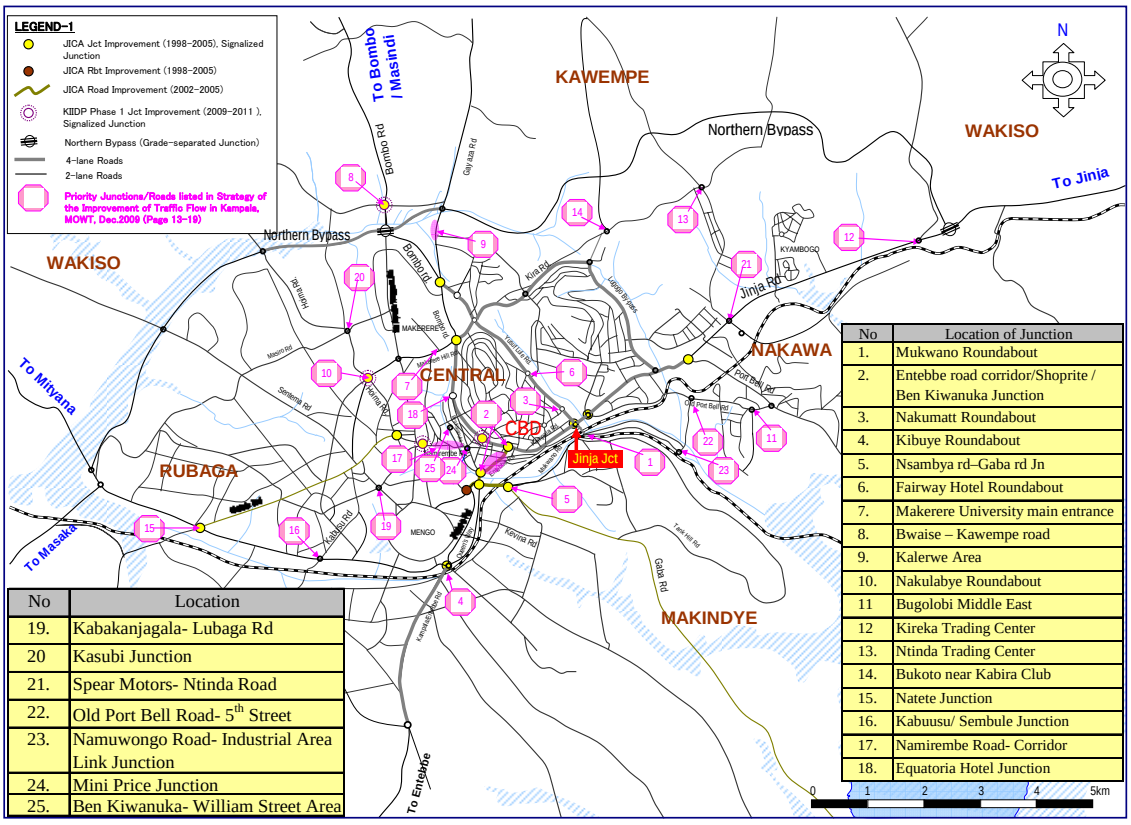
- Serious safety issues associated with boda bodas must be addressed by a combination of measures, including regulation, sensitization/ education and law enforcement.

Continuous road safety education campaigns targeted at different categories of road users, including the school children is crucial. The police should participate more in educating the public and enforcing the new measures.

The task force also recommended traffic enforcement, efficient public transport introduction (BRT), and institutional issues. It also strongly recommended establishment of an Urban Traffic Unit since creation of a Greater Kampala MATA would take time due to the need for change in the existing legislation.

(3) Specific Measures by Road and Junction

The task force suggested specific measures for the improvement of endemic congestion for the junctions in Figure 4.5.1. The measures for each junction are intended for short term and medium term applications with estimated costs.



No	Location
19.	Kabakanjagala- Lubaga Rd
20	Kasubi Junction
21.	Spear Motors- Ntinda Road
22.	Old Port Bell Road- 5th Street
23.	Namuwongo Road- Industrial Area Link Junction
24.	Mini Price Junction
25.	Ben Kiwanuka- William Street Area

No	Location of Junction
1.	Mukwano Roundabout
2.	Entebbe road corridor/Shoprite / Ben Kiwanuka Junction
3.	Nakumatt Roundabout
4.	Kibuye Roundabout
5.	Nsambya rd–Gaba rd Jn
6.	Fairway Hotel Roundabout
7.	Makerere University main entrance
8.	Bwaise – Kawempe road
9.	Kalerwe Area
10.	Nakulabye Roundabout
11	Bugolobi Middle East
12	Kireka Trading Center
13.	Ntinda Trading Center
14.	Bukoto near Kabira Club
15.	Natete Junction
16.	Kabuusu/ Sembule Junction
17.	Namirembe Road- Corridor
18.	Equatoria Hotel Junction

Source: JICA Study Team

Figure 4.5.1 Location Map of Priority Junctions listed in MoWT Strategy for the Improvement of Traffic Flow

4.6 OTHER DEVELOPMENT PLANS RELATED TO ROADS IN GKMA

Other studies and development planning have been conducted for the GKMA in the past decade, or are still on-going, including below:

(1) Road Sector Development Program (RSDP)

RSDP-1 was formulated in 1996 for the period 1996/97 – 2005/06 as a strategy aimed at promoting cheap, efficient and reliable road transport services. However, after a mid-term review, it was updated with the RSDP-2 for the years 2001/02 – 2010/11, finalized in March 2002. A further review to produce RSDP-3 was commissioned in 2008, but has no final report has been prepared as of the end of 2009.

UNRA Strategic Plan for 2008/09 – 2012/13 was prepared taking full account of the status of RSDP-2 up to mid-2008.

(2) The Road Safety Audit and Improvement Study, 2000 (RSAIS)

The study was carried out under the Ten-Year Road Sector Development Program (1996-2006). The study estimated that the total cost of accidents to Uganda's economy was US$ 122.4 million in 1988, representing 2.3% of the DGP. The study focused on four initiatives, namely:

- The elimination of "black spots"
- Update the database to record and analyze accident data
- Strengthen the capacity of police to enforce traffic laws through training, equipment and development
- Review Traffic and Road Safety Act.

(3) The East African Road Network Project by EAC

The EAC with its member countries, Kenya, Uganda, Tanzania, Rwanda, and Burundi, has established the five main corridors within the community as the East African Road Network Project (refer to Figure 2.1.1 in this report), which constitute a strategic priority and required rehabilitation and upgrading to complete the road network in the community.

(4) Kampala Structure Plan (Land Use Plan)

Land use plan and development of road and public transport are two key elements in achieving a desirable transport network system in GKMA. The latest ten-year structure plan for Kampala City was established in 1994. The validity of current structure had been extended for further five years but as it was also expired, urgent updating is required.

KCC is going to study and establish a new structure plan (land use plan) covering not only the KCC area but also the GKMA with the assistance of the WB. KCC intends to utilize part of KIIDP finance for the new physical development plan that would guide physical development of the city over the next ten years.

The MoLHUD and KCC are currently in the process of procuring a consultant for the project, "Updating Kampala Structure Plan and Upgrading the Kampala GIS Unit". Related study will start around September – October 2010, and will be completed within 2 years.

According to the TOR for the consultancy services, outline of the study is as follows:

The overall objective of the consultancy is to prepare a physical development plan to guide orderly physical and sustainable development of the city over the next decade, through a

participatory process.

The specific objectives of the study are to:

1). Evaluate the past planning interventions and draw lessons learnt from it, so as to form a basis for the subsequent planning interventions;

2). Develop a communication strategy for sensitizing the private and public stakeholders during the preparation and implementation of the structure plan;

3). Prepare a new physical development plan that includes maps and other graphics, and reports for the planned area;

4). Upgrade the existing GIS system so that the information generated in the background studies and during the preparation of the structure plan can be linked and used for further planning and land management;

5). Evaluate the manpower and technical/skill capacity gaps in physical planning and land management, formulate a training strategy and conduct on-the-job training programs for the staff on specific thematic areas;

6). Review and develop development standards and guidelines for the implementation of the development plan; and

7). Develop a capital investment plan (CIP) reflecting priority intervention areas with cost estimates.

(5) Situational Analysis and Drafting National Urban Policy

The MoLG is going to conduct a situational analysis and drafting of a national urban policy in Uganda by employing a consultant through the financial assistance of the WB. The study will involve carrying out a comprehensive urban situation analysis to generate baseline information and indicators on physical, demographic, economic livelihoods, services, planning, urban management and investments gaps and trends. It will also identify legal policy and governance-related gaps that are consequential and critical for the pro-poor growth of the urban areas in Uganda. It will be conducted over selected and representative samples of urban areas from different regions, sizes and contexts in Uganda. The Consultant will prepare a draft national urban policy and explore various sources of financing urban development. They will also prepare appropriate recommendations to facilitate implementation of the national urban policy and strategic urban development plan.

(6) Kampala Drainage Master Plan (KDMP)

The MoLG and KCC initiated KDMP to ensure that rehabilitation and sustainable upgrading are implemented in an orderly and affordable manner. The WB financed the study under Nakivubo Channel Rehabilitation Project (NCRP).

The objective of the KDMP is to develop comprehensive storm water drainage master plan to solve the problems in Kampala City. Channels were designed to improve their capacity in carrying flood water. These were initiated by enlarging existing channels, providing new channels and culverts, and upgrading existing culverts and lining of canals.

The NCRP Phase I was implemented under the WB finance while its Phase II has been implemented under KIIDP.

CHAPTER 5 TRAFFIC SURVEY AND TRAFFIC DEMAND FORECAST

5.1 TRAFFIC SURVEY

5.1.1 OBJECTIVES OF TRAFFIC SURVEY

The Study Team conducted a traffic survey, including traffic count survey (12hr and 24hr), origin-destination (O-D) survey, intersection traffic count survey at peak hours, taxi interview survey, bike taxi (locally known as boda-boda) interview survey, and travel speed survey, in Kampala City in January 2010. It aims to identify the current traffic condition and to forecast the future traffic demand. A supplemental traffic survey was conducted on major junctions in June 2010 to study the current traffic conditions and intersection problems.

5.1.2 OUTLINE AND SCHEDULE OF TRAFFIC SURVEY

(1) Outline of Traffic Survey

The type of surveys, objective, method and coverage are shown in the following table;

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	11 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 the present traffic situation on major roads	Actual driving survey by passenger car	

Source: JICA Study Team

(2) Schedule of Traffic Survey

The schedule of the traffic surveys is summarized below:

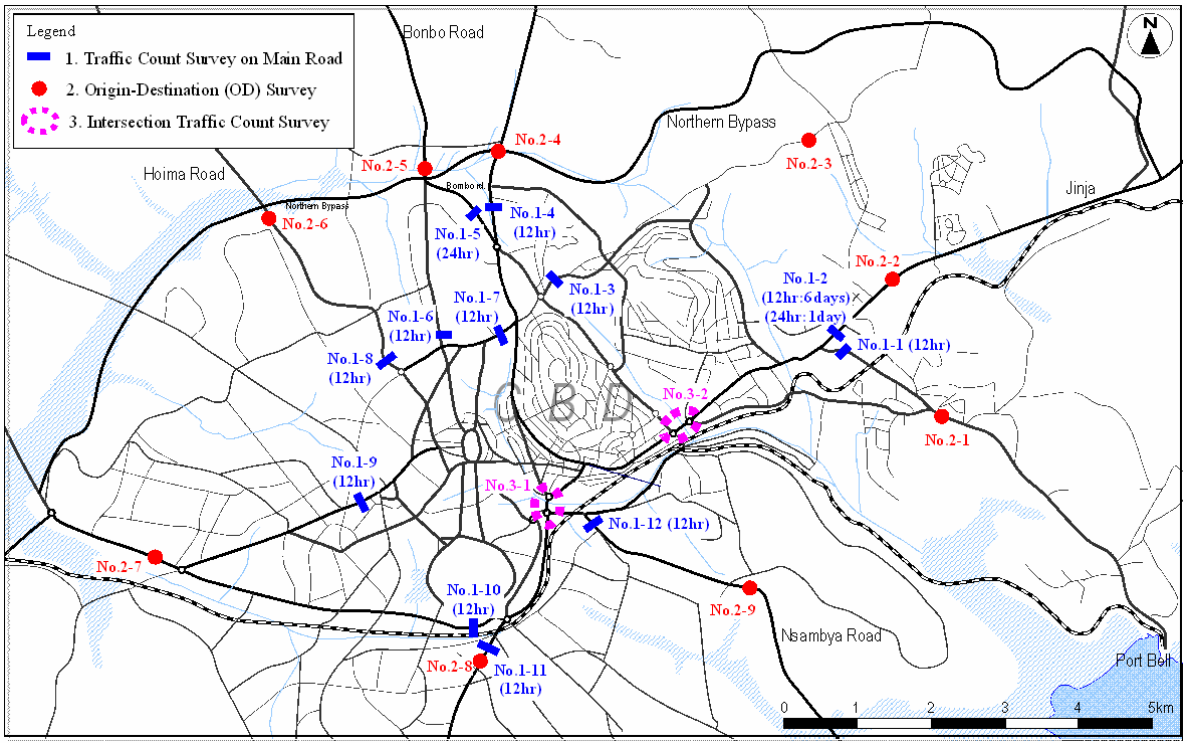
Survey	2009	2010	
	Dec.	Jan.	Feb.
Preparation of Survey			
Training and Trial			
Traffic Count Survey (12hr and 24hr)			
Origin-Destination (O-D) Survey			
Intersection Traffic Count Survey			
Taxi Passenger & Driver Interview			
Boda-Boda Passenger & Driver Interview			
Data Entry and Reporting			
Travel Speed Survey			

Source: JICA Study Team

Figure 5.1.1 Schedule of Traffic Survey

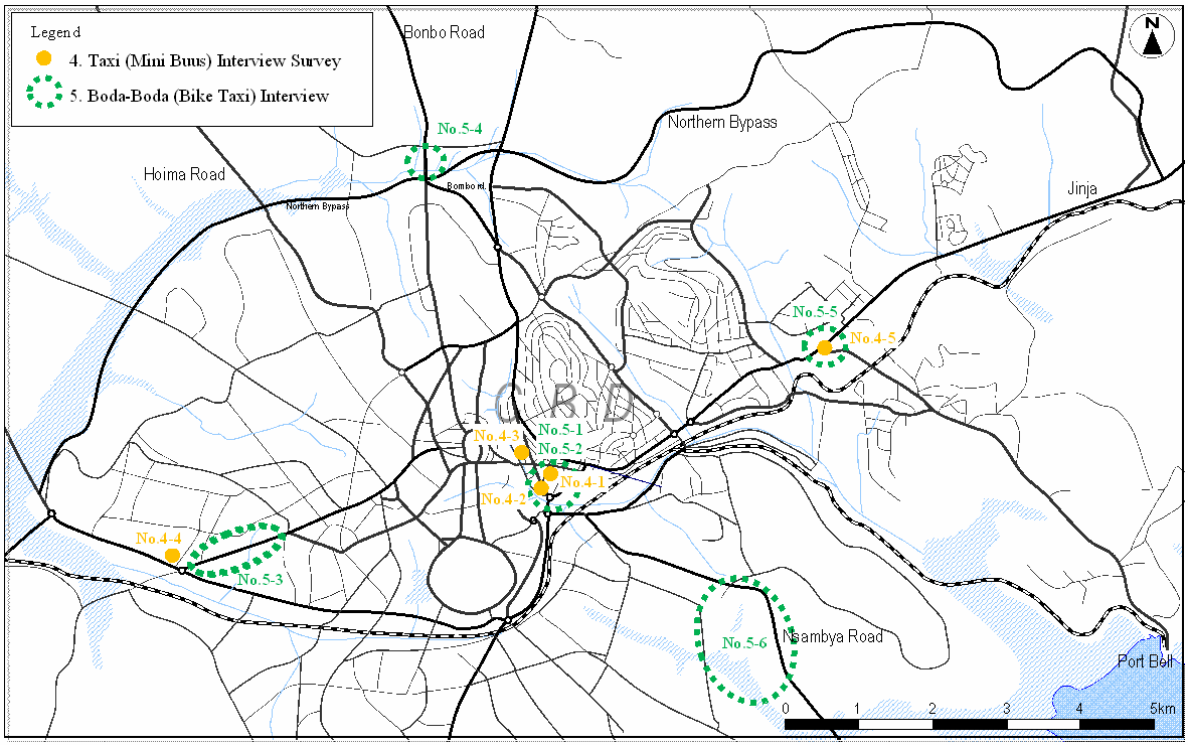
(3) Location of Traffic Survey

The location of the traffic surveys is shown below:



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)

Refer to Section 5.2.4 and Figure 5.1.4 as to the location of the travel speed survey.

5.1.3 DESCRIPTION OF TRAFFIC SURVEY

(1) Traffic Count Survey

This survey aims to count the number of vehicles to capture traffic volume on major roads. Three types of traffic counts survey such as 12 hour traffic count, 24 hour traffic count and one week traffic count were conducted. The contents of the traffic count survey are shown in table 5.1.2. Table 5.1.3 shows the seven vehicle types classified at the traffic counts.

Table 5.1.2 Contents of Traffic Count Survey

Survey Date	- 12th January 2010: 1-1 (12hr), 1-2 (12hr), 1-3 (12hr), 1-4 (12hr), 1-5 (24hr), 1-6 (12hr) - 13th January 2010: 1-2 (24hr), 1-7 (12hr), 1-8 (12hr), 1-9 (12hr), 1-10 (12hr), 1-11 (12hr), 1-12 (12hr) - 14th – 18th January 2010: 1-2 (12hr)
Survey Hour	- 12 hours from 7:00 a.m. to 7:00 p.m. - 24 hours from 7:00 a.m. to 7:00 a.m. in the next morning
Vehicle Type	- Seven (7) categories as shown in Table 5.1.3.
Survey Method	- To count the number of vehicles by direction and by vehicle type continuously for 12hr or 24hr. - To record the number of vehicles on the survey sheet every thirty (30) minutes.

Source: JICA Study Team

Table 5.1.3 Vehicle Types

Category		Illustration
1	Passenger Vehicle (P-Car)	
2	Small Size Cargo Vehicle (Cargo)	
3	Minibus (Taxi)	
4	Large Size Bus (L-Bus)	
5	Medium Goods Vehicle (MGV)	
6	Heavy Goods Vehicle (HGV)	
7	Motor Bicycle (Bike)	

Source: JICA Study Team

(2) O-D Survey

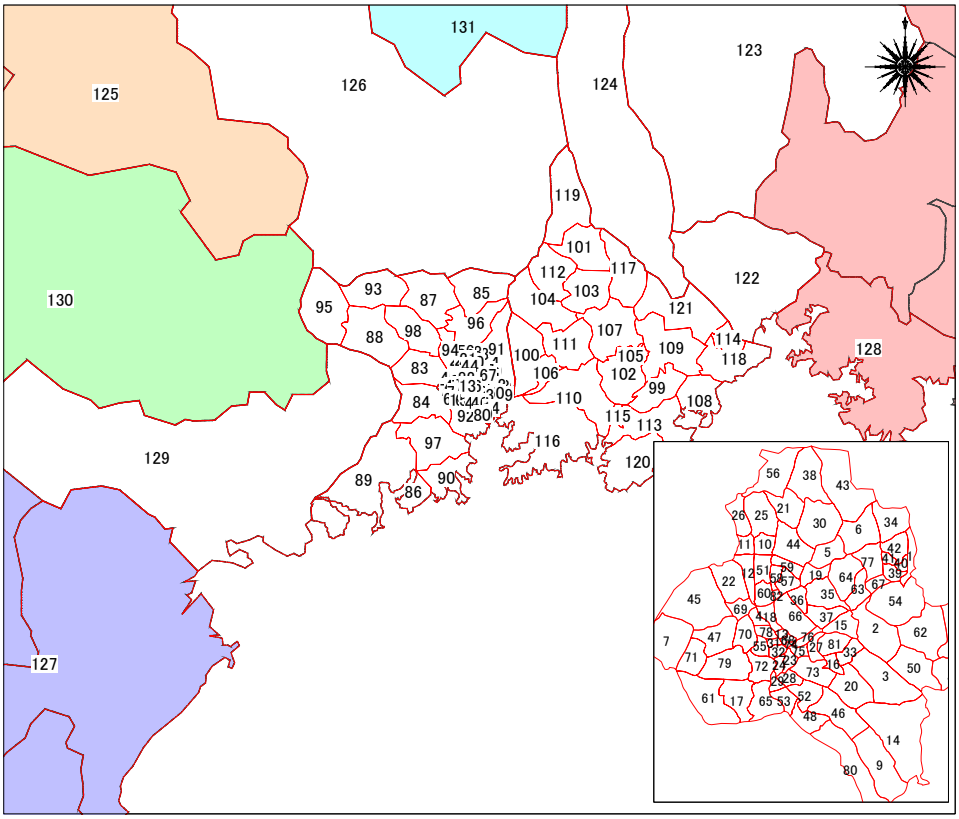
O-D survey is to interview vehicle drivers along the major roads to capture trip information especially origin and destination of vehicle trips. In this Study, interviews were conducted along the nine major arterial roads in GKMA. Trip characteristics such as trip purpose, travel time and so on were also asked at the interview. The details of the O-D survey are as follows:

Table 5.1.4 Contents of O-D Survey

Survey Date	- 12th January 2010: 2-1, 2-2, 2-3, 2-4, 2-5 - 13th January 2010: 2-6, 2-7, 2-8, 2-9
Survey Hour	- 12 hours from 7:00 a.m. to 7:00 p.m.
Vehicle Type	- Same as the traffic count survey
Survey Method	- Interview to drivers by surveyors at the roadside
Survey Content	- Survey Time - Vehicle Type - Origin and Destination of the Trip - Trip Purpose - Travel Time - Address of Residence - Number of Passengers in the Vehicle including the Driver - Trip Frequency - Contents and Volume of Freight

Source: JICA Study Team

The study area and its neighboring districts are divided into 131 zones to define the location of origin and destination, of which Kampala district are divided by every parish level and Mukono district and Wakiso district are divided by every sub-county. Outside of the study area composed of adjoining districts is divided by every district. As a result, Kampala City, Wakiso District and Mukono District is divided to 82, 16 and 23 zones respectively. Other areas are divided to 10 zones. The zone location is as follows:



Source: JICA Study Team

Figure 5.1.3 Zone Location for O-D Survey

(3) Intersection Traffic Count Survey

Intersection traffic count survey aims to count the number of vehicles to determine traffic volumes and movement at major intersections. 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.

Table 5.1.5 Contents of Intersection Traffic Count Survey

Survey Date	- 14th January 2010: 3-1, 3-2
Survey Hour	- Peak hours from 7:00 to 10:00 in the morning and 16:00 to 19:00 in the evening
Vehicle Type	- Same as the traffic count survey
Survey Method	- To makes interview to the drivers asking where (which direction) to go. In order to simplify the survey, the direction list shall be used and tick the answer on survey sheet. - To record the number of vehicles on the survey sheet every thirty (30) minutes.

Source: JICA Study Team

(4) Taxi (Minibus) Interview Survey

This survey aims to collect information about public transport (minibus) drivers and users, and their opinion regarding the service of the public transport system. Passengers' origin and destination of trips as well as trip characteristics were also asked same as the vehicle O-D survey. The contents of the taxi interview survey are as follows.

Table 5.1.6 Contents of Taxi (Minibus) Interview Survey

Survey Date	- 15th January 2010: 4-1, 4-2, 4-3, 4-4, 4-5
Survey Hour	- 12 hours from 7:00 a.m. to 7:00 p.m.
Target	- Drivers and passengers
Survey Method	- Interview by surveyors at major taxi park
Survey Content	- To the passengers: Personal Information (sex, age, occupation, monthly wage), Trip Purpose, Origin and Destination, Taxi Usage Frequency, Taxi Fare, Satisfaction Level of current Taxi Service, Willingness to Pay - To the drivers: Personal Information (sex, age, occupation, monthly wage), Operation records on yesterday, Average number of operation a day, Average working time a day, Time of peak hours, Occupancy level (peak time and off-peak time)

Source: JICA Study Team

(5) Boda-Boda (Bike Taxi) Interview Survey

This survey aims to collect information on public transport (boda-boda) drivers and users. The contents of the boda-boda interview survey are as follows.

Table 5.1.7 Contents of Boda-Boda Interview Survey

Survey Date	- 18th January 2010: 5-1, 5-2, 5-3, 5-4, 5-5, 5-6
Survey Hour	- 12 hours from 7:00 a.m. to 7:00 p.m.
Target	- Drivers and passengers
Survey Method	- Interview by surveyors at major boda-boda stages
Survey Content	- To the passengers: Trip Purpose, Boda-Boda Usage Frequency, Fare, Origin and Destination - To the drivers: Personal Information (sex, age), Employment status (owner or employed), Average daily income

Source: JICA Study Team

(6) Travel Speed Survey

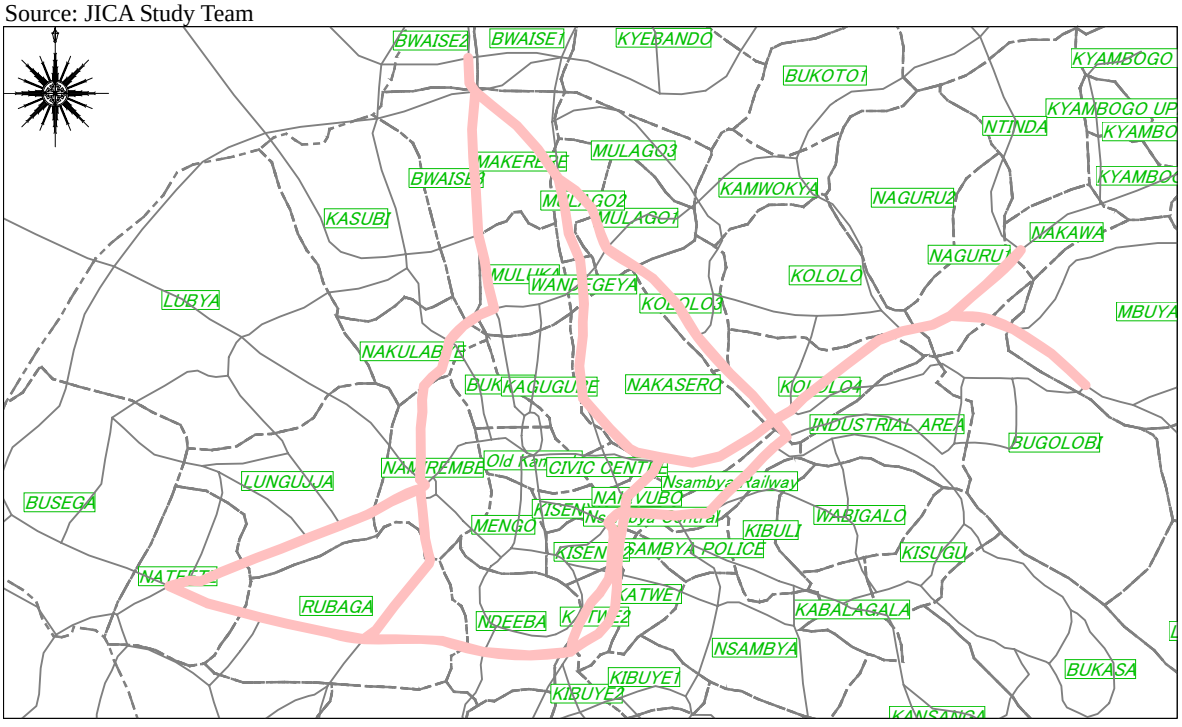
Travel speed survey has two purposes: one is to collect information on the present traffic situation in the study area and the other is to compare the results with that in NTMP/GKMA in 2003-2004.

For this purpose, 19 main roads were selected as survey routes as shown in Figure 5.1.4. The contents of the travel speed survey are as follows.

Table 5.1.8 Contents of Travel Speed Survey

Survey Date	- 2nd, 3rd, 4th, 9th, 10th, 11th February 2010
Survey Hour	- morning and evening peak hours on weekday
Survey Method	- Actual driving survey by passenger car and Collection of 4 samples (round trip)

Source: JICA Study Team



Source: JICA Study Team

Figure 5.1.4 Selected Routes for Travel Speed Survey

5.2 PRESENT TRAFFIC CONDITIONS

5.2.1 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.

(1) 24-hour Traffic Volume

24 hour traffic count is conducted at two survey points, Jinja road and Bombo road (No.1-2 and No.1-5). At both of survey points, ratio of 12 hour volume / 24 hour volume is higher in the CBD direction compared to the outside direction. Data for converting 12-hour counts to 24-hour counts is obtained also from the survey result. Based on the data from No.1-2 and No.1-5, 1.39 is derived as the factor for converting 12-hour counts to its 24-hour equivalent. The 12-hour flows obtained by this study are converted to Annual Average Daily Traffic (AADT) volumes using 1.39 as the conversion factor. Table 5.2.1 and Figure 5.2.1 shows the result of 24-hour traffic survey.

Table 5.2.1 Result of Traffic Count Survey

Location	Direction	Daytime (7:00 – 19:00)			Night time (19:00-7:00)			24h/12h
		Vehicle	Bike	Total	Vehicle	Bike	Total	
No.1-2 Jinja Road (13th Jan)	To CBD	13,229	4,663	17,892	4,017	1,100	5,117	1.33
	To Outside	13,045	2,527	15,572	4,983	1,086	6,069	
	Total	26,274	7,190	33,464	9,000	2,186	11,186	
No.1-5 Bombo Road (12th Jan)	To CBD	6,505	5,591	12,096	2,216	2,312	4,528	1.48
	To Outside	6,005	3,827	9,832	2,551	3,464	6,015	
	Total	12,510	9,418	21,928	4,767	5,776	10,543	
Total	To CBD	19,734	10,254	29,988	6,233	3,412	9,645	1.39
	To Outside	19,050	6,354	25,404	7,534	4,550	12,084	
	Total	38,784	16.608	55,392	13,767	7,962	21,729	

Source: JICA Study Team

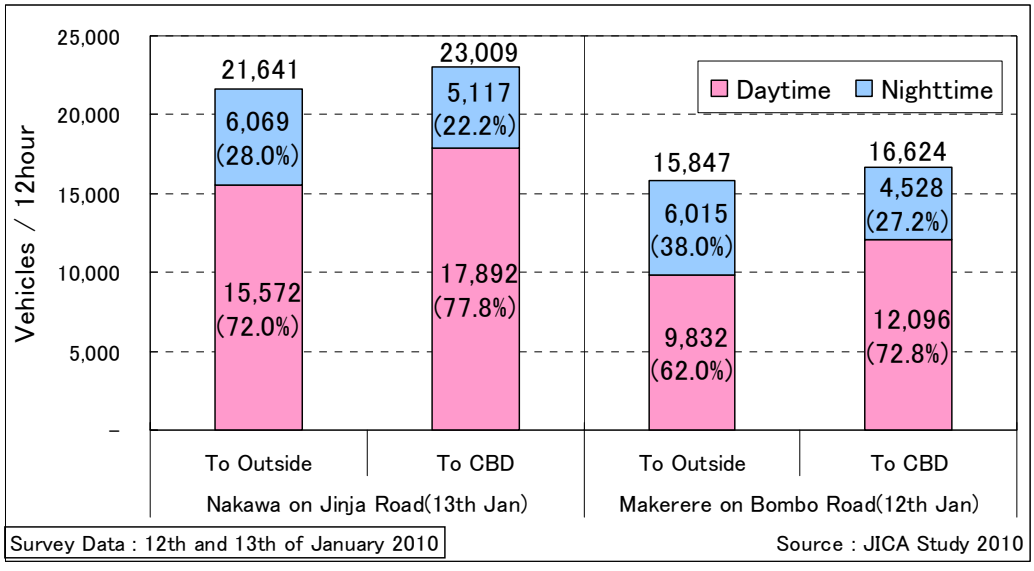


Figure 5.2.1 Day-time / Night-time Variation

(2) Traffic Volume (12hr) and Vehicle Composition

Figure 5.2.2 shows the traffic volume at each site, by vehicle type over 12 hour periods. 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 the only 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 single carriageway.

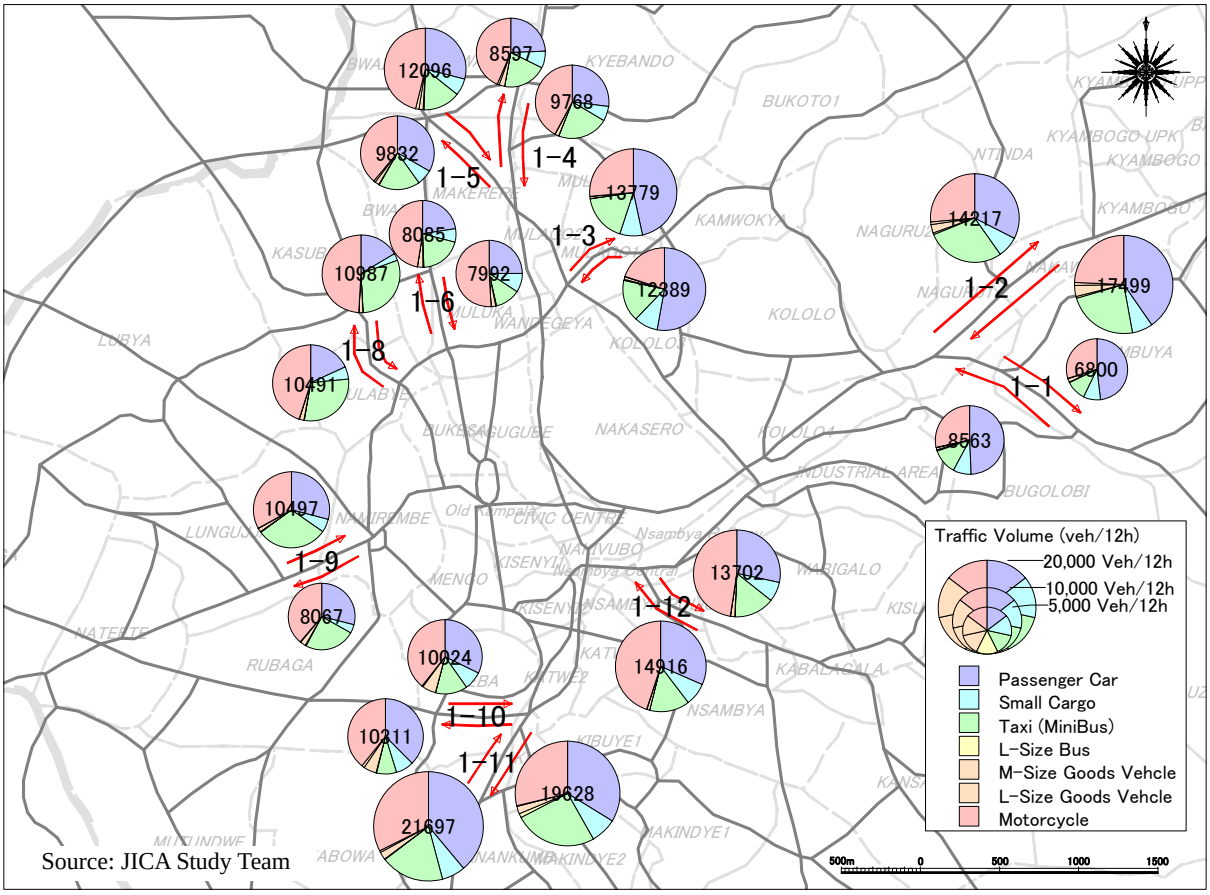


Figure 5.2.2 Distribution of Traffic Volume

In view of vehicle composition, the proportion of motorcycle including boda-boda is relatively high (36.7%), followed by passenger car (35.1%). This is because boda-boda is currently the major transportation means in the city while the share of mini-bus is at 18.5%.

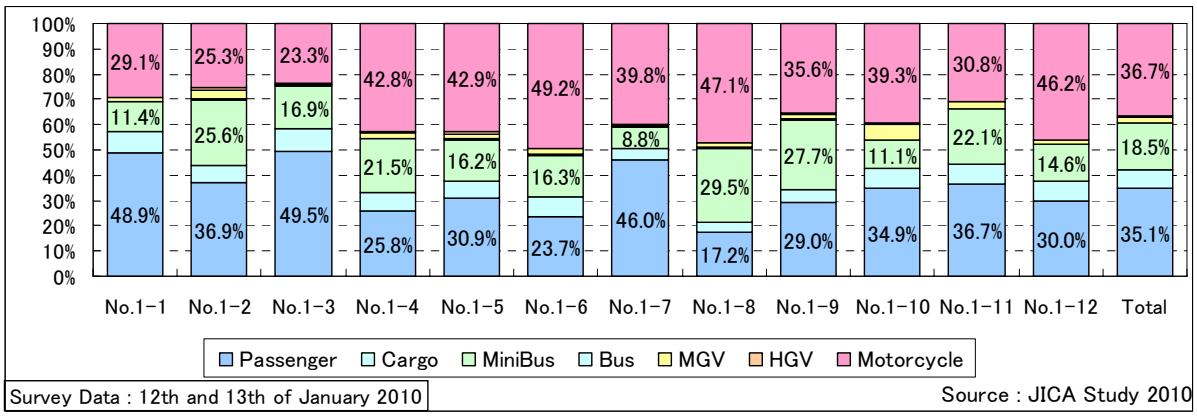


Figure 5.2.3 Comparison of Vehicle Composition

(3) Hourly and Daily Variation

Figure 5.2.4 shows the hourly profiles over the 12 hour day at Nakawa (No.1-2). The peak hour of traffic volume to the CBD direction on weekdays appears to occur in the morning between 8:00 and 9:00 hours. And evening peak hour to outside direction appears between 17:00 and 18:00. Other data display relatively flat profiles over 12 hour day and do not have specific features.

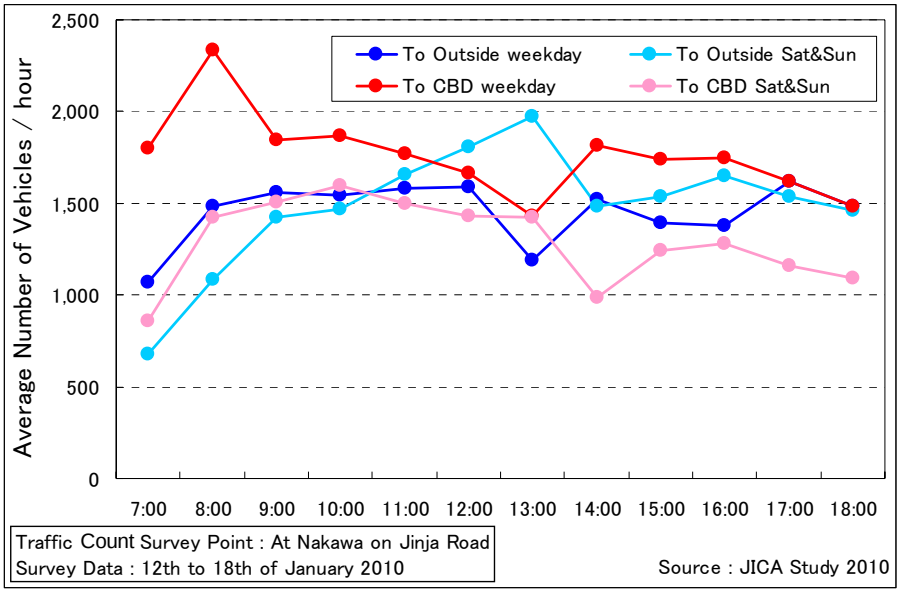


Figure 5.2.4 Hourly Variation by Directions

The traffic survey for consecutive seven days from Sunday to Saturday was also carried out at Nakawa to obtain the data of daily variation. The traffic volume on Monday on both directions was greater than that of other days. 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.

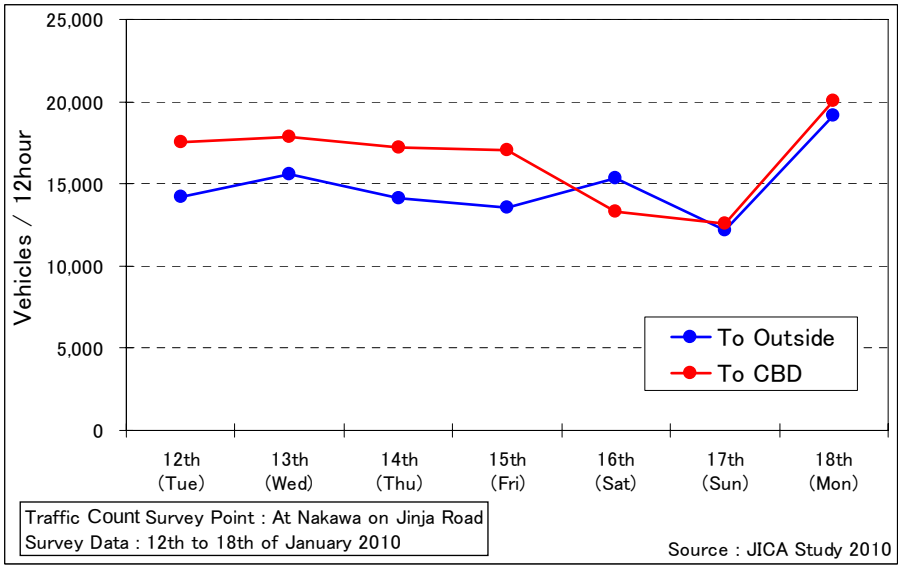


Figure 5.2.5 Daily Variation by Directions

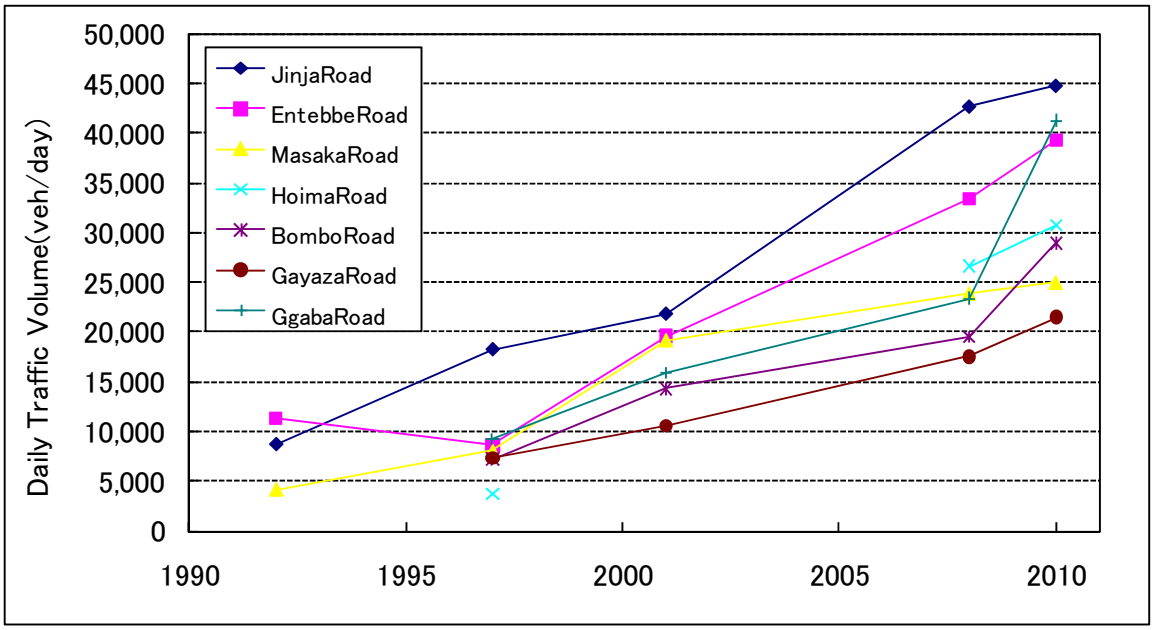
(4) Traffic Growth Rate on Major Arterial Roads

Table 5.2.2 and Figure 5.2.6 shows the past traffic count data and trend of traffic growth on major rods, respectively. 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 5.2.2 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



Source: As shown in Table 5.2.2.

Figure 5.2.6 Trend of Traffic Growth on Major Roads from 1992 - 2010

5.2.2 JUNCTION TRAFFIC

(1) Shoprite-Clock Tower Intersection (No.3-1)

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) connected to the intersection. All surveyed points were located on inflow side (entrance of intersection).

Figure 5.2.7 shows the total inflow traffic volume to Shoprite and Clock Tower Junction. The traffic flow shows that the peak in the morning occurs between 7:00 and 8:00 hours and peak in the evening occurs between 18:00 and 19:00. In particular, inflow traffic from Mengo Hill Rd in the morning is largest. On the other hand, inflow from Entebbe road is largest in the evening.

This phenomenon shows that Mengo Hill Road is dominant for the traffic to CBD and Entebbe Road is dominant for the traffic from CBD. In the evening, inflow traffic from Mengo Hill Rd and Entebbe Rd is almost same in number. In comparison between the morning and evening data, traffic volume in the morning is relatively higher than that in the evening.

Figure 5.2.8 shows the composition of vehicle type of inflow traffic. In view of vehicle type, mini-bus shows the highest share in the morning and motorcycle shows the highest share in the evening.

The peak traffic volume of 11,000 veh/hr far exceeded the capacity of the intersection. In addition, traffic flows at this intersection is often disturbed by irregular vehicle movements especially by motorcycles. Consequently, traffic congestion occurs throughout the day.

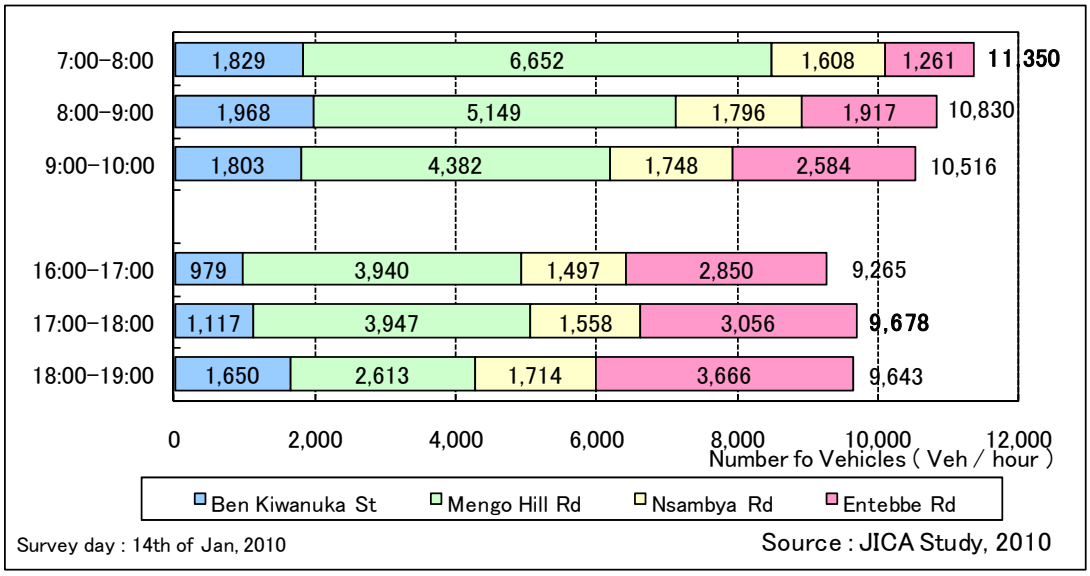


Figure 5.2.7 Traffic Volume Variation of Inflow (Shoprite & Clock Tower Jcts)

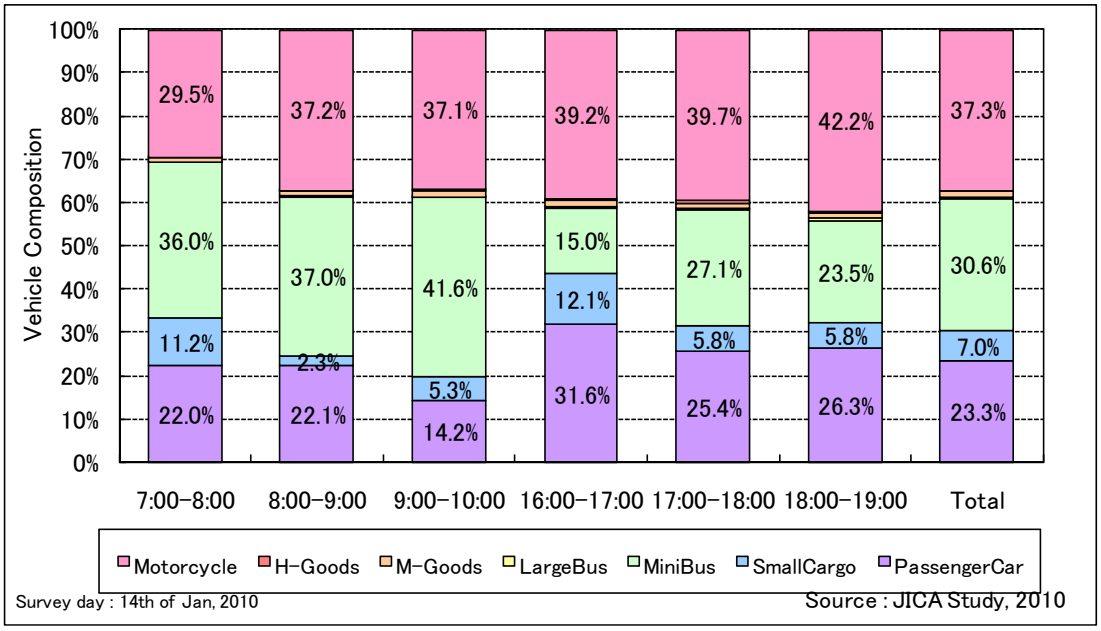


Figure 5.2.8 Vehicle Type Variation of Inflow Traffic (Shoprite & Clock Tower Jcts)

The outflow traffic volume from the intersection was derived based on the interview survey and traffic count survey at inflow side. The outflow traffic volume at Shoprite and Clock Tower

Intersection is estimated as shown in Tables 5.2.3 and 5.2.4.

Figures 5.2.9 show the traffic flows at the Shoprite and Clock Tower Junction from 7:00 to 8:00 in the morning and figure 5.2.10 shows the traffic flow from 17:00 to 18:00 in the evening. At the Clock Tower Junction, largest traffic is observed in the direction from Mengo Hill Road to Entebbe Road in the morning peak hour. At the Shoprite Junction, largest traffic is observed in the direction from Entebbe road to Entebbe Road closely followed by direction from Entebbe Road to Ben Kiwanuka Street. Therefore it can be said that the dominant traffic flow at the Shoprite and Clock Tower Junction is from Mengo Hill Road to Entebbe Junction and from Mengo Hill Road to Ben Kiwanuka Street.

In the evening peak hour, even though general traffic flow is changing to out flow from CBD, largest traffic volume at the Clock Tower Junction is from Mengo Hill road. Strait traffic from Shoprite junction to Entebbe direction is second largest. At the Shoprite Junction, traffic from Entebbe Junction to Clock Tower Junction is largest. As a whole Traffic from Entebbe Junction to Entebbe direction is dominant flow in the evening.

Table 5.2.3 Estimated Traffic Flow (Morning; Shoprite & Clock Tower Jcts)

IN (come from)		OUT (go to)	7:00 – 8:00		8:00 – 9:00		9:00 – 10:00		Morning Total	
			Interview Result	Estimated Traffic	Interview Result	Estimated Traffic	Interview Result	Estimated Traffic	Interview Result	Estimated Traffic
Ben Kiwanuka St		Kampala Rd	2.8%	51	3.4%	66	1.9%	35	2.7%	152
		Jinja Rd	4.8%	87	5.8%	114	3.3%	60	4.7%	261
		Market St	2.4%	44	2.9%	58	1.8%	32	2.4%	134
		Nkrumah Rd	2.1%	38	2.6%	51	1.4%	26	2.1%	115
		Sikh St	3.4%	62	4.0%	79	2.5%	45	3.3%	186
		Nsambya Rd	27.5%	503	23.1%	454	36.7%	662	28.9%	1,619
		Queen's Way	57.1%	1,044	58.2%	1,146	52.3%	943	55.9%	3,133
Mengo Hill Rd		St Balikuddembe St	23.0%	1,530	26.5%	1,362	34.6%	1,518	27.3%	4,410
		Sikh St	27.0%	1,795	28.5%	1,467	25.8%	1,132	27.2%	4,394
		Market St	9.3%	619	8.0%	414	4.8%	211	7.7%	1,244
		Kampala Rd	5.4%	361	4.1%	211	3.1%	138	4.4%	710
		Jinja Rd	8.2%	543	7.0%	361	3.1%	136	6.4%	1,040
		Nkrumah Rd	2.9%	190	2.0%	104	0.6%	28	2.0%	322
		Nsambya Rd	10.2%	677	8.8%	453	12.9%	566	10.5%	1,696
		Queen's Way	14.1%	937	15.1%	777	14.9%	653	14.6%	2,367
Nsambya Rd		Queen's Way	20.5%	329	29.4%	528	26.4%	461	25.6%	1,318
		St Balikuddembe St	26.5%	426	26.2%	470	28.1%	491	26.9%	1,387
		Sikh St	8.5%	137	9.7%	174	9.0%	157	9.1%	468
		Market St	10.6%	171	3.7%	67	4.7%	83	6.2%	321
		Kampala Rd	10.1%	162	7.8%	140	10.7%	187	9.5%	489
		Jinja Rd	6.8%	110	6.1%	110	9.8%	172	7.6%	392
		Nkrumah Rd	17.0%	273	17.1%	307	11.3%	197	15.1%	777
Nasser Rd	Entebbe Rd	Nsambya Rd	19.0%	52	28.2%	84	41.1%	276	33.1%	412
		Queen's Way	67.0%	183	37.2%	111	32.7%	220	41.4%	514
		St Balikuddembe St	13.9%	38	34.6%	103	26.2%	176	25.5%	317
Jinja Rd		Nsambya Rd	26.5%	154	21.9%	88	18.1%	143	21.7%	385
		Queen's Way	33.5%	195	54.0%	217	44.1%	348	42.8%	760
		St Balikuddembe St	40.0%	233	24.1%	97	37.8%	299	35.5%	629
Kampala Rd		Nsambya Rd	51.1%	114	37.1%	172	8.9%	41	28.5%	327
		Queen's Way	42.6%	95	47.0%	218	56.5%	261	50.0%	574
		St Balikuddembe St	6.3%	14	15.9%	74	34.6%	160	21.6%	248
Market St		Nsambya Rd	14.8%	27	13.5%	102	25.6%	169	18.7%	298
		Queen's Way	36.1%	66	55.9%	421	60.8%	401	55.6%	888
		St Balikuddembe St	49.2%	90	30.5%	230	13.6%	90	25.7%	410

Source: JICA Study Team

Table 5.2.4 Estimated Traffic Flow (Evening; Shoprite & Clock Tower Jcts)

IN (come from)		OUT (go to)	16:00 – 17:00		17:00 – 18:00		18:00 – 19:00		Evenning Total	
			Interview Result	Estimated Traffic	Interview Result	Estimated Traffic	Interview Result	Estimated Traffic	Interview Result	Estimated Traffic
Ben Kiwanuka St		Kampala Rd	4.1%	40	3.2%	36	3.5%	58	3.6%	134
		Jinja Rd	7.4%	72	5.6%	62	6.2%	102	6.3%	236
		Market St	3.7%	36	2.9%	32	3.1%	51	3.2%	119
		Nkrumah Rd	3.2%	31	2.4%	27	2.7%	44	2.7%	102
		Sikh St	6.2%	61	3.9%	44	4.4%	72	4.7%	177
		Nsambya Rd	30.6%	300	36.2%	404	30.6%	505	32.3%	1,209
		Queen's Way	44.8%	439	45.8%	512	49.6%	818	47.2%	1,769
Mengo Hill Rd		St Balikuddembe St	7.5%	295	18.0%	712	22.5%	589	15.2%	1,596
		Sikh St	8.9%	349	10.3%	405	17.5%	456	11.5%	1,210
		Market St	6.8%	268	4.5%	178	8.5%	221	6.4%	667
		Kampala Rd	2.3%	90	3.8%	149	3.0%	78	3.0%	317
		Jinja Rd	9.7%	383	7.6%	300	5.4%	141	7.8%	824
		Nkrumah Rd	11.2%	440	6.5%	256	4.1%	106	7.6%	802
		Nsambya Rd	33.2%	1,308	15.8%	622	15.8%	413	22.3%	2,343
		Queen's Way	20.5%	807	33.6%	1,325	23.3%	609	26.1%	2,741
Nsambya Rd		Queen's Way	33.4%	500	23.5%	366	14.1%	241	23.2%	1,107
		St Balikuddembe St	24.9%	373	25.6%	399	28.5%	488	26.4%	1,260
		Sikh St	13.8%	206	17.7%	276	21.6%	370	17.9%	852
		Market St	5.5%	82	7.6%	119	11.3%	194	8.3%	395
		Kampala Rd	7.3%	109	12.6%	196	12.2%	209	10.8%	514
		Jinja Rd	10.0%	150	4.3%	67	3.7%	63	5.9%	280
		Nkrumah Rd	5.1%	77	8.7%	135	8.7%	149	7.6%	361
Nasser Rd	Entebbe Rd	Nsambya Rd	17.1%	161	12.9%	121	32.0%	410	21.9%	692
		Queen's Way	62.4%	588	72.7%	682	66.3%	849	67.1%	2,119
		St Balikuddembe St	20.5%	193	14.4%	135	1.6%	21	11.0%	349
Jinja Rd		Nsambya Rd	7.1%	35	0.0%	0	10.2%	38	6.2%	73
		Queen's Way	63.4%	312	71.4%	227	78.3%	293	70.3%	832
		St Balikuddembe St	29.5%	145	28.6%	91	11.5%	43	23.6%	279
Kampala Rd		Nsambya Rd	14.4%	110	31.0%	332	13.7%	120	20.8%	562
		Queen's Way	65.0%	496	57.7%	619	82.7%	722	67.8%	1,837
		St Balikuddembe St	20.6%	157	11.3%	121	3.6%	31	11.4%	309
Market St		Nsambya Rd	28.0%	183	28.8%	210	24.7%	281	26.7%	674
		Queen's Way	57.9%	378	45.6%	332	60.6%	690	55.6%	1,400
		St Balikuddembe St	14.1%	92	25.5%	186	14.7%	168	17.7%	446

Source: JICA Study Team

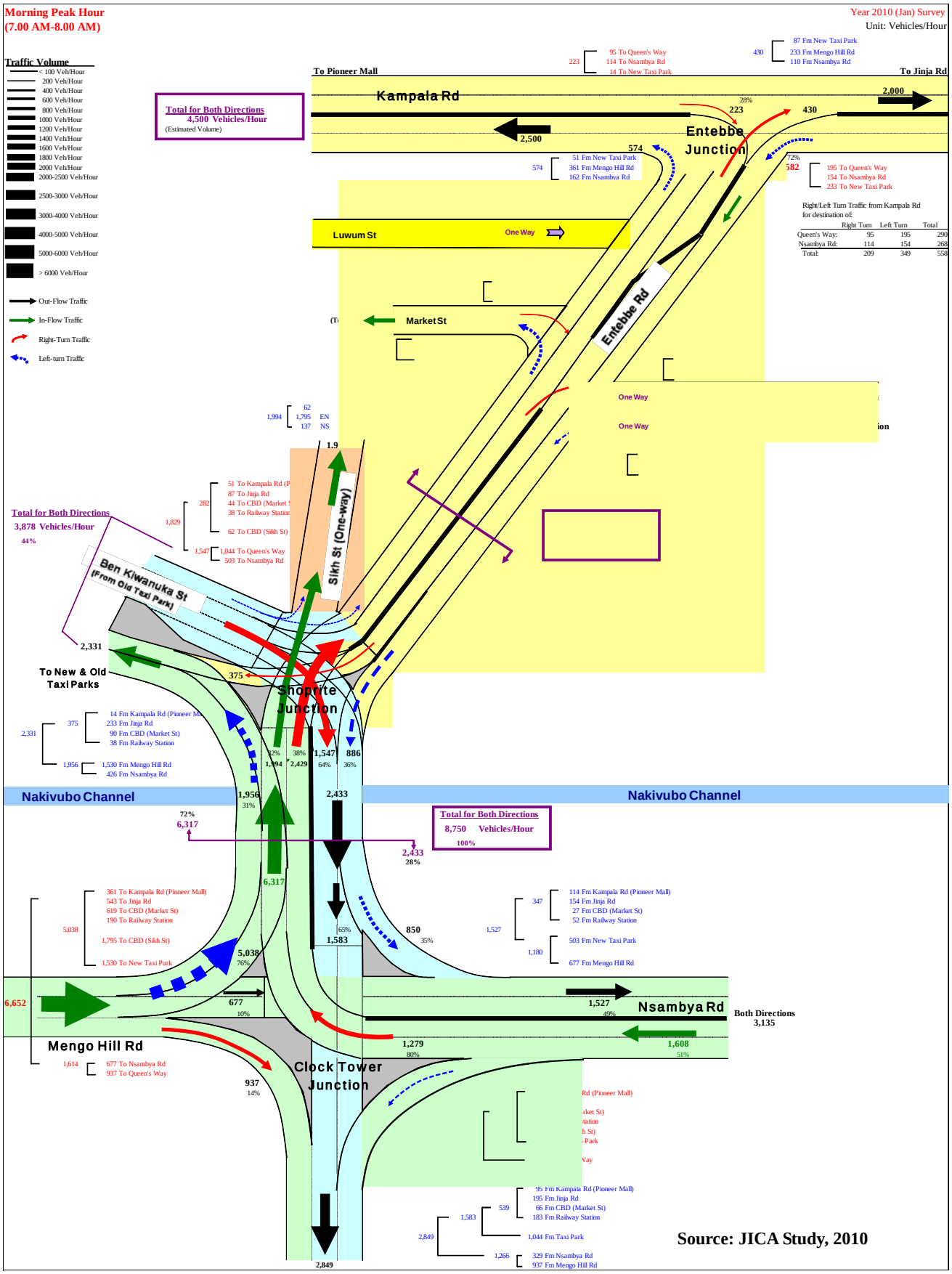


Figure 5.2.9 Traffic Flows on Shoprite & Clock Tower Junctions (Morning Peak)

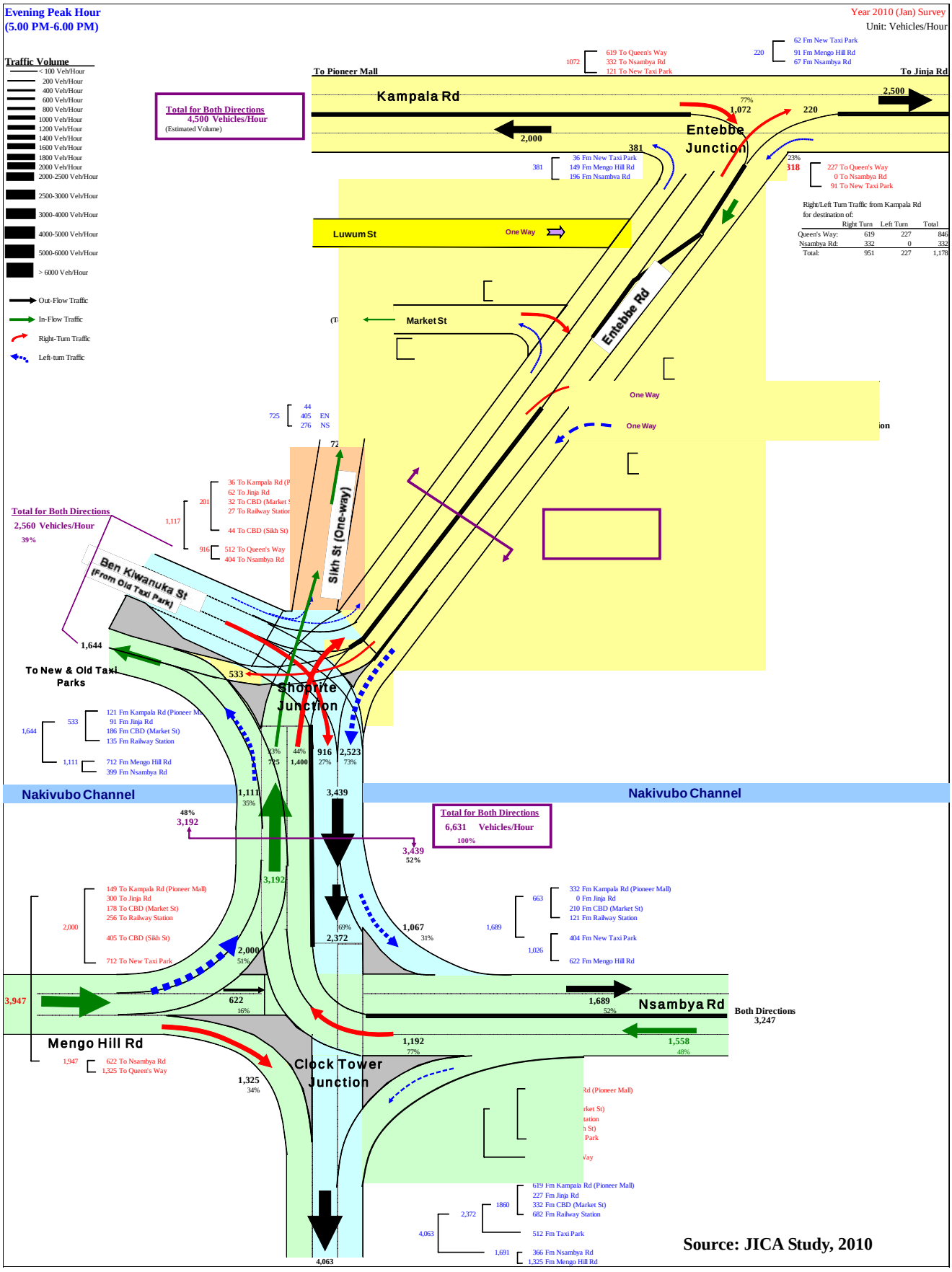


Figure 5.2.10 Traffic Flows on Shoprite & Clock Tower Junctions (Evening Peak)

(2) Jinja-Africana Intersection (No.3-2)

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) connected to the intersection. All surveyed points were located on inflow side (entrance of intersection).

Figure 5.2.11 shows the total inflow traffic volume to Jinja-Africana Junction. The traffic flow shows that the peak in the morning occurs between 8:00 and 9:00 hours and peak in the evening occurs between 17:00 and 18:00. Inflow traffic from Jinja Road is largest in the morning. Inflow from Yusufu Lule Road is largest in the evening. But inflow traffic from all surveyed roads shows almost same in number. The traffic volume in the morning and evening peak hours is almost the same too.

Figure 5.2.12 shows the vehicle type of inflow traffic. Passenger car occupies largest share throughout survey time.

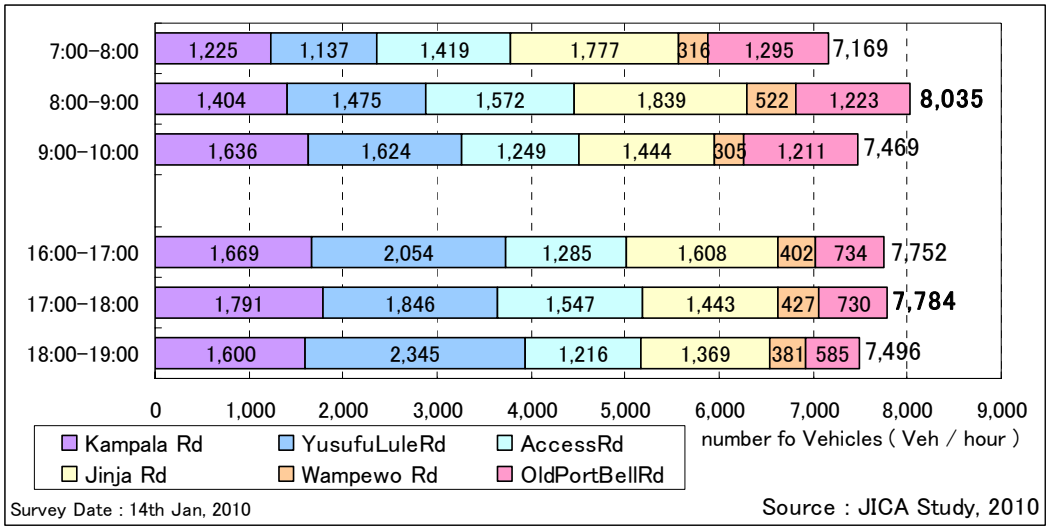


Figure 5.2.11 Traffic Volume Variation of Inflow (Jinja Junction & Africana Roundabout)

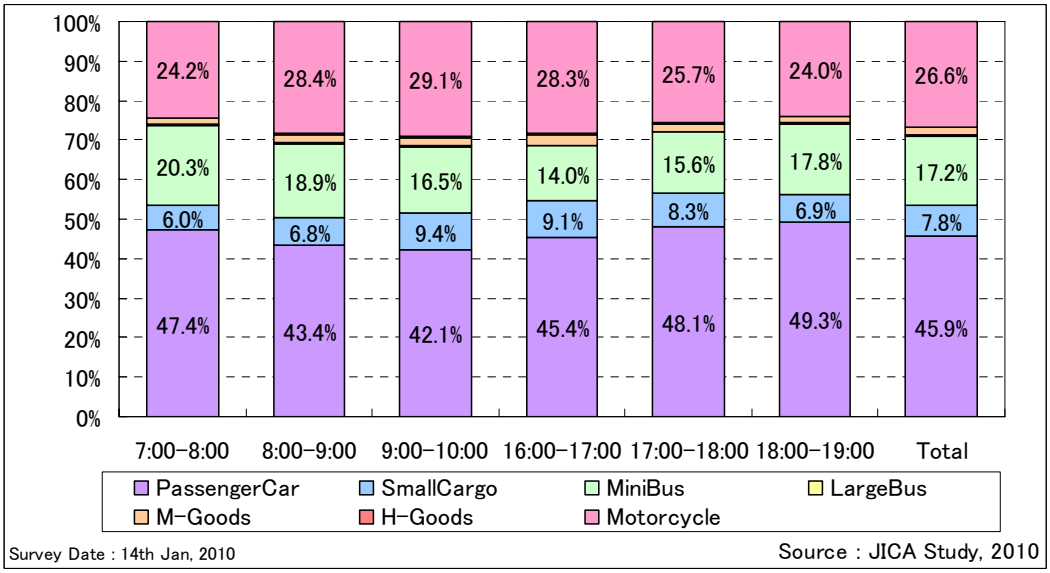


Figure 5.2.12 Vehicle Type Variation of Inflow Traffic (Jinja Junction & Africana Roundabout)

With the same method applied for the Shoprite and Clock Tower Intersections, the traffic flows at Jinja Junction and Africana Roundabout Intersection is estimated as shown in Tables 5.2.5 and 5.2.6.

Figures 5.2.13 show the traffic flows at Jinja-Africana Junction from 8:00 to 9:00 in the morning. At Africana Roundabout, straight traffic from Jinja Road (eastward) to Jinja Junction is largest. Second largest is the traffic from Old Prt Bell Road to Jinja Junction. At Jinja Junction, traffic from Africana Roundabout to Kampala Road is largest and traffic from Mukwano Roundabout to Yusufu Lule Road is second largest. As a result traffic flow from Jinja Road to Kampala Road is distinguished in the morning.

In the evening at Africana Roundabout, traffic from Jinja Junction to Jinja Road (eastward) Jinja Junction is largest and traffic from Jinja Road (eastward) to Jinja Junction is second largest. At Jinja Junction, traffic from Africana Roundabout to Kampala Road is largest and traffic from Mukwano Roundabout to Yusufu Lule Road is second largest. Comparing morning peak and evening peak, principal direction of traffic flow does not change in spite of reversing traffic from inflow to outflow.

Table 5.2.5 Estimated Traffic Flow (Morning; Jinja Junction & Africana Roundabout)

IN (come from)	OUT (go to)	7:00 – 8:00		8:00 – 9:00		9:00 – 10:00		Morning Total	
		Interview Result	Estimated Traffic	Interview Result	Estimated Traffic	Interview Result	Estimated Traffic	Interview Result	Estimated Traffic
Kampala Rd	Yusufu Lule Rd	0.0%	0	0.6%	9	2.0%	33	1.0%	42
	Access Rd	28.2%	346	36.6%	514	23.8%	389	29.3%	1,249
	Jinja Rd	46.7%	572	43.7%	613	53.9%	882	48.5%	2,067
	Wampewo Rd	4.6%	56	4.5%	63	7.0%	114	5.5%	233
	Old Port Bell Rd	20.5%	251	14.6%	205	13.3%	218	15.8%	674
	Total	100.0%	1,225	100.0%	1,404	100.0%	1,636	100.0%	4,265
Yusufu Lule Rd	Kampala Rd	14.7%	167	23.8%	351	14.0%	227	17.6%	745
	Access Rd	33.7%	383	34.8%	513	27.4%	445	31.7%	1,341
	Jinja Rd	18.8%	214	11.3%	167	12.5%	203	13.8%	584
	Wampewo Rd	19.6%	223	10.1%	149	11.6%	188	13.2%	560
	Old Port Bell Rd	13.2%	150	20.0%	295	34.5%	561	23.7%	1,006
	Total	100.0%	1,137	100.0%	1,475	100.0%	1,624	100.0%	4,236
Access Rd	Kampala Rd	5.6%	80	7.9%	124	6.2%	78	6.7%	282
	Yusufu Lule Rd	61.5%	872	63.3%	995	65.7%	820	63.4%	2,687
	Jinja Rd	19.6%	278	11.6%	183	16.6%	207	15.8%	668
	Wampewo Rd	5.5%	78	8.5%	133	6.6%	82	6.9%	293
	Old Port Bell Rd	7.8%	111	8.7%	137	5.0%	62	7.3%	310
	Total	100.0%	1,419	100.0%	1,572	100.0%	1,249	100.0%	4,240
Jinja Rd	Kampala Rd	70.9%	1,260	68.1%	1,253	66.8%	964	68.7%	3,477
	Yusufu Lule Rd	12.4%	221	10.3%	190	15.7%	227	12.6%	638
	Access Rd	6.4%	113	9.2%	170	8.5%	123	8.0%	406
	Wampewo Rd	7.9%	141	7.8%	143	5.1%	73	7.1%	357
	Old Port Bell Rd	2.4%	42	4.5%	83	3.9%	57	3.6%	182
	Total	100.0%	1,777	100.0%	1,839	100.0%	1,444	100.0%	5,060
Wampewo Rd	Kampala Rd	37.7%	119	41.4%	216	45.2%	138	41.4%	473
	Yusufu Lule Rd	5.4%	17	0.6%	3	1.3%	4	2.1%	24
	Access Rd	18.4%	58	13.8%	72	6.6%	20	13.1%	150
	Jinja Rd	18.4%	58	23.6%	123	24.6%	75	22.4%	256
	Old Port Bell Rd	20.3%	64	20.7%	108	22.3%	68	21.0%	240
	Total	100.0%	316	100.0%	522	100.0%	305	100.0%	1,143
Old Port Bell Rd	Kampala Rd	67.4%	873	62.7%	767	61.0%	739	63.8%	2,379
	Yusufu Lule Rd	17.5%	226	17.0%	208	18.6%	225	17.7%	659
	Access Rd	6.6%	85	8.6%	105	11.1%	135	8.7%	325
	Jinja Rd	3.2%	42	1.3%	16	2.0%	24	2.2%	82
	Wampewo Rd	5.3%	69	10.4%	127	7.3%	88	7.6%	284
	Total	100.0%	1,295	100.0%	1,223	100.0%	1,211	100.0%	3,729
Total	Kampala Rd	34.9%	2,499	33.7%	2,711	28.7%	2,146	32.4%	7,356
	Yusufu Lule Rd	18.6%	1,336	17.5%	1,405	17.5%	1,309	17.9%	4,050
	Access Rd	13.7%	985	17.1%	1,374	14.9%	1,112	15.3%	3,471
	Jinja Rd	16.2%	1,164	13.7%	1,102	18.6%	1,391	16.1%	3,657
	Wampewo Rd	7.9%	567	7.7%	615	7.3%	545	7.6%	1,727
	Old Port Bell Rd	8.6%	618	10.3%	828	12.9%	966	10.6%	2,412
	Total	100.0%	7,169	100.0%	8,035	100.0%	7,469	100.0%	22,673

Source: JICA Study Team

Table 5.2.6 Estimated Traffic Flow (Evening; Jinja Junction & Africana Roundabout)

IN (come from)	OUT (go to)	16:00 – 17:00		17:00 – 18:00		18:00 – 19:00		Evenning Total	
		Interview Result	Estimated Traffic	Interview Result	Estimated Traffic	Interview Result	Estimated Traffic	Interview Result	Estimated Traffic
Kampala Rd	Yusufu Lule Rd	0.9%	15	0.4%	8	0.4%	7	0.6%	30
	Access Rd	30.6%	510	42.3%	758	49.6%	794	40.8%	2,062
	Jinja Rd	56.0%	934	45.6%	816	39.4%	630	47.0%	2,380
	Wampewo Rd	3.8%	64	3.0%	53	3.8%	60	3.5%	177
	Old Port Bell Rd	8.7%	146	8.7%	156	6.8%	109	8.1%	411
	Total	100.0%	1,669	100.0%	1,791	100.0%	1,600	100.0%	5,060
Yusufu Lule Rd	Kampala Rd	7.2%	147	4.0%	74	10.6%	249	7.5%	470
	Access Rd	24.2%	497	2.3%	42	31.7%	744	20.5%	1,283
	Jinja Rd	24.4%	501	29.0%	536	29.5%	692	27.7%	1,729
	Wampewo Rd	15.5%	319	27.2%	503	13.3%	311	18.1%	1,133
	Old Port Bell Rd	28.7%	590	37.4%	691	14.9%	349	26.1%	1,630
	Total	100.0%	2,054	100.0%	1,846	100.0%	2,345	100.0%	6,245
Access Rd	Kampala Rd	3.2%	41	6.3%	97	1.2%	15	3.8%	153
	Yusufu Lule Rd	63.0%	809	59.7%	923	54.7%	665	59.2%	2,397
	Jinja Rd	18.1%	233	21.3%	329	29.4%	357	22.7%	919
	Wampewo Rd	9.0%	116	4.3%	67	3.2%	39	5.5%	222
	Old Port Bell Rd	6.7%	86	8.5%	131	11.5%	140	8.8%	357
	Total	100.0%	1,285	100.0%	1,547	100.0%	1,216	100.0%	4,048
Jinja Rd	Kampala Rd	67.2%	1,080	70.3%	1,015	73.3%	1,004	70.1%	3,099
	Yusufu Lule Rd	9.1%	146	6.2%	90	9.2%	126	8.2%	362
	Access Rd	10.9%	176	11.2%	162	7.9%	108	10.1%	446
	Wampewo Rd	7.9%	127	7.2%	104	5.3%	72	6.9%	303
	Old Port Bell Rd	4.9%	79	5.0%	72	4.3%	59	4.8%	210
	Total	100.0%	1,608	100.0%	1,443	100.0%	1,369	100.0%	4,420
Wampewo Rd	Kampala Rd	35.8%	144	33.5%	143	38.1%	145	35.7%	432
	Yusufu Lule Rd	1.5%	6	3.0%	13	5.5%	21	3.3%	40
	Access Rd	13.4%	54	13.6%	58	13.6%	52	13.6%	164
	Jinja Rd	23.1%	93	19.7%	84	14.4%	55	19.2%	232
	Old Port Bell Rd	26.1%	105	30.2%	129	28.3%	108	28.3%	342
	Total	100.0%	402	100.0%	427	100.0%	381	100.0%	1,210
Old Port Bell Rd	Kampala Rd	50.5%	371	57.4%	419	48.5%	284	52.4%	1,074
	Yusufu Lule Rd	20.8%	153	22.5%	164	19.8%	116	21.1%	433
	Access Rd	12.0%	88	11.6%	85	9.9%	58	11.3%	231
	Jinja Rd	6.3%	46	2.2%	16	8.2%	48	5.4%	110
	Wampewo Rd	10.4%	76	6.3%	46	13.5%	79	9.8%	201
	Total	100.0%	734	100.0%	730	100.0%	585	100.0%	2,049
Total	Kampala Rd	23.0%	1,783	22.5%	1,748	22.6%	1,697	22.7%	5,228
	Yusufu Lule Rd	14.6%	1,129	15.4%	1,198	12.5%	935	14.2%	3,262
	Access Rd	17.1%	1,325	14.2%	1,105	23.4%	1,756	18.2%	4,186
	Jinja Rd	23.3%	1,807	22.9%	1,781	23.8%	1,782	23.3%	5,370
	Wampewo Rd	9.1%	702	9.9%	773	7.5%	561	8.8%	2,036
	Old Port Bell Rd	13.0%	1,006	15.1%	1,179	10.2%	765	12.8%	2,950
	Total	100.0%	7,752	100.0%	7,784	100.0%	7,496	100.0%	23,032

Source: JICA Study Team

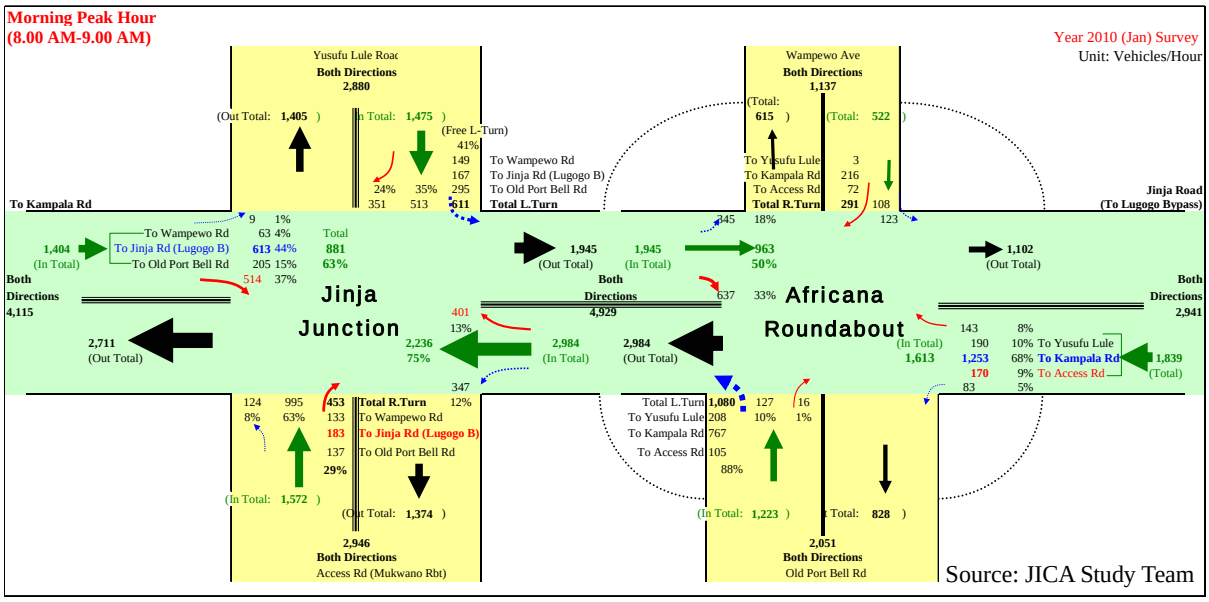


Figure 5.2.13 Traffic Flows on Jinja Junction & Africana Roundabout (Morning Peak Hour)

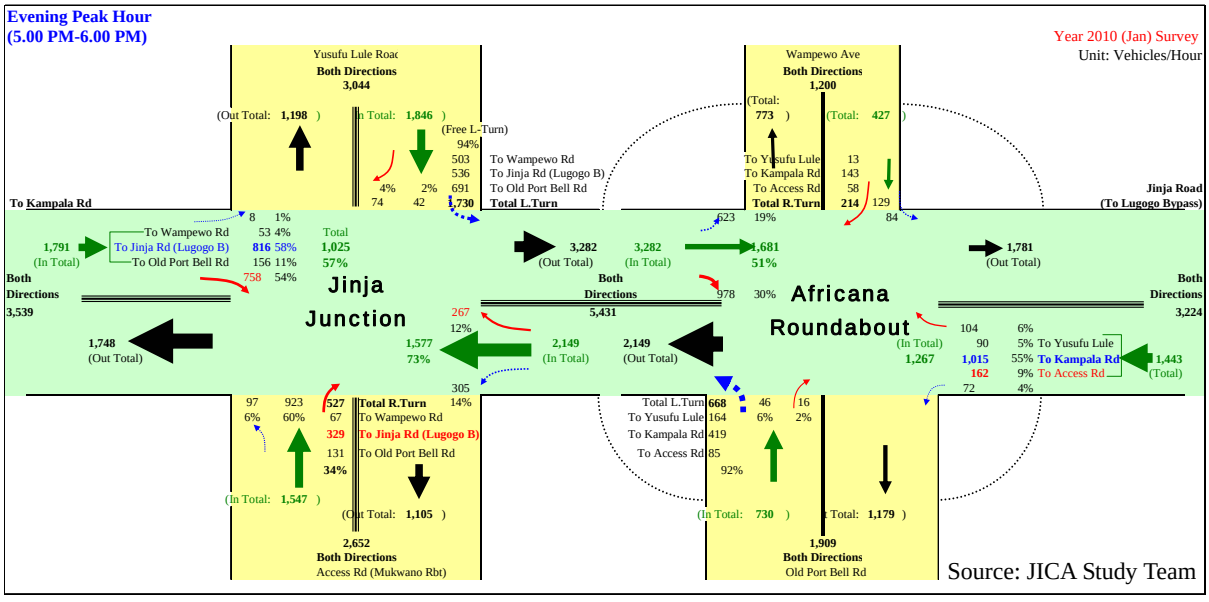


Figure 5.2.14 Traffic Flows on Jinja Junction & Africana Roundabout (Evening Peak Hour)

5.2.3 RESULTS OF O-D SURVEY

(1) Sample Rate

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

The sampled rate of O-D data was 6%. The sampled rate for motorcycles was relatively low

because of high travel speed. As the sampled rate excluding motorcycles was 9%, this could be considered satisfactory in statistical terms. Table 5.2.7 shows the number of samples at each location.

The JICA Study Team and the BRT Pre-FS study team shared their traffic survey data with each other, because both data could fill the gap such as seasonal factor. In addition, both survey points were at relatively close locations.

Table 5.2.7 Number of Sample (Excluding Motorcycles)

Location&Direction		Number of Vehicles	Samples	Sample Rate	Terget Location of Expanding
2-1	To CBD	6,121	857	14.0%	No.1-1
	To Outside	4,772	540	11.3%	PortBell Road
	SubTotal	10,893	1,397	12.8%	
2-2	To CBD	13,237	595	4.5%	No.2-2
	To Outside	10,460	714	6.8%	Jinja Road
	SubTotal	23,697	1,309	5.5%	
2-3	To CBD	6,294	623	9.9%	ITP Survey Data(2010 Feb)
	To Outside	7,574	676	8.9%	Kira Road
	SubTotal	13,868	1,299	9.4%	
2-4	To CBD	5,658	842	14.9%	ITP Survey Data(2010 Feb)
	To Outside	3,895	673	17.3%	Gayaza Road
	SubTotal	9,553	1,515	15.9%	
2-5	To CBD	6,205	782	12.6%	ITP Survey Data(2010 Feb)
	To Outside	6,319	985	15.6%	Bombo Road
	SubTotal	12,524	1,767	14.1%	
2-6	To CBD	5,591	790	14.1%	No.1-8
	To Outside	5,766	647	11.2%	Hoima Road
	SubTotal	11,357	1,437	12.7%	
2-7	To CBD	10,656	648	6.1%	ITP Survey Data(2010 Feb)
	To Outside	9,583	610	6.4%	Nateete Road,Masaka Road
	SubTotal	20,239	1,258	6.2%	
2-8	To CBD	14,665	575	3.9%	No.1-11
	To Outside	13,935	728	5.2%	Entebbe Road
	SubTotal	28,600	1,303	4.6%	
2-9	To CBD	8,219	687	8.4%	No.1-12
	To Outside	7,179	771	10.7%	Gaba Road
	SubTotal	15,398	1,458	9.5%	
Total		146,129	12,743	8.7%	

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

(2) O-D Table

O-D tables attached in Annex 2 were produced based on the survey results. It was estimated based on the results of the O-D survey and the count survey conducted on January 2010. The factor for converting 12-hour count to its 24-hour equivalent is 1.39 as discussed above. Moreover, seasonal conversion factor is considered because January is a school holiday period (refer to Section 5.3.3 as to a seasonal conversion factor).

(3) Origin and Destination

Figure 5.2.15 shows the composition of O-D trips. 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. The proportion of Kampala inner trip is strongly connected to trip length by mode. Inner trip of motorcycle shows a large share because travel distance for motorcycles is not so long. On the other hand, large-size bus, medium goods vehicle and heavy goods vehicle show a small share because of their long trip distance.

In addition, centre of Kampala City (inner side of Masaka Rd., Entebbe Rd., Jinja Rd. and Northern B.P.) and its outer side have a strong link through Entebbe Road, Bombo Road and Jinja Road as illustrated in Figure 5.2.16.

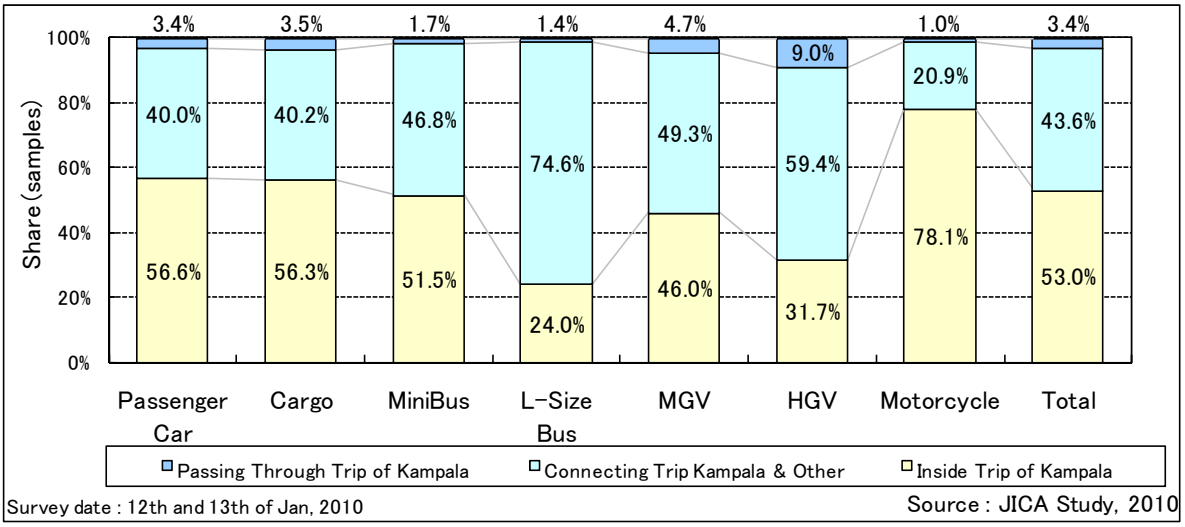


Figure 5.2.15 Rate of Traffic at Main Origin and Destination

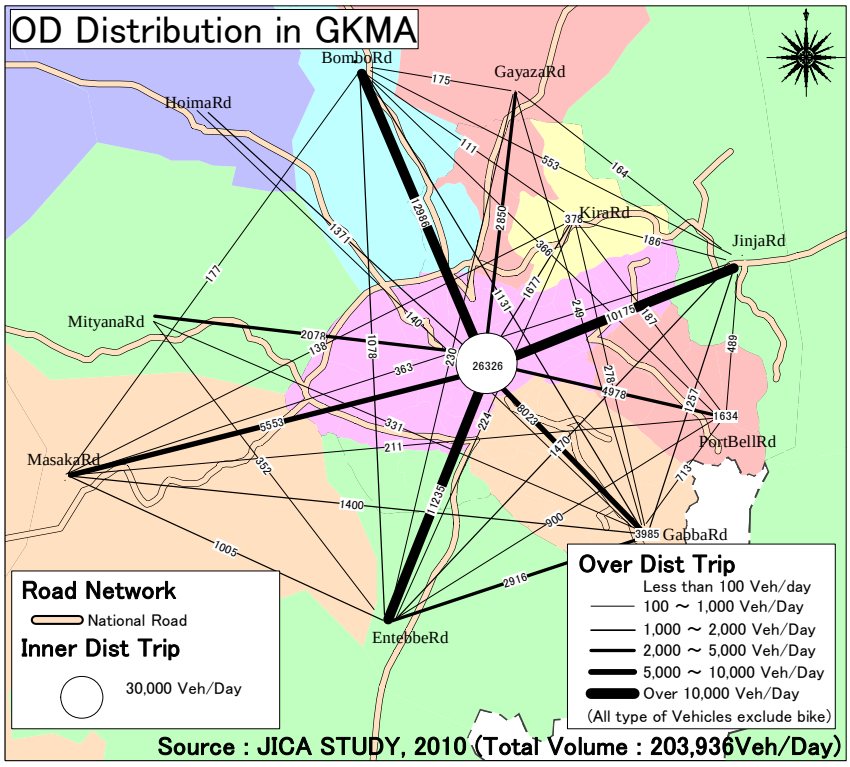


Figure 5.2.16 Estimated Inter-Area Traffic Volume excluding Motorcycle

Table 5.2.8(1) Estimated Number of Vehicles by Type (1/2)

Origin	Destination	Passenger Car	Cargo	MiniBus	L-Size Bus	MGV	HGV	Motorcycle	Total
Inner City of Kampala	Inner City of Kampala	14,170	2,735	7,897	45	1,373	106	20,335	46,661
	Jinja Road Side	4,580	973	3,947	168	380	127	2,812	12,987
	Port Bell Road Side	3,331	571	917	16	126	17	2,092	7,070
	Kira Road Side	1,138	136	337		51	15	356	2,033
	Gabba Road Side	4,312	927	2,453	10	315	6	7,808	15,831
	Gayaza Road Side	870	338	1,326	11	281	24	2,278	5,128
	Entebbe Road Side	4,681	952	5,149	63	362	28	484	11,719
	Bombo Road Side	5,341	1,152	5,478	153	725	137	8,113	21,099
	Mityana Road Side	557	129	1,040	53	258	41	909	2,987
	Hoima Road Side	410	101	683	21	133	23	451	1,822
	Masaka Road Side	2,118	394	2,276	151	564	50	1,685	7,238
Sub Total		41,508	8,408	31,503	691	4,568	574	47,323	134,575
Jinja Road Side	Inner City of Kampala	6,971	1,239	5,537	151	519	165	1,944	16,526
	Jinja Road Side	167	22	173	2	15	2		381
	Port Bell Road Side	384	47	21		34	3	202	691
	Kira Road Side	124	9	51		2		32	218
	Gabba Road Side	737	295	108	3	91	23	318	1,575
	Gayaza Road Side	75	25	62			2		164
	Entebbe Road Side	1,102	121	99	2	129	17		1,470
	Bombo Road Side	434	22	4		54	39	859	1,412
	Mityana Road Side	52				7			59
	Hoima Road Side	45				11	1		57
	Masaka Road Side	100	29	98		91	45		363
Sub Total		10,191	1,809	6,153	158	953	297	3,355	22,916
Port Bell Road Side	Inner City of Kampala	3,798	664	989	20	153	16	1,280	6,920
	Jinja Road Side	363	63	91		16	5	199	737
	Port Bell Road Side	1,352	168	80	7	26	1	2,125	3,759
	Kira Road Side	162	15	10					187
	Gabba Road Side	556	70	50	1	34	2	279	992
	Gayaza Road Side	53	7			12	6		78
	Entebbe Road Side	635	88	158	6	8	5		900
	Bombo Road Side	199	38	65	3	51	10		366
	Mityana Road Side	17	7			12	1		37
	Masaka Road Side	135	28	29	1	17	1		211
Sub Total		7,270	1,148	1,472	38	329	47	3,883	14,187
Kira Road Side	Inner City of Kampala	1,561	278	363	12	127	5	1,419	3,765
	Jinja Road Side	69	42	147	2	3		43	306
	Port Bell Road Side	240	8	16		5			269
	Kira Road Side	289	37	33		17	2	253	631
	Gabba Road Side	197	15	42		23	1		278
	Gayaza Road Side	25	6			7		17	55
	Entebbe Road Side	149	45	26		4			224
	Bombo Road Side	63	33	15					111
	Masaka Road Side	76	27	24		10	1	86	224
Sub Total		2,669	491	666	14	196	9	1,818	5,863
Gabba Road Side	Inner City of Kampala	5,740	1,393	2,991	19	280	23	6,439	16,885
	Jinja Road Side	468	226	54	1	91	13	332	1,185
	Port Bell Road Side	647	91	36	1	10	8		793
	Kira Road Side	271	24	16	4	14			329
	Gabba Road Side	2,722	606	471	19	159	8	6,005	9,990
	Gayaza Road Side	159	12	37		41		55	304
	Entebbe Road Side	1,743	411	658	3	98	3	2,450	5,366
	Bombo Road Side	634	125	222	7	133	10	44	1,175
	Mityana Road Side	177	24	44	1	82	3		331
	Hoima Road Side	104	20			15	1		140
	Masaka Road Side	966	69	76	22	240	27	552	1,952
Sub Total		13,631	3,001	4,605	77	1,163	96	15,877	38,450

Source: JICA Study Team

Table 5.2.8(1) Estimated Number of Vehicles by Type (2/2)

Origin	Destination	Passenger Car	Cargo	MiniBus	L-Size Bus	MGV	HGV	Motorcycle	Total
Gayaza Road Side	Inner City of Kampala	1,756	372	2,280	18	233	18	2,226	6,903
	Jinja Road Side	109	39				7		155
	Port Bell Road Side	62	6			24			92
	Kira Road Side	40		30		7			77
	Gabba Road Side	141	77	37	16	57	8		336
	Gayaza Road Side	38	5	50		7	1	19	120
	Entebbe Road Side	194	9	15		10	2		230
	Bombo Road Side	74	16	51		34		34	209
	Mityana Road Side	31							31
	Hoima Road Side					9			9
	Masaka Road Side	57	5						62
Sub Total		2,502	529	2,463	34	381	36	2,279	8,224
Entebbe Road Side	Inner City of Kampala	7,990	1,231	5,919	67	477	72	3,803	19,559
	Jinja Road Side	813	184	109	2	86	23	885	2,102
	Port Bell Road Side	569	81			46	10		706
	Kira Road Side	207	43			4			254
	Gabba Road Side	2,134	409	252		169	34	3,299	6,297
	Gayaza Road Side	150	19	53		4	7		233
	Entebbe Road Side	334	17	110		40			501
	Bombo Road Side	690	204	120		59	5	298	1,376
	Mityana Road Side	208	18			126			352
	Hoima Road Side	29	44				5		78
	Masaka Road Side	634	166	84	5	110	6		1,005
Sub Total		13,758	2,416	6,647	74	1,121	162	8,285	32,463
Bombo Road Side	Inner City of Kampala	4,425	899	5,272	94	623	114	6,841	18,268
	Jinja Road Side	308	82	92	3	66	10	42	603
	Port Bell Road Side	98	82	96		16	3	80	375
	Kira Road Side	17	8	12		9			46
	Gabba Road Side	506	102	576		62	11		1,257
	Gayaza Road Side	81	40	129		15			265
	Entebbe Road Side	331	102	300	3	86	9	1,109	1,940
	Bombo Road Side	1,035	315	562	19	153	9	1,600	3,693
	Mityana Road Side	26		13		11			50
	Hoima Road Side	9				7			16
	Masaka Road Side	64	44	26	2	39	2		177
Sub Total		6,900	1,674	7,078	121	1,087	158	9,672	26,690
Mityana Road Side	Inner City of Kampala	1,042	123	813	56	197	20	905	3,156
	Jinja Road Side	38	15			13	12		78
	Port Bell Road Side	134							134
	Kira Road Side	22							22
	Gabba Road Side	39	24	16		61			140
	Gayaza Road Side			35		6	1		42
	Entebbe Road Side	91	57			34	3		185
	Bombo Road Side	32	3	49		4	1		89
	Mityana Road Side	36		52					88
	Masaka Road Side					10	1		11
Sub Total		1,434	222	965	56	325	38	905	3,945
Hoima Road Side	Inner City of Kampala	233	66	780	12	74	5		1,170
	Jinja Road Side	9					4		13
	Port Bell Road Side	31							31
	Gabba Road Side	39				9			48
	Gayaza Road Side	19							19
	Entebbe Road Side	27		112		8			147
	Bombo Road Side		27				1		28
	Masaka Road Side	49				2			51
Sub Total		407	93	892	12	93	10		1,507
Masaka Road Side	Inner City of Kampala	2,097	383	2,293	168	336	44	937	6,258
	Jinja Road Side	98	30	53		20	8		209
	Port Bell Road Side	88	122			31	3		244
	Kira Road Side	70		21			1		92
	Gabba Road Side	677	175	100	1	160	9		1,122
	Gayaza Road Side	32				18	1		51
	Entebbe Road Side	419	117	100	6	206	10		858
	Bombo Road Side	164	84	103		23	19	298	691
	Hoima Road Side					2	1		3
	Masaka Road Side	47		136		37			220
Sub Total		3,692	911	2,806	175	833	96	1,235	9,748
Total		103,962	20,702	65,250	1,450	11,049	1,523	94,632	298,568

Source: JICA Study Team

(4) Trip Purpose

Trip purposes by vehicle type are shown in Figure 5.2.17. Only passenger car does not have a dominated purpose. For other vehicles, over half of them are driven for business purpose. (As for minibus, large bus and motorcycle, questions were asked to drivers.)

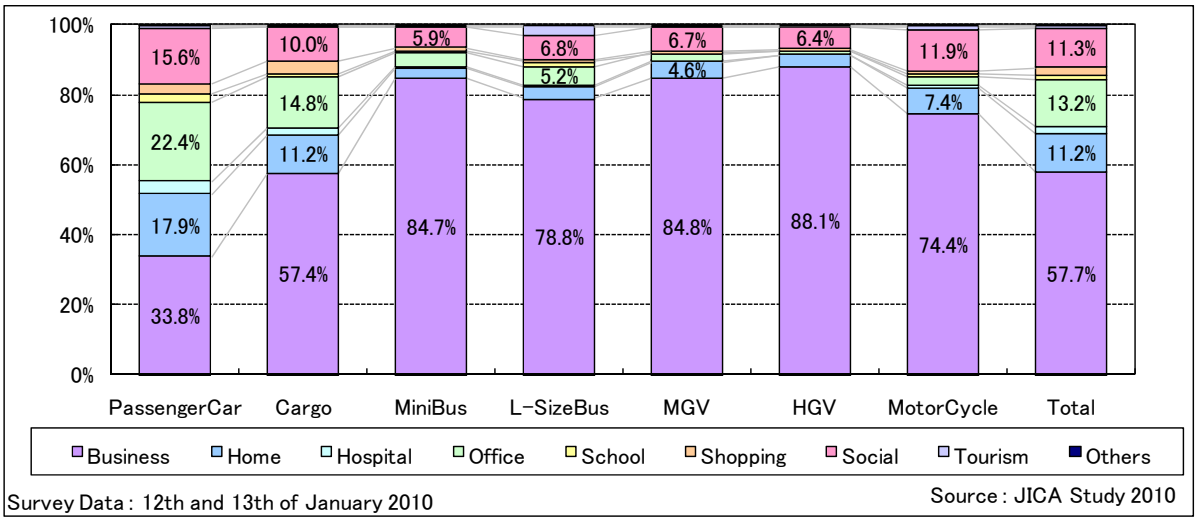


Figure 5.2.17 Trip Purpose

(5) Trip Frequency

Table 5.2.18 shows the trip frequency by trip purpose. The trend of trip frequency is mainly divided into two groups, namely, daily use and a few days per week. Approximately 40% of the trip frequency for drivers related to business is over two times per day. Also over two times per day is the dominating average of trip frequency in this survey. For Office, Home, School and Social purposes, over 50% of drivers use car more than one time a day. It is noted that frequency of more than once a day is highest for School purpose.

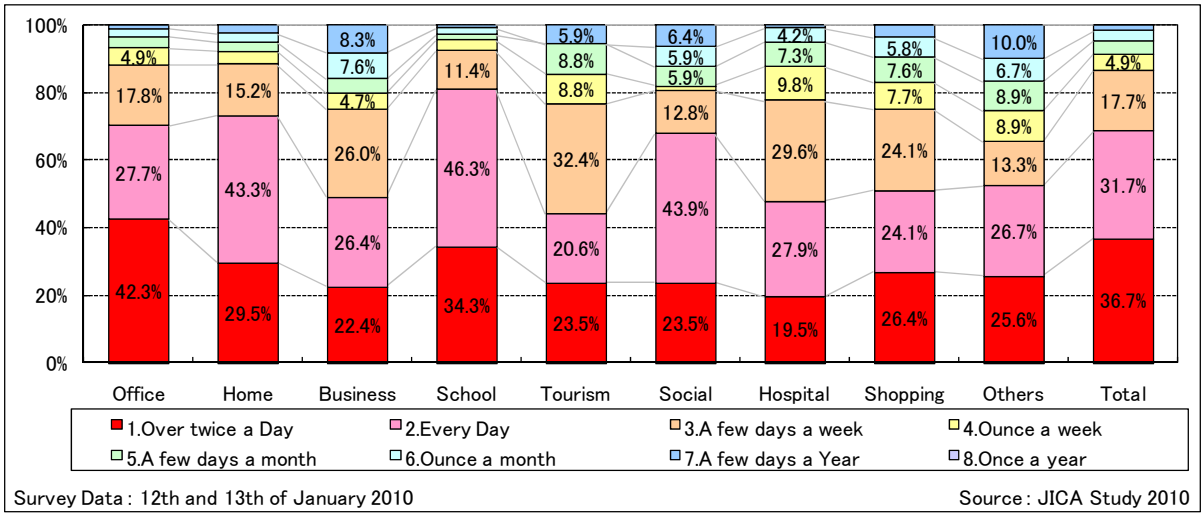


Figure 5.2.18 Trip Frequency

(6) Number of Passengers

Buses have the largest average number of passengers with about 40 persons for a large bus and 10 persons for a minibus. The average number of persons in a passenger car and transit vehicles is less than three. The average passenger of a motorcycle is 1.16 persons, and approximately 70% of motorcycles were occupied by driver alone.

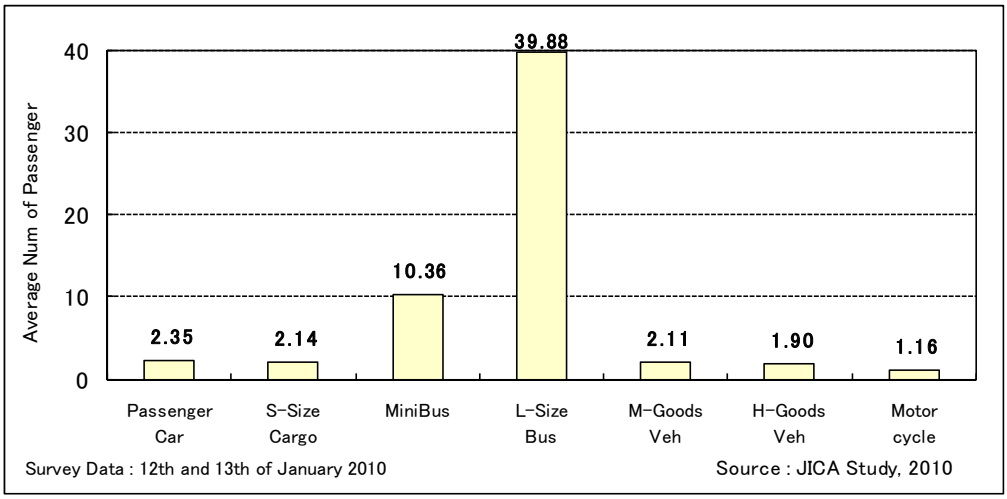


Figure 5.2.19 Average Number of Passenger by Vehicle Type

(7) Trip Time

Travel time from origin to destination was surveyed based on estimation and experience of drivers. As clearly shown in Figure 5.2.20, travel time is divided into three large groups. Travel time for common activities such as commuting and shopping is within 1 hour. Travel time for extraordinary activities and those related to business is longer than those for common activities.

In addition, travel time of daily users is within 1 hour, which is the same as that for common activities.

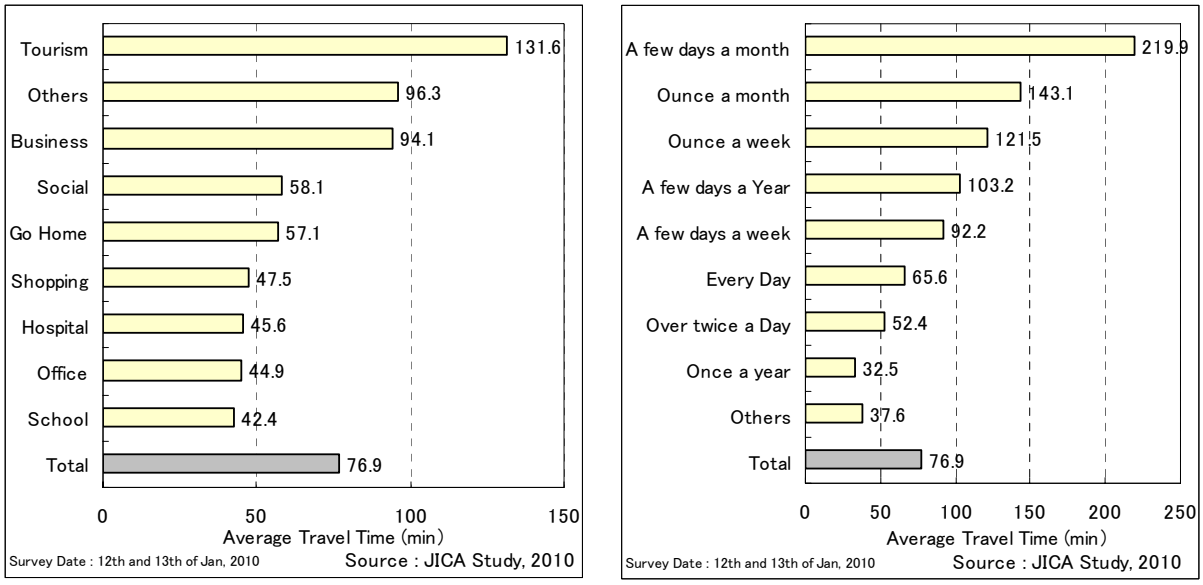


Figure 5.2.20 Trip Time by Purpose and Frequency

(8) Goods Transport

Table 5.2.9 shows the number and the average loads of cargo by truck size. On average, laden trucks are observed to carry 1.56 tones. The main commodities transported are food, mixed goods, construction materials and agricultural products. Taking into account unladen trucks, the average will be dropped because many trucks were observed to be running unladen, or with passengers only. In general, medium goods vehicle occupies a large share (52%), followed by heavy goods truck (28%).

Comparing the inflow cargo and outflow cargo, amount shows almost same. It is surmised that the Kampala City Center functions also as the cargo terminal which creates large amount of outflow and inflow of cargo.

Table 5.2.9 Average Tonnage of Goods Transported

		Number (veh/day)	Total Amount (ton/day)	Average Tonnage (ton/veh)
To City Center	Small Size Cargo Truck	10,574	4,160	0.39
	Medium Goods Truck	5,643	16,474	2.92
	Heavy Goods Truck	720	5,038	7.00
	Total	16,937	25,672	1.52
To Suburb	Small Size Cargo Truck	10,128	2,968	0.29
	Medium Goods Truck	5,406	16,611	3.07
	Heavy Goods Truck	803	6,703	8.35
	Total	16,337	26,282	1.61
Total	Small Size Cargo Truck	20,702	7,128	0.34
	Medium Goods Truck	11,049	33,085	2.99
	Heavy Goods Truck	1,523	11,740	7.71
	Total	33,274	51,954	1.56

Source: JICA Study Team

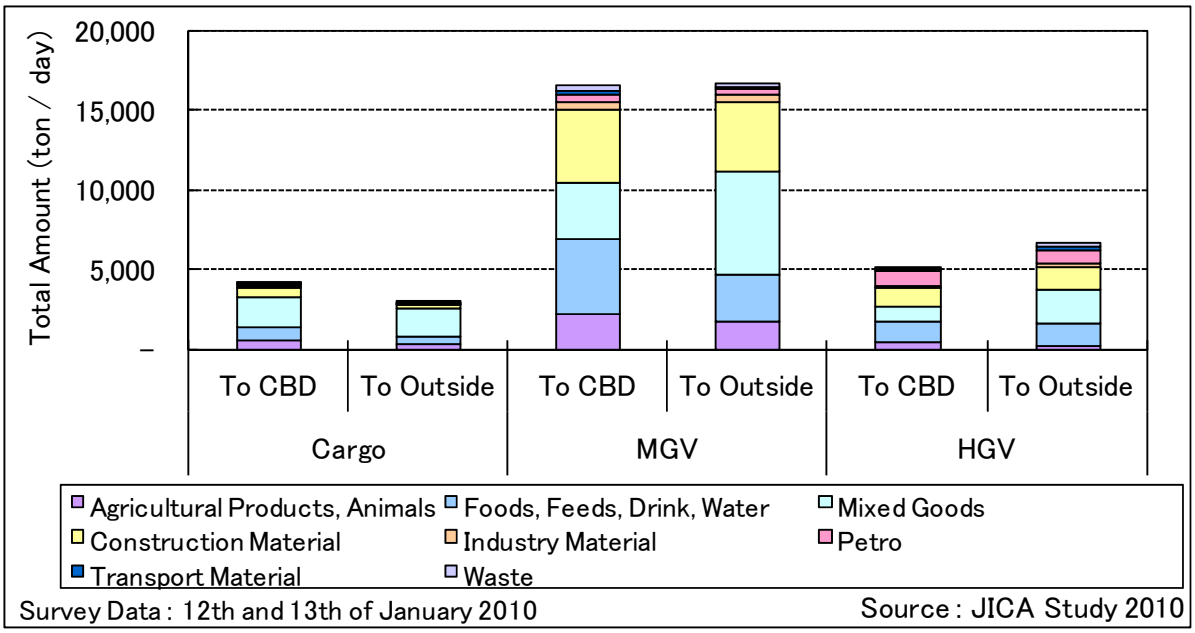


Figure 5.2.21 Main Transported Goods

(9) Summary for Existing Traffic Flow Patterns

As discussed earlier, O-D trip table is compiled in Annex 2. Figures 5.2.22, 5.2.23 and 5.2.24 illustrate the trip desire line diagram. These figures present characteristics of a strong relationship between the center of Kampala and other areas.

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.

As illustrated by circle, relation to the area within 4 km is not strong and major destinations are outside of 4km radius. (Figure 5.2.22) Outside the Kampala city area, connection with Nabweru area followed by Kira, Entebbe and Busiro is strong. (Figure 5.2.23) Except for GKMA and adjacent districts, connection with Masaka district is strong. (Figure 5.2.24)

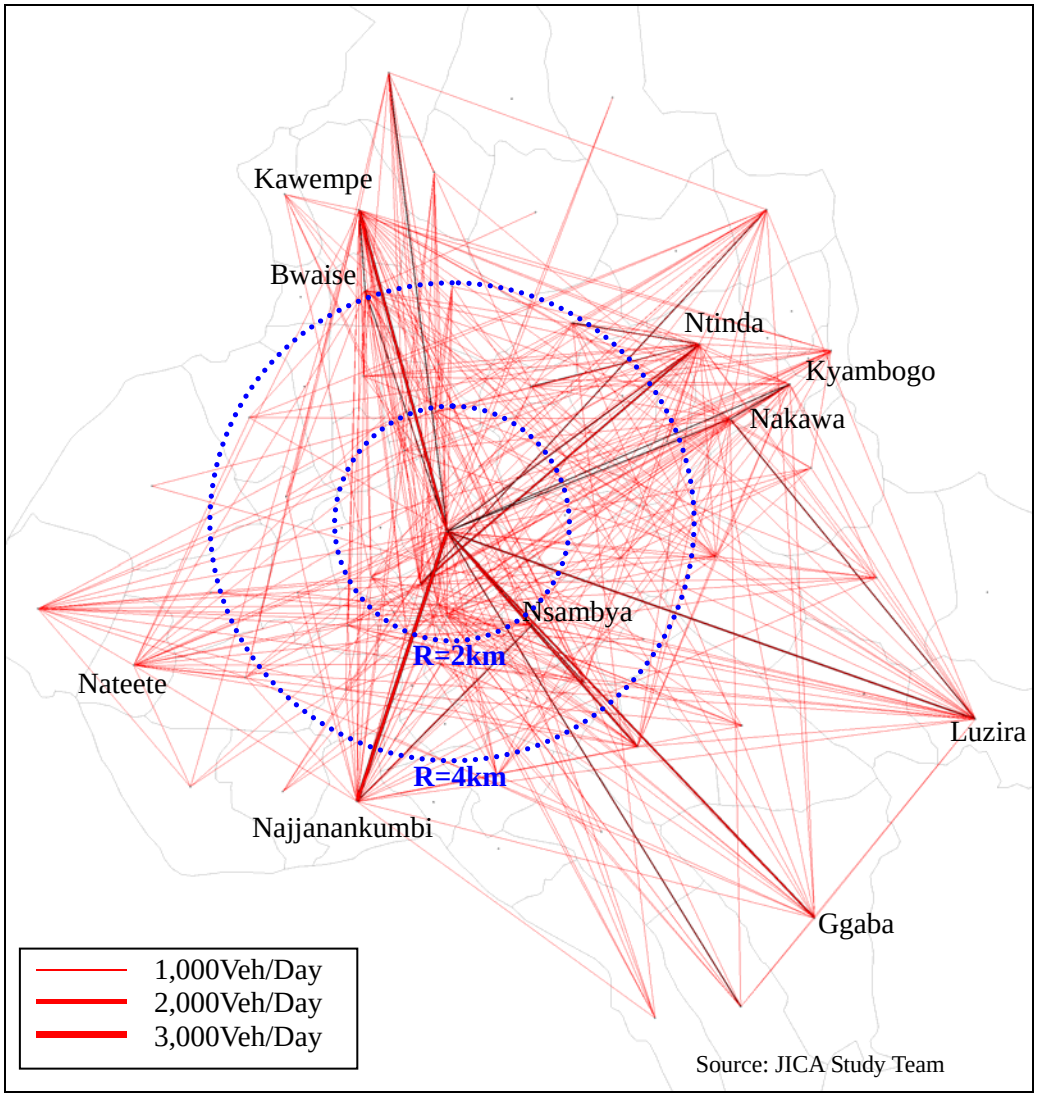


Figure 5.2.22 Diagram for Trip Desire Line (Parish Level of Kampala)

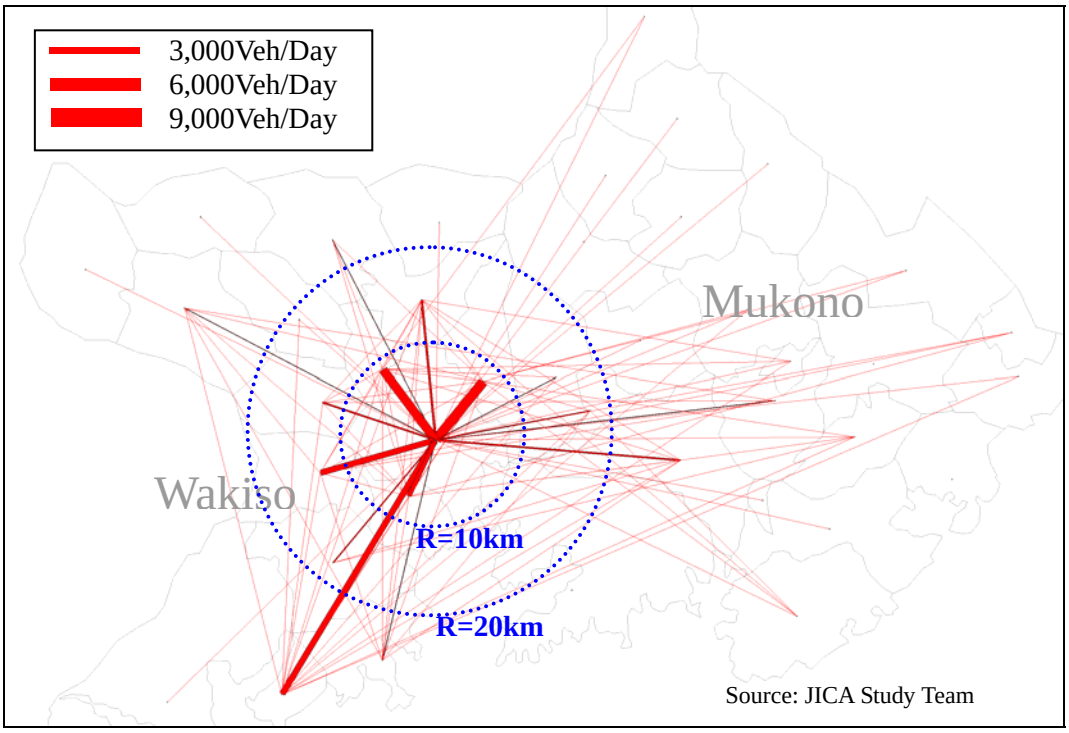


Figure 5.2.23 Diagram for Trip Desire Line (Sub-county Level Diagram)

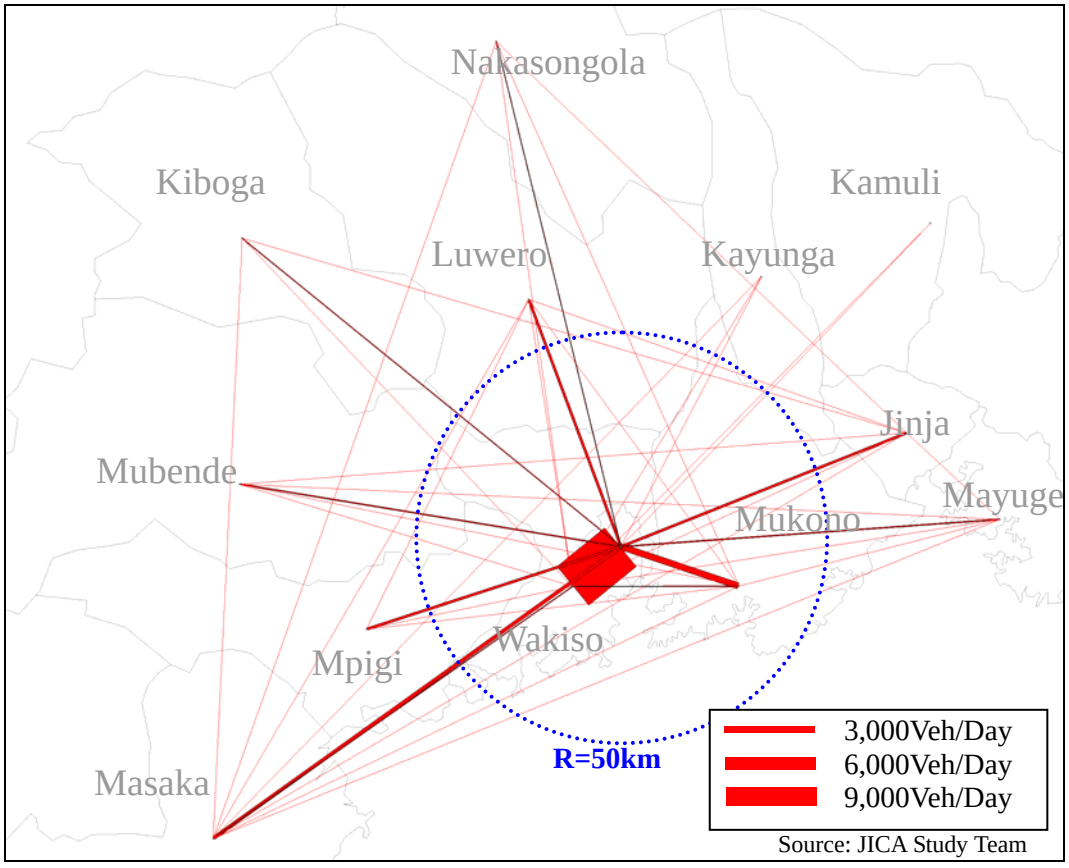


Figure 5.2.24 Diagram for Trip Desire Line (District Level Diagram)