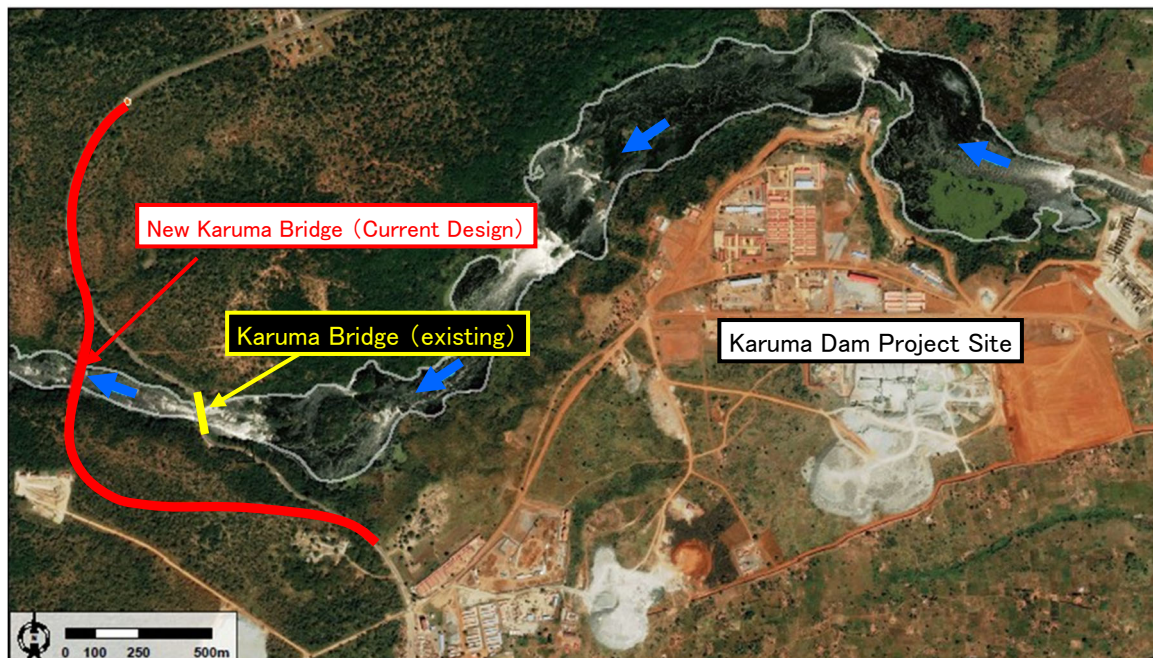





CHAPTER 4 DATA COLLECTION AND STUDY ON NEW KARUMA BRIDGE

4.1 Current Condition of the Study Area

4.1.1 Geographical Condition

The project area is mountainous, with an approximate altitude of 1,000 m-1,050 m above sea level and is covered by forest. In this area, the River Nile flows down east to west. The river is meandering, and its width varies. It is assumed that the existing bridge was built at the narrowed point of the river, where the width is approximately 80m. On the other hand, the detailed design of the new Karuma Bridge carried out in 2014 selects its crossing point at 500m downstream from the existing bridge. The river width at the crossing is approximately 130m. The bridge length was determined to be approximately 200m due to the shape of river cross section. In addition, construction of Karuma Hydropower Dam is ongoing at approximately 4 km upstream from the existing bridge.



【Karuma Bridge (existing)】	【The River Nile】	【Route of Current Design】
The existing bridge is constructed at a valley between hills on both sides.	The river width is narrow at the existing crossing and the river is meandering.	New route passes through the forest within the Murchison Falls Nation Park.
		

Source: JST

Figure 4.1.1 The Geographical Condition of New Karuma Bridge

4.1.2 Geological Condition

Rock outcrops were observed at both riverbanks and existing approach roads. According to the Final Detailed Design Report for the Project prepared by AIC Progetti, laboratory tests were conducted for the rock sampled from surface of the outcrops. According to the test results, allowable rock bearing pressure could vary from 2.6 to 8.6 MPa. However, the strength of the rock is expected to be better for deeper rock.

It was also reported that the rock support layer at the site is found after the depth of 0.02 – 1.0m. The followings are photos of rock outcrops observed at the project site.



Rock cut on Gulu side approach road
(the right bank)



Rock cut on Kampala side approach road
(the left bank)

Source: JST

Figure 4.1.2 Rock Outcrops Observed at New Karuma Bridge Site

4.1.3 Meteorology

The Karuma Bridge is located in a tropical area and at 1,000m elevation characterized by predominantly torrential rains and high humidity. The temperature in Karuma is within a range between 17°C and 33C across the year, as shown in Table 4.1.1.

Table 4.1.1 Average Temperature in 2014–2018 (°C)

Location		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Ave	max	31.2	33.1	31.2	29.4	29.2	28.9	28.7	28.6	29.2	28.9	29.2	30.0	29.6
	min	17.2	18.4	18.4	17.8	17.9	17.2	16.8	17.1	17.2	17.5	18.1	17.8	17.6

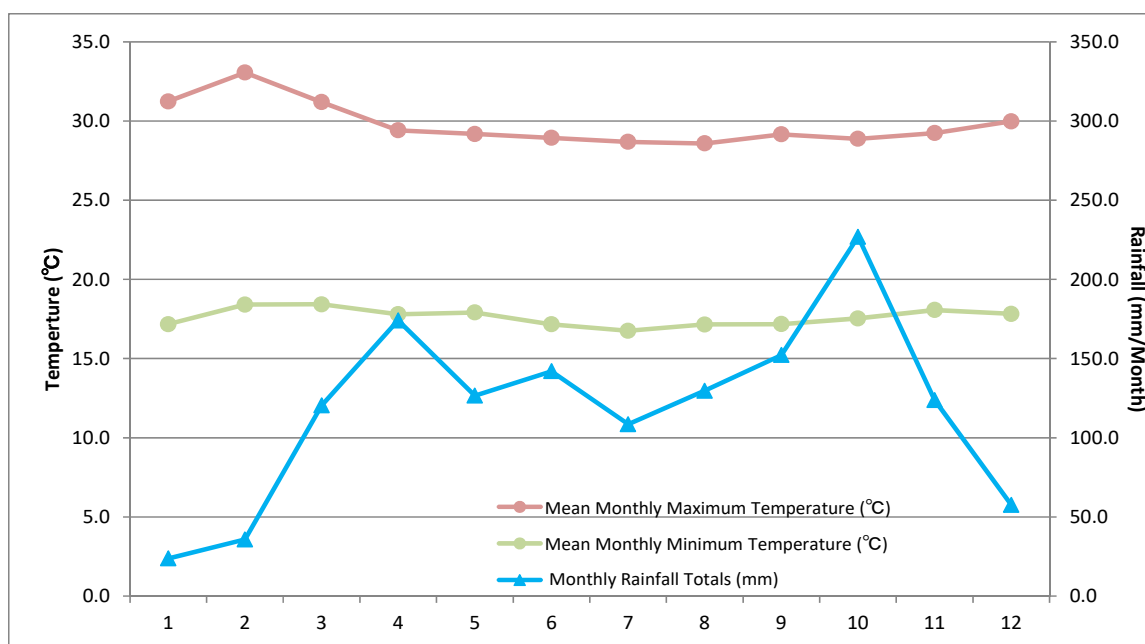
Source: Meteoblue

The monthly rainfall in Karuma is shown in Table 4.1.2. The Karuma has two tropical rainy seasons in a year, i.e., light rain season from March to May, and heavy rain season from August to October.

Table 4.1.2 Average Monthly Rainfall in 20012–2016(mm)

Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2012-2016	24	36	120	174	127	142	109	130	152	227	124	57	1421

Source: Department of Meteorology, Uganda



Source: Department of Meteorology, Uganda

Figure 4.1.3 Average Temperature and Rainfall in Karuma

4.1.4 Hydrological Condition

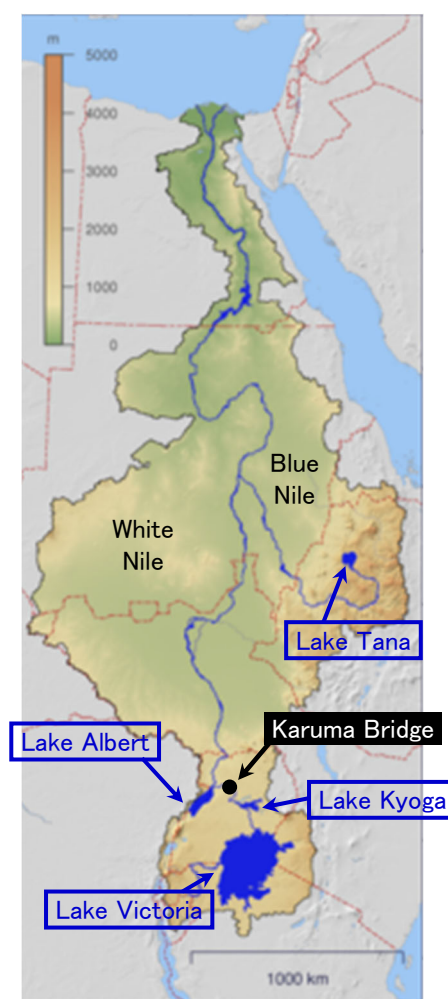
(1) The River Nile

Karuma Bridge crosses the River Nile. It may be said that Lake Victoria is the source of the Nile, but Lake Victoria has many inflow rivers. On the other hand, the outflow river from Lake Victoria is Nile river only. Generally, Nile river length includes Lake Victoria and inflow rivers to Lake Victoria. The water in Lake Victoria flows to Jinja which is the northern coast of this lake, then to Lake Kyoga where is approximately 500km northern side. After then its flow is to western side from Lake Kyoga, and to Lake Albert in the border of Congo. The River Nile is called “the Victoria Nile” before reaching the Lake Albert and then is called “Albert Nile”, and after Republic of the Sudan, it is called “White Nile.” Furthermore, downstream at Khartoum in Sudan, it meets “the Blue Nile” from Lake Tana in Ethiopian. After then its flow is to Egypt, Nile delta and finally to the Mediterranean Sea. The total river length of Nile river is approximately 6,650 km, and it is one of the main rivers in the world.

Table 4.1.3 Main Rivers in the world

	Amazon	Nile	Yangtze	Congo
Length (km)	7,570	6,650	6,300	4,700
Area (Million km ²)	7,05	2,9	1,8	3,7
Average discharge (Thousand m ³ /s)	297	2-3	21	39

Source: JST



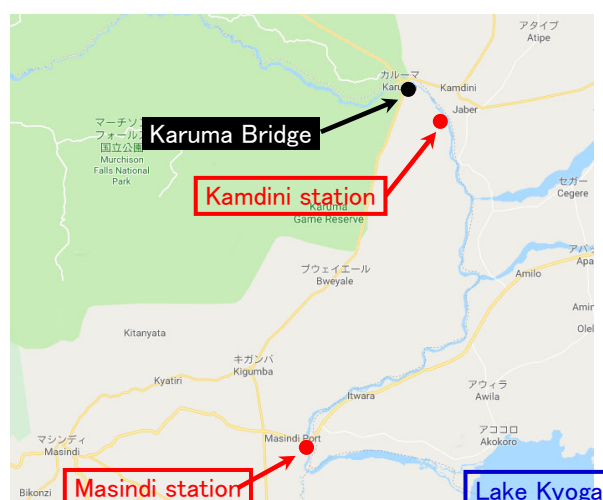
Source: JST

Figure 4.1.4 Nile River

(2) Hydrometrical Station of the Nile around Karuma Bridge

Hydrometrical stations along the Nile are Jinja station near Lake Victoria, Mbulamuti station approximately 40km downstream from the site, Masindi station about 90 km upstream and Kamdini station about 10km upstream. The Ministry of Water and Environment maintains hydrological data of these stations.

Designs of the current new Karuma Bridge and the Karuma hydropower dam project used hydrological data such as discharge, water level and water velocity obtained at Masindi and Kamdini stations.



Source: JST

Figure 4.1.5 Location of the Water Station

(3) Hydrological Condition in Karuma hydropower station

Construction of Karuma Hydropower Dam is ongoing at approximately 4km upstream from the existing Karuma Bridge. The hydrological data for this power station was indicated in the detailed design report and the discharge for the design was calculated by the discharge data from Masindi and Kamdini stations

Table 4.1.4 Discharge for Different Return Period (m³/s)

	25-year	50-year	100-year	1,000-year	10,000-year
MASINDI Station (Catchment area:317.160 km ²)	2,281	2,502	2,721	3,446	4,170
KAMDINI Station (Catchment area : 341.530 km ²)	2,316	2,538	2,758	3,486	4,212

Source: The Final Detailed Design Report for the Project prepared by AIC Progetti

According to this report, Karuma hydropower station was designed considering a 4,700 m³/s discharge with an extra of 10% to the 4,212 m³/s (10,000-year) in Kamdini station. .

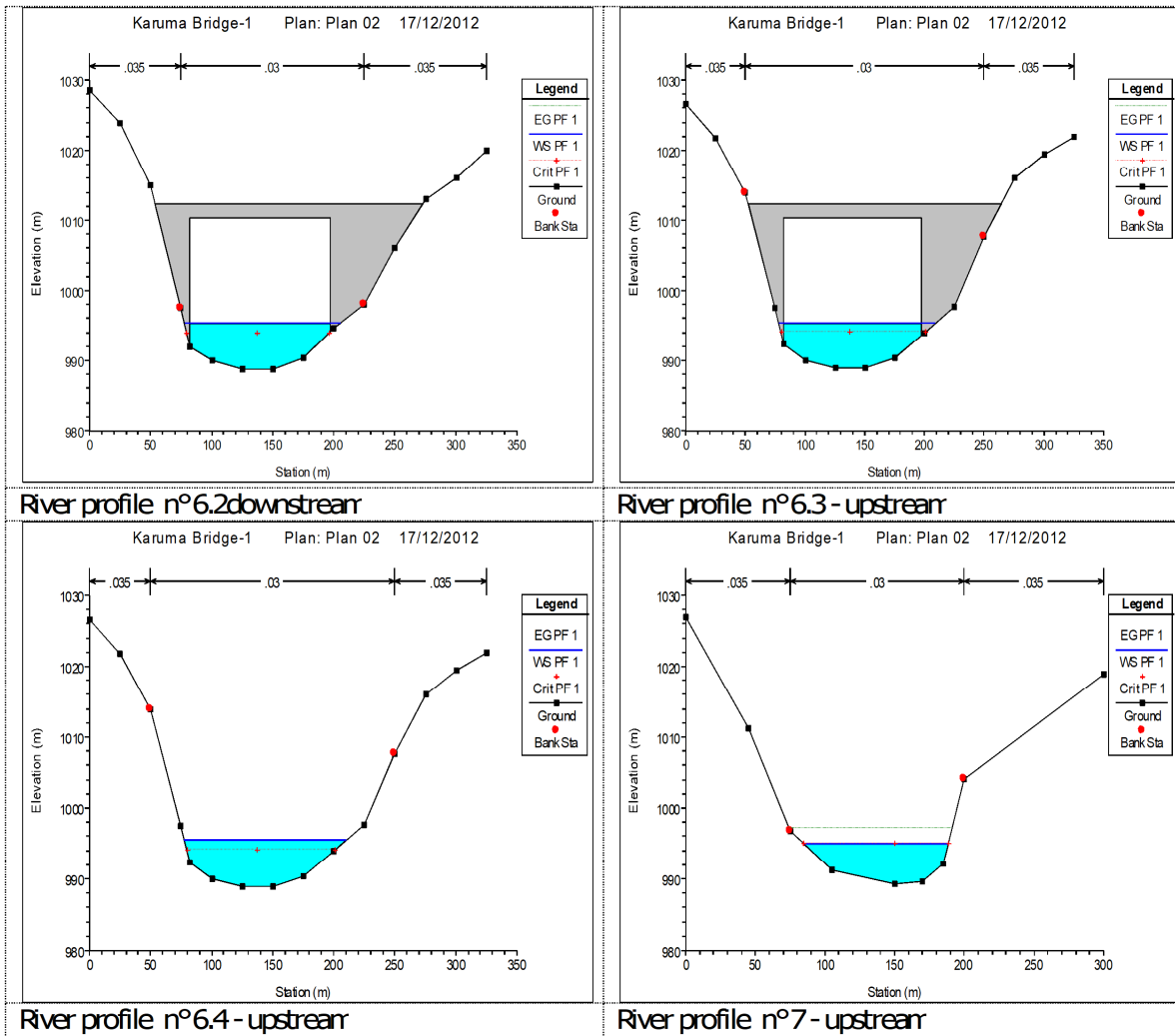
(4) Hydrological Condition for Design of New Karuma Bridge

According to the Final Detailed Design Report, the non-uniform flow calculation for the design of new Karuma Bridge was conducted using a discharge of 2,758 m³/s (100-year flood) in Kamdini station and the water level and flow width in new Karuma Bridge was evaluated as shown in Table below:

Table 4.1.5 List of the Non-uniform Flow Calculation Results in the New Karuma bridge

Reach	River Sta	Profile	Discharge		Water Level							
			Q Total (m ³ /s)	Min Ch Elev. (m)	W.S. Elev. (m)	Crit W.S. elevation (m)	E.G. Elev. (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m ²)	Top Width (m)	Froude #Chl
Victoria Nile river	11	998.00	2758	997.30	1'003.17		1'004.02	0.0021	4.09	674.89	150.83	0.62
Victoria Nile river	10.5*	948.00	2758	995.94	1'002.49		1'003.84	0.0034	5.14	537.07	122.43	0.78
Victoria Nile river	10	898.00	2758	994.44	1'001.52	1'001.52	1'003.55	0.0056	6.31	436.84	107.83	1.00
Victoria Nile river	9.5*	848.00	2758	993.44	1'000.63	1'000.63	1'002.72	0.0056	6.40	430.66	103.73	1.00
Victoria Nile river	9	798.00	2758	992.44	999.14	999.14	1'001.25	0.0056	6.43	428.83	102.64	1.00
Victoria Nile river	8.5*	748.00	2758	991.94	998.81	998.81	1'000.82	0.0056	6.28	439.51	111.82	1.00
Victoria Nile river	8	698.00	2758	991.00	997.41	997.41	999.45	0.0052	6.34	444.26	116.37	0.97
Victoria Nile river	7.5*	648.00	2758	990.30	996.60	996.60	998.67	0.0056	6.37	433.56	106.45	1.00
Victoria Nile river	7	598.00	2758	989.30	995.06	995.06	997.14	0.0057	6.39	431.71	104.46	1.00
Victoria Nile river	6.4	578.00	2758	989.00	995.49	994.10	996.47	0.0022	4.38	629.75	132.41	0.64
Victoria Nile river	6.3	556.50	Bridge		995.31		996.42					
Victoria Nile river	6.1	518.00	2758	988.70	995.25		996.30	0.0024	4.55	606.26	126.83	0.66
Victoria Nile river	6	498.00	2758	988.30	995.32		996.21	0.0018	4.17	661.14	127.45	0.58
Victoria Nile river	5.5*	448.00	2758	988.24	993.88	993.88	995.95	0.0053	6.38	438.62	112.89	0.98
Victoria Nile river	5	398.00	2758	988.05	993.58	993.58	995.65	0.0056	6.37	433.27	108.31	1.00
Victoria Nile river	4.5*	348.50	2758	987.74	993.15	993.15	995.08	0.0056	6.16	448.23	119.31	1.00
Victoria Nile river	4	299.00	2758	987.44	992.65	992.65	994.48	0.0058	6.00	460.92	129.95	1.00
Victoria Nile river	3.5*	249.00	2758	987.44	992.05	992.05	993.73	0.0060	5.74	480.70	144.77	1.01
Victoria Nile river	3	199.00	2758	987.44	991.82	991.56	993.14	0.0048	5.09	542.09	164.33	0.89
Victoria Nile river	2.5*	149.00	2758	986.94	991.34	991.31	992.85	0.0062	5.44	507.13	169.42	1.00
Victoria Nile river	2	99.00	2758	986.44	990.54	990.54	992.00	0.0062	5.35	518.21	181.73	1.00
Victoria Nile river	1.5*	49.50	2758	986.44	990.09	990.09	991.45	0.0064	5.16	535.46	201.30	1.00
Victoria Nile river	1	0.00	2758	986.44	989.67	989.67	990.93	0.0065	4.97	554.75	221.39	1.00

Source: The Final Detailed Design Report for the Project prepared by AIC Progetti



Source: The Final Detailed Design Report for the Project prepared by AIC Progetti

Figure 4.1.6 Results of the Varied Flow Calculation in the New Karuma Bridge

As such, design flood water level for the new Karuma Bridge is estimated to be 996.42 m above the sea level. The minimum clearance under the girder (freeboard) determined by the design discharge was 1.5m. From the above results, sufficient freeboard is secured for the planned vertical alignment, but the pier of the new bridge is slightly encroaching into the river course. In that case, the footing shall be embedded into a certain depth of the river bed in order to avoid the impact caused by local scouring.

4.2 Constrains in Road Alignment

4.2.1 Facilities

(1) Road situation

The existing bridge is located on the Kampala – Gulu/Arua highway approximately 250km north of Kampala city. The Kampala–Gulu highway is the only paved road connecting Kampala and Gulu, the main city in the northern region of Uganda. The northern side of Karuma Bridge is an important point for traffic with a junction of the Northern corridor and its branch. Rehabilitation and improvement of the highway have been conducted consecutively, and the road condition has been maintained sufficiently. If the situation of South Sudan is stabilized and economic activities are recovered, this highway will act as the main arterial connecting Mombasa port and thus an increased traffic load is expected.

(2) Facilities in Karuma Bridge area

A district borders of Nwoya and Kiryandongo lies on the River Nile around Karuma Bridge. About half of the area of both districts is designated as Murchison Falls National Park. The existing and the new Karuma Bridges are located in the eastern end of the National Park.

The ongoing Karuma hydropower dam is located approximately 4km upstream of the existing bridge. The new Karuma Bridge was planned at approximately 500m downstream from the existing bridge. Major facilities around the Karuma Bridge are shown in Figure 4.2.1.



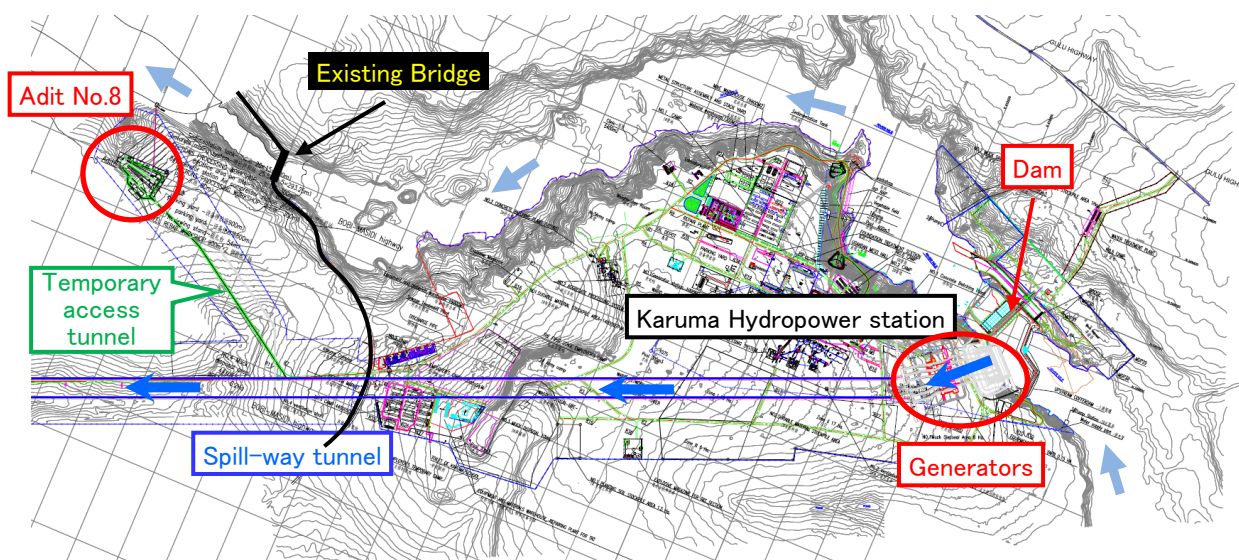
Source: JST

Figure 4.2.1 Facilities in Karuma Bridge Site

(3) Karuma hydropower station project

Outline of the Karuma dam project

Figure 4.1.1 shows the plan of Karuma hydropower station project. The water diverted at the dam flows into six pipes to generate electricity and then discharged to the same river at about 6 km downstream from the existing Karuma Bridge through double spill-way tunnels. The spill-way tunnels are constructed approximately 100m deep from the existing road surface. The adit located near the new Karuma Bridge route is a temporary facility and will be closed after completion of the project. However, the temporary access tunnel will be abandoned and remains as a void space.



Type of scheme: run-off the river
 Powerhouse: underground on left bank (maximum output: 600 MW)
 Discharge for the maximum output: 1.128 m³/ s
 Diversion site : approximately 1.5 km upstream of the existing Karuma bridge
 Overflow structure design flood: 4.700 m³/ s
 Diversion flow system: intake tunnel 400 m + tailrace tunnel 8.570 m + tailrace open channel 140 m
 Outfall structure : approximately 9,1 km downstream the diversion site
 Mandatory environmental flow (fish pass) discharged to downstream reach : 100 m³/ s

Source: Drowing and report by Karuma hydropower station

Figure 4.2.2 Outline of Karuma hydropower station

Dam break analysis

According to “Karuma Hydropower Project Dam Break Analysis and Inundation Report”, a complete or half collapse of the dam is assessed. It is concluded that if the dam collapses completely, the discharge of 6,600 m³/s which is more than a discharge of 10,000-year flood will be flown to the downstream and it increases the water level approximately 1.27m. Therefore, the impact to the new bridge will be negligible. Table 4.2.1 shows the results of dam break analysis.

Table 4.2.1 Results of Dam Break Analysis

Location	Distance downstream (km)	Warning time (hh:mm)	Peak water Level (RL m)	Maximum water depth increase (m)
Partial failure				
Karuma bridge	4	00:09	1004.12	1.09
Chobe lodge	18	01:13	943.19	0.18
Murchison Falls	85	09:15	709.18	0.00
Full failure				
Karuma bridge	4	00:10	1004.32	1.27
Chobe lodge	18	01:20	942.87	0.22
Murchison Falls	85	09:45	708.93	0.10

Source: Karuma Hydropower Project Dam break analysis and Inundation report

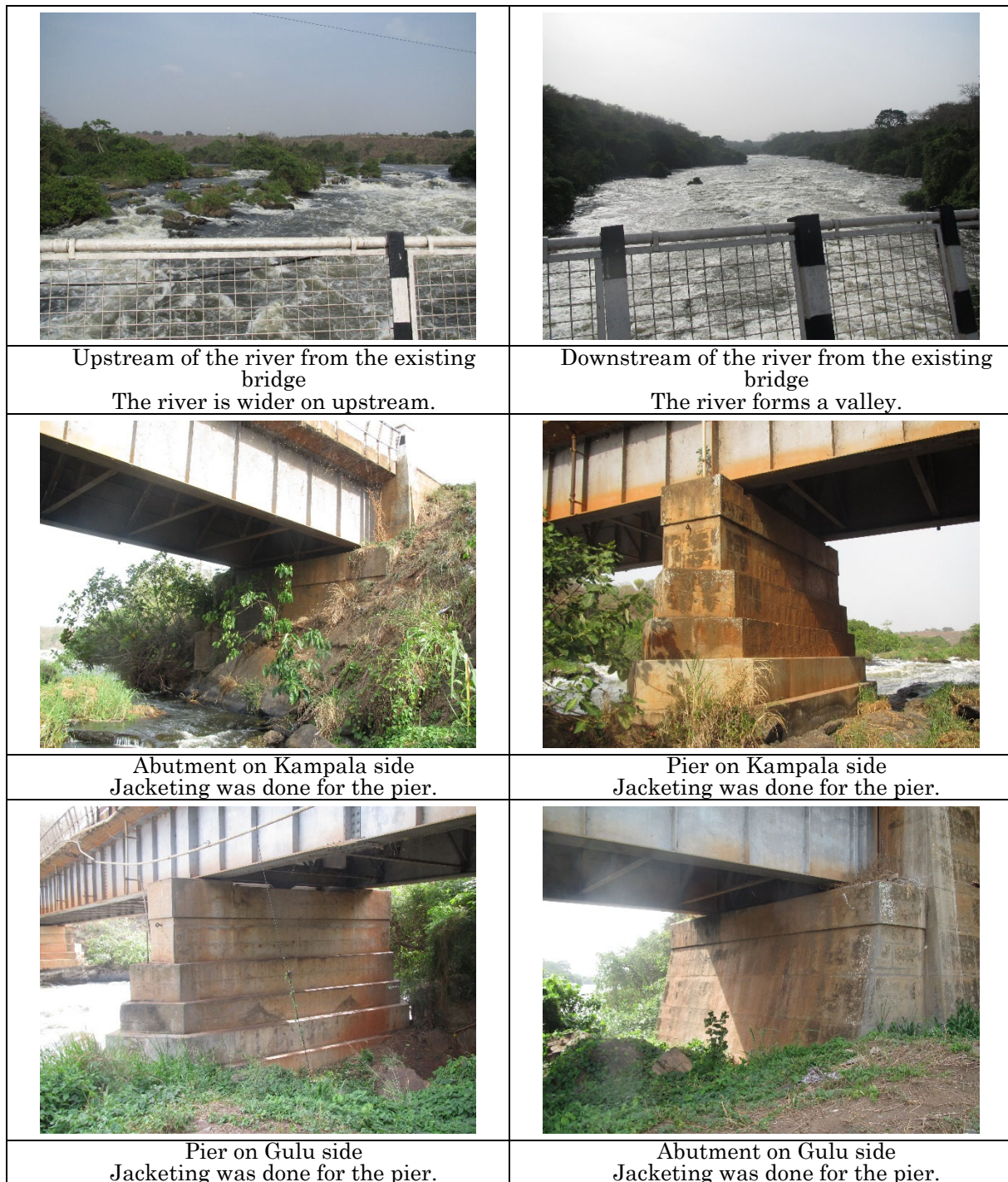
Existing bridge

The existing Karuma Bridge was constructed in 1964 and is a three span continuous steel-concrete composite bridge (reinforced concrete deck on twin steel plate girders). It is 84.7m long with a carriageway width of 7.35m kerb to kerb with a 0.43m raised walkway on both sides. Figure 4.2.3 and Figure 4.2.4 show the current situation of the project site.

<p>Existing bridge and approach road on Gulu side Accident prone location with a combination of sharp curve and downward slope.</p>	<p>Narrow Road Width for Large Bus</p>
<p>Narrow Road Width for Heavy Truck</p>	<p>Existing bridge from the new Karuma bridge location (current design)</p>
<p>Existing bridge from upstream of Kampala side</p>	<p>Existing bridge from downstream side on Gulu side</p>

Source: JST

Figure 4.2.3 Existing Bridge-1/2



Source: JST

Figure 4.2.4 Existing Bridge-2/2

(4) Justification for the Reconstruction of the Bridge

1) Condition of the Existing Bridge

It was reported that rehabilitation works was conducted for the existing bridge in 2012. In the project, the following works was carried out:

- Resealing of the deck slab with a layer of asphalt concrete
- Replacement of the loose expansion joints
- General maintenance of bridge and approach guardrails
- Under pinning and painting of steel girders

In addition, concrete jacketing to all the substructures were implemented.

However, no expansion joint was installed on the bridge deck. Cracks and severe water leakage with probable Alkali–aggregate reaction was observed, and exposure of rebars at the soffit of the concrete deck slab was found as show in the photos below.

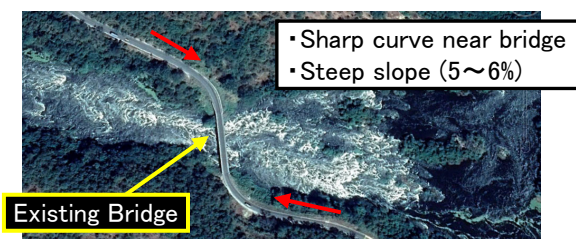
	
<p>Serious water leakage at bridge decks</p>	<p>Exposed rebars found at soffit of the bridge deck</p>
	
<p>Steel girders were repainted in 2012. No loss of bolts were observed.</p>	<p>Expansion joints were not found.</p>
	
<p>Drainage catch pit was clogged by garbage.</p>	<p>Railings have been maintained by URNA</p>

Source: JST

Figure 4.2.5 Condition of the Existing Bridge

2) Accidents at Karuma Bridge

Approach roads to the existing Karuma Bridge on both sides have a sharp curve with a steep slope of 5 % to 6% and its road width is not sufficient. Because of this unfavourable road geometrics, many accidents have occurred at the bridge. In addition, “Feasibility and Preliminary Design Study Report – New Karuma Bridge, August 2018, UNRA (referred to as “FS-NKB”)” reported some recent accidents as extracted below:



Source: JST

Figure 4.2.6 Road Condition Near the Bridge

Table 4.2.2 Recent accidents near Karuma Bridge

(i)	On 5th June 2018, a Fuso truck loaded with timber travelling from Lira District to Bweyale lost control and crashed into the guide rails & masonry parapet on the left hand side of the approach road and the bridge guard rails damaging approximately 16m length of approach road guide rails and 23.5m portion of the bridge guard rails. Apportion of 17m length of the masonry wall was also damaged. The lorry has plunged into the river and disappeared into the water, occupants feared dead except one behind the lorry who managed to jump off but sustained injuries.
(ii)	On 30th May 2018, Erute North County Member of Parliament Hon. Charles Angiro Gutomoi was involved in an accident on the Karuma Bridge in Kiryandongo District. The MP was driving himself in a Toyota Noah UAV 089G when he collided with a Fuso truck registration number UAJ 730U near Karuma Bridge at about 3am.
(iii)	<p>On 07th July 2017, an identified truck carrying cows, 9 people and chicken lost control at night and knocked a boda cyclist with two passengers dead. The over speeding Truck lost control at the Karuma Bridge and knocked guard rails and plunged into the River Nile water. The truck was headed for Kampala having left a food market in Northern Uganda. Rescue Marine police managed to recover only 3 bodies and with 6 dead cows.</p> <p>On 10th January 2018, Two foreign nationals were killed and one critically injured in a road accident in Ayuda village Diima parish near Karuma Bridge in Kiryandongo District on the Kampala –Gulu highway. The accident took place at around 10:15am when a driver of the vehicle, registration number UAB 042B, in which the foreign nationals were travelling knocked Truck registration UAU 366 loaded with sand. The lorry was coming from the Kampala direction, headed to Lira, while the other vehicle was coming from the opposite direction.</p> <p>In May 2018 a Gaaga Bus registration number UAK 562L from Lira to Kampala was involved in an accident with a tractor registration number UAU 872M and a trailer loaded with crates of beer near the Karuma Bridge. The bus reportedly hit the tractor before it rolled and collided with the oncoming lorry. The accident claimed the lives of 22 people and happened near Karuma Bridge at Nanda village, in Nyamasha parish, Mutunda sub-county, Kiryandongo district.</p>

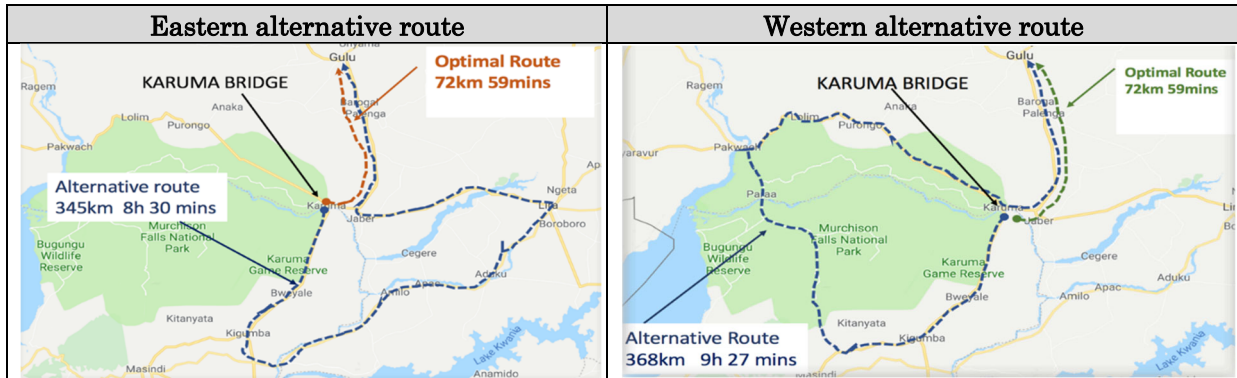


Source: Feasibility and Preliminary Design Study Report – New Karuma Bridge (2018.8 ; UNRA)

3) Alternative route

“FS-NKB” indicates the travel time and distance of the route from Karuma to Gulu in case of the closure of Karuma Bridge. According to this report, it takes 8.5 hours on the eastern and 9.5 hours on the western route while optimum route takes an hour as shown in Table 4.2.3.

Table 4.2.3 Alternative Routes for the Nile Crossing



Source: Feasibility and Preliminary Design Study Report – New Karuma Bridge (2018.8 ; UNRA)

4.2.2 Current design of new Karuma Bridge

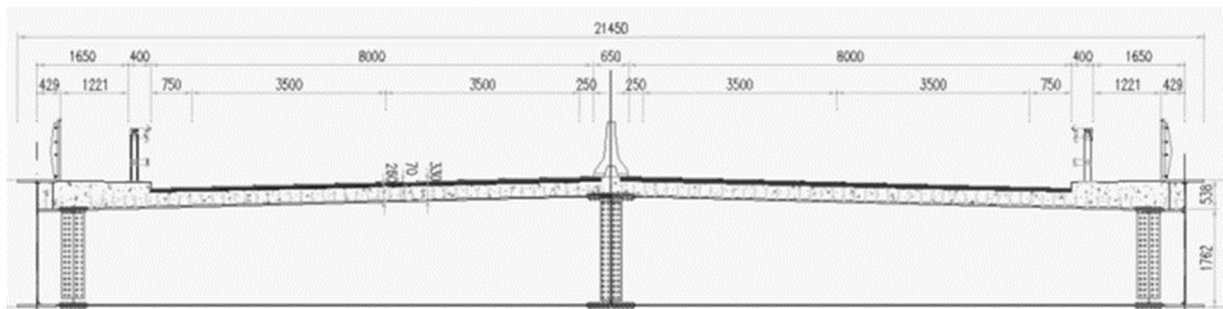
(1) Situation after the completion of the current detailed design

The detail design of new Karuma Bridge was completed by AIC Progetti in association with Prome on July 2017 and the design was reviewed by UNRA on August 2018 under the “FS-NKB”. The report indicates not only technical issues but also effects to the economy and traffic after completion.

(2) Outline of the current detailed design

1) Bridge width

The detailed design report of the new Karuma Bridge indicates the cross section of new bridge as shown in the figure below. It consists of four vehicle lanes with a walkway on both sides. The overall width of this road is 20.75m.



Source: Final Detailed Design Report for the new Karuma Bridge

Figure 4.2.7 Cross section of New Karuma Bridge

2) Bridge location study

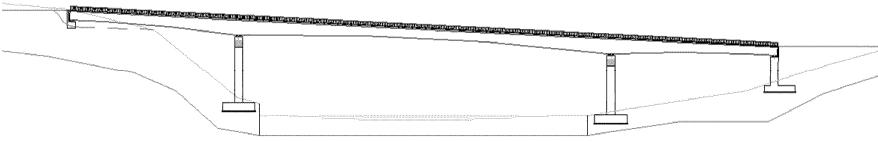
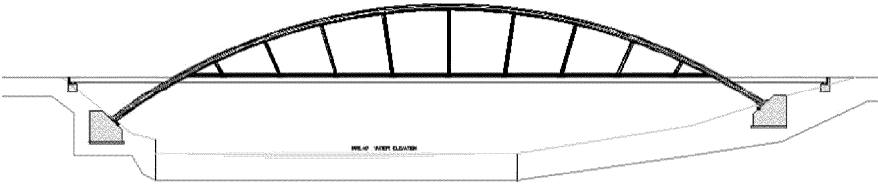
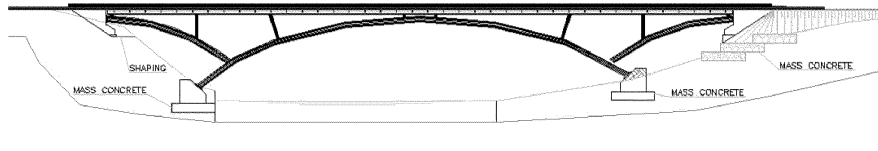

The feasibility and detailed design reports for the new Karuma bridge project contain no alternative study for bridge crossing point and alignment of approach roads. The new alignment seems to be determined with criteria; i) narrow river section for bridge crossing, ii) align bridge perpendicular to the river flow, and iii) applying appropriate geometric standard for the new approach roads.

3) Bridge type selection study

According to the detailed design report, four bridge type options, i.e. i) steel-concrete composite bridge, ii) tied arch bridge, iii) deck arch bridge and iv) cable-stayed bridge, were compared and

evaluated. The evaluation criteria are i) flow capacity, ii) road access earthworks, iii) aesthetics, iv) costs, v) maintenance, and vi) launching operations. The study selected the cable-stayed bridge option for the new bridge as shown in Table 4.2.4.

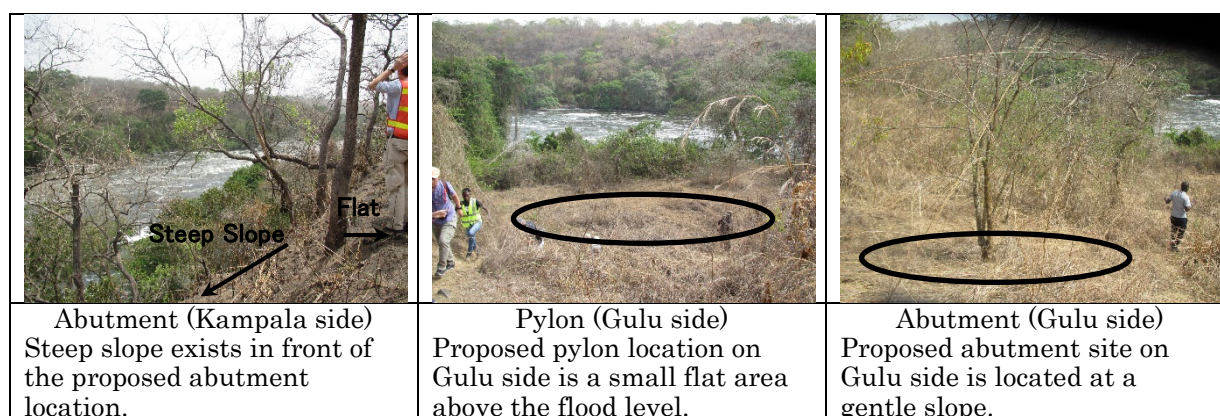
Table 4.2.4 Evaluation of Bridge Type

Bridge Type	Evaluation from report
<p>1. Steel-concrete composite bridge</p> 	<ul style="list-style-type: none"> • River effect=1 • Road access=3 • Aesthetics=1.5 • Costs=5 • Maintenance=2 • Launching=5 <li style="text-align: right;">Total=17.5
<p>2. Tied arch bridge</p> 	<ul style="list-style-type: none"> • River effect=3 • Road access=2 • Aesthetics=4.5 • Costs=1 • Maintenance=4 • Launching=1 <li style="text-align: right;">Total=15.5
<p>3. Deck arch bridge</p> 	<ul style="list-style-type: none"> • River effect=5 • Road access=5 • Aesthetics=4.5 • Costs=1.5 • Maintenance=4.5 • Launching=2 <li style="text-align: right;">Total=22.5
<p>4. Cable stayed bridge</p> 	<ul style="list-style-type: none"> • River effect=5 • Road access=5 • Aesthetics=5 • Costs=1 • Maintenance=4.5 • Launching=2 <li style="text-align: right;">Total=22.5

Source: Final Detailed Design Report for the New Karuma Bridge

4) Location of the substructure of new Karuma bridge in current design

During the field survey carried out by the JST, locations of substructures proposed for the new bridge was investigated as shown in the photos below. The proposed locations were considered to be suitable for planning the substructures.



Source: JST

Figure 4.2.8 Location of New Karuma Bridge**5) Cost of new Karuma bridge in current design**

The detailed design report indicated the cost estimation of the project as shown in the table below. Total project cost is UGX 255,782,067,064 (approx. USD 70 mil @USD1.00=UGX3,700) and the cost of only the bridge without overhead expenses is UGX 167,525,195,167 (approx. USD 45 mil).

Table 4.2.5 Grand summary of Bills of Quantities

Bill No.	DESCRIPTION	AMOUNT			
		Detailed Design, July 2014		Feasibility Study, Aug 2018	
		UGX	Convert into USD million*	UGX	USD**
1	GENERAL	18,875,400,326	5.1	18,875,400,326	4,839,846
2	DRAINAGE	818,845,855	0.2	1,966,519,573	504,236
3	EARTHWORKS AND PAVEMENT LAYERS OF GRAVEL OR CRUSHED STONE	6,519,978,252	1.8	15,658,215,487	4,014,927
4	BITUMINOUS LAYERS AND SEALS	2,069,490,432	0.6	4,970,036,076	1,274,368
5	ANCILLARY ROADWORKS	480,970,554	0.1	1,155,086,764	296,176
6	STRUCTURES	167,525,195,167	45.3	167,525,195,167	42,955,178
8-9-10	DAYWORKS (8 LABOUR-9 MATERIALS-10 EQUIPMENT)	465,555,618	0.1	465,555,618	119,373
	SUB-TOTAL A	196,755,436,203	53.2	210,616,009,011	54,004,105
	Works Contingencies (15% of sub-total A)	29,513,315,430	8.0		
	Revision of price Contingencies (15% of sub-total A)	29,513,315*,430	8.0		
	GRAND TOTAL PRICE (carried forward to Form of Tender)	255,782,067,064	69.1		

*: Conversion rate: USD1.00=UGX3,700

**: Amount in USD as shown in the report (@USD1.00=UGX3,900)

Source: Final Detailed Design Report July 2014 and Feasibility Study August 2018 for the New Karuma Bridge

4.2.3 Environmental and Social Considerations for New Karuma Bridge**(1) Environmental Impact Assessment (ESIS)****1) Current Conditions of ESIS Report**

ESIS for the New Karuma Bridge was originally prepared in February 2015 in accordance with the national regulations and referring to the safeguard policies of World Bank (WB) and African Development Bank (AfDB) as they were the potential lenders to the Government of Uganda. ESIS was approved by NEMA in August 2016 with the conditions. Major approval conditions related to ESIS report or environmental impacts are summarized below.

- Ensure that the proposed site location of contractors' camp for storage of plant equipment and other facilities is 100 meters away from the protected zone of the River Nile and away from other ecologically sensitive areas.
- Initiate and carry out annual environmental audits and submit the environmental audits reports to NEMA.
- If there is a need to undertake quarrying activities to support the construction works, separate ESIS should be undertaken, and ESIS reports submitted to NEMA for approval before commencement of construction works.
- Carry out awareness promotion activities among the communities likely to be negatively affected by the bridge construction in close collaboration with the local authorities.
- Ensure that Environmental Monitoring and Management Plan is implemented.
- Put in place measures to mitigate dust emission, vibration and excessive noise generation, so as to minimize adverse impacts on wildlife, workers and neighbouring communities.

The approved ESIS was updated in 2018 by UNRA to satisfy requirements in JICA Guidelines with the purpose of expected financial support from JICA. The updated ESIS was not submitted to NEMA since UNRA considered amendment of ESIS approval was not necessary.

Followings are the findings from the interview with the officer of the ESIS review section in NEMA:

- Expiry of the ESIS approval was not precisely mentioned in the approval certificate issued in August 2016. Generally, the validity period of ESIS approval was 5 years maximum from the approval date if a project proponent requested NEMA for extension of approval. If a project was not implanted within the 5 years validity period, new ESIS approval was necessary to be obtained since the natural and social conditions in and around the project area might be changed.
- ESIS was needed to be conducted if the project design was significantly modified from the one in the approved ESIS. "Significantly modified" meant, for example, the route passed to another area. If the modified route was still within the same area and possible adverse impact was not larger than the one assessed in the approved ESIS, amendment of ESIS was not required.
- In case the project design was slightly modified, or the project was implemented within 5 years from the ESIS approval, modified design was needed to be explained by updating the Environmental Management Plan to be submitted before commencement of construction works.

2) Review Results of ESIS Report

According to the updated ESIS, total 182 plant species belonging to 49 families were found in the project area. Among them, 170 species in total were classified as Near Threatened or Least Concern as the IUCN category species.

As for fauna, 98 species of butterflies were recorded in the project area though there was no IUCN category species. For amphibians, 11 species were recorded and all of them were classified as Least Concern according to the IUCN red list. However, these 11 species are widely distributed and tolerant to a broad range of habitats. Regarding reptiles, 18 species were recorded and 1 specie was classified ad Least Concern in the IUCN red list. With respect to mammals, 15 species of small mammals and 11 species of medium to large mammals were recorded. Among them, 14 small mammals and 9 medium to large mammals were classified as Least Concern and 2 medium to large mammals were classified as Vulnerable in the IUCN red list.

The approved ESIS report was reviewed with reference to JICA Guidelines for Environmental and Social Considerations issued in April 2010 (the JICA Guidelines). Review results and findings were explained in Table 4.2.5.

Table 4.2.5 Review Results of ESIS Report

JICA Guidelines	ESIS for New Karma Bridge (Feb. 2015)	ESIS for New Karuma Bridge (Sep. 2018)
1. Project Proponent		
Describe outline of proposed component which are targeted as the environmental and social considerations	There was description of project outline, and it was considered sufficient to examine possible environmental and social impact.	There was description of project outline, and it was considered sufficient to examine possible environmental and social impact.
2. Baseline data		
Describe below: a) Pollution control including the results of site measurement b) Natural environment c) Protected area and culturally important area d) Land use e) Customary land, involuntary resettlement	a) Site measurement was conducted for air quality though measurement points of air quality were not explained. Site measurement of water quality was not conducted though its reason was unknown due to the missing result of Scoping. b) Field survey for flora and fauna was conducted, and the results were explained though location of vulnerable flora and fauna species identified in the field survey was not explained. c) It was explained that the project area was located in the protected area namely Karuma Wildlife Reserve though it was not visually explained, e.g. through a map. Pottery was found near the project area though distance between the excavated area and the project area was not described. d) and e) Land use was explained though involuntary resettlement and customary land use were not explained.	a) For air quality, noise and vibration, measurement date for the Karuma Dam project was used. There was no water quality measurement data, but its reason was not explained. b) The results of field survey conducted in 2015 were summarized. c) A large-scale map showing the location of the project area and Karma Wildlife Reserve were included. d) Same description as ESIS in 2015. e) It was explained in the baseline condition that the most dominant land tenure in the project area is customary and other land regimes in the area include public land (i.e. the area for Karma Wildlife Reserve). It is not sure only from this description whether the project area contains customary land or not since the entire project area is inside Karma Wildlife Reserve).
3. Policy, legal and institutional framework		
Describe below: a) Regulations and standards related to ESIS and information disclosure b) Roles and responsibilities of relevant authorities	a) Relevant regulations on ESIS, natural and social environment as well as pollution control including standards to implement the project were explained. As for information disclosure, relevant regulations were not described though the importance of public involvement was explained. b) There was description about general roles and responsibilities of relevant authorities but not specific description of roles and responsibilities on this project.	a) There were exAlt-1tions on ESIS relevant regulations and national standards though description on regulations related to information disclosure was not found. b) Similar to ESIS in 2015, general roles and responsibilities of relevant authorities were explained but no specific description of roles and responsibilities on this project was found.
4. Analysis of alternatives		
Compare feasible alternatives considering location, technology, design, cost, environmental/social considerations and operation including without project.	Alternatives on bridge shape were examined from the viewpoints of flow capacity, road access earthworks, environment and aesthetics, cost, maintenance and technology/technique. However, there was no examination on location or alignment and without project.	Location of bridge including without project and type of structures were examined.

JICA Guidelines	ESIS for New Karma Bridge (Feb. 2015)	ESIS for New Karuma Bridge (Sep. 2018)
5. Scoping and TOR for field survey		
Describe preliminary evaluation of possible impact at pre-construction, construction and operation phases based on secondary data and site reconnaissance and show survey contents/measures (TOR)	Scoping was conducted but there was no description in the ESIS report.	Scoping was conducted but there was no description in the ESIS report.
6. Impact Assessment		
Describe likely positive and negative impacts in quantitative terms to the extent possible. Impacts should include both of direct and indirect impacts.	Likely direct positive and negative impacts at each project phase were examined. However, indirect or accumulated impact was not described. As for mitigation during operation phase, contents of mitigation for “risk of human accidents and injuries” and “risk of accidents to wildlife animals” seem to be for the construction phase.	There was no quantitative examination in the impact assessment.
7. Environmental management and monitoring plan		
Describe below: a) concrete mitigation measures to the items evaluated as negative impacts, b) monitoring plan (parameters, location, frequency) at each project phase c) implementing and responsible organizations for all mitigation measures and monitoring d) cost for mitigation measures and monitoring	a) and c): Mitigation measures to the possible adverse impact were examined with responsible parties at each project phase. b) and c): Monitoring plan with parameters, frequency, responsibility and cost was examined at each project phase though monitoring location/points was not described. There was no description about institutional framework for preparing and submitting the environmental and social monitoring reports to concerned parties including JICA.	a) and c): Mitigation measures to the possible adverse impact were examined with responsible parties at each project phase. b) and d): Monitoring plan with parameters, frequency, responsibility and cost was examined at each project phase though monitoring location/points was not described. There was no description about institutional framework for preparing and submitting the environmental and social monitoring reports to concerned parties including JICA.
8. Stakeholder analysis and holding stakeholder meetings		
Include a record of stakeholder meetings	Project stakeholders were analysed, and stakeholder meetings were held. It was explained that the initial consultation was conducted during site reconnaissance in the ESIS report though there was no description about consultation at the draft final ESIS stage. In addition, the following information was outstanding: ➢ number of participants ➢ invitation methods ➢ answer from the project proponent	Stakeholder meetings were held for updating ESIS, but date of the meetings, number of participants, the invitation methods were not mentioned.

Source: JST

(2) Resettlement Action Plan (RAP)

✓ Current Conditions of RAP

The project does not entail acquisition of privately used land or involuntary resettlement. Accordingly, RAP was not prepared.

4.3 Formulation of the Project: Road Design

4.3.1 Design Criteria of the Road

Geometric design of the Project has been done in accordance with the parameters for a design road class of II Paved, as described in Vol. 1. Geometric Design of the MoWT Road Design Manual. Summary of the applicable geometric design parameters for the Project is shown below.

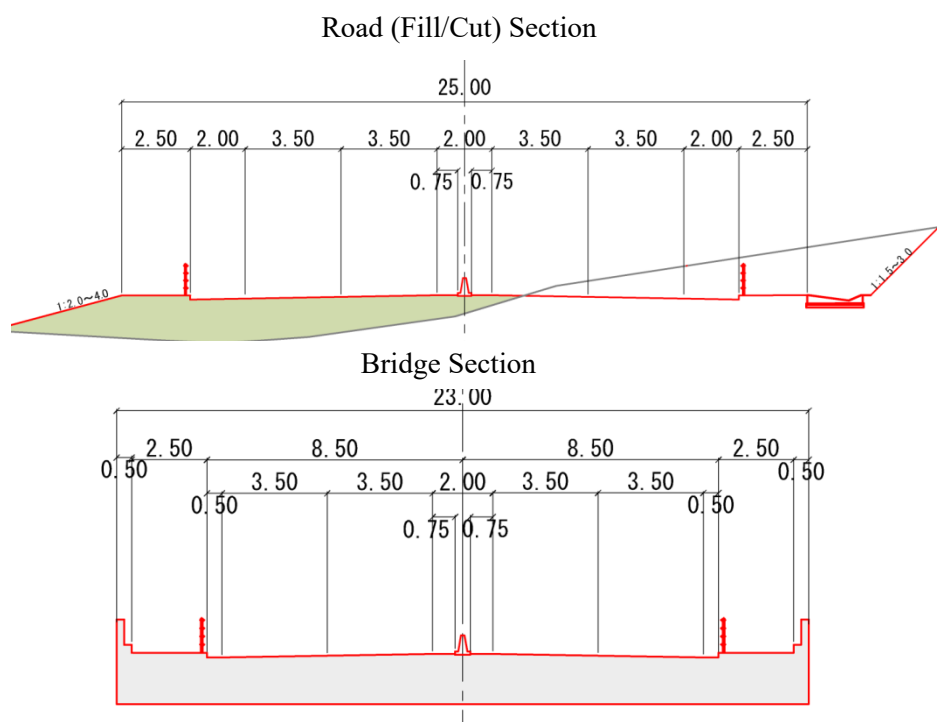
Table 4.3.1 Summary of Applicable Geometric Design Parameters for the Project

Design Element	Unit	Road	Existing Road
Road Class		II Paved	-
Design Speed	km/h	70	50
Min. Stopping Sight Distance	m	95	-
Min. Passing Sight Distance	m	485	-
Min. Horizontal Curve Radius	m	185	80
Max. Gradient (Desirable)	%	5.5	6.0%
Max Gradient (absolute)	%	7.5	
Crest Vertical Curve stopping	Kmin	22	-
Sag Vertical Curve stopping	Kmin	20	-
Normal Cross fall	%	2.5	-

Source: Uganda Road Design Manual

4.3.2 Plan of the Cross Section

Typical lane width of 3.50m which is the same as II paved class of Road Design manual is recommended. Typical Cross Sections for the Road section and Bridge section of the project are shown in the Figures below.



Source: JST

Figure 4.3.1 Proposed Typical Cross Section

4.3.3 Study on the Alignment through Comparison of Alternative

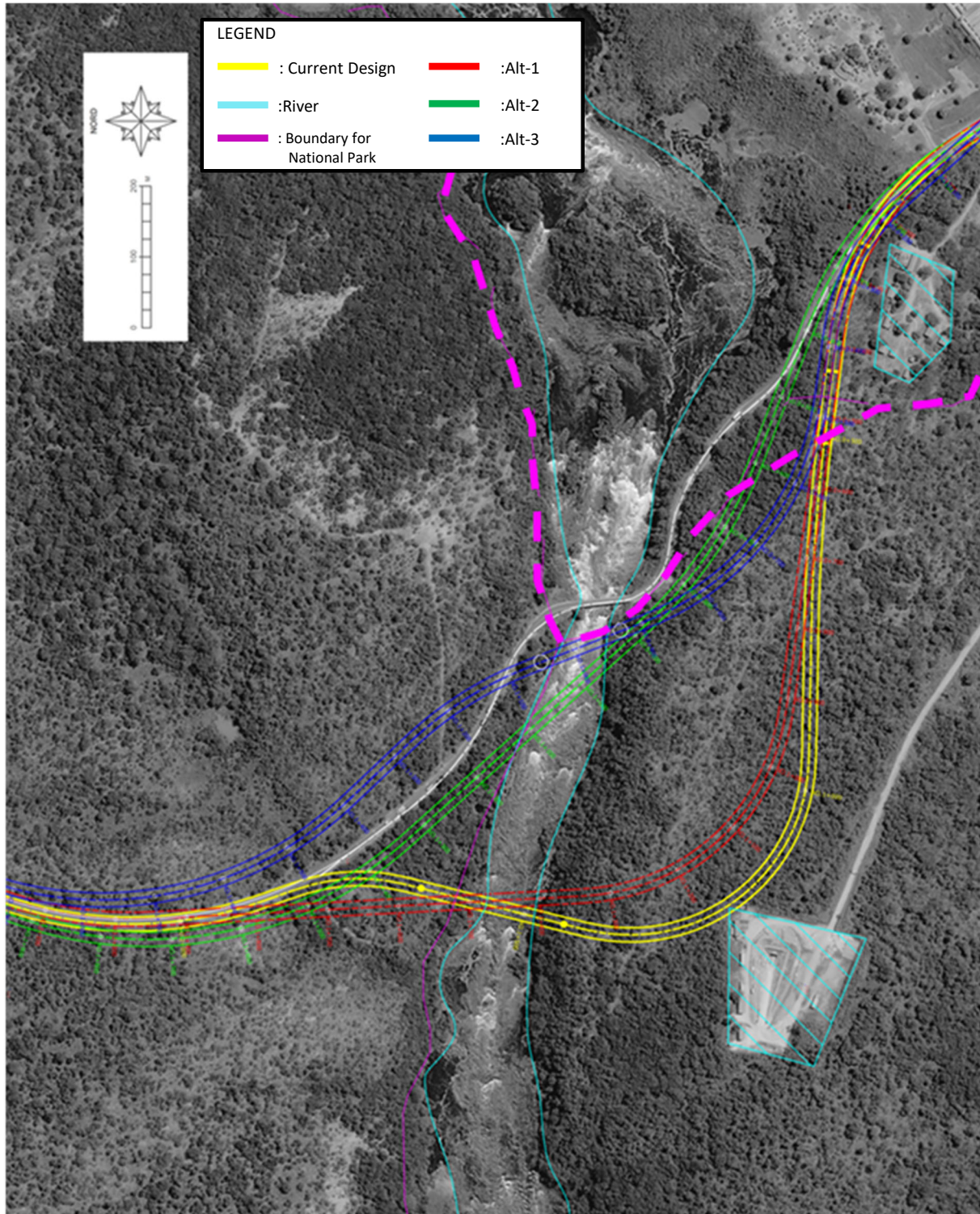
Two alternatives are established after the site reconnaissance, traffic data, environmental conditions, related plans, existing road infrastructures, and so on. Main features of each alternative are shown in the following table and figure.

- ✓ The Current Design affects the Karuma Hydropower station facilities such as Adit-8 and Temporary Access Tunnel.
- ✓ Alternative-1 eliminates the effect of the Karuma hydropower station facilities. Additionally, the longitudinal gradient is improved to 4% in order to prevent the declining of heavy vehicles' speed.
- ✓ Alternative-2 drastically modifies horizontal/vertical alignment from current plan in order to further improve drivability and safety.
- ✓ Alternative-3 modifies horizontal/vertical alignment from current plan and shortens bridge length, compared to alternative-2

Table 4.3.2 Summary of Applicable Geometric Design Parameters for the Project

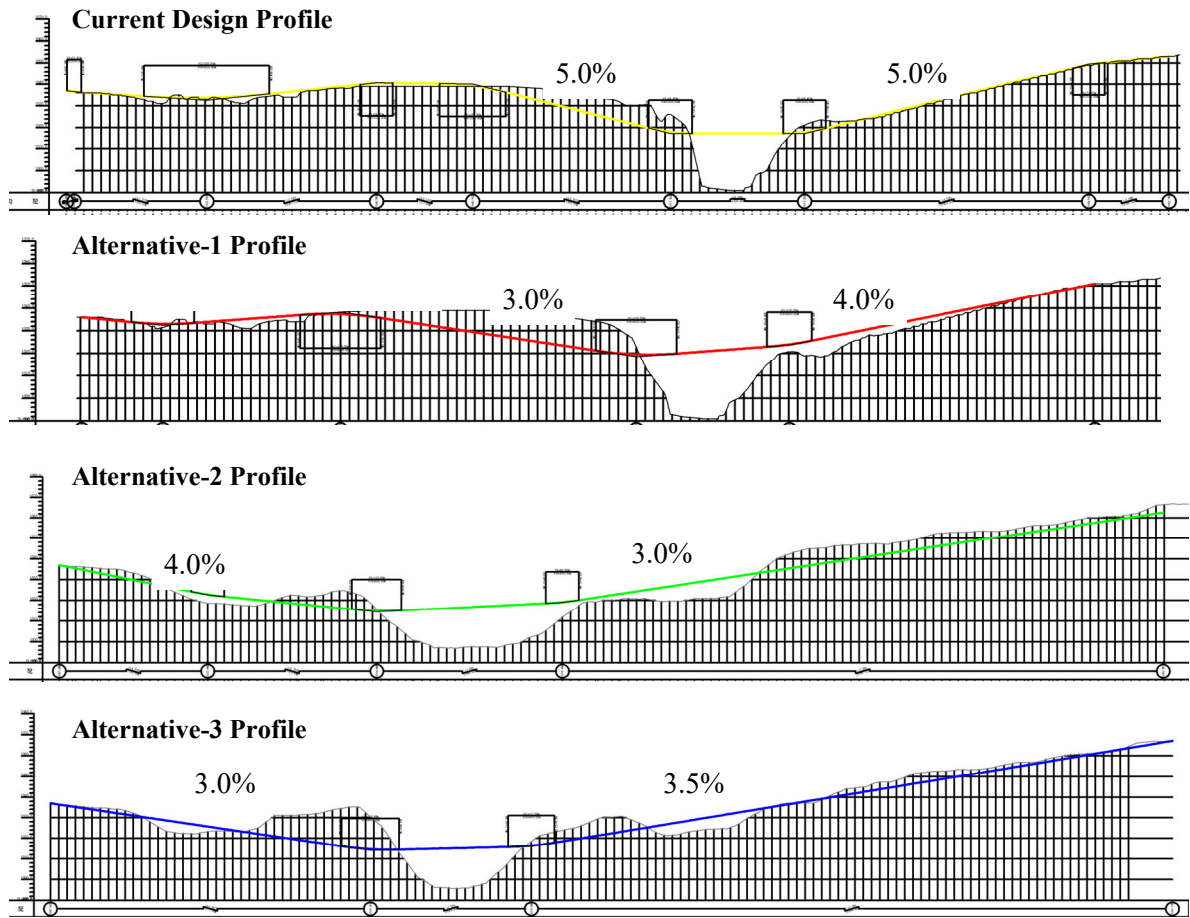
Item	Current Plan	Alternative-1	Alternative-2	Alternative-3
Road length	2,500m	2,400m	2,100m	2,200m
Horizontal Alignment	252m	300m	500m	300m
Vertical Alignment	5%	4%	4%	3.5%
Affected Facilities	Underground temporary tunnel	-	-	-

Source: JST



Source: JST

Figure 4.3.2 Road Horizontal Alignment for Each Alternative



Source: JST

Figure 4.3.3 Road Vertical Alignment for Each Alternative

4.4 Formulation of the Project: Bridge Design

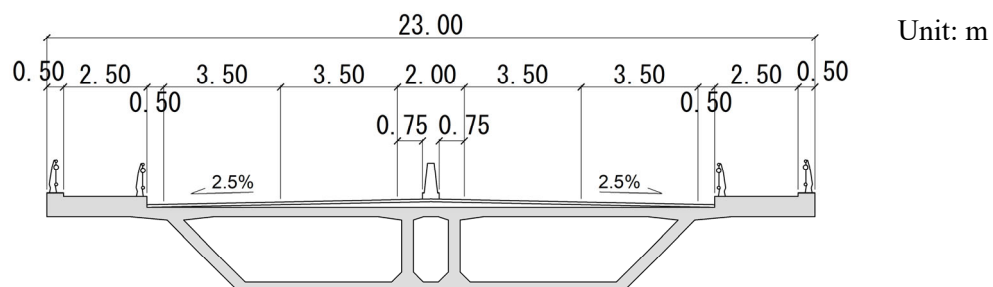
4.4.1 Bridge Planning and Design Conditions

Planning and design conditions for this study were summarized in Table 4.4.1 below considering the ones applied in the Detailed Design for Kampala Flyover Construction and Road Upgrading Project conducted by the same joint venture as the JST.

Table 4.4.1 Planning and Design Conditions

Item	Description	Remarks
Design Standards	Eurocodes (EN) with UK National Annex Road Design Manual (RDM) of MoWT	Use of Eurocodes were instructed by UNRA. Supplemented by Japanese standard as necessary.
Design Life	120 years	EN (UK National Annex)
Lane Numbers	Four-lane carriageway with footways on both sides (see Figure 3.4.1)	
Unit Weights	Reinforced concrete: 25 kN/m ³ Unreinforced concrete: 23 kN/m ³ Steel: 78.5 kN/m ³ Asphalt concrete: 23.0 kN/m ³ Backfill soil: 20 kN/m ³ Water: 10kN/m ³	EN1991-1-1
Design Traffic Loads	TS and UDL (300kN,200kN,100kN,5.5kn/m2) Single Axle Load (400kN) Special Vehicle (165kN) Crowd Loading (5.0kN/m2)	EN 1991-1-1 NA to EN 1991-2
Peak Ground Acceleration Coefficient	0.15	RDM V Bridge Design (Zone 1).
Other Loads	Wind, temperature, etc.	EN 1991-1-4 and/or EN 1991-1-5
Design Discharge	2,758 m ³ /s (100-year flood) in the current detailed design	120-year flood shall be considered in accordance with the design life.
Freeboard (clearance during flood)	1.5m	Minimum 1.2m is recommended for 2000 m ³ /s ≤ Q<5000 m ³ /s according to Japanese standard
Geological Conditions	Rock outcrops are observed around the bridge site.	Strength of the rock shall be confirmed by further investigation.

Source: JST and Design Criteria Report for KFCRUP



Source: JST

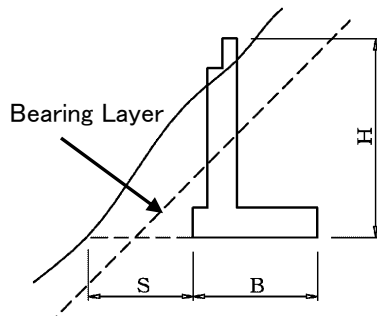
Figure 4.4.1 Proposed Cross Section Elements of New Karuma Bridge

4.4.2 Conceptual Design of New Karuma Bridge

(1) Required Bridge Length and Location of Abutments

Bridge length were determined for the alignment options presented in the previous section. The following conditions were taken into account in locating bridge abutments for both sides of the river:

- ✓ The height of the abutment (assuming common inversed T-shaped abutment) shall not be more than 12m according to Japanese standard.
- ✓ Position of the abutment which will be located on slope are determined based on the rule shown in Figure 4.4.2 below:



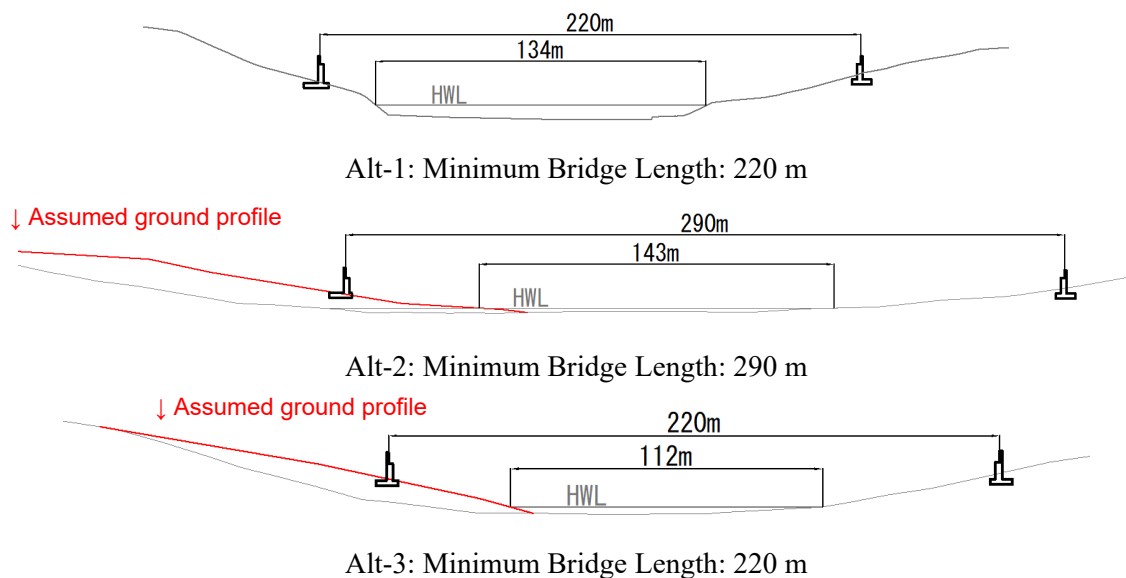
Type of Bearing Layer	Recommendable S value
Soil	$S \geq B$
Soft Rock	$S \geq 1/2 B$
Rock	$S \geq 1.0 \text{ m}$

Note: "Soft rock" was tentatively considered for bearing layer in this study.

Source: Bridge Design Manual, MLIT, Japan

Figure 4.4.1 Position of Abutment on Slope

Based on the above rule for abutment position, estimated bridge length from the abutment positions and vertical alignments are shown in Figure 4.4.3. The bridge lengths were established rounded by 10m. River widths for each option, i.e. 134m and 143m and 112m for Alt-1 and Alt-2 and Alt-3 respectively, were determined based on the design of 100-year flood level analysed by the current detailed design study.



Note: HWL: High Water Level

Source: JST

Figure 4.4.2 Estimated Bridge Lengths for Three Route Alternatives

(2) Selection of Bridge Types

1) Bridge Type Options

The Victoria Nile which the new Karuma Bridge will cross has high volume of discharge and very rapid flow all year round. Also, rock outcrops observed at the riverbed make building cofferdam impossible to work in the river course. Therefore, it is not feasible to construct piers inside the river course.

From these conditions of the site, preliminary bridge type selection was made among the ones with economical span of more than 110 m which is the river width during the flood. As a result, steel arches, prestressed concrete continuous rigid frame box girder, steel/concrete cable stayed bridge and extradosed bridge were selected. It should be noted that the aesthetic aspect for this bridge is very important for the Ugandan Government in selecting the bridge type. The original design was made in the motif of a local musical instrument called “Adungu”.

Table 4.4.2 Preliminary Bridge Type Selection

Bridge Types		Economical Span Length (m)												Economical Span Length (m)	Evaluation/Comments		
		70	80	90	100	110	120	130	140	150	160	170	180				190
Steel Bridges	Tied Arch	Langer	[Commonly applicable]												60 ~ 120	No	
		Lohse	[Commonly applicable]												80 ~ 160	Selected	Selected for Alt-1
		Langer Truss	[Commonly applicable]												120 ~ 150	No	Lohse type covers this span length
		Trussed Langer	[Commonly applicable]												80 ~ 140	No	Lohse type covers this span length
	Conventional Arch	Network Arch	[Commonly applicable]												100 ~ 200	Selected	Selected for Alt-2 and Alt-3
		Conventional Arch	[Commonly applicable]												70 ~ 160	No	Lohse type covers this span length
		Cable Stayed	[Commonly applicable]												130 ~ 400	Selected	Steel concrete composite deck
		Suspension	[Commonly applicable]												150 ~ 1900	No	Not economical
Concrete Bridges	Continuous Box	[Commonly applicable]												50 ~ 140	Selected	Cantilever Construction	
	Cable Stayed	[Commonly applicable]												100 ~ 260	Selected	Steel concrete composite deck	
	Extradosed	[Commonly applicable]												100 ~ 200	Selected		





Commonly applicable
 Applicable
 Selected as a candidate

Source: “Design Data Book 2011”, Japan Bridge Association, “Prestressed Concrete Highway Bridge Planning Manual”, Prestressed Concrete Contractors Association, Japan

2) Characteristics of Bridge Type Options

Images and characteristics of preliminary selected bridge types are shown in Table 4.4.3.

Table 4.4.3 Characteristics of Bridge Type Options

Bridge Type	Image	Description
Cable-stayed (Current Design)		<ul style="list-style-type: none"> • Cable-stayed type with a double-column pylon. • Balanced by selfweight of the pylon and tension of cables. • Estimated cost UGX 211 b. (USD 58 m.) excluding contingencies.
Cable-stayed bridge / Centre cable type (Alternative type)		<ul style="list-style-type: none"> • Cable-stayed type with a single-column pylon. • The motive of Adungu (a local musical instrument) is maintained. • Construction volume of the main pylon is reduced by a single-plane cable and additional cable provided behind the main span.
Arch bridge (Alternative type)		<ul style="list-style-type: none"> • This type is typical for the site condition. • Eliminated in the current detailed design due to its appearance and constructability.
Extradosed bridge (Alternative type)		<ul style="list-style-type: none"> • Generally, one of the most economical option for this span length • Total bridge length would be longer due to its structural characteristics.

Source: JST

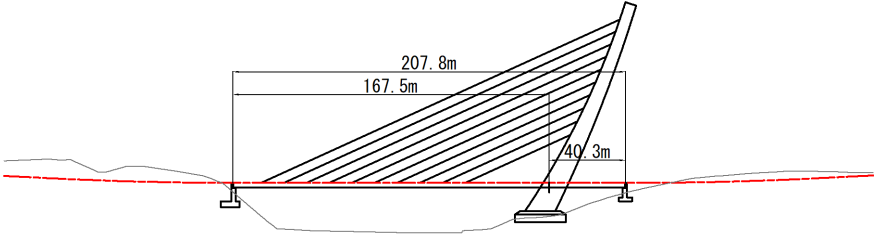
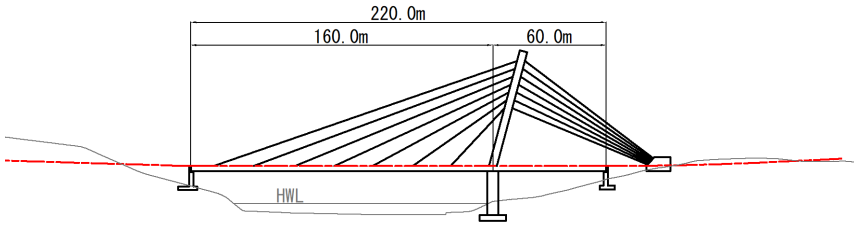
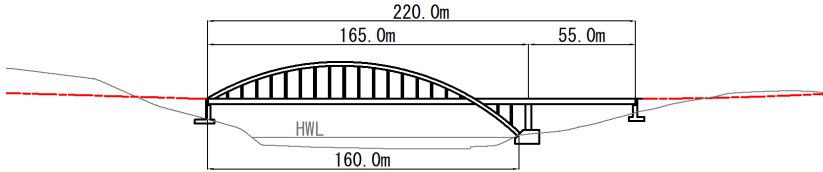
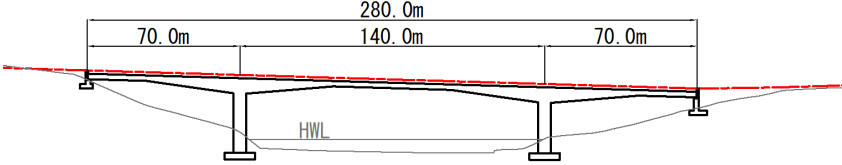
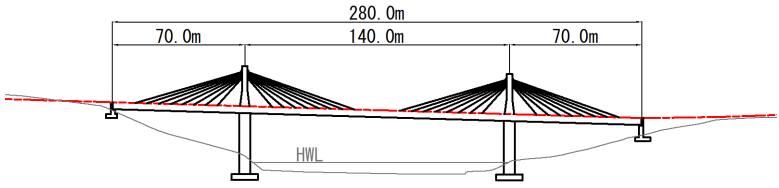
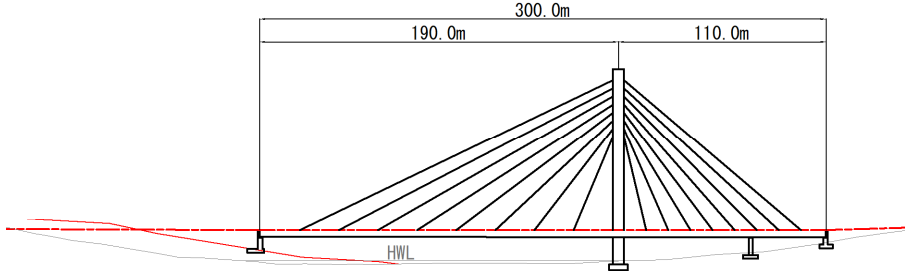
Side views of the options and remarks are presented below. Both the concrete box girder and the extradosed will require longer total bridge length for the same main span length due to its structural characteristics. However, drivability will be improved by raising the road profile. There are no significant differences in bridge structural aspects in arch and cable-stayed options. However, the arch options will be disadvantageous in constructability and cost due to necessity of a cable crane (see Photo) which shall be imported and exported after completion.

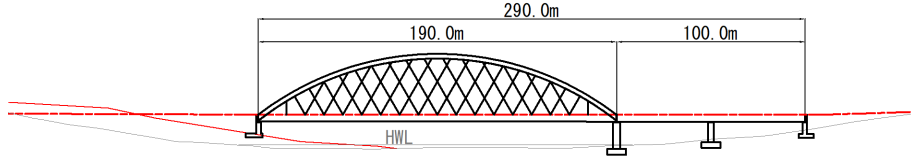
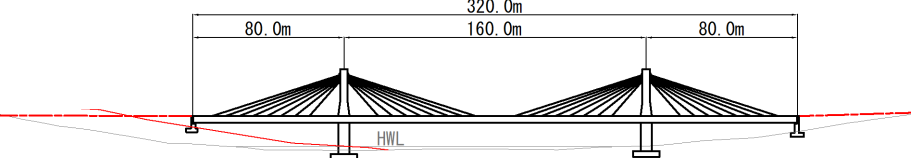
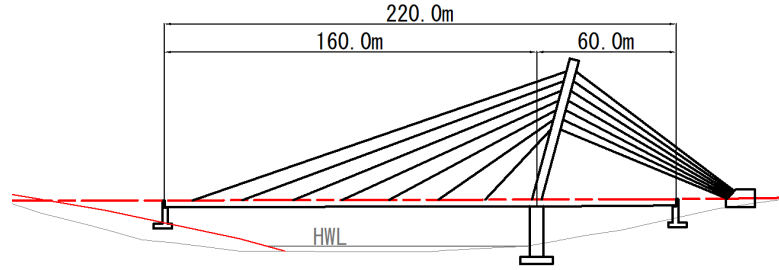
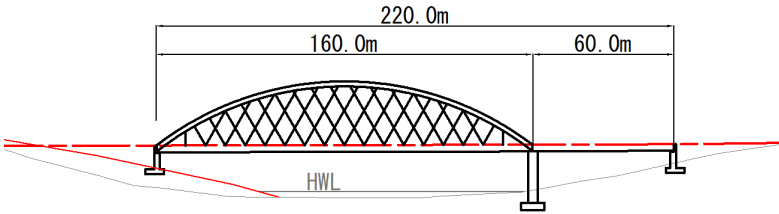
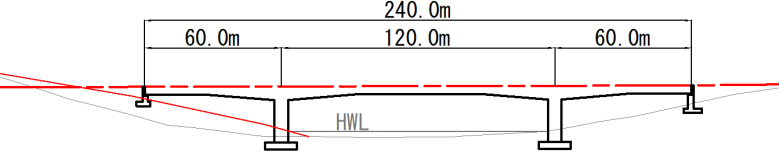
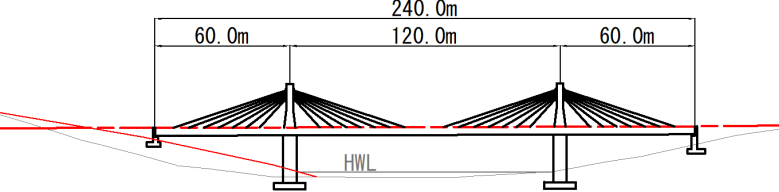


Source: Japan Bridge Association

**Construction of Steel Arch using
Temporary Cable Crane**

Table 4.4.4 Side View of Bridge Options

Side View	Remarks
<p data-bbox="188 264 630 293">【Cable-stayed Bridge – Current Design】</p> 	<p data-bbox="1153 389 1417 450">Current design in the motif of Adungu harp.</p>
<p data-bbox="188 582 520 611">【Alt-1 – Cable-stayed Bridge】</p> 	<p data-bbox="1153 591 1417 880">An alternative for the current design. The bridge length will become slightly longer than the original one due to the conditions for “Alt-1” route option. Piers are not placed inside the river course.</p>
<p data-bbox="188 900 496 929">【Alt-1 – Steel Arch Bridge】</p> 	<p data-bbox="1153 931 1417 1077">An option with arch alternative to the above cable-stayed. Piers are not placed inside the river course.</p>
<p data-bbox="188 1117 799 1146">【Alt-1 – Continuous Concrete Box Rigid Frame Bridge】</p> 	<p data-bbox="1153 1113 1417 1346">The road profile is raised by adjusting to the topography to provide two intermediate piers. Piers are placed slightly inside the river flow.</p>
<p data-bbox="188 1350 507 1379">【Alt-1 – Extradosed Bridge】</p> 	<p data-bbox="1153 1350 1417 1637">Improve the above concrete box structure to extradosed. Structural depth of the girder is lower than the above option, which contributes to improving the appearance of the bridge.</p>
<p data-bbox="188 1646 520 1675">【Alt-2 – Cable-stayed Bridge】</p> 	<p data-bbox="1153 1646 1417 1998">An option with cable-stayed bridge for Alt-2 route. Piers are not placed inside the river course. The side span was determined to be 110m from an example. Additional pier was provided at the side span for a provision of negative reaction.</p>

Side View	Remarks
<p>【Alt-2 – Steel Arch Bridge】</p> 	<p>An option with arch alternative to the above cable-stayed. A steel girder bridge is recommended for the side spans.</p>
<p>【Alt-2 – Extradosed Bridge】</p> 	<p>An option of extradosed bridge for Alt-2 route. Piers are not placed inside the river course.</p>
<p>【Alt-3 – Cable-stayed Bridge】</p> 	<p>An alternative for the current design. The bridge length will become slightly longer than the original one due to the conditions for “Alt-3” route option. Piers are not placed inside the river course.</p>
<p>【Alt-3 – Steel Arch Bridge】</p> 	<p>An option with arch alternative to the above cable-stayed. Piers are not placed inside the river course.</p>
<p>【Alt-3 – Continuous Concrete Box Rigid Frame Bridge】</p> 	<p>The road profile is raised by adjusting to the topography to provide two intermediate piers. Piers are placed slightly inside the river flow.</p>
<p>【Alt-3 – Extradosed Bridge】</p> 	<p>Improve the above concrete box structure to extradosed. Structural depth of the girder is lower than the above option, which contributes to improving the appearance of the bridge.</p>

Source: JST

4.4.3 Rough Estimation of Construction Cost

Based on the combination of road alignment alternatives and bridge structure alternatives, finally seven alternative plans were established. The seven kinds of plans were examined from several points of view.

As far as cost of each plan is concerned, roughly estimated construction costs for each plan are summarized in Table 4.4.5. The costs were estimated as one of the criteria for the comparative study of alternatives. The estimation was done considering unit costs adopted by the current detailed design, Kampala Flyover and actual construction costs of similar bridges. Further cost survey and analysis are required to estimate construction cost more accurately.

Table 4.4.5 Estimated Cost of Construction for Each Alternative Bridge Type

Options	Bridge		Consultant Service (8%)	Contingency Cost (10%)	Total	Road		
	Length	Cost				Length	Cost	
	(m)	(USDm)				(m)	(USDm)	
Alt -1	Cable-stayed	220	39	3.1	4.2	47	2,080	6.8
	Steel Arch	220	43	3.4	4.6	51	2,080	6.8
	Concrete Box	280	33	2.6	3.6	39	2,020	6.6
	Extradosed	280	41	3.3	4.4	48	2,020	6.6
Alt -2	Cable-stayed	300	50	4	5.4	59	1,800	5.9
	Steel Arch	290	58	4.7	6.3	69	1,810	5.9
	Extradosed	320	41	3.3	4.5	49	1,780	5.8
Alt -3	Cable-stayed	220	39	3.1	4.2	46	1,980	6.4
	Steel Arch	220	42	3.4	4.6	50	1,980	6.4
	Concrete Box	240	28	2.2	3.0	33	1,960	6.4
	Extradosed	240	34	2.7	3.7	40	1,960	6.4
Current DD (Cable-stayed)	208	45	3.6	9.7	58	2,300	6.1	

*: 20% from Cost estimated of current Detailed Design

Source: JST

4.5 Natural/ Social Environmental Considerations for Alternatives

A total of 3 alternatives were initially considered for the new Karuma Bridge as their routes and technical examinations were explained in Section 4.3. In this section, findings on environmental and social considerations at each alternative are explained.

4.5.1 Natural Environmental Consideration

All alternatives are located inside Karuma Wildlife Reserve. Therefore, impacts to the ecosystem might occur regardless of route option. Location of all alternatives is quite close (i.e. distance among 3 alternatives are 200m in maximum) to each other and all alternatives are located at the entrance of Karuma Wildlife Reserve. It is assumed that impacts on ecosystem of all alternatives might not be so much different based on this situation, and extent of possible impacts to ecosystem might depend on extent of land reclamation in Karuma Wildlife Reserve. Accordingly, impact at each alternative was examined based on extent of land reclamation (i.e. volume of embankment and excavation) and size of the isolated area (i.e. the area remained due to construction of the bridge).

The current design is located the farthest from the existing road among all alternatives. In other words, the isolated area is the largest for the current design among all alternatives. As for the extent of land reclamation, the assumed volume of embankment and excavation is the second largest among all alternatives. Alternative 1 is located the second farthest from the existing road among all alternatives (i.e. located between the current design and Alternative 2). As for the extent of land reclamation, the assumed volume of embankment and excavation is same as the current design.

Alternative 2 is located the nearest from the existing road, meaning the isolated area is smallest among all alternatives. As for the extent of land reclamation, the assumed volume of embankment and excavation is the smallest among all alternatives.

Alternative 3 is located slightly farer from the existing road compared with Alternative 2. It means that the assumed size of isolated area is larger than Alternative 2. As for extent of land reclamation, the assumed volume of embankment and excavation is the 2nd smallest among all alternatives.

Based on the above preliminary examination, Alternative 2 is considered posing less environmental impact than the other 3 alternatives only from the currently available information.

4.5.2 Social Environmental Consideration

There is no difference among 3 alternatives due to absence of residential area or economic activities along all the alternatives.

4.5.3 Concerns for Implementing the Project

(1) Update ESIS

As explained in 4.2.3, updating or renewing ESIS is necessary in case of significant change of the project design (i.e. impact assessed in ESIS is significantly changed), or the project is not implemented within 5 years. Modification of alignment from the current design to Alternative 1 or 2 may not be considered significant change. In addition, possible environmental impact may not be negatively increased even though the bridge type is changed from the current design. Under this situation, milestone to renew ESIS or just extension of the current ESIS approval depends on the schedule of project implementation though consultation with NEMA on ESIS update is important when the project design is fixed.

(2) Consultation with Relevant Authorities

According to an interview with officers of UWA, their concern was how flora and fauna in the isolated area was handled. All alternatives are located at the entrance area of Karuma Wildlife Reserve, and accordingly, significant impact to the isolated area might not occur. It was confirmed

with UNRA that sufficient consultation with concerned authorities would be held in the process of project cycle. Thus, sufficient consultation between UNRA and UWA is considered to be held to implement appropriate measures.

(3) Additional Explanation of Items Not Described in the Current ESIS

As the Table 4.2.5 shows, there were some items which were required in JICA Guidelines to explain but not described in the original/updated EIA. Additional explanation on those items as mentioned in the Table 4.5.1 Description to be added in the EIA Report are necessary to meet the requirements in JICA Guidelines.

Table 4.5.1 Description to be added in the EIA Report

JICA Guidelines	Need to Add Explanation
1. Project Proponent	None
2. Baseline data	<ul style="list-style-type: none"> ➤ Need to add explanation of a reason not to conduct water quality measurement. If it was explained in the scoping result, need to add the scoping result as mentioned in No. 5 below. ➤ Need to show the locations where vulnerable flora and fauna species were observed. ➤ Need to add explanation of the location where the pottery was excavated. ➤ Need to add explanation of the location where customary land was located inside the project area or not.
3. Policy, legal and institutional framework	<ul style="list-style-type: none"> ➤ Need to add relevant regulations on information disclosure. ➤ Need to add explanation below: <ul style="list-style-type: none"> - Responsibility of relevant departments in UNRA to implement environmental management and monitoring plan at each project phase - Procedure of environmental management and monitoring at each project phase. For example at the project phase, the contractor prepare his own environmental management plan, and it will be approved by UNRA with technical support from the supervision consultant. Then, approved environmental management plan will be submitted to NEMA. Such procedure shall be explained at each project phase.
4. Analysis of alternatives	None
5. Scoping and TOR for field survey	➤ Need to add the result of scoping.
6. Impact Assessment	➤ Need to add quantitative examination of the items selected through scoping.
7. Environmental management and monitoring plan	<ul style="list-style-type: none"> ➤ Need to add provisional monitoring parameters, frequency, location at each project phase including the operation phase. ➤ Need to add institutional procedure for preparation and submission of the monitoring report at each project phase. For example, the contractor will conduct monitoring and prepare monitoring report at the construction phase, but these activities will be done by the road management responsible agency at the operation phase.
8. Stakeholder analysis and holding stakeholder meetings	➤ Need to add number of participants, invitation methods and answer from the project proponent for the raised questions/comments.

Source: JST

4.6 Traffic Demand Forecast and Evaluation of the Alternative

4.6.1 Date Analysis on the Traffic Survey

(1) Objective

The major objectives of the traffic surveys in the Project are as follows:

- ✓ To update the result of the previous survey and evaluate the number of lane

Traffic surveys have been conducted as shown in Table 4.6.1.

Table 4.6.1 Summary of Traffic Survey in Karuma

Study item	Contents	Target	Field Work
Traffic Volume Count	To capture traffic volume on weekday by counting number of vehicles	1 point (24 hr 1day)	March /2019

Source: JST

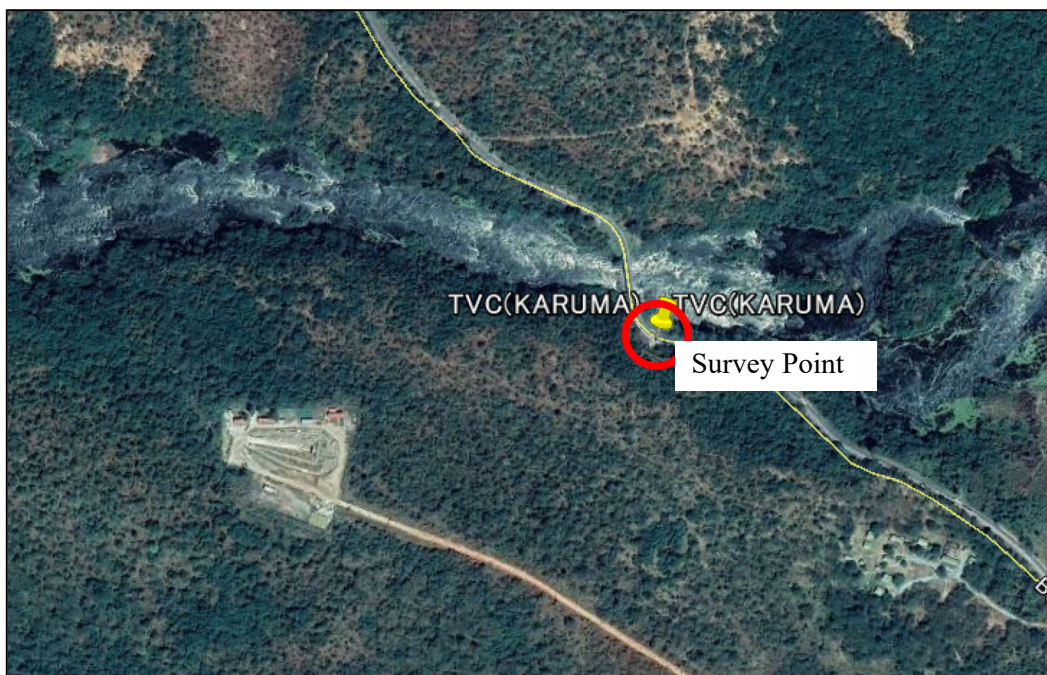


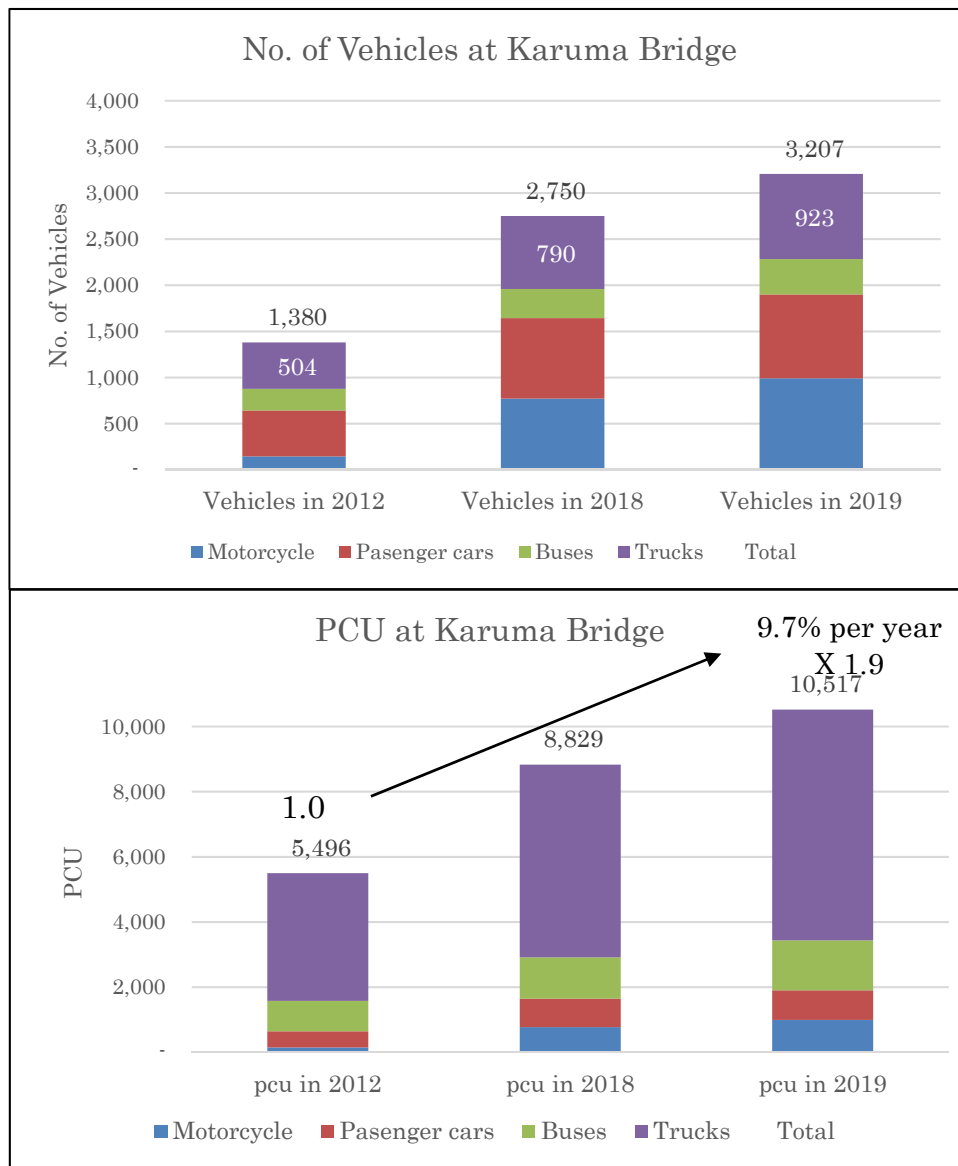
Figure 4.6.1 Traffic Survey Location Map

(2) Result of Traffic Survey in Karuma

1) Traffic Volume

PCU/day of Traffic volume in Karuma increased 1.9 times between 2012 and 2019.

Details are shown in the figure below.



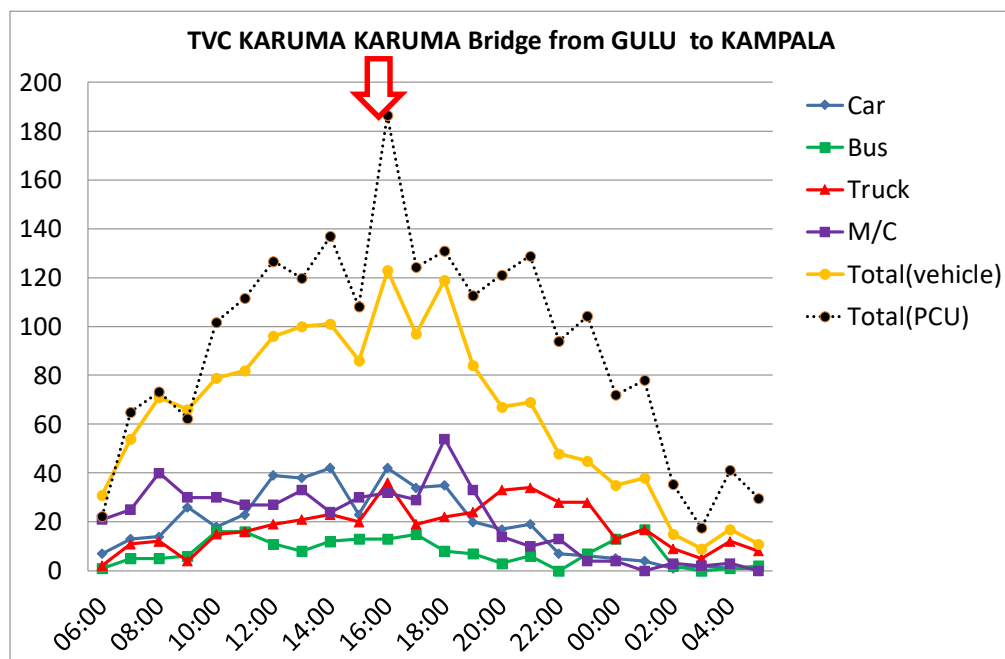
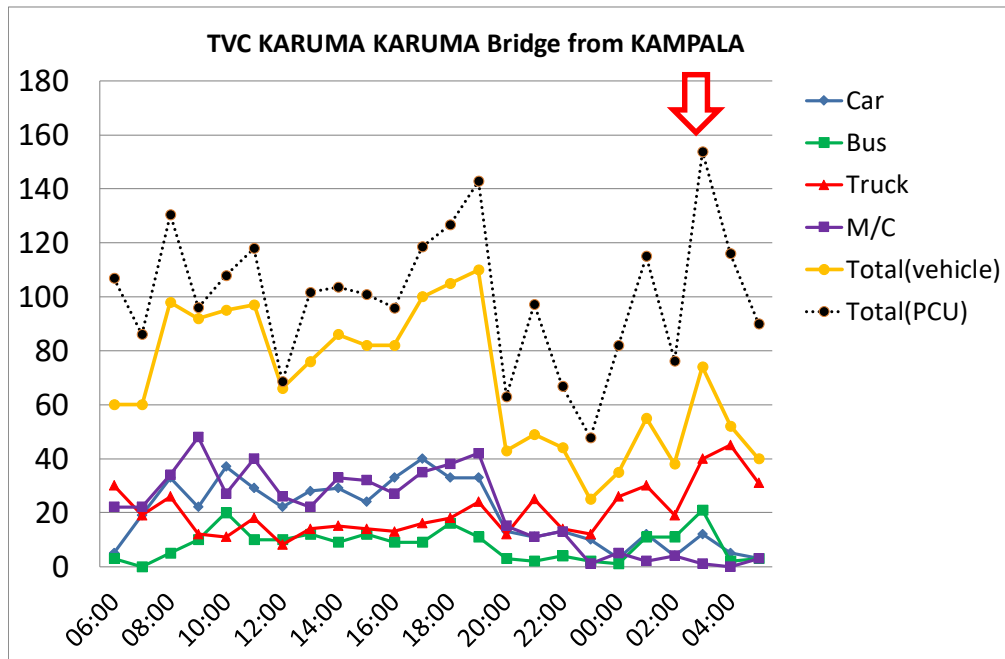
Source: (a) Detailed Design, PROME Consultant, 2014 (b) Feasibility Study, UNRA, 2018, JST

Figure 4.6.2 Result of Traffic Survey and Previous Survey

2) Hourly Variation/ Peak Ratio

Peak time from Kampala to Gulu is 03:00. It means that most trucks pass the Karuma bridge under unsafe road conditions in order to arrive at the border between Uganda and South Sudan in the morning.

- ✓ [Peak Hour (pcu):Kampala→ Gulu] 03:00-04:00, 8.5% (186pcu/hour)
- ✓ [Peak Hour (pcu) Gulu→ Kampala] 16:00-17:00, 6.1% (154pcu/hour)



Source: JST

Figure 4.6.3 Hourly Variation / Peak Ratio

3) NMT Survey

- ✓ NMT Count Survey was conducted in order to crossing NMT volume of Karuma Bridge.

Table 4.6.2 Summary of NMT volume

Type	Number of per day
Pedestrian	179
Bicycle	109
Total	288

Source: JST

- ✓ NMT Interview Survey was conducted in order to grasp a general picture to travel purpose and frequency for trips made across Karuma Bridge.

Table 4.6.3 Summary of NMT Interview

NMT Total Volume	288
Number of Samples	162
Sampling rate	56%

Source: JST

Table 4.6.4 Trip Purpose and Crossing Frequency of NMT

Purpose	School	Hospital	Market	Business	Home	Other	Total
No	5	6	23	63	29	38	164
Ratio	3.0%	3.7%	14.0%	38.4%	17.7%	23.2%	100.0%
Frequency	everyday		3days/week	1day/ week	Other		Total
No	113		11	35	5		164
Ratio	68.9%		6.7%	21.3%	3.0%		100.0%

Source: JST

4.6.2 Future Traffic Demand

(1) Growth Rate

The assumption of annual growth rates of traffic demand on New Karuma Bridge from 2019 to 2044 was set up from the analysis on the past trend data of population and GDP and the framework of related plans. The annual growth rates are as follows:

- ✓ Passenger types of vehicle such as motorcycle, minibus, bus and passenger car are assumed to increase from by 3.0% 2019 to 2044 of annual growth rate. This is because that the national trend of population growth rate between the year of 2002 and 2014 was 3.0% and the recent trend of population growth rate in the past five years were also nearly 3.0%. Therefore, it is reasonable to set a figure of 3% as the long-term growth rate until 2044.
- ✓ Freight types of vehicles such as truck and trailer are assumed to increase from 2017 to 2044 by 6.0% of annual growth rate. The Uganda vision 2040 published in 2010 set up the DGP growth of around 8% between the year of 2012 and 2040. However, the trend of GDP growth rate in the past five years was less than 6%. Master Plan on Logistics in Northern Economic Corridor published in 2017 assumed that the GDP growth rate in Uganda would be 5.7% in 2030. Therefore, it seems that 6.0% is reasonable as the GDP annual growth rate in the long run until 2044.

Table 4.6.5 Population and GDP in Uganda for the Past Five Years

Indicators	year	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018
Population ('000')		33,990	34,964	35,885	36,904	37,942
Annual Growth rate of Population (%)		2.91	2.87	2.63	2.84	2.81
GDP (billion shillings) *1		50,651	53,279	55,826	57,983	61,361
Annual Growth rate of GDP (%)		5.11	5.19	4.78	3.86	5.83
GDP per capita (UGX,'000') *2		1,490	1,524	1,556	1,571	1,617
Annual GDP per capita growth rate(%)		2.14	2.26	2.09	1.00	2.93

Source: Uganda Bureau of Statistics *1: GDP is at constant 2009/10 prices

*2: GDP per capita is at constant 2009/2010 prices

Table 4.6.6 Assumption of Future Population and GDP in Uganda

Indicators	year	2019	2024	2029	2034	2039	2044
population ('000') estimated *1		40,252	46,663	54,096	62,712	72,700	84,279
population growth ratio from 2019		1.0	1.2	1.3	1.6	1.8	2.1
GDP (billion shillings) *2		68,945	92,264	123,470	165,231	221,117	295,904
GDP growth ratio from 2019		1.0	1.3	1.8	2.4	3.2	4.3
GDP per capita (UGX,'000') *3		1,713	1,977	2,282	2,635	3,042	3,511
GDP per capita growth ratio from 2019		1.0	1.2	1.3	1.5	1.8	2.0

Source: JST

*1: population is estimated with 3% of annual growth rate from 2017

*2: GDP is estimated with 6% of annual growth rate from 2017

*3: GDP per capita is calculated using the above estimated figures

(2) Future Traffic Volume

Based on the growth rate set up in the previous section, the future traffic demand on the new Karuma Bridge in years 2024, 2034 and 2044 are forecast under the assumption that a new additional route between Kampala and Gulu would not be built until 2044. The future demand for the target years are 13 thousands per day in 2024, 22 thousands per day in 2034 and 37 thousands pcu per day in 2044. If the past growth trend at 9.7% of the annual growth rate between 2012 and 2019, shown in Figure 4.6.2, is applied for forecasting, the future demand would be 42 thousands pcu per day in 2034. It is then safe to assume that the demand in 2034 will be ranging between 22 and 42 thousands pcu per day.

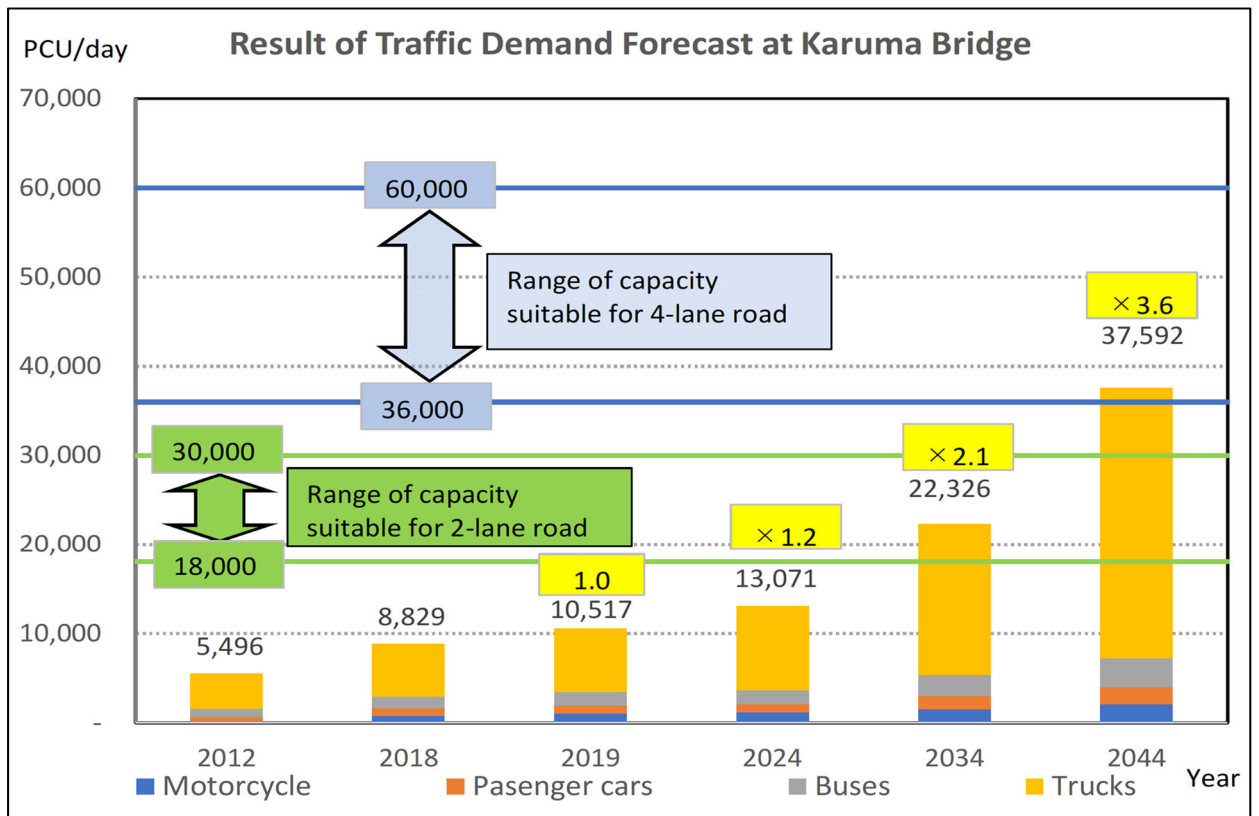
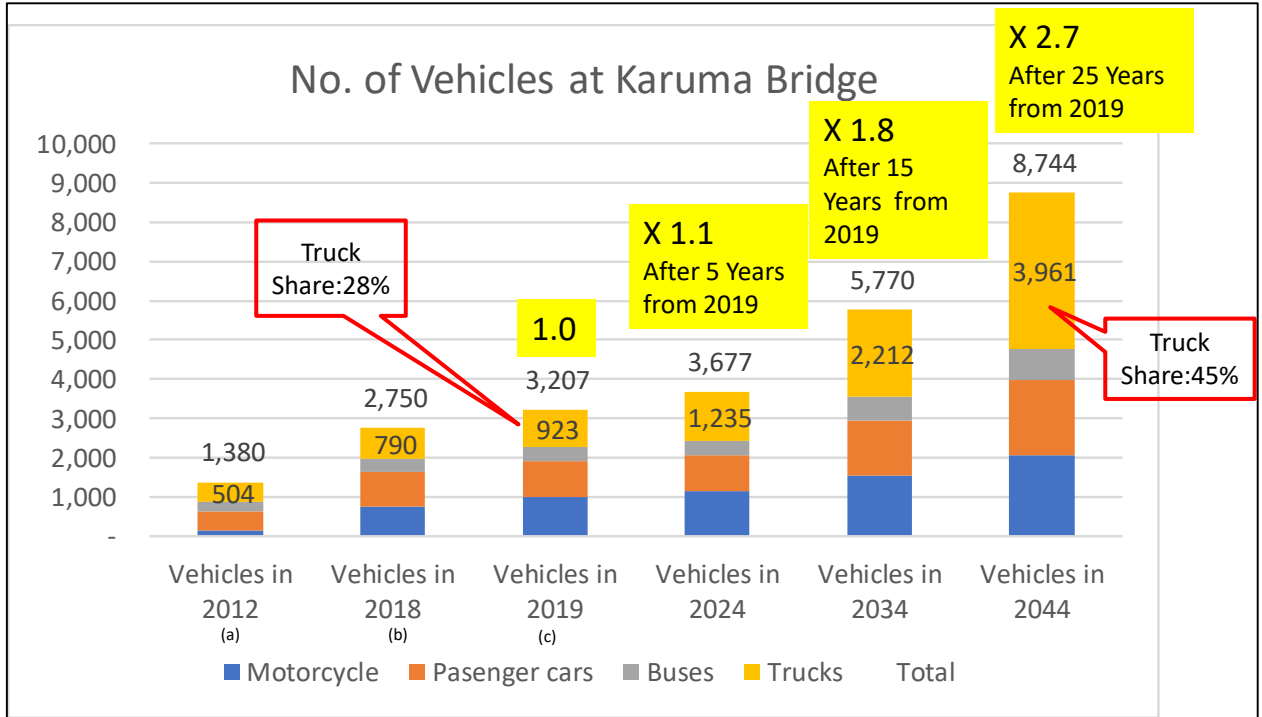
An appropriate range of capacity suitable for 4-lane road is assumed to be from 36thousands to 60thousands pcu per day. The range was calculated as a 4-lane road at minus 25% or plus 25% of the 48thousands pcu capacity per day. In case of 2-lane road, the capacity is assumed to be from 18thousands to 30thousands pcu per day. Therefore, it is estimated that the traffic demand would exceed the capacity of two lane road between 2034 and 2044.

There are two options for the number of lanes on the Karuma Bridge, which are *two* or *four*. If a two-lane option is selected, the project cost would be reduced compared to a four-lane option. It could also be easier to call for funds from donors. It would be completed more urgently than the other, and as a result, traffic accidents would be reduced at an earlier stage. Nevertheless, the risk for the two-lane option is the lack of capacity around the year of 2034, approximately 10 years after the provision. In this case, it is necessary to build an additional bridge over the Nile River the near site of the New Kaluma Bridge.

On the other hand, a four-lane option is said to be a reasonable one because it could provide sufficient road capacity in the long run and safer driving conditions than the two-lane option, specifically in that truck lane can be designated separately from lanes for passenger cars and motorcycles. Nevertheless, it would have several issues related to construction costs and maintenance, longer period of construction and greater difficulty to call for funding compared to the two-lane option.

Here, JICA study team assumed a four-lane option to be a better option. This is because the main objectives of the project are to alleviate the risk of traffic accidents and deal appropriately with the growing traffic demand in the long run at the same time. If the lack of capacity emerges, it will lead to additional risk of traffic accidents caused by congestion. Furthermore, the benefits of the project would spread to a wider area beyond the boundaries of South Sudan, DRC and Ethiopia as the New Karuma Bridge has a key role to deliver resources and goods to the wider area. Under uncertain assumptions for traffic demand forecast, it is a tentative suggestion for the issue on the number of lane.

The final decision about the number of lane will be done through the discussion among stakeholders in the following stage after this Data Collection Survey.



Source: JST

Figure 4.6.4 Future Traffic Volume

(3) Confirmation of Road Capacity

In order to alleviate traffic congestion, traffic volume has to fall below road capacity. Hourly road capacity by the Highway Capacity Manual, US Transport Research Board, is shown in Table 4.6.7 Capacity of Project Road.

Table 4.6.7 Capacity of Project Road

Design Speed (km/h)	Number of Lanes	Capacity
70	4	6,600 pcu/hour

Source: Highway Capacity Manual 2000 (US Transport Research Board)

According to traffic count survey in 2019 peak hour ratio (peak hour traffic volume/24 hour volume) on The Karuma Bridge was 8.5%. Based on the future demand forecast, daily traffic was converted to peak hour traffic. Table 4.6.8 shows V/C ratio (Volume Capacity Ratio) in 2024, 2034 and 2044. As a result, road capacity exceeds traffic volume in each year.

Table 4.6.8 V/C Ratio of New Karuma Bridge

Number of lane		4
Capacity		6,600 pcu/hour
Peak Ratio		8.5%
2024		
Traffic Volume	PCU/ day	13,100
	PCU/ hour	1,100
V/C Ratio		0.18
2034		
Traffic Volume (One Direction)		22,300
		1,900
V/C Ratio		0.29
2044		
Traffic Volume (One Direction)		37,600
		3,200
V/C Ratio		0.48

Source: JST

4.6.3 Evaluation of the Alternative

Above-mentioned bridge options were compared and evaluated relatively for each evaluation items. Evaluation items were established as follows:

- **Safety:** The most important requirement for new Karuma bridge project is safety. There are several major problems in traffic safety around the existing bridge which has narrow width of carriageway and sidewalk on the old bridge, sharp gradient of the access road to the bridge with curve alignment and the bad drivability including visibility. The problems would lead to serious traffic accidents.
- **Aesthetics:** Ugandan side considers that this bridge will be an important touristic resource. Hence, an appearance and aesthetic aspect of the bridge is one of the most important items for evaluation.
- **Environmental impact:** Natural environmental impact to the Murchison Falls National Park shall be minimized.
- **Constructability:** A rapid flow of the river, rock outcrops and complicated topography which affect constructability of the bridge shall be fully considered in the bridge planning.
- **Maintainability:** It is important to mitigate maintenance works in the design.
- **Construction cost:** It is important not only for the feasibility of the project. The amount itself may affect financing opportunities.

Score for criteria is given by comparative manner as shown in Table 4.6.9.

Table 4.6.9 Score for Criteria

Evaluation Category / Item	Criteria		
	Worse : 1	Middle: 2	Better: 3
1. Safety			
Horizontal alignment (Minimum radius)	$X < 300\text{m}$	$300\text{m} \leq X < 500\text{m}$	$500\text{m} \leq X$
Vertical alignment (Maximum Gradient)	$X \geq 5.0\%$	$4.0\% < X < 5.0\%$	$X \leq 4.0\%$
2. Aesthetics			
Monumental Structure	Common	Moderate	Monumental
Harmony with surroundings	Unharmonized	Moderate	Harmonized
3. Environment			
Affected area enclosed by existing and new roads	$X \geq 200,000 \text{ m}^2$	$100,000 \text{ m}^2 < X < 200,000 \text{ m}^2$	$X \leq 100,000 \text{ m}^2$
4. Constructability			
Special technology	Special Technology	International firm can implement	Conventional
Works in the river	Need cofferdam	Risk of necessity of cofferdam	No need cofferdam
5. Maintainability*			
Steel/Cable	Steel repainting/bolt	Outer cable	All concrete
6. Cost			
Construction Cost of bridge (million USD)	$X \geq 50$	$40 < X < 50$	$X \leq 40$

* Concrete bridges also require appropriate maintenance works

Note: As a relative comparison, 1 means worse, 2 mean average, 3 means better.

As a result, the extradosed bridge of Alternatives 2 & 3 were more highly evaluated for the project among all alternatives. The result of the evaluation is shown as follows:

Table 4.6.10 Comparison of Bridge Options

	Current	Alternative-1				Alternative-2			Alternative-3			
		Cable-stayed	Arch	Conc Box	Extra-dosed	Cable-stayed	Arch	Extra-dosed	Cable-stayed	Arch	Conc Box	Extra-dosed
Length (m)	208	220	220	280	300	300	320	220	220	240	240	240
Safety	1	2	2	2	3	3	3	2	2	2	2	2
	1	3	3	3	3	3	3	3	3	3	3	3
Aesthetics	3	3	2	3	3	2	3	3	2	1	3	3
	1	1	2	3	1	2	3	1	2	2	2	3
Environment	1	1	1	1	3	3	3	2	2	2	2	2
	2	2	1	2	2	1	2	2	1	3	2	2
Constructability	3	3	3	1	3	3	2	3	3	2	2	2
	2	2	2	3	2	2	3	2	2	3	3	3
Maintainability	1	2	1	2	1	1	2	2	1	3	2	3
Cost	1	2	1	2	1	1	2	2	1	3	3	3
Overall Evaluation	C	B	C	B	B	B	A	B	B	B	B	A

Note : As a relative comparison, 1 and C means worse, 2 and B mean average, 3 and A means better.

Overall evaluation is made on the basis of the average and standard deviation.

Source: JST

4.7 Recommendation for New Karuma Bridge Project

4.7.1 Reference opinions from experts on Scenarios and Issues for the project

In examining the scenario and future issues of the project, the JICA Study Team interviewed experts on transportation planning and logistics planning who are familiar with transport and logistics conditions in Africa, and obtained helpful comments. The members of the expert are:

- Professor Tetsuro Hyodo, Doctor of Engineering, Department of Logistics & Information Engineering, Tokyo University of Marine Science and Technology
- Professor Shinya Hanaoka, Doctor of Information Science, Department of International Development Engineering, Tokyo Institute of Technology
- Mr. Masakazu Oide, Senior, Nittsu Research Institute and Consulting, Inc.

The key comments from the experts are summarised below as recommendations for the next phase:

- Safe rest facilities and places for long distance drivers are required at regular intervals. It would be a good idea to have a truck rest facility near the Karuma Bridge. In order to improve truck transportation, the development of new truck station called “connect area” are put in practice in Japan. The connect area means the area utilizing a smart interchange as the site for changing drivers or trucks. The project aims at preventing the driver dozing by the long driving and realizing the 24-hour driving operation. As a method to utilize the expressway network more efficiently where long-distance truck logistics is supported by connect areas, logistic industries expect it greatly and urgently.
- An experiment with one driver driving of three large trucks in tandem has been conducting in Japan, as an application of automatic driving technology. This is an efficient operation that responds to the driver shortage, and has a high economic effect that can be expected to reduce transportation costs. The distance between vehicles is 10m, and it is set so that the passing vehicle cannot enter between the trucks. For developing a new roadside station near the New Karuma Bridge, it is important to provide a large parking space, which is convenient for such convey operation of large trucks.
- It is worthwhile to consider establishing a truck priority lane. The truck priority lane can be effective to reduce the risk of a rear-end collision of a vehicle, contact with a pedestrian and falling off the road.
- In developing countries where truck demand is rapidly increasing, I think that a plan with four-lane on the New Karuma Bridge will not be an excessive investment. However, from the perspective of truck operation companies, it is strongly expected to ensure at least one detour when traffic is closed. Therefore, a plan of two routes with two lanes would be preferable rather than one route with four lanes.

4.7.2 Proposed Scenarios for Formulation of the Project

(1) Re-evaluation of Number of Lane on the Karuma Bridge

As presented in 4.6.2., there are two options for the number of lanes on the New Karuma Bridge; two-lane and four-lane option. The tentative candidates are shown in Table 4.7.1 including the cases of two-lane option.

As far as the construction cost of the bridge is concerned, the cost for the two-lane option would range between 23 and 35 million USD, whereas the four-lane options are from 33 to 49 million USD. As a result, the two-lane option would be lower than four-lane option by 10 to 14 million USD. Approximately 30% of construction cost could be reduced by the two-lane option. The reduction of the cost is greatly evaluated if a new Karuma Bridge is urgently required. Nevertheless it would impose risks of congestion in the long run, compared to the four-lane options.

Table 4.7.1. Estimated Cost Considering Two Lane Options

Options		Lane Nos.	Bridge		Consultant Service (8%)	Contingency Cost (10%)	Total	Road	
			Length	Cost				Length	Cost
			(m)	(USDm)	(USDm)	(USDm)	(USDm)	(m)	(USDm)
Alt -2	Extradosed	4	320	41	3.3	4.5	49	1,780	5.8
		2		29	2.3	3.2			35
Alt -3	Concrete Box	4	240	28	2.2	3.0	33	1,960	6.4
		2		19	1.6	2.1			23
	Extradosed	4	240	34	2.7	3.7	40	1,960	6.4
		2		25	2.0	2.7			30

Source: JST

An alternative idea to deal with increasing traffic demand in the future is to implement two-phased development process. In the first phase, the New Karuma Bridge with two lanes will be constructed as an urgent short term project. Afterward, in responding to the increase of traffic demand, another route development including an additional new bridge with two lanes will be constructed for the medium/long term. This plan can be regarded as a practical one because the future traffic demand by 2034 is estimated to be within the capacity of two-lane trunk road.

Moreover, from the long term view, regarding traffic accident and disaster response, let's compare "one four-lane route" with "two two-lane routes". Developing "two two-lane routes" creates flexibility in traffic in uncertain circumstance, for example, when one route is closed due to a major traffic accident or natural disaster, another route works. Of course, another route shall be developed near to the first one. On the other hand, "one four-lane route" can be seen as an efficient transport project enable to deal with the long term traffic demand. Nevertheless, if something happens to close the traffic on the route, no route exist beside detour routes with an additional distance of more than 300km under the current situation. In this regard, "one-route with four lanes" has the disadvantage to the failsafe function.

Based on the above discussions it is necessary to think about which is better, "one four-lane route" or "two two-lane routes" in the next stage, in addition to the discussion on how to utilize the existing bridge.

(2) Financial arrangement

To implement such the New Karuma Bridge project, JICA assistance through ODA loan or Grant Aid is effective and important. There are two scenarios in terms of the financial arrangement as follows.

First, if emphasis is placed on dealing with aging of the existing Karuma Bridge and urgently dealing with traffic accidents, selecting a low-cost structural bridge with two-lane which will relatively shorten the construction period is desirable. As a result, depending on the cost, there is the possibility of Grant Aid.

Second, as an important bridge over the River Nile, emphasizing landmark design, responding to the long-term increase in demand for trucks, and widening the New Karma Bridge in advance of the construction of trunk roads in the north-south direction. If emphasis is placed on such policies, it will be acceptable to select a relatively expensive structure type with four lane and with landmark design, and a relatively long construction period until the project is completed. As a result of this case, the possibility of ODA loan becomes higher.

(3) Counterpart fund

If there is budget constraint, the project may be divided into phases. Since the main bridge construction cannot be divided into different phases, road construction works might be one of the phases of the project, and in such case, the Government of Uganda may be requested to bear the cost for the phases which will not be covered by the ODA.

(4) Points to be noted for requesting financial assistance from the Japanese government

In order to adopt this project, the purpose of the project is clarified, and the alignment and bridge structure are selected in line with the purpose, and it is necessary to revise the EIA report and to approve it by NEMA to meet the level required by JICA.



Source: JST

Figure 4.7.1 3D Image of New Karuma Bridge

4.7.3 Remaining Issue

(1) Environmental and Social Issues

[Major Findings on the Current ESIS Report]

Need to include scoping results, to clarify the monitoring and reporting structure at pre-construction, construction and operation phases respectively, to add explanation of timing, methods of announcement, comments raised by the participants and answers from UNRA.

[Environmental Concerns for Implement the Project]

- Due consultation with the concerned authorities especially UWA to implement the project in the protected area
- Need supplementary explanation of the items not described in the current ESIS

(2) Topographic survey

Topographic survey for Alternative-2 and Alternative-3 routes is necessary to carry out bridge planning more precisely.

(3) Further cost survey and analysis

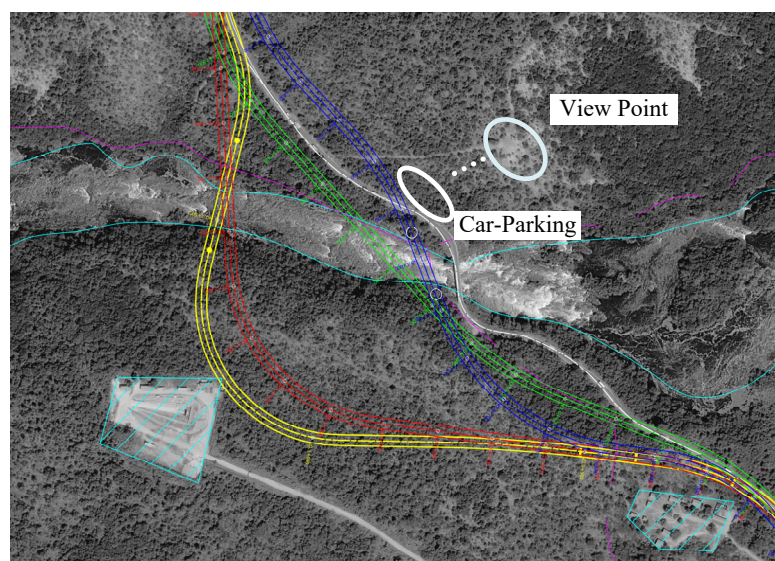
Further cost survey and analysis are required to estimate construction cost more accurately.

(4) Viewing Spot

In order to enhance the touristic value of the site, it is recommended to provide sightseeing decks for viewing landscapes around the new Karuma Bridge as presented in the current detailed design drawings.

(5) Roadside Station in the Karuma area

Karuma bridge has a great demand of long-distance truck, long distance bus and business drivers between Kampala and Gulu or South Sudan. In fact, there are many traffic in midnight crossing the Karuma bridge. Karuma town would be a candidate for rest place for drivers of such vehicles. It is expected that such Roadside Station will be implemented by Northern Corridor Transit & Transport Coordination Authority. It is expected to provide petro station, car workshops, toilets, shops, restaurants, free parking space, information of transport, tourist spots, travel route, and so on. The location of roadside station shall be outside the national park and near towns.



Source: JST

Figure 4.7.2 Location of Roadside Station and View Point

ANNEX

1. LIST OF MEETING/ PARTIES	A 1-1
2. TRAFFIC SURVEY	A 2-1
3. AXEL LOAD SURVEY	A 3-1
4. TRAFFI DEMAND FORECAST	A 4-1
5. PHOTO	A 5-1

ANNEX-1 LIST OF MEETING/ PARTIES

(1) LIST OF MEETING

No	Date	Place	Purpose	Organization
1	02/14	JICA Head Quarters	Presentation of the Summary of the Inception Report	JICA
2	02/27	UNRA	Presentation of the Summary of the Inception Report	UNRA
3	02/27	JICA Uganda	Presentation of the Summary of the Inception Report	JICA/
4	02/28	MoWT	Kick-off Meeting with Stakeholders	MoWT, UNRA, KCCA
5	03/01	UEGCL	Data Collection about Karuma Bridge	UEGCL
6	03/01	AfDB	Data Collection	AfDB
7	03/01	MoFPED	Data Collection	MoFPED
8	03/01	KCCA	Data Collection	KCCA
9	03/02	UEGCL	Data Collection	UEGCL, Uganda Wildlife Authority
10	03/05	KCCA	Data Collection	KCCA
11	03/05	URC	Data Collection	TRC
12	03/05	UNRA	Data Collection	UNRA
13	03/05	UWA	Data Collection	UWA
14	03/05	NEMA	Data Collection	NEMA
15	03/06	SGR	Data Collection	SGR Project Management Unit
16	03/06	UNRA	Data Collection	UNRA
17	03/07	KCCA	Data Collection	KCCA
18	03/07	World Bank	Data Collection	World Bank
19	03/11	MoFPED	Data Collection	MoFPED
20	03/12	Uganda Police Force	Data Collection	Uganda Police Force
21	03/12	UNRA	Explanation of the Progress of the Study	UNRA
22	03/14	MoWT	1 st Stakeholders Meeting	MoWT, UNRA, KCCA etc.
23	03/15	JICA Uganda	Explanation of the Progress of the Study	JICA Uganda
24	03/15	Japanese Embassy	Explanation of the Progress of the Study	Japanese Embassy
25	03/20	JICA Head Quarters	Explanation of the Progress of the Study	JICA Head Quarters
26	04/17	JICA Head Quarters	Explanation of the Draft Final Report	JICA Head Quarters
27	04/23	UNRA	Explanation of the Draft Final Report	UNRA
28	04/25	MoWT	2 nd Stakeholders Meeting	MoWT, UNRA, KCCA etc.
29	04/26	JICA Uganda	Explanation of the Draft Final Report	JICA Uganda
30	04/29	Japanese Embassy	Explanation of the Draft Final Report	Japanese Embassy
31	05/9	JICA Head Quarters	Explanation of the result of 2 nd Stakeholders Meeting	JICA Head Quarters
32	05/31	JICA Head Quarters	Explanation of the Final Report	JICA Head Quarters

(2) LIST OF PARTIES in UGADA

NAME	POSITION
UNRA	
Isaac Wani	Director Network Planning & Engineering
Patrick Muleme	Head Design
Michael Ochola	Team Leader Bridges & Structures
Brian Emmy Karugaba	Environmental Specialist
Opige Denis	Bridges & Structures Engineer
Tibaijuka Godwin	Bridges & Structures Specialist
Lawrence Pasco	Head Bridges & Structures
Pius Emuli Wajega	Graduate Engineer
Philip Kyeyune Kazibwe	Project Formulation Engineer
Pamella Asimwe	MD Engineer
Moses Ochola	Highways Specialist
Ronald Kazibwe	Drainage Engineer
Brian E. Kanyaba	Environmental Specialist
Rodgers Opio	Graduate Engineer
Tugume Ivan	Manager Land Surveying
Jude Mubangizi	TL Highways
MoWT	
Samson Bagonza	Permanent Secretary
Robert Rwanga	Commissioner Roads and Bridges
William Kabiho	Assistant Commissioner Engineer /Urban Roads
Sadres N. Kabyanga	Assistant Commissioner Engineer /Urban Roads
Kabanda Peter C	Assistant Commissioner
Wilson Byamukama	Highways Engineer
KCCA	
Jacob Byamukama	Deputy Director Roads Management
Richard Irumba	Manager Land & Engineering Surveys
Waidhuba Anthony	Architect
Gonza Alozius	
MoFPED	
Wanyera Maris	Ag. Director – Debt & Cash Policy
Hajime Onishi	Senior Advisor – ODA Loan & Private Sector Development
Azizah Nabitato	Senior Economist
URC	
Geofrey Obara	Chief Civil Engineer
Brian Sempebwa	Senior Civil Engineer
Tukamuhabwa Jonathan	Surveyor
Ronald S. Kyobe	Principal Engineer
SGR Project Management Unit	
Daniel Kabaggoza,	Senior Civil Engineer
Lawrence Bbaale	Civil Engineer, Design review & Reconciliation
Edgar Mugarura	Civil Engineer
Uganda Police Force	
Bazil Mugisha	Commandant Police
UEGCL	
Otim Moses	Manager, Health, Safety, Environment & Social Development

Beatrice Nyanzi	SBD
Vincent Kisembo	M&E Officer
Moses Anguyo	Civil Engineer
Wilberforce Manirakiza	Civil Engineer Dam Safety
Ariho Ayebare Raymond	Civil Engineer Dam Safety
Gordon Yikii	MPIS
Enos Kalyesubula	Chief Engineer
Albert Byaruhanga	Project Manager
UETCL	
Alsen Habumugisha	Senior Surveyor
UTL	
Paul Musuto	Planning Engineer
UWA	
Buhanga Edgar	
AfDB	
Mbekeani Kennedy	Uganda Country Manager
Peter Engbo Rasmussen	Principle Country Economist
Makajuma Odongo George	
WB	
Ivan Emmanuel Mwondha	Senior Transport Specialist

ANNEX-2 TRAFFIC SURVEY

ANNEX 2. TRAFFIC SURVEY

(1) Traffic Survey in Kampala City

3 types of traffic surveys have been conducted, as shown in Table 2.1

Table 2.1 Summary of Traffic Survey in Kampala

	Study item	Contents	Target	Field Work
1	Traffic Volume Count	To capture traffic volume on weekday by counting number of vehicles	<ul style="list-style-type: none"> • 10 points (16hr 1 day) • 1 point (24hr 1 day, 16hr 2 days) 	12(Tue)-14(Thu) March /2019
2	Intersection Directional Traffic Flow Counts	To capture directional traffic flow at intersection on weekday by counting number of vehicles	• 2 places, 3 peak-2 hours (morning, noon and evening)	13(Wed)/ March /2019
3	Travel speed survey	To analyse travel speed by vehicles affected by traffic congestion on the Masaka roads during peak hours.	1 route, at 3 peak-hours (morning, noon and evening)	12(Tue)-14(Thu) March /2019

Source: JST

The traffic survey includes 12 locations in Kampala city, as described in Table 2.2. and illustrated in Figure 2.1.

Table 2.2 List of Traffic Survey Points

Traffic Volume Count	No.	Objective Road	Remarks
24hrs count (1 weekday) & 16hrs count (2 weekdays) Total 3 days (continuous days)	TVC24-1	Masaka Road Near KIBUYE JCT	Kibuye-Busega, Kampala
16hrs count (1 weekday)	TVC16-1	Queens Way	
	TVC16-2	Katwe Road	
	TVC16-3	Entebbe Road	
	TVC16-4	Masaka Road (Near the Rail Station)	
	TVC16-5	Masaka Road (Near Nalukolongo Road)	
	TVC16-6	Masaka Road (Busega JCT Eastside)	
	TVC16-7	Masaka Road (Busega JCT Westside)	
	TVC16-8	Masaka Road (Busega JCT Southside)	
	TVC16-9	Northern by-pass	
	TVC16-10	Kampala-Entebbe Highway	
Intersection Traffic Volume Counts	No.	Intersection	Remarks
Intersection traffic counts	J-1	Masaka road x Wankulukuku Road	Kibuye-Busega, Kampala
	J-2	Masaka road x Natete Road	
Travel speed survey	No.	Route	Remarks
Travel Speed	S-1	Kibuye → Busega on Masaka road	Kibuye-Busega, Kampala
	S-2	Kibuye ← Busega on Masaka road	

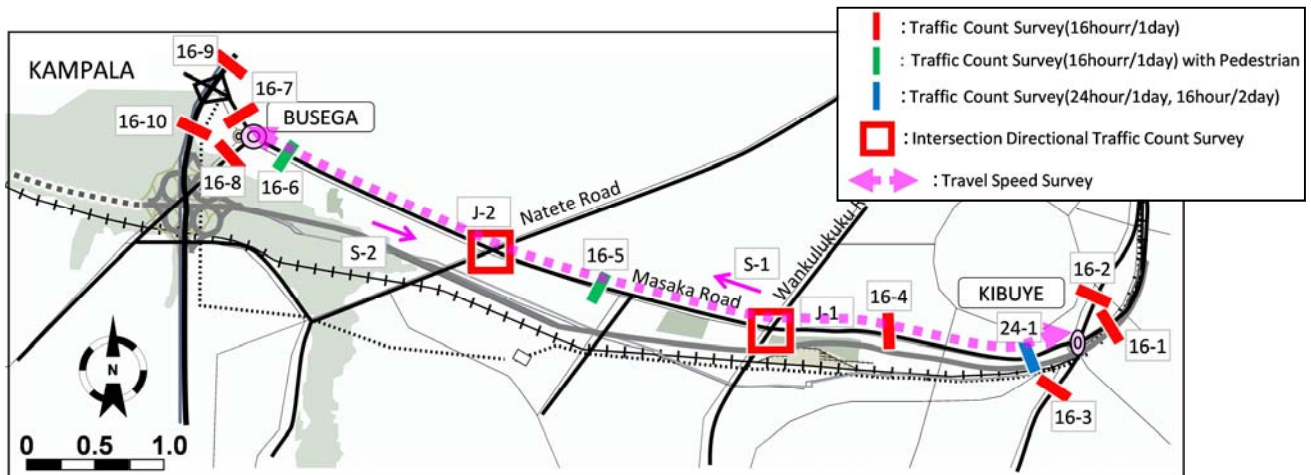


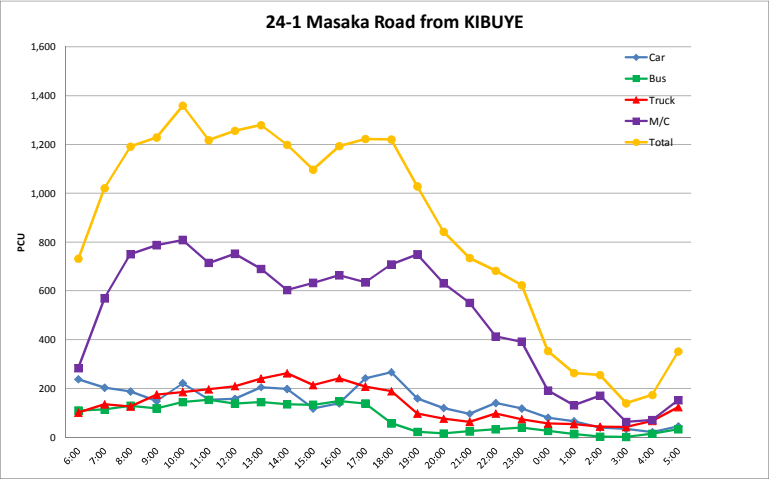
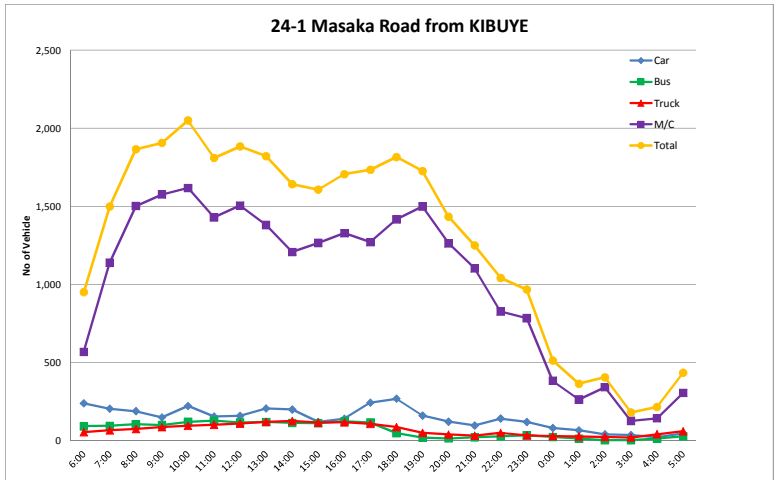
Figure 2.1 Traffic Survey Location Map

Result of Traffic Survey in Kampala City shows following pages.

Traffic Count Survey(24hrs Count)

Date: 13-Mar-19 Location No: 24-1
 Location: Masaka Road Surveyor Name: FREEDOM, SIMON, FRED, GODWIN
 Direction: From KIBUYE To BUSEGA

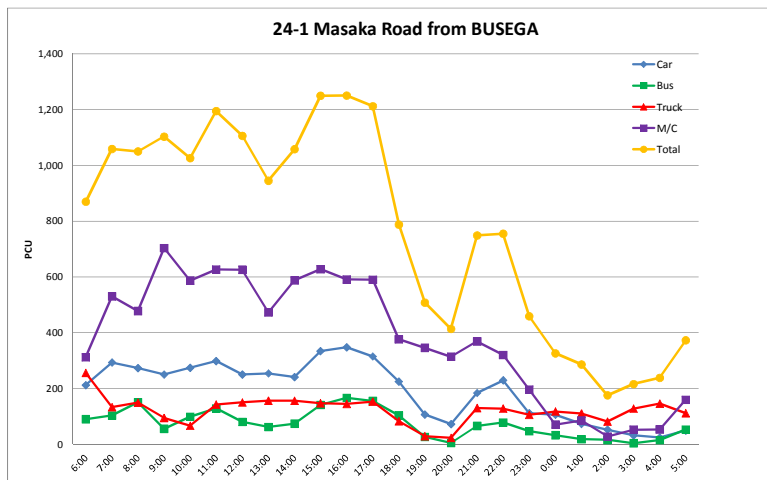
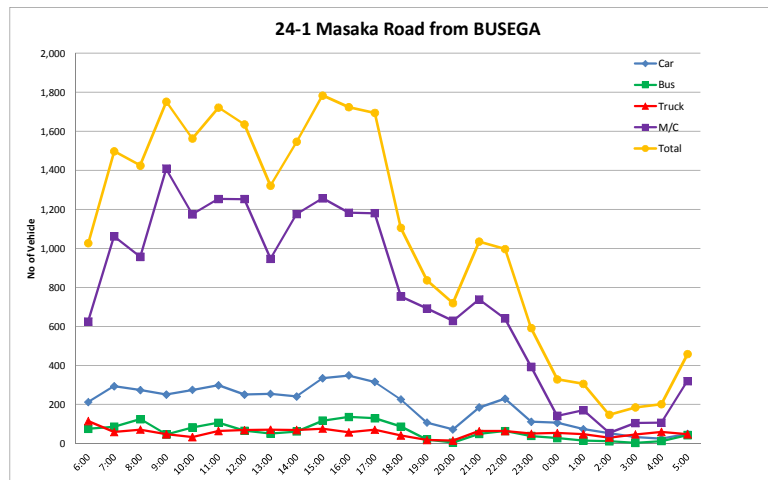
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian		
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0	0		
6:00 - 7:00	238	91	0	0	30	13	5	6	567	81		950	1,031
7:00 - 8:00	203	86	7	0	29	20	10	6	1,138	95		1,499	1,594
8:00 - 9:00	187	92	11	1	44	20	7	2	1,501	98		1,865	1,963
9:00 - 10:00	148	96	2	0	41	20	13	11	1,575	59		1,906	1,965
10:00 - 11:00	221	115	4	0	48	20	13	12	1,617	45		2,050	2,095
11:00 - 12:00	154	120	6	0	54	22	15	10	1,429	38		1,810	1,848
12:00 - 13:00	157	115	0	0	56	29	16	7	1,504	44		1,884	1,928
13:00 - 14:00	205	113	3	2	55	35	16	12	1,380	41		1,821	1,862
14:00 - 15:00	198	111	1	0	53	39	21	11	1,207	38		1,641	1,679
15:00 - 16:00	118	108	1	1	61	33	9	11	1,265	37		1,607	1,644
16:00 - 17:00	139	120	3	0	52	34	17	13	1,328	38		1,706	1,744
17:00 - 18:00	242	114	1	0	55	26	13	12	1,270	42		1,733	1,775
18:00 - 19:00	267	46	0	1	34	24	14	13	1,416	45		1,815	1,860
19:00 - 20:00	159	17	1	0	24	14	10	1	1,499	46		1,725	1,771
20:00 - 21:00	120	13	0	0	16	17	3	2	1,262	29		1,433	
21:00 - 22:00	96	19	1	0	15	8	4	4	1,102	16		1,249	
22:00 - 23:00	140	27	0	0	20	21	7	0	826	9		1,041	
23:00 - 24:00	118	33	0	0	11	14	6	2	783	5		967	
0:00 - 1:00	80	22	0	0	12	12	3	1	382	0		512	
1:00 - 2:00	65	10	1	0	10	9	2	4	262	1		363	
2:00 - 3:00	39	2	0	0	10	9	3	0	341	0		404	
3:00 - 4:00	34	1	0	0	6	10	3	0	125	3		179	182
4:00 - 5:00	21	12	0	0	23	12	3	1	142	14		214	228
5:00 - 6:00	44	27	0	0	24	23	5	7	304	18		434	452
Total (24h)	3,393	1,510	42	5	783	484	102	71	24,225	842	0	30,808	25,621



Traffic Count Survey(24hrs Count)

Date: 13-Mar-19 Location No: 24-1
 Location: Masaka Road Surveyor Name: GERALD, JULIET, SIRAJJE, SULAIT
 Direction: From BUSEGA To KIBUYE

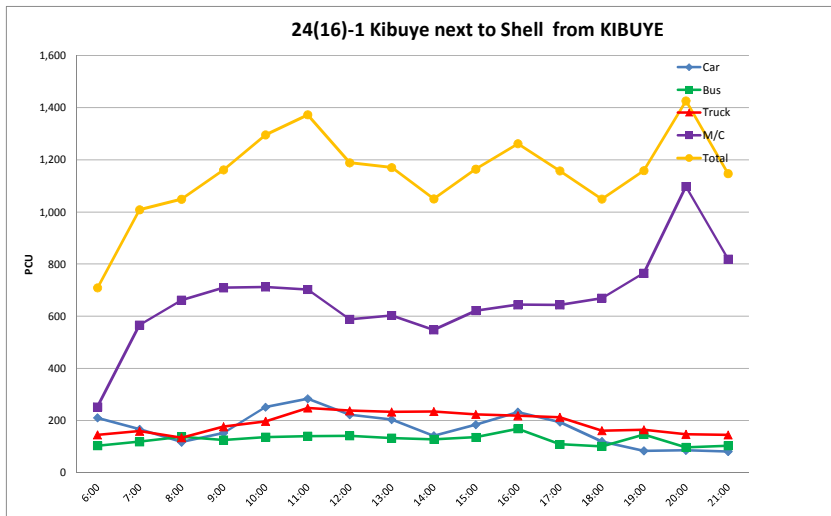
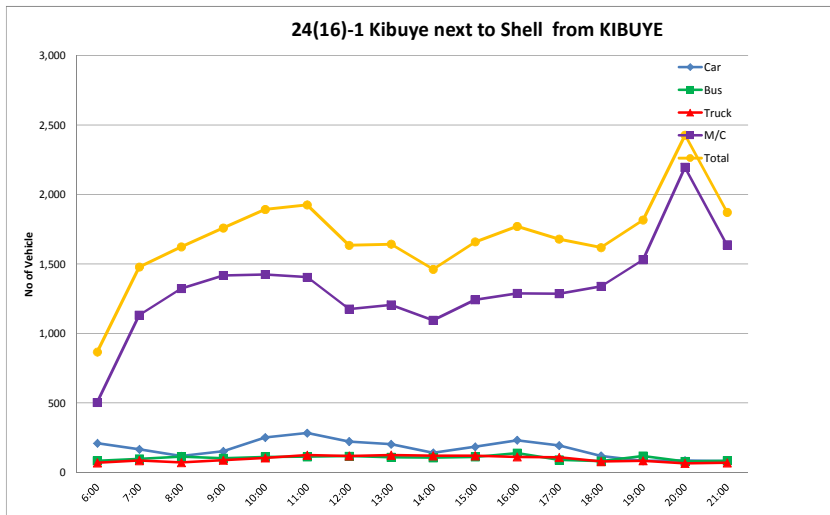
	Vehicle										NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)		
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0				
6:00 - 7:00	212	75	0	0	41	44	25	5	624	43			1,026	1,069
7:00 - 8:00	293	82	3	0	20	20	17	1	1,061	33			1,497	1,530
8:00 - 9:00	273	120	4	0	30	24	14	3	956	25			1,424	1,449
9:00 - 10:00	250	45	1	0	21	18	8	0	1,408	39			1,751	1,790
10:00 - 11:00	274	81	1	0	13	13	6	0	1,174	29			1,562	1,591
11:00 - 12:00	298	103	3	0	27	14	18	5	1,253	24			1,721	1,745
12:00 - 13:00	250	60	3	2	26	23	17	2	1,252	16			1,635	1,651
13:00 - 14:00	254	48	3	0	26	24	14	6	946	6			1,321	1,327
14:00 - 15:00	241	59	2	0	29	13	18	9	1,175	13			1,546	1,559
15:00 - 16:00	334	116	1	0	41	16	16	3	1,256	35			1,783	1,818
16:00 - 17:00	348	129	4	3	17	12	16	12	1,182	20			1,723	1,743
17:00 - 18:00	315	128	1	0	31	15	18	6	1,180	12			1,694	1,706
18:00 - 19:00	225	85	1	0	21	8	7	5	753	16			1,105	1,121
19:00 - 20:00	107	13	7	0	11	3	2	1	692	10			836	846
20:00 - 21:00	72	4	0	0	11	2	2	0	628	7				
21:00 - 22:00	184	32	13	4	29	18	10	6	738	5				
22:00 - 23:00	229	60	4	0	31	15	13	4	640	2				
23:00 - 24:00	111	35	3	0	23	12	12	3	392	1				
0:00 - 1:00	106	27	0	0	19	24	9	2	141	0				
1:00 - 2:00	73	15	0	0	13	22	7	5	170	0				
2:00 - 3:00	52	8	0	3	6	9	8	7	54	0				
3:00 - 4:00	32	2	1	0	8	13	20	5	104	2			185	187
4:00 - 5:00	24	11	0	1	17	18	18	6	106	9			210	219
5:00 - 6:00	49	39	4	0	12	23	8	4	319	47			505	552
Total (16h)	4,606	1,377	59	13	523	403	166	69	18,204	394	0		21,524	21,903



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 24(16)-1
 Location: Kibuye next to Shell Surveyor Name: FREEDOM, SIMON, FRED, GODWIN
 Direction: From KIBUYE To BUSEGA

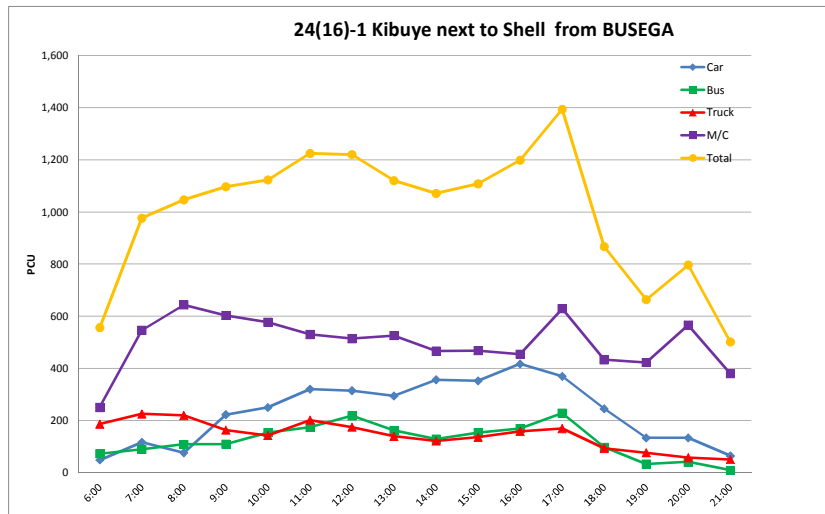
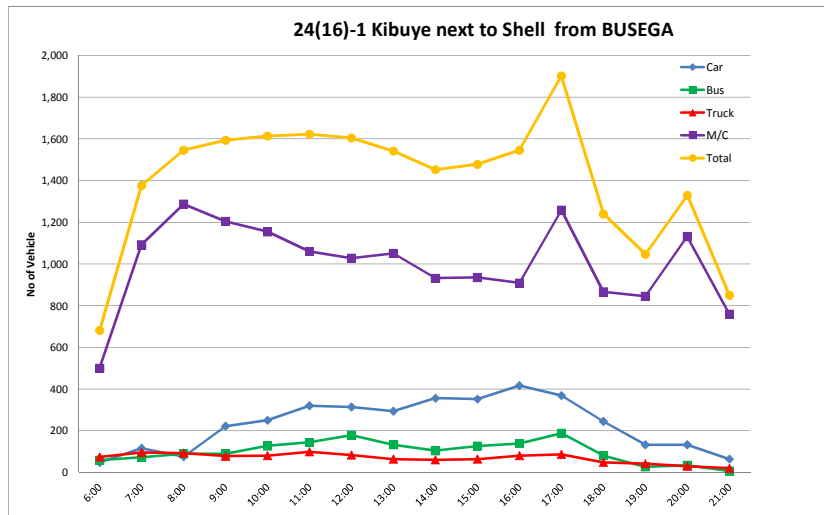
	Vehicle										NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)		
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0				
6:00 - 7:00	210	80	3	1	32	17	12	8	504	65	505	867	1,437	
7:00 - 8:00	166	93	3	1	45	26	9	5	1,131	82	534	1,479	2,095	
8:00 - 9:00	117	110	2	1	36	25	6	4	1,323	96	503	1,624	2,223	
9:00 - 10:00	152	96	5	1	40	32	12	4	1,418	41	532	1,760	2,333	
10:00 - 11:00	251	108	3	1	55	30	12	7	1,425	41	531	1,892	2,464	
11:00 - 12:00	283	100	13	0	61	37	19	8	1,405	48	493	1,926	2,467	
12:00 - 13:00	222	114	3	0	62	24	20	13	1,176	28	535	1,634	2,197	
13:00 - 14:00	203	107	1	1	64	45	6	10	1,206	41	399	1,643	2,083	
14:00 - 15:00	141	105	1	0	61	33	17	9	1,095	38	353	1,462	1,853	
15:00 - 16:00	184	109	3	0	65	34	14	7	1,243	25	361	1,659	2,045	
16:00 - 17:00	232	135	4	0	56	34	10	12	1,288	23	397	1,771	2,191	
17:00 - 18:00	194	89	1	0	48	46	9	5	1,287	47	363	1,679	2,089	
18:00 - 19:00	119	76	5	1	37	20	11	10	1,339	60	619	1,618	2,297	
19:00 - 20:00	83	112	5	2	45	17	11	11	1,531	69	1,076	1,817	2,962	
20:00 - 21:00	85	77	3	0	27	17	11	11	2,196	37	990	2,427	3,454	
21:00 - 22:00	81	80	3	1	32	17	12	8	1,638	21	592	1,893	2,506	
Total (16h)	2,723	1,591	58	10	766	454	78	64	21,205	762	8,783	27,151	36,696	



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 24(16)-1
 Location: Kibuye next to Shell Surveyor Name: GERALD, JULIET, SIRAJJE, SULAIT
 Direction: From BUSEGA To KIBUYE

	Vehicle										NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11	Type (1-9)		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian			
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0				
6:00 - 7:00	48	56	2	1	12	43	17	2	500	102	527	681	1,310	
7:00 - 8:00	116	68	4	1	28	41	20	7	1,092	118	472	1,377	1,967	
8:00 - 9:00	76	89	1	0	27	39	24	3	1,287	94	341	1,546	1,981	
9:00 - 10:00	222	83	5	1	34	25	18	1	1,205	88	350	1,594	2,032	
10:00 - 11:00	250	128	0	0	47	24	7	3	1,155	76	239	1,614	1,929	
11:00 - 12:00	320	142	2	0	46	30	20	3	1,060	58	257	1,623	1,938	
12:00 - 13:00	314	170	8	1	37	27	18	2	1,028	38	219	1,605	1,862	
13:00 - 14:00	294	129	2	2	24	25	14	1	1,051	32	288	1,542	1,862	
14:00 - 15:00	356	101	2	2	28	19	11	2	932	26	265	1,453	1,744	
15:00 - 16:00	352	125	2	0	29	16	15	4	935	26	288	1,478	1,792	
16:00 - 17:00	417	134	4	1	38	30	12	1	909	24	265	1,546	1,835	
17:00 - 18:00	369	183	3	2	44	26	11	6	1,258	35	257	1,902	2,194	
18:00 - 19:00	245	81	0	0	25	13	9	1	866	23	313	1,240	1,576	
19:00 - 20:00	133	27	0	0	22	16	3	1	845	24	177	1,047	1,248	
20:00 - 21:00	133	34	0	0	16	8	4	2	1,132	4	188	1,329	1,521	
21:00 - 22:00	64	6	1	0	5	8	5	2	759	19	122	869	1,010	
Total (16h)	3,709	1,556	36	11	462	390	59	17	16,014	787	4,568	22,446	27,801	

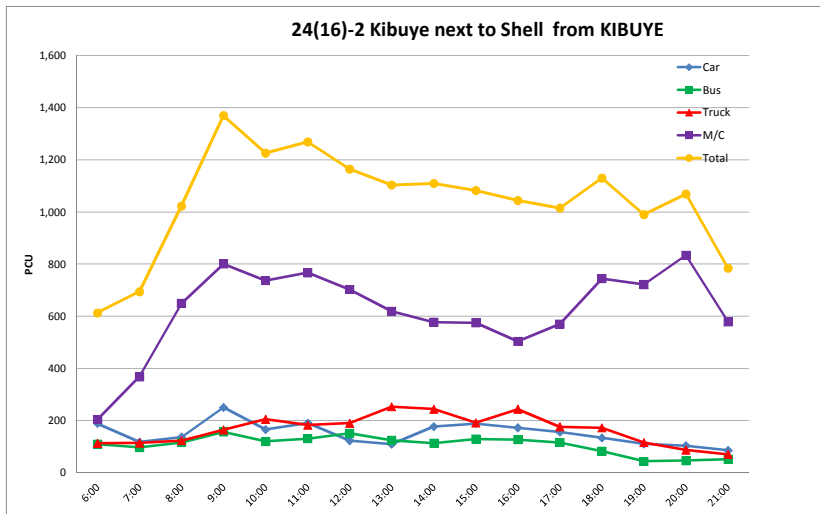
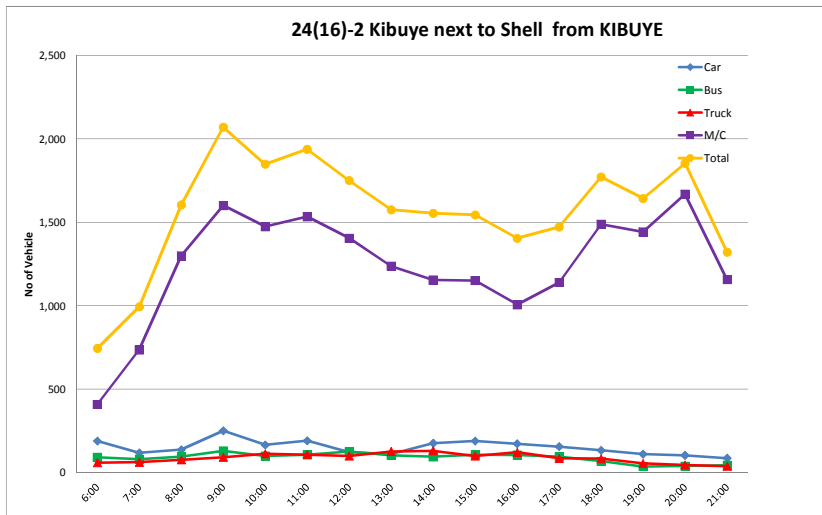


Traffic Count Survey(16hrs Count)

Date: 14-Mar-19
 Location: Kibuye next to Shell
 Direction: From KIBUYE To BUSEGA

Location No: 24(16)-2
 Surveyor Name: KASULE FRED, RUHINDA GODWIN & LUGONA SIMON

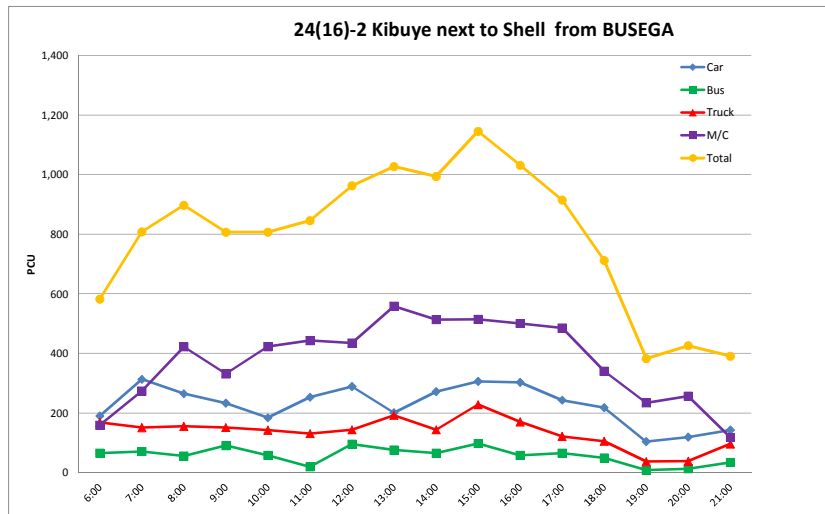
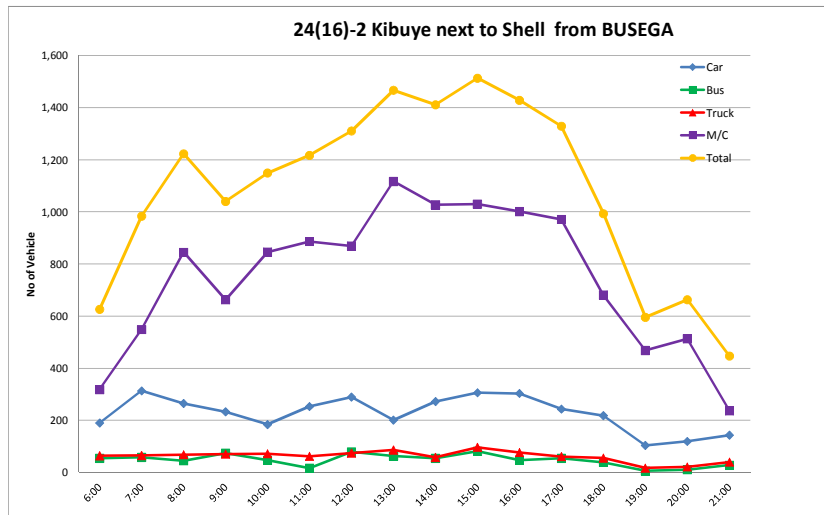
	Vehicle										NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11	Type (1-9)		
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0				
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian			
6:00 - 7:00	188	88	2	0	30	16	6	6	408	32			744	776
7:00 - 8:00	117	75	4	0	37	11	6	8	735	46			993	1,039
8:00 - 9:00	136	87	7	0	51	16	6	3	1,299	54			1,605	1,659
9:00 - 10:00	250	126	3	0	53	22	11	5	1,601	34			2,071	2,105
10:00 - 11:00	165	92	6	0	67	20	16	9	1,474	43			1,849	1,892
11:00 - 12:00	190	101	6	0	67	25	9	6	1,534	35			1,938	1,973
12:00 - 13:00	122	124	1	0	53	24	16	6	1,405	50			1,751	1,801
13:00 - 14:00	109	103	0	0	63	31	20	12	1,237	30			1,575	1,605
14:00 - 15:00	176	93	1	0	73	29	20	8	1,154	36			1,554	1,590
15:00 - 16:00	188	105	2	0	47	38	8	6	1,150	25			1,544	1,569
16:00 - 17:00	172	103	2	0	57	38	17	9	1,006	21			1,404	1,425
17:00 - 18:00	155	87	6	1	35	31	13	5	1,139	48			1,472	1,520
18:00 - 19:00	133	65	1	1	38	24	13	8	1,489	59			1,772	1,831
19:00 - 20:00	110	35	1	0	24	14	11	5	1,443	71			1,643	1,714
20:00 - 21:00	103	37	1	0	22	16	2	5	1,668	59			1,854	1,913
21:00 - 22:00	85	41	1	0	17	17	3	0	1,157	10			1,331	1,341
Total (16h)	2,399	1,362	44	2	734	372	67	38	19,899	653	0	25,100	25,753	



Traffic Count Survey(16hrs Count)

Date: 14-Mar-19 Location No: 24(16)-2
 Location: Kibuye next to Shell Surveyor Name: NELSON, BALUKU RAMANZANI & SAKU S
 Direction: From BUSEGA To KIBUYE

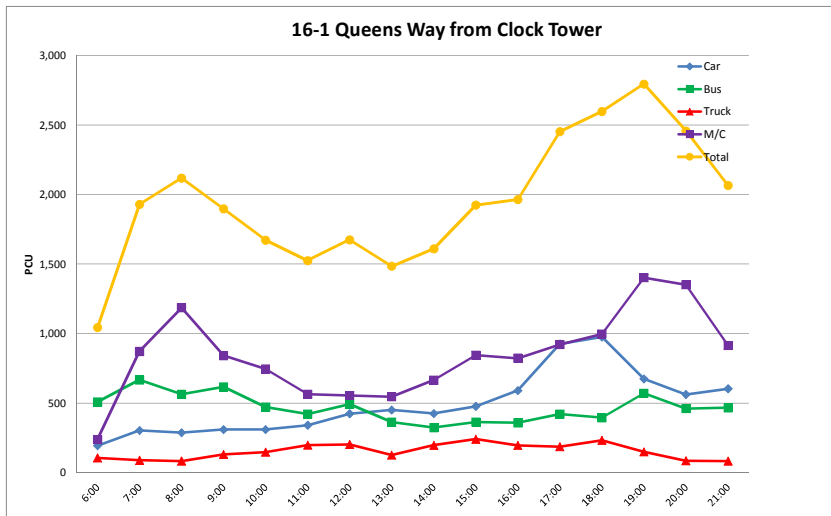
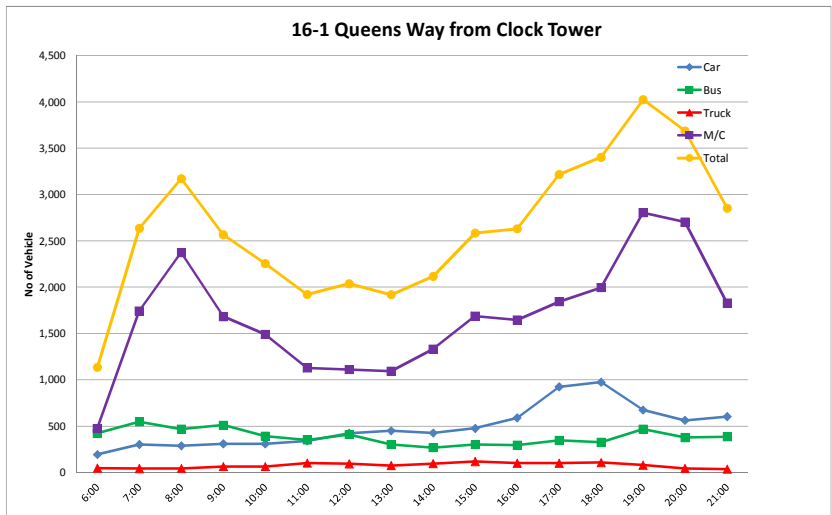
	Vehicle										NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11	Type (1-9)		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian			
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0				
6:00 - 7:00	190	52	2	0	15	18	18	13	318	45		626	671	
7:00 - 8:00	313	55	3	0	21	24	11	9	548	34		984	1,018	
8:00 - 9:00	265	43	1	1	24	23	16	5	845	28		1,223	1,251	
9:00 - 10:00	233	67	7	0	29	21	5	15	663	14		1,040	1,054	
10:00 - 11:00	184	45	0	2	37	17	12	6	846	11		1,149	1,160	
11:00 - 12:00	253	16	0	0	28	16	9	9	886	16		1,217	1,233	
12:00 - 13:00	289	77	2	0	38	20	6	10	869	23		1,311	1,334	
13:00 - 14:00	201	62	1	0	38	14	15	19	1,117	35		1,467	1,502	
14:00 - 15:00	272	54	0	0	18	14	9	17	1,027	21		1,411	1,432	
15:00 - 16:00	306	81	0	0	28	38	12	18	1,030	19		1,513	1,532	
16:00 - 17:00	303	44	2	1	32	19	14	12	1,001	39		1,428	1,467	
17:00 - 18:00	243	53	1	0	28	22	5	6	971	17		1,329	1,346	
18:00 - 19:00	218	32	7	0	31	10	4	10	681	16		993	1,009	
19:00 - 20:00	104	4	2	0	7	5	3	2	468	11		595	606	
20:00 - 21:00	119	8	2	0	11	8	1	1	513	12		663	675	
21:00 - 22:00	143	27	1	0	14	9	12	5	236	1		448	449	
Total (16h)	3,636	720	31	4	399	278	51	54	12,019	342	0	17,397	17,739	



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 16-1
 Location: Queens Way Surveyor Name: ARINAITWE EMMY, SSESANGA APOLLO, KISULE MOSES
 Direction: From Clock Tower To KIBUYE

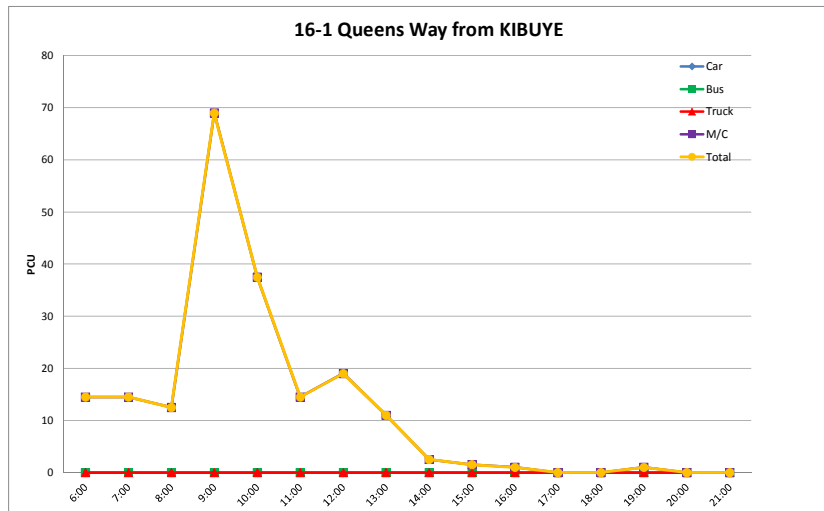
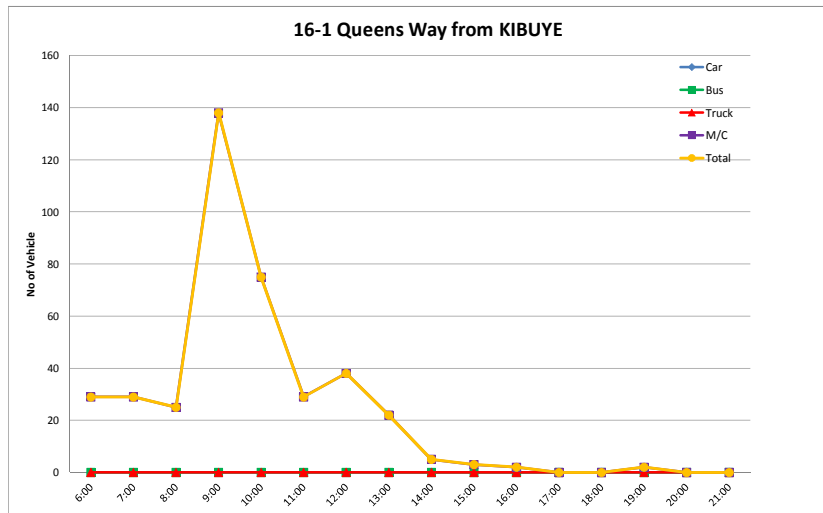
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	193	416	2	3	17	10	9	9	475	21		1,134	1,155
7:00 - 8:00	303	524	15	8	19	8	5	9	1,743	37		2,634	2,671
8:00 - 9:00	287	463	5	0	22	9	9	2	2,373	19		3,170	3,189
9:00 - 10:00	309	502	8	1	32	13	14	5	1,683	30		2,567	2,597
10:00 - 11:00	309	389	3	0	28	7	20	9	1,490	21		2,255	2,276
11:00 - 12:00	341	351	0	0	60	9	20	13	1,128	17		1,922	1,939
12:00 - 13:00	424	408	2	0	44	13	23	13	1,110	15		2,037	2,052
13:00 - 14:00	450	299	3	0	51	6	9	8	1,092	16		1,918	1,934
14:00 - 15:00	425	265	2	1	48	12	16	18	1,330	19		2,117	2,136
15:00 - 16:00	476	302	1	0	62	14	30	11	1,688	12		2,584	2,596
16:00 - 17:00	590	289	3	3	58	10	23	9	1,645	19		2,630	2,649
17:00 - 18:00	925	342	2	4	60	18	16	7	1,843	33		3,217	3,250
18:00 - 19:00	975	316	9	1	53	10	33	11	1,995	39		3,403	3,442
19:00 - 20:00	674	443	25	1	49	5	15	10	2,803	41		4,025	4,066
20:00 - 21:00	562	355	19	3	27	2	13	2	2,702	16		3,685	3,701
21:00 - 22:00	603	371	11	2	17	4	16	0	1,829	4		2,857	2,861
Total (16h)	7,846	6,035	110	27	647	150	146	50	26,929	359	0	42,155	42,514



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 16-1
 Location: Queens Way Surveyor Name: KULE ISAAC, KIMERA ALBERT, RUKUNDO JESSE
 Direction: From KIBUYE To Clock Tower

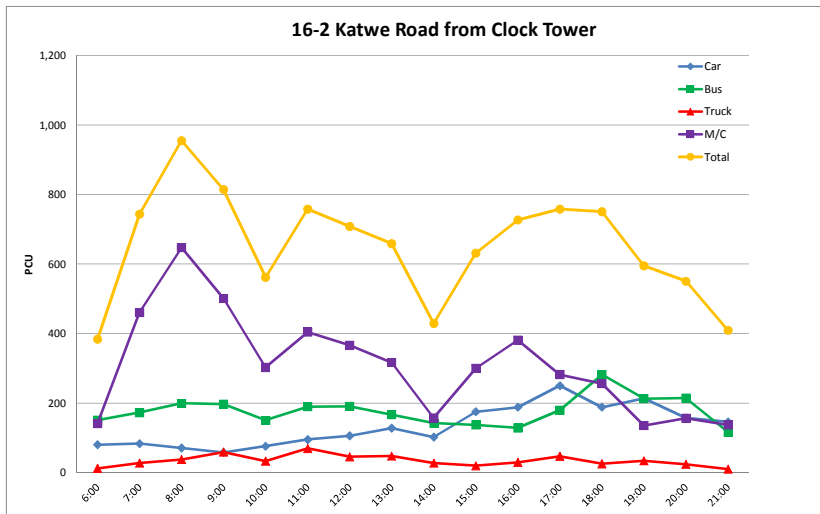
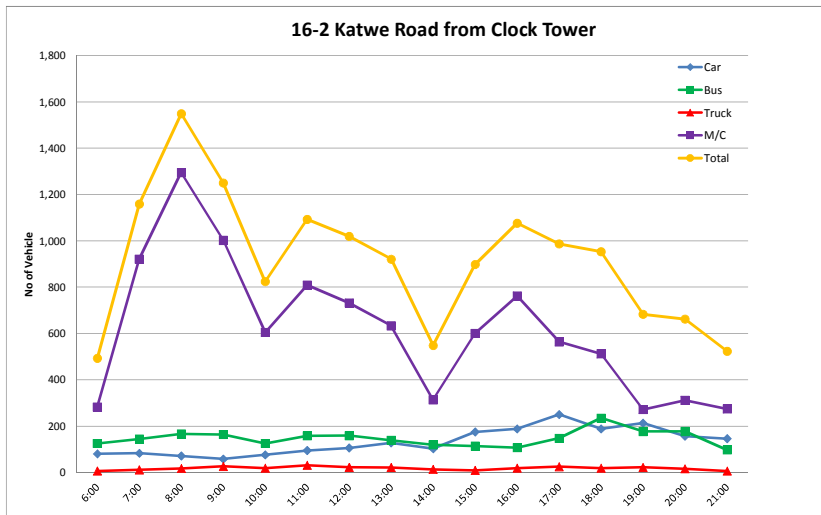
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	0	0	0	0	0	0	0	0	29	11		29	40
7:00 - 8:00	0	0	0	0	0	0	0	0	29	13		29	42
8:00 - 9:00	0	0	0	0	0	0	0	0	25	26		25	51
9:00 - 10:00	0	0	0	0	0	0	0	0	138	34		138	172
10:00 - 11:00	0	0	0	0	0	0	0	0	75	80		75	155
11:00 - 12:00	0	0	0	0	0	0	0	0	29	34		29	63
12:00 - 13:00	0	0	0	0	0	0	0	0	38	36		38	74
13:00 - 14:00	0	0	0	0	0	0	0	0	22	22		22	44
14:00 - 15:00	0	0	0	0	0	0	0	0	5	2		5	7
15:00 - 16:00	0	0	0	0	0	0	0	0	3	0		3	3
16:00 - 17:00	0	0	0	0	0	0	0	0	2	3		2	5
17:00 - 18:00	0	0	0	0	0	0	0	0	0	1		0	1
18:00 - 19:00	0	0	0	0	0	0	0	0	0	0		0	0
19:00 - 20:00	0	0	0	0	0	0	0	0	2	1		2	3
20:00 - 21:00	0	0	0	0	0	0	0	0	0	0		0	0
21:00 - 22:00	0	0	0	0	0	0	0	0	0	0		0	0
Total (16h)	0	0	0	0	0	0	0	0	397	263	0	397	660



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 16-2
 Location: Katwe Road Surveyor Name: MUHEREZA JOSEPH, NAKANYIKE ESTHER, SWAIBU KIBERU
 Direction: From Clock Tower To KIBUYE

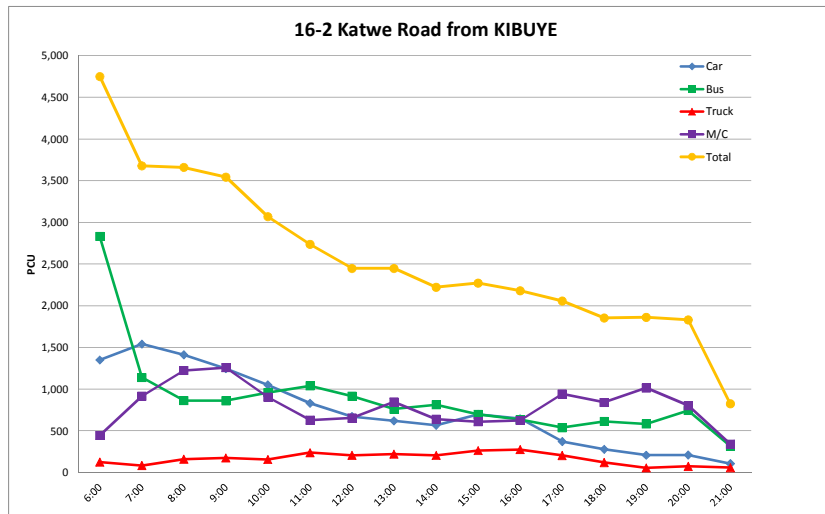
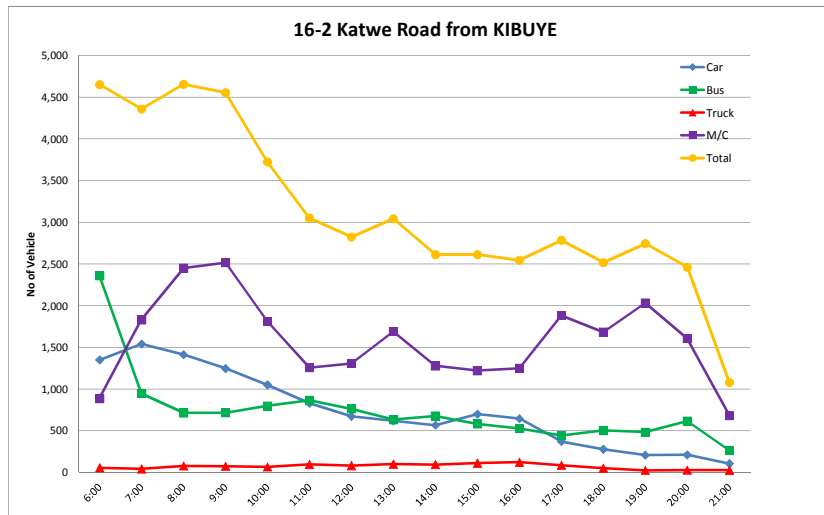
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	80	122	3	0	2	4	0	0	282	35		493	528
7:00 - 8:00	83	144	0	0	2	6	3	0	921	135		1,159	1,294
8:00 - 9:00	71	166	0	0	8	2	7	0	1,295	62		1,549	1,611
9:00 - 10:00	58	164	0	0	10	7	7	2	1,002	64		1,250	1,314
10:00 - 11:00	76	124	1	0	10	5	3	0	605	24		824	848
11:00 - 12:00	95	158	0	0	8	19	4	0	809	41		1,093	1,134
12:00 - 13:00	106	159	0	0	9	9	2	2	732	19		1,019	1,038
13:00 - 14:00	128	139	0	0	8	6	6	1	633	20		921	941
14:00 - 15:00	102	119	0	0	4	8	0	1	314	16		548	564
15:00 - 16:00	175	113	1	0	4	2	2	1	600	20		898	918
16:00 - 17:00	188	106	1	0	12	7	0	0	762	19		1,076	1,095
17:00 - 18:00	250	144	3	1	11	13	1	0	564	24		987	1,011
18:00 - 19:00	188	235	0	0	14	3	1	0	512	25		953	978
19:00 - 20:00	213	176	1	0	16	3	2	1	271	36		683	719
20:00 - 21:00	157	171	6	0	11	5	0	0	312	40		662	702
21:00 - 22:00	146	97	0	0	4	1	1	0	274	19		542	561
Total (16h)	2,116	2,337	16	1	133	100	7	2	9,888	599	0	14,657	15,256



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 16-2
 Location: Katwe Road Surveyor Name: PETER MUGUMYA, MUSA ISIKO, JIMMY GOLOBA
 Direction: From KIBUYE To Clock Tower

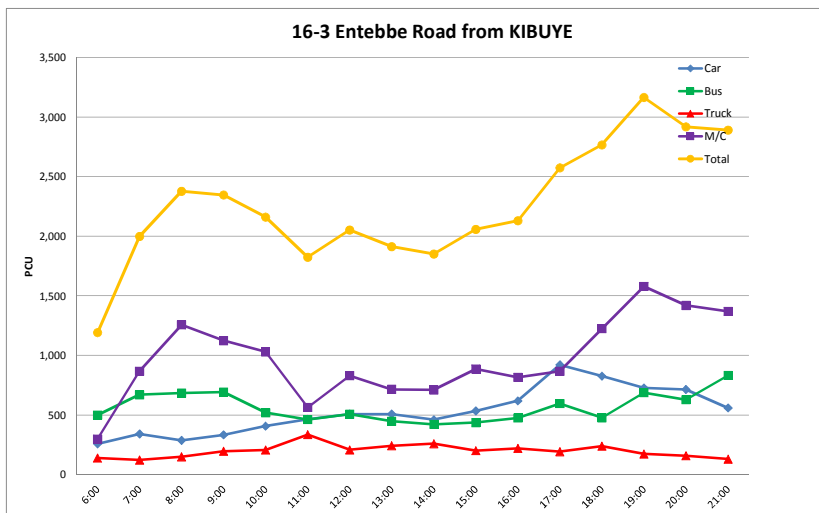
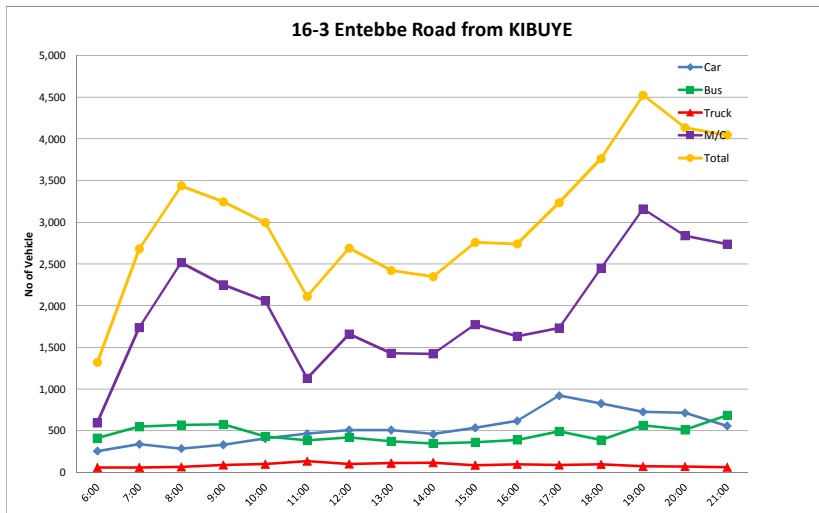
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	1,350	2,359	1	0	20	18	14	3	887	58		4,652	4,710
7:00 - 8:00	1,540	941	1	4	21	10	8	3	1,831	171		4,359	4,530
8:00 - 9:00	1,413	705	7	3	36	19	18	4	2,450	137		4,655	4,792
9:00 - 10:00	1,247	709	5	2	22	31	16	6	2,517	101		4,555	4,656
10:00 - 11:00	1,050	794	4	0	22	21	20	3	1,811	42		3,725	3,767
11:00 - 12:00	831	863	3	0	28	31	28	10	1,257	28		3,051	3,079
12:00 - 13:00	672	760	2	0	20	26	26	9	1,308	38		2,823	2,861
13:00 - 14:00	620	630	3	0	40	28	24	8	1,691	45		3,044	3,089
14:00 - 15:00	567	674	2	0	37	27	22	7	1,278	34		2,614	2,648
15:00 - 16:00	699	576	5	0	40	28	33	11	1,221	21		2,613	2,634
16:00 - 17:00	646	523	3	1	46	40	31	6	1,250	25		2,546	2,571
17:00 - 18:00	371	431	5	7	26	31	23	6	1,884	49		2,784	2,833
18:00 - 19:00	278	486	12	6	17	16	12	6	1,684	50		2,517	2,567
19:00 - 20:00	208	474	7	2	6	10	6	1	2,031	38		2,745	2,783
20:00 - 21:00	211	603	12	1	7	10	11	1	1,606	22		2,462	2,484
21:00 - 22:00	106	257	5	1	9	13	4	1	683	9		1,088	1,097
Total (16h)	11,809	11,785	77	27	397	359	120	32	25,389	868	0	50,233	51,101



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 16-3
 Location: Entebbe Road Surveyor Name: ESTHER, PASCHAL, PROSSY
 Direction: From KIBUYE To ENTEBBE

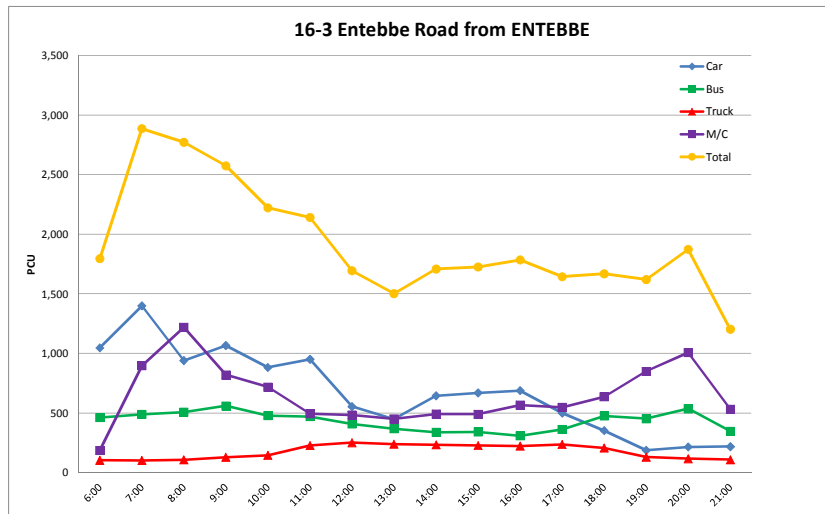
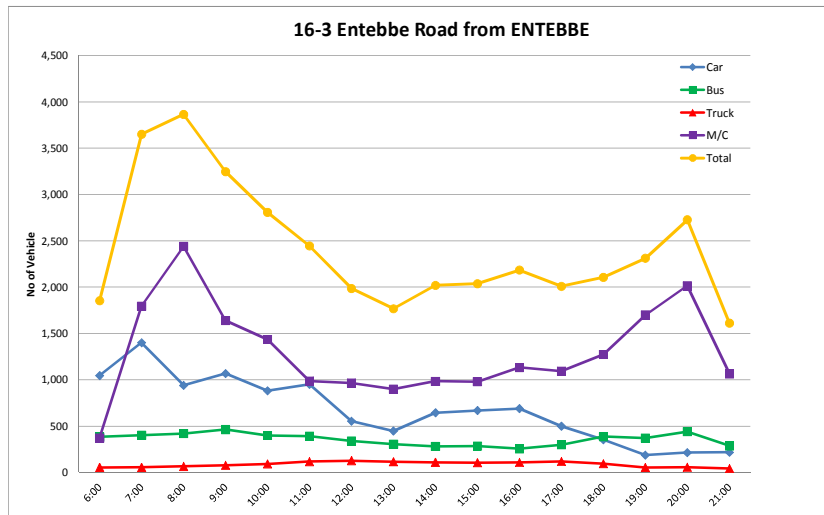
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	256	402	9	2	17	19	17	4	595	64		1,321	1,385
7:00 - 8:00	340	526	15	8	25	19	10	4	1,736	111		2,683	2,794
8:00 - 9:00	287	563	6	0	23	25	16	2	2,515	68		3,437	3,505
9:00 - 10:00	333	568	5	2	39	18	30	2	2,250	66		3,247	3,313
10:00 - 11:00	407	430	2	0	43	33	17	6	2,060	44		2,998	3,042
11:00 - 12:00	464	383	1	0	36	47	40	12	1,128	21		2,111	2,132
12:00 - 13:00	508	414	6	1	44	36	18	3	1,660	35		2,690	2,725
13:00 - 14:00	508	371	1	1	42	45	19	6	1,430	23		2,423	2,446
14:00 - 15:00	460	339	6	3	46	39	24	9	1,422	22		2,348	2,370
15:00 - 16:00	535	359	2	1	30	28	25	4	1,774	14		2,758	2,772
16:00 - 17:00	619	373	13	4	32	43	20	3	1,634	39		2,741	2,780
17:00 - 18:00	921	479	6	6	32	40	13	4	1,734	35		3,235	3,270
18:00 - 19:00	827	373	5	11	27	37	31	3	2,450	37		3,764	3,801
19:00 - 20:00	727	545	19	2	19	35	15	4	3,160	66		4,526	4,592
20:00 - 21:00	714	469	33	8	25	29	16	1	2,840	50		4,135	4,185
21:00 - 22:00	559	660	19	6	26	25	10	2	2,740	26		4,073	4,099
Total (16h)	8,465	7,254	148	55	506	518	130	21	31,128	721	0	48,490	49,211



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 16-3
 Location: Entebbe Road Surveyor Name: SAMUEL KATO, ASIMWE JOSEPH, MUNGUCI GETRUDE
 Direction: From ENTEBBE To KIBUYE

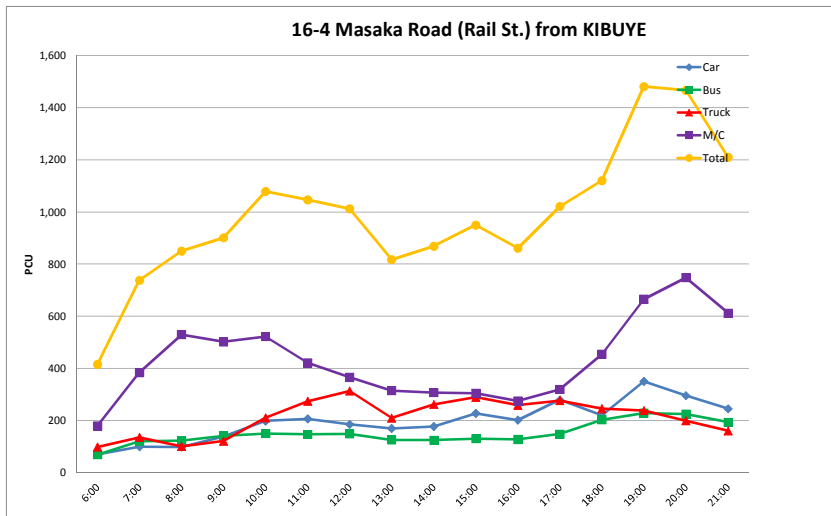
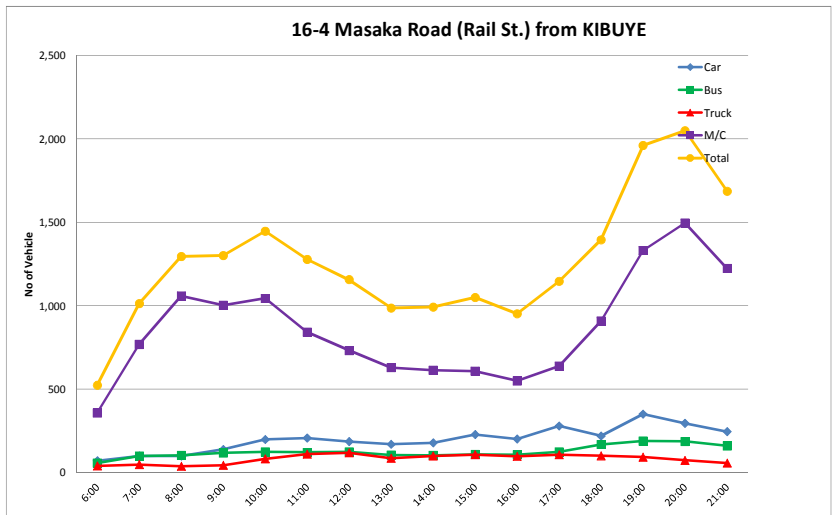
	Vehicle										NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11	Type (1-9)		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian			
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0				
6:00 - 7:00	1,046	376	7	0	28	16	8	2	371	43		1,854	1,897	
7:00 - 8:00	1,400	388	10	4	30	16	7	2	1,794	50		3,651	3,701	
8:00 - 9:00	940	411	9	0	42	16	6	1	2,440	52		3,865	3,917	
9:00 - 10:00	1,067	458	4	2	48	21	7	1	1,640	28		3,248	3,276	
10:00 - 11:00	882	395	3	0	58	33	1	0	1,436	12		2,808	2,820	
11:00 - 12:00	951	389	2	0	57	39	13	8	987	25		2,446	2,471	
12:00 - 13:00	554	337	2	0	60	44	17	6	965	23		1,985	2,008	
13:00 - 14:00	447	306	0	0	52	34	25	4	899	9		1,767	1,776	
14:00 - 15:00	644	281	1	0	46	33	19	11	984	10		2,019	2,029	
15:00 - 16:00	669	282	2	0	44	31	26	4	980	8		2,038	2,046	
16:00 - 17:00	688	248	7	0	49	33	18	8	1,133	14		2,184	2,198	
17:00 - 18:00	499	287	8	3	59	30	20	9	1,094	30		2,009	2,039	
18:00 - 19:00	352	357	26	4	40	27	20	8	1,272	23		2,106	2,129	
19:00 - 20:00	187	357	10	5	19	11	16	8	1,699	24		2,312	2,336	
20:00 - 21:00	215	422	18	1	26	15	12	3	2,015	15		2,727	2,742	
21:00 - 22:00	218	282	5	0	13	10	15	5	1,064	6		1,618	1,624	
Total (16h)	10,759	5,576	114	19	671	409	127	45	20,773	372	0	38,637	39,009	



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 16-4
 Location: Masaka Road (Rail St.) Surveyor Name: BERT KIRU, JOHH MUGUME, SOFIA BIRU
 Direction: From KIBUYE To BUSEGA

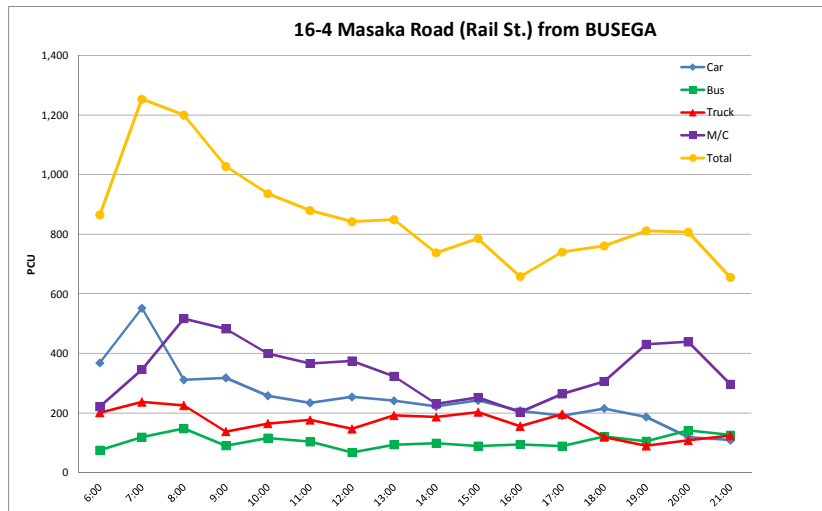
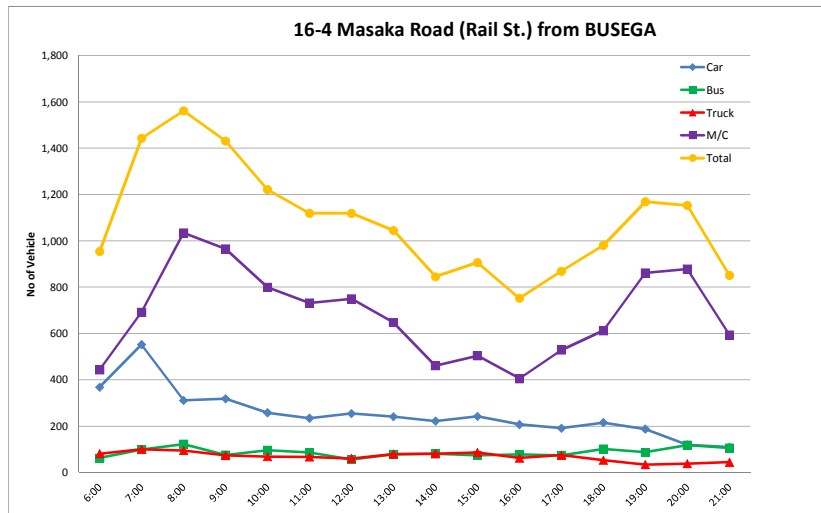
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	70	56	1	0	9	16	7	7	357	13		523	536
7:00 - 8:00	99	97	0	2	6	15	7	19	768	18		1,013	1,031
8:00 - 9:00	98	102	0	0	6	14	10	7	1,058	7		1,295	1,302
9:00 - 10:00	138	116	0	1	8	10	15	10	1,003	15		1,301	1,316
10:00 - 11:00	198	120	1	2	23	20	22	17	1,044	22		1,447	1,469
11:00 - 12:00	206	119	1	1	30	36	14	30	841	12		1,278	1,290
12:00 - 13:00	185	121	1	1	23	39	35	20	731	14		1,156	1,170
13:00 - 14:00	169	102	2	0	23	31	13	18	628	7		986	993
14:00 - 15:00	177	102	0	1	23	28	15	33	613	4		992	996
15:00 - 16:00	227	108	0	0	16	42	20	28	608	13		1,049	1,062
16:00 - 17:00	201	106	0	0	21	25	19	31	549	32		952	984
17:00 - 18:00	279	123	0	0	24	35	33	14	638	19		1,146	1,165
18:00 - 19:00	219	165	3	0	30	30	28	12	908	41		1,395	1,436
19:00 - 20:00	350	182	5	1	26	19	36	11	1,331	55		1,961	2,016
20:00 - 21:00	295	182	4	0	19	9	35	10	1,496	51		2,050	2,101
21:00 - 22:00	245	158	1	1	13	7	30	7	1,224	28		1,714	1,742
Total (16h)	3,156	1,959	19	10	300	376	201	113	13,797	351	0	20,258	20,609



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 16-4
 Location: Masaka Road (Rail St.) Surveyor Name: KOMUHANGI, SANDRA, ABIGAIL
 Direction: From BUSEGA To KIBUYE

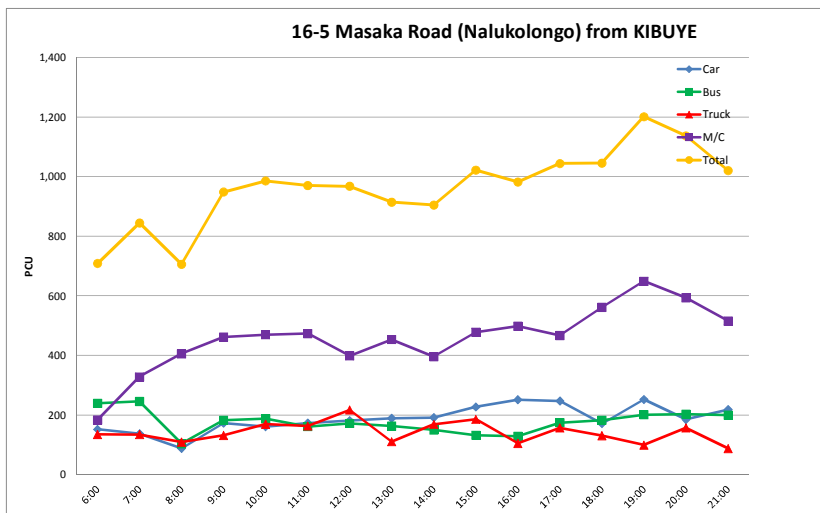
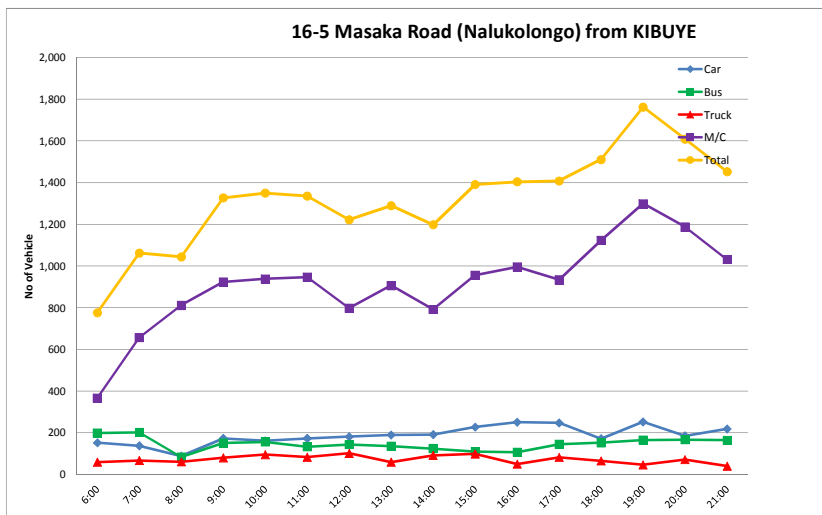
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	368	61	1	0	27	15	35	4	443	39		954	993
7:00 - 8:00	552	98	1	0	34	28	33	5	692	27		1,443	1,470
8:00 - 9:00	311	118	4	0	37	15	38	5	1,034	46		1,562	1,608
9:00 - 10:00	318	75	0	0	42	13	16	2	965	30		1,431	1,461
10:00 - 11:00	258	96	0	0	20	24	21	3	799	40		1,221	1,261
11:00 - 12:00	234	85	1	0	14	23	25	5	732	13		1,119	1,132
12:00 - 13:00	254	55	1	0	15	26	12	7	749	9		1,119	1,128
13:00 - 14:00	241	78	0	0	24	25	26	4	647	17		1,045	1,062
14:00 - 15:00	222	79	1	1	27	29	21	4	461	8		845	853
15:00 - 16:00	242	73	1	0	30	23	30	3	504	9		906	915
16:00 - 17:00	207	77	1	0	14	27	18	3	405	3		752	755
17:00 - 18:00	191	74	0	0	15	29	25	6	529	12		869	881
18:00 - 19:00	215	101	0	0	19	19	15	0	612	24		981	1,005
19:00 - 20:00	187	86	0	1	7	12	13	2	861	5		1,169	1,174
20:00 - 21:00	119	118	0	0	2	20	15	1	878	5		1,153	1,158
21:00 - 22:00	109	105	0	0	6	15	17	6	593	0		851	851
Total (16h)	4,028	1,379	11	2	333	343	133	21	10,904	287	0	17,420	17,707



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 16-5
 Location: Masaka Road (Nalukolongo) Surveyor Name: JESICA, BERNADETTE, GILES, SEMU
 Direction: From KIBUYE To BUSEGA

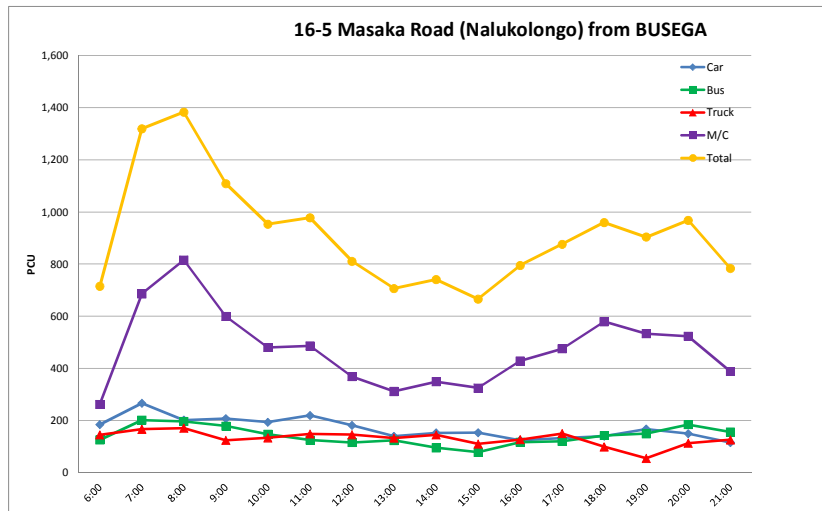
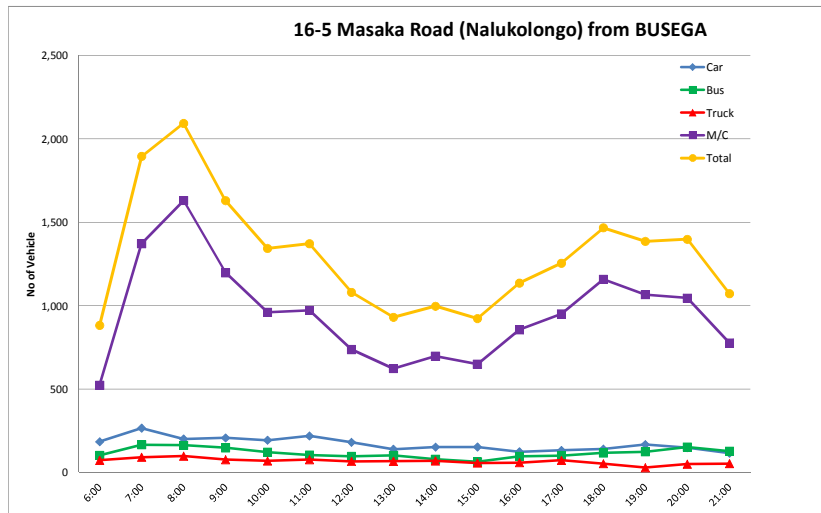
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	152	197	2	0	22	17	6	14	366	14	84	776	874
7:00 - 8:00	137	196	3	3	33	18	0	16	656	32	147	1,062	1,241
8:00 - 9:00	88	80	1	3	37	12	4	8	811	23	229	1,044	1,296
9:00 - 10:00	173	148	2	1	51	21	5	3	923	46	163	1,327	1,536
10:00 - 11:00	161	156	0	0	53	31	4	7	938	48	138	1,350	1,536
11:00 - 12:00	173	130	2	1	39	30	10	4	947	31	100	1,336	1,467
12:00 - 13:00	181	143	0	0	39	39	13	10	797	23	112	1,222	1,357
13:00 - 14:00	189	132	3	0	33	14	9	3	906	26	135	1,289	1,450
14:00 - 15:00	191	121	3	0	50	25	6	10	792	33	143	1,198	1,374
15:00 - 16:00	227	109	1	0	51	30	6	11	956	28	125	1,391	1,544
16:00 - 17:00	251	106	1	0	21	18	7	4	996	34	139	1,404	1,577
17:00 - 18:00	247	145	0	0	41	28	5	8	934	20	211	1,408	1,639
18:00 - 19:00	171	151	1	0	30	22	8	5	1,123	62	280	1,511	1,853
19:00 - 20:00	252	157	7	1	18	17	6	5	1,299	58	523	1,762	2,343
20:00 - 21:00	185	155	11	0	26	27	16	2	1,187	24	572	1,609	2,205
21:00 - 22:00	218	154	10	0	15	15	6	4	1,031	23	221	1,476	1,720
Total (16h)	2,996	2,280	47	9	559	364	54	39	14,662	525	3,322	21,165	25,012



Traffic Count Survey(16hrs Count)

Date: 12-Mar-19 Location No: 16-5
 Location: Masaka Road (Nalukolongo) Surveyor Name: AMALA, SPECIOZA, IVAN, KIIZA
 Direction: From BUSEGA To KIBUYE

	Vehicle										NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11	Type (1-9)		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian			
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0				
6:00 - 7:00	184	97	2	3	30	36	6	1	523	56	173	882	1,111	
7:00 - 8:00	266	162	2	2	49	30	8	4	1,372	88	350	1,895	2,333	
8:00 - 9:00	201	161	2	0	57	30	8	3	1,631	105	323	2,093	2,521	
9:00 - 10:00	207	145	3	0	51	18	6	2	1,198	66	246	1,630	1,942	
10:00 - 11:00	193	120	2	0	37	16	10	6	960	53	261	1,344	1,658	
11:00 - 12:00	219	103	1	0	39	24	10	4	972	41	237	1,372	1,650	
12:00 - 13:00	181	95	1	0	27	18	15	6	737	31	209	1,080	1,320	
13:00 - 14:00	139	101	0	1	30	27	7	3	623	30	278	931	1,239	
14:00 - 15:00	152	77	2	0	30	22	12	5	697	21	171	997	1,189	
15:00 - 16:00	153	60	4	0	29	17	6	5	649	20	171	923	1,114	
16:00 - 17:00	124	91	5	0	25	18	9	7	856	40	225	1,135	1,400	
17:00 - 18:00	132	100	0	0	34	21	10	8	950	35	277	1,255	1,567	
18:00 - 19:00	140	113	3	1	29	11	5	7	1,158	41	386	1,467	1,894	
19:00 - 20:00	167	123	1	0	16	7	2	4	1,066	40	508	1,386	1,934	
20:00 - 21:00	149	152	1	0	19	15	12	4	1,046	20	510	1,398	1,928	
21:00 - 22:00	115	125	2	1	18	15	13	7	776	13	309	1,085	1,407	
Total (16h)	2,722	1,825	31	8	520	325	57	42	15,214	700	4,634	20,873	26,207	

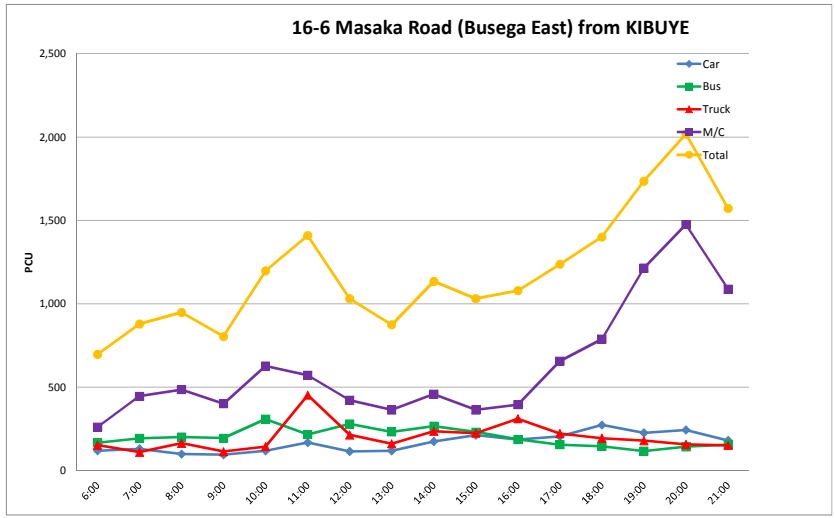
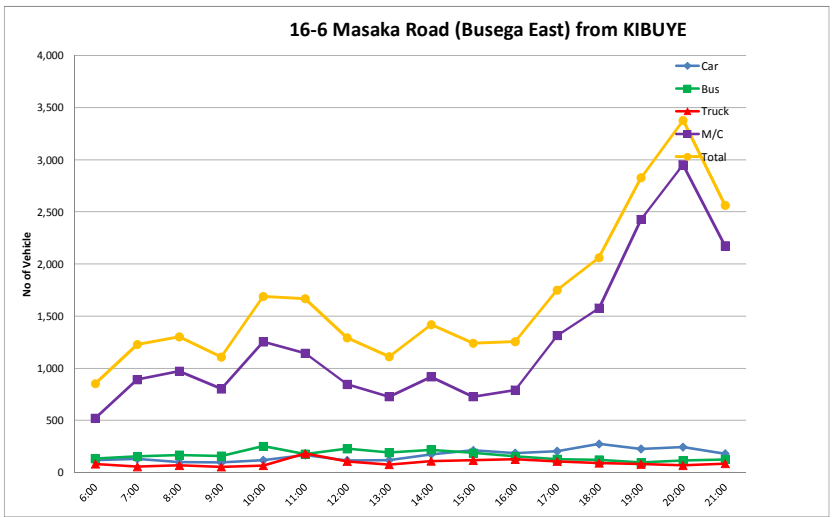


Traffic Count Survey(16hrs Count)

Date: 14-Mar-19
 Location: Masaka Road (Busega East)
 Direction: From KIBUYE To BUSEGA

Location No: 16-6
 Surveyor Name: OTEMI, DENIS, RUTAGANYA, JACKIE

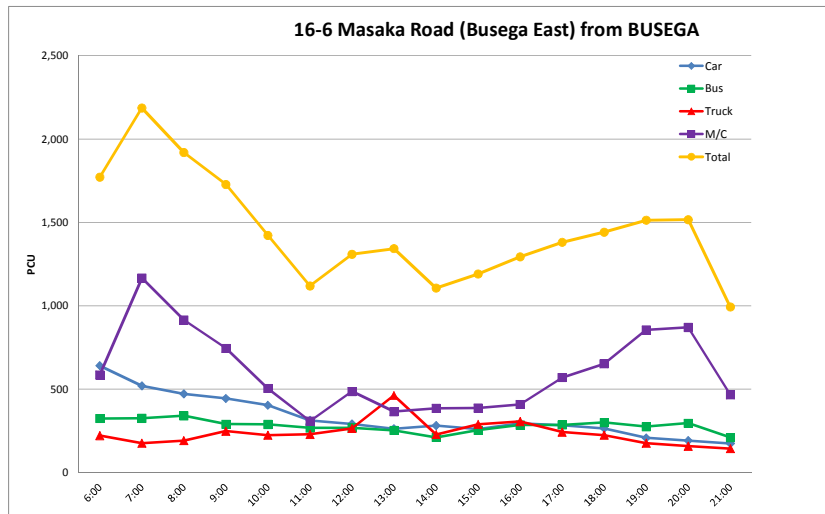
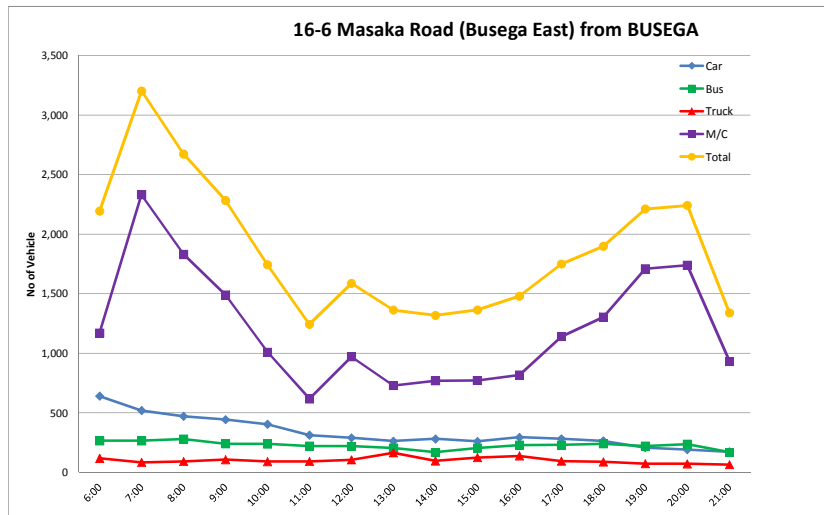
	Vehicle										NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)		
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0				
6:00 - 7:00	118	119	8	6	45	19	9	8	520	18	370	852	1,240	
7:00 - 8:00	130	136	7	10	27	15	11	2	891	24	629	1,229	1,882	
8:00 - 9:00	99	160	6	0	18	26	8	15	970	13	606	1,302	1,921	
9:00 - 10:00	95	148	3	6	20	22	5	6	802	11	464	1,107	1,582	
10:00 - 11:00	118	240	6	6	26	22	10	8	1,253	15	555	1,689	2,259	
11:00 - 12:00	168	164	5	6	59	33	12	77	1,144	12	424	1,668	2,104	
12:00 - 13:00	115	215	5	7	48	37	13	8	844	5	400	1,292	1,697	
13:00 - 14:00	118	186	2	3	30	27	11	7	727	4	493	1,111	1,608	
14:00 - 15:00	174	208	3	6	46	31	22	10	917	16	431	1,417	1,864	
15:00 - 16:00	212	176	5	6	53	49	7	7	726	8	417	1,241	1,666	
16:00 - 17:00	186	147	3	3	31	53	19	23	790	10	421	1,255	1,686	
17:00 - 18:00	204	123	4	1	47	32	11	16	1,312	24	594	1,750	2,368	
18:00 - 19:00	273	118	1	1	37	32	16	6	1,577	44	713	2,061	2,818	
19:00 - 20:00	226	87	8	0	28	31	17	4	2,428	73	753	2,829	3,655	
20:00 - 21:00	243	106	6	3	23	24	13	8	2,952	65	677	3,378	4,120	
21:00 - 22:00	180	116	2	6	50	18	10	6	2,174	29	487	2,591	3,107	
Total (16h)	2,659	2,449	74	70	588	471	93	70	20,027	371	8,434	26,772	35,577	



Traffic Count Survey(16hrs Count)

Date: 14-Mar-19 Location No: 16-6
 Location: Masaka Road (Busega East) Surveyor Name: OKWARE, AGUMA, RICHARD, MICHAEL
 Direction: From BUSEGA To KIBUYE

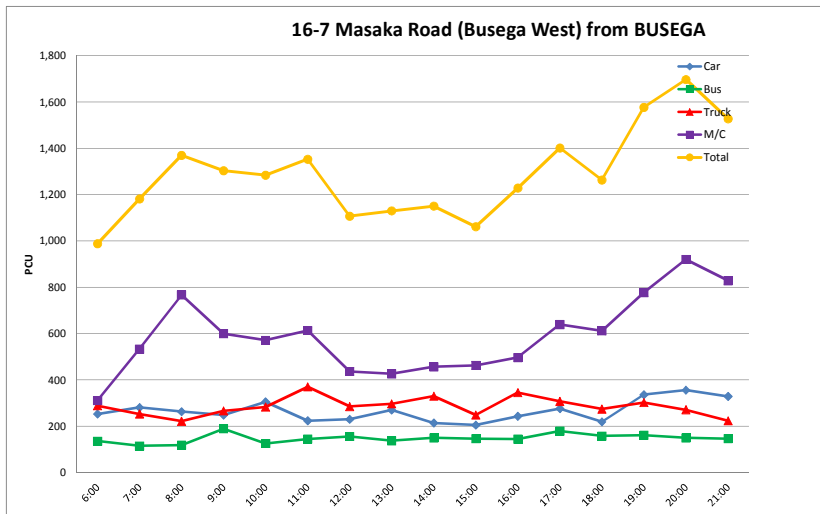
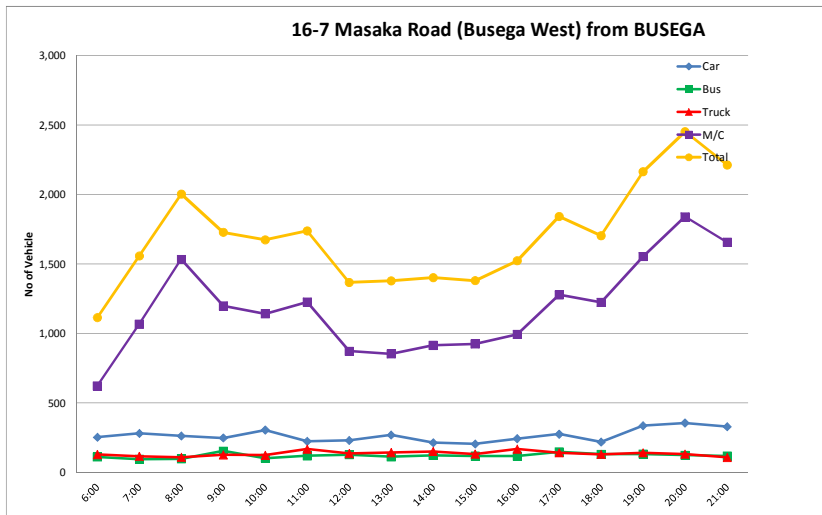
	Vehicle										NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11	Type (1-9)		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian			
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0				
6:00 - 7:00	641	254	9	3	59	44	8	7	1,170	60	194	2,195	2,449	
7:00 - 8:00	520	247	18	1	33	36	10	5	2,332	68	433	3,202	3,703	
8:00 - 9:00	472	268	10	2	37	38	13	4	1,830	29	406	2,674	3,109	
9:00 - 10:00	444	238	3	0	34	45	23	6	1,490	20	305	2,283	2,608	
10:00 - 11:00	404	235	2	2	27	27	24	13	1,010	23	226	1,744	1,993	
11:00 - 12:00	313	217	1	3	26	28	22	16	618	20	168	1,244	1,432	
12:00 - 13:00	291	212	5	3	31	26	31	17	972	24	140	1,588	1,752	
13:00 - 14:00	263	198	2	6	38	17	98	11	730	9	99	1,363	1,471	
14:00 - 15:00	282	156	4	9	37	19	28	13	770	11	83	1,318	1,412	
15:00 - 16:00	261	196	3	7	48	24	29	23	773	9	124	1,364	1,497	
16:00 - 17:00	295	215	7	8	59	33	24	23	817	19	128	1,481	1,628	
17:00 - 18:00	283	216	8	7	29	21	20	26	1,140	10	135	1,750	1,895	
18:00 - 19:00	265	225	4	12	26	22	22	19	1,304	18	212	1,899	2,129	
19:00 - 20:00	208	206	5	10	22	25	17	9	1,710	19	231	2,212	2,462	
20:00 - 21:00	192	217	13	8	34	9	14	15	1,740	14	306	2,242	2,562	
21:00 - 22:00	174	156	7	6	22	29	7	7	932	6	135	1,346	1,487	
Total (16h)	5,308	3,456	101	87	562	443	133	122	19,338	359	3,325	29,905	33,589	



Traffic Count Survey(16hrs Count)

Date: 14-Mar-19 Location No: 16-7
 Location: Masaka Road (Busega West) Surveyor Name: KATONO, ISHAZA, ADNAN
 Direction: From BUSEGA To BULENGA

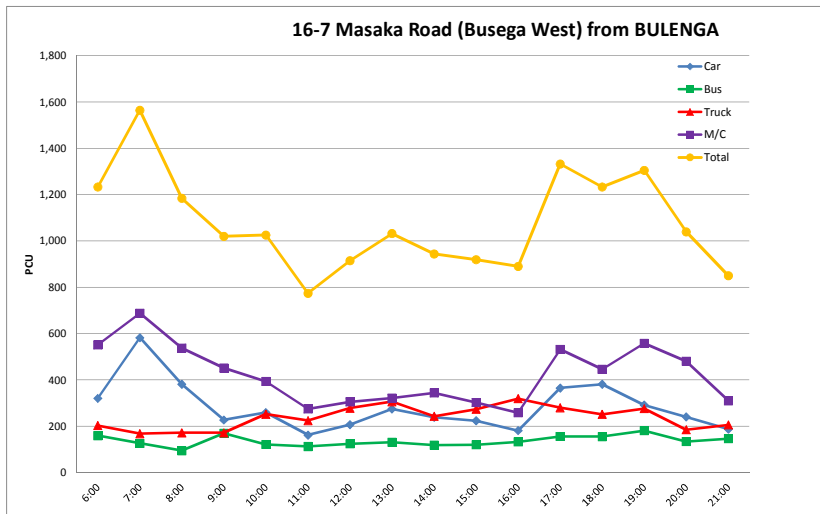
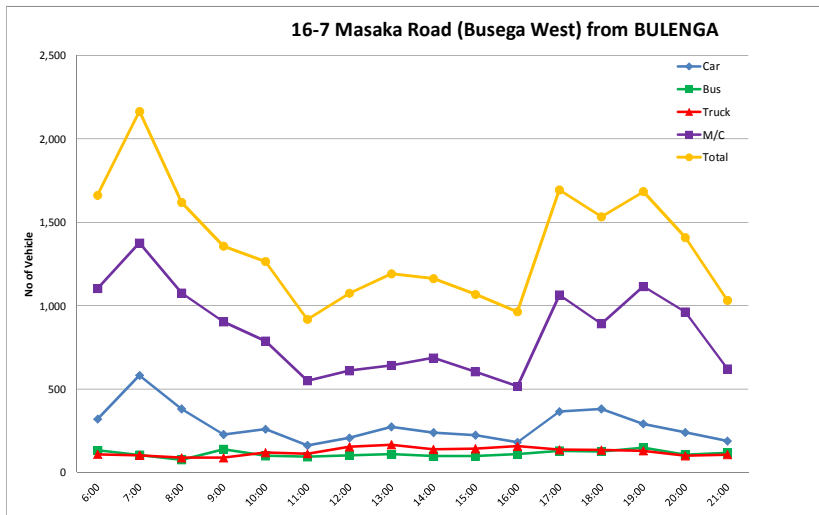
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	253	106	3	2	46	48	27	8	622	16		1,115	1,131
7:00 - 8:00	281	92	3	0	44	43	20	9	1,066	16		1,558	1,574
8:00 - 9:00	263	97	1	0	48	40	10	11	1,534	27		2,004	2,031
9:00 - 10:00	248	146	4	4	56	38	19	14	1,199	8		1,728	1,736
10:00 - 11:00	305	100	1	2	39	54	12	19	1,142	6		1,674	1,680
11:00 - 12:00	224	118	1	1	71	40	27	30	1,226	5		1,738	1,743
12:00 - 13:00	230	125	1	2	62	36	25	13	873	5		1,367	1,372
13:00 - 14:00	270	110	2	1	64	44	16	19	853	2		1,379	1,381
14:00 - 15:00	214	118	4	1	61	46	27	17	914	9		1,402	1,411
15:00 - 16:00	205	110	4	4	69	41	10	12	925	13		1,380	1,393
16:00 - 17:00	243	116	2	1	78	48	20	22	993	9		1,523	1,532
17:00 - 18:00	276	142	6	0	59	39	22	21	1,278	11		1,843	1,854
18:00 - 19:00	219	129	2	0	53	48	15	14	1,224	3		1,704	1,707
19:00 - 20:00	336	128	5	0	59	47	22	14	1,554	25		2,165	2,190
20:00 - 21:00	356	122	1	1	60	41	15	16	1,840	37		2,452	2,489
21:00 - 22:00	329	108	10	1	49	32	16	11	1,657	11		2,224	2,235
Total (16h)	4,252	1,867	50	20	918	685	120	110	18,900	203	0	27,256	27,459



Traffic Count Survey(16hrs Count)

Date: 14-Mar-19 Location No: 16-7
 Location: Masaka Road (Busega West) Surveyor Name: EDNA, SHEILA, ESTHER
 Direction: From BULENGA To BUSEGA

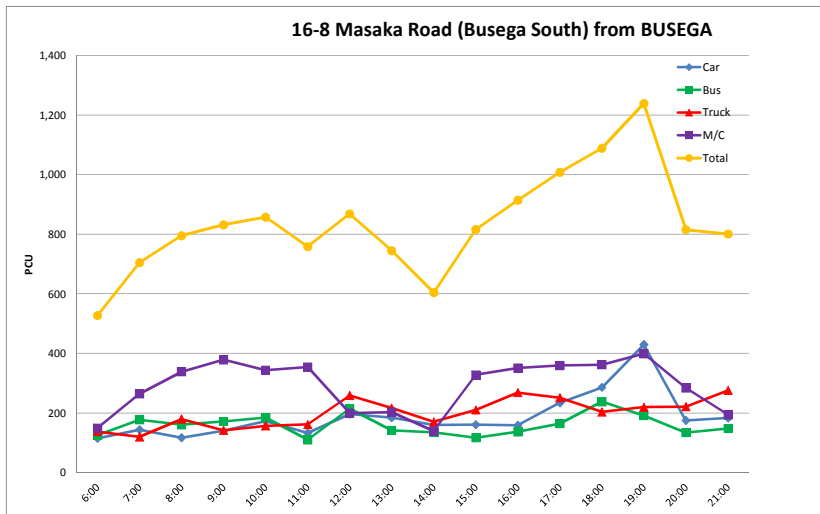
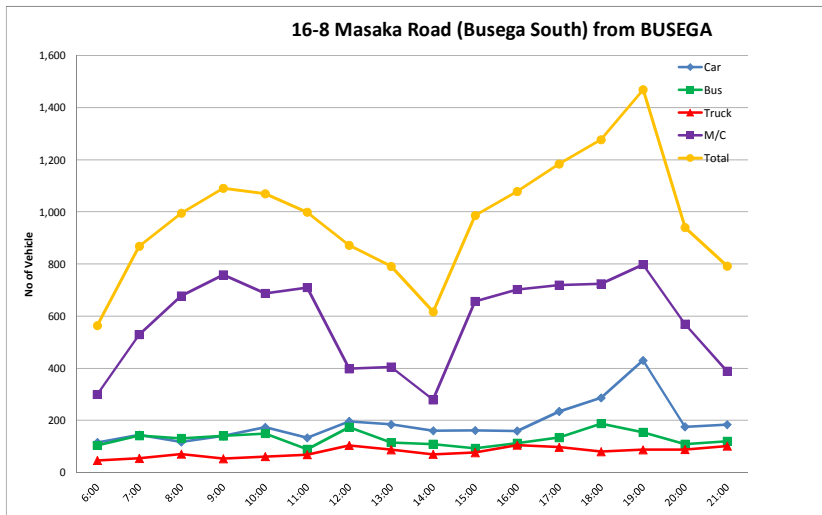
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	320	129	3	0	58	30	4	16	1,102	44		1,662	1,706
7:00 - 8:00	582	100	4	0	67	25	3	8	1,376	33		2,165	2,198
8:00 - 9:00	381	68	7	1	41	34	3	10	1,075	7		1,620	1,627
9:00 - 10:00	227	131	7	1	41	34	3	10	903	6		1,357	1,363
10:00 - 11:00	259	98	1	1	47	47	10	15	787	9		1,265	1,274
11:00 - 12:00	162	94	0	0	55	30	13	14	550	13		918	931
12:00 - 13:00	207	102	1	0	86	46	8	14	611	10		1,075	1,085
13:00 - 14:00	274	109	0	0	92	45	9	20	642	5		1,191	1,196
14:00 - 15:00	239	97	0	1	82	35	8	13	687	6		1,162	1,168
15:00 - 16:00	224	93	3	2	71	46	4	21	604	5		1,068	1,073
16:00 - 17:00	181	108	2	0	71	53	12	21	516	5		964	969
17:00 - 18:00	365	126	2	1	61	44	10	21	1,064	13		1,694	1,707
18:00 - 19:00	381	120	2	4	69	45	8	12	892	10		1,533	1,543
19:00 - 20:00	291	140	7	1	48	59	9	14	1,115	13		1,684	1,697
20:00 - 21:00	240	95	5	6	52	35	5	8	962	9		1,408	1,417
21:00 - 22:00	188	103	11	3	49	46	2	10	620	5		1,037	1,042
Total (16h)	4,521	1,713	55	21	990	654	50	107	13,506	193	0	21,803	21,996



Traffic Count Survey(16hrs Count)

Date: 14-Mar-19 Location No: 16-8
 Location: Masaka Road (Busega South) Surveyor Name: STELLA, HARRIET, HENRY
 Direction: From BUSEGA To MPIGI

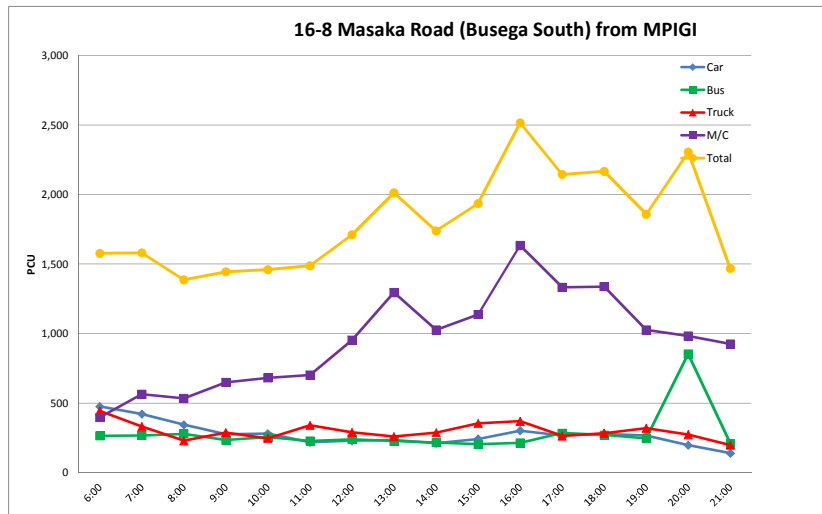
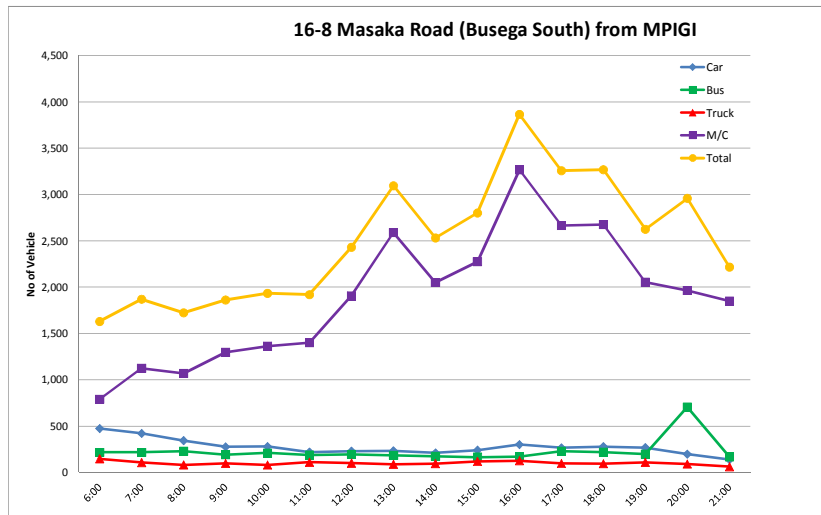
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	115	103	0	1	3	16	21	6	299	18		564	582
7:00 - 8:00	144	125	10	6	19	22	8	5	529	18		868	886
8:00 - 9:00	117	124	5	2	15	28	14	13	677	24		995	1,019
9:00 - 10:00	140	133	4	3	8	24	15	6	758	17		1,091	1,108
10:00 - 11:00	173	140	4	5	9	34	11	7	687	12		1,070	1,082
11:00 - 12:00	133	82	5	2	19	29	14	6	709	4		999	1,003
12:00 - 13:00	196	161	9	4	24	45	27	8	398	9		872	881
13:00 - 14:00	184	104	10	1	20	38	19	10	405	6		791	797
14:00 - 15:00	160	100	3	5	12	41	4	12	279	17		616	633
15:00 - 16:00	161	86	1	6	7	38	15	16	656	14		986	1,000
16:00 - 17:00	159	106	5	1	19	52	19	15	702	9		1,078	1,087
17:00 - 18:00	234	127	5	2	19	41	28	9	719	10		1,184	1,194
18:00 - 19:00	286	160	16	11	13	44	14	9	724	11		1,277	1,288
19:00 - 20:00	430	137	14	3	12	55	13	7	798	27		1,469	1,496
20:00 - 21:00	175	97	8	3	15	49	18	6	569	12		940	952
21:00 - 22:00	183	113	3	4	7	60	18	16	388	32		824	856
Total (16h)	2,990	1,898	102	59	221	616	125	78	9,297	240	0	15,624	15,864



Traffic Count Survey(16hrs Count)

Date: 14-Mar-19 Location No: 16-8
 Location: Masaka Road (Busega South) Surveyor Name: LEONARD, PAUL, ASABA
 Direction: From MPIGI To BUSEGA

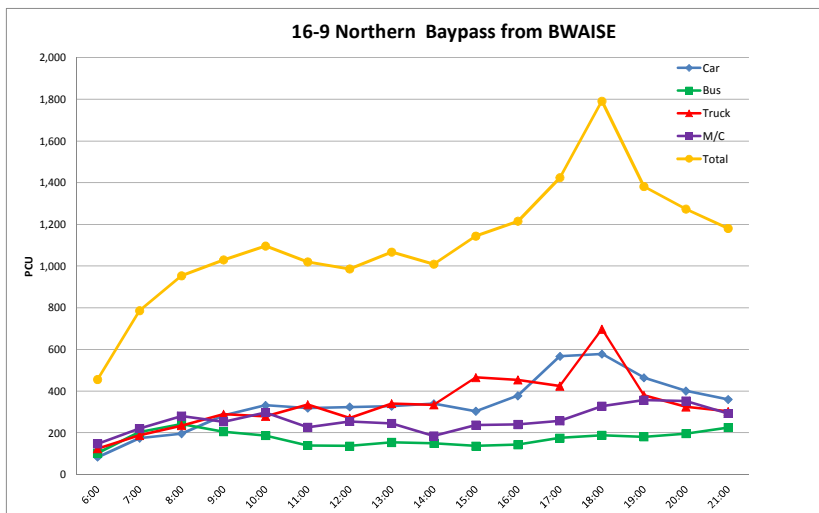
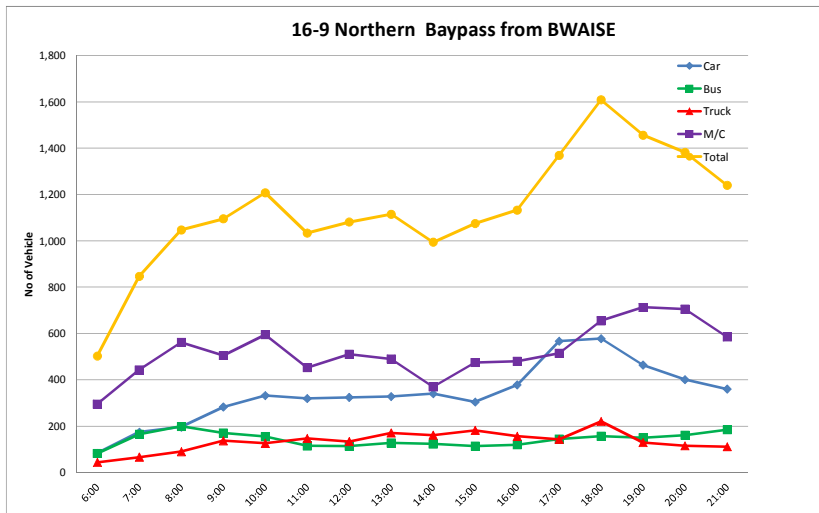
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	475	212	4	2	19	24	90	14	790	32		1,630	1,662
7:00 - 8:00	421	196	20	1	10	19	64	14	1,125	57		1,870	1,927
8:00 - 9:00	344	219	9	1	13	25	40	4	1,069	47		1,724	1,771
9:00 - 10:00	276	184	3	4	12	29	49	9	1,297	33		1,863	1,896
10:00 - 11:00	280	207	0	3	11	11	47	12	1,363	32		1,934	1,966
11:00 - 12:00	219	182	3	2	9	25	60	17	1,402	28		1,919	1,947
12:00 - 13:00	229	185	6	4	13	28	52	7	1,907	16		2,431	2,447
13:00 - 14:00	233	179	1	5	11	22	47	8	2,590	12		3,096	3,108
14:00 - 15:00	211	165	4	6	7	25	44	18	2,051	6		2,531	2,537
15:00 - 16:00	241	156	4	5	12	29	65	12	2,276	11		2,800	2,811
16:00 - 17:00	301	152	7	10	15	38	50	24	3,267	14		3,864	3,878
17:00 - 18:00	266	212	13	5	20	26	36	15	2,665	35		3,258	3,293
18:00 - 19:00	278	206	7	6	10	25	48	12	2,676	16		3,268	3,284
19:00 - 20:00	267	184	5	9	14	27	61	7	2,052	41		2,626	2,667
20:00 - 21:00	197	687	13	5	9	23	43	16	1,965	56		2,958	3,014
21:00 - 22:00	139	155	8	5	3	12	39	8	1,848	4		2,221	2,225
Total (16h)	4,377	3,481	107	73	188	388	342	94	30,343	440	0	39,993	40,433



Traffic Count Survey(16hrs Count)

Date: 14-Mar-19 Location No: 16-9
 Location: Northern Bypass Surveyor Name: FRANK, SHARON, BRIDGET
 Direction: From BWAISE To BUSEGA

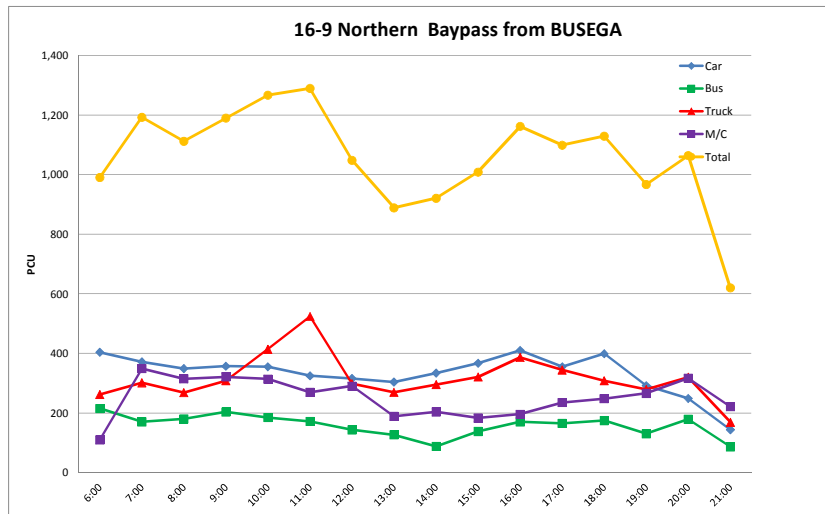
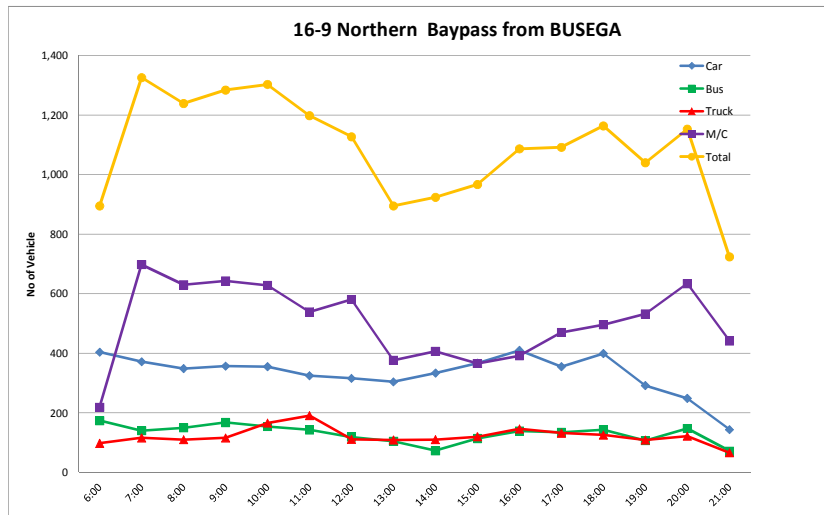
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	83	72	8	2	6	12	20	5	295	9		503	512
7:00 - 8:00	174	152	11	2	12	13	22	19	442	9		847	856
8:00 - 9:00	196	195	1	3	16	40	21	13	562	6		1,047	1,053
9:00 - 10:00	283	168	1	1	45	78	10	4	505	1		1,095	1,096
10:00 - 11:00	332	153	1	1	43	54	11	18	595	3		1,208	1,211
11:00 - 12:00	319	111	3	1	43	72	18	14	453	6		1,034	1,040
12:00 - 13:00	324	114	0	0	54	60	14	5	510	5		1,081	1,086
13:00 - 14:00	328	124	2	1	83	47	20	20	490	6		1,115	1,121
14:00 - 15:00	340	119	2	2	76	39	29	17	370	2		994	996
15:00 - 16:00	304	114	0	0	53	39	50	40	475	3		1,075	1,078
16:00 - 17:00	378	117	2	0	20	42	62	32	480	4		1,133	1,137
17:00 - 18:00	567	139	3	2	20	26	57	40	515	4		1,369	1,373
18:00 - 19:00	578	153	2	1	19	25	66	110	655	6		1,609	1,615
19:00 - 20:00	464	147	3	0	20	21	60	28	713	6		1,456	1,462
20:00 - 21:00	401	154	6	1	22	23	47	23	705	8		1,382	1,390
21:00 - 22:00	360	171	11	2	25	23	26	37	585	4		1,244	1,248
Total (16h)	5,431	2,203	56	19	557	614	368	310	8,350	82	0	18,192	18,274



Traffic Count Survey(16hrs Count)

Date: 14-Mar-19 Location No: 16-9
 Location: Northern Bypass Surveyor Name: JOHN, RONALD JULIUS
 Direction: From BUSEGA To BWAISE

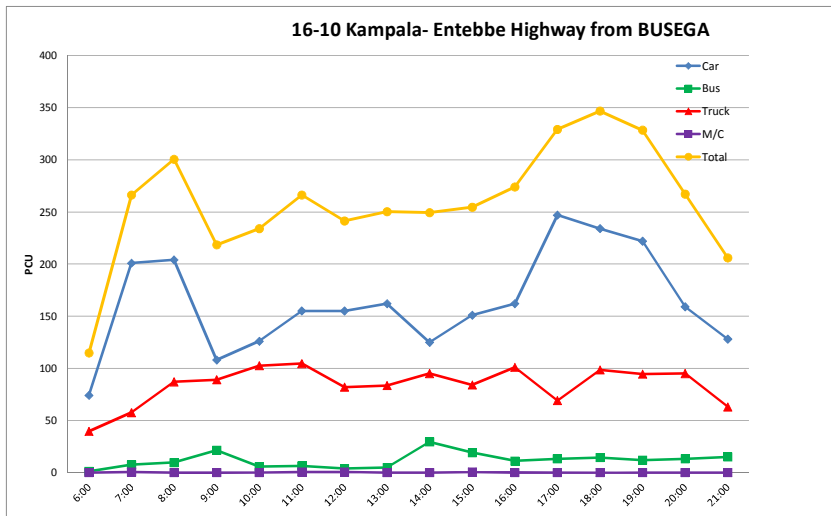
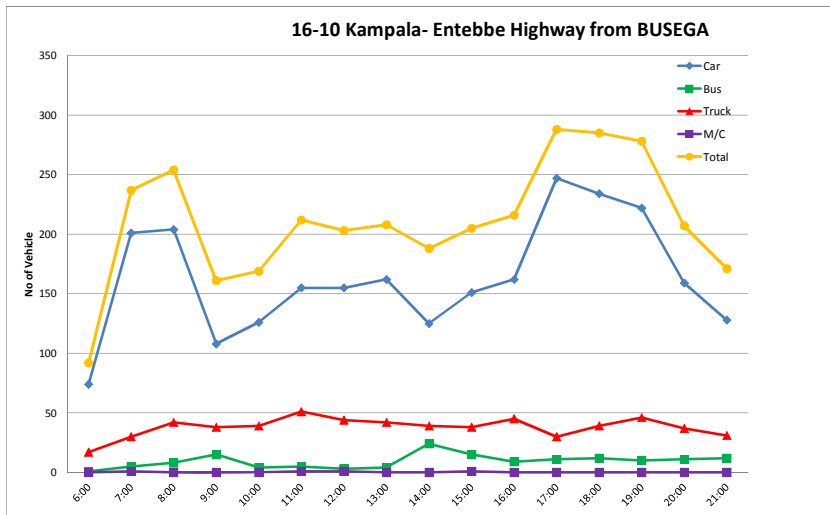
	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	404	164	3	7	16	41	18	23	219	4		895	899
7:00 - 8:00	372	135	3	2	15	67	9	25	698	9		1,326	1,335
8:00 - 9:00	349	149	1	0	22	62	11	15	630	10		1,239	1,249
9:00 - 10:00	357	165	1	2	13	65	10	28	643	8		1,284	1,292
10:00 - 11:00	355	154	0	0	38	72	28	28	628	1		1,303	1,304
11:00 - 12:00	325	142	1	0	17	102	8	64	539	2		1,198	1,200
12:00 - 13:00	316	117	2	0	2	85	9	15	581	3		1,127	1,130
13:00 - 14:00	304	103	2	0	12	82	6	9	377	4		895	899
14:00 - 15:00	334	72	1	0	1	87	7	15	407	2		924	926
15:00 - 16:00	367	110	4	0	2	94	11	13	366	4		967	971
16:00 - 17:00	410	133	3	3	9	102	9	26	392	6		1,087	1,093
17:00 - 18:00	355	127	7	1	7	100	9	16	470	2		1,092	1,094
18:00 - 19:00	399	137	4	2	13	100	6	7	496	10		1,164	1,174
19:00 - 20:00	292	101	6	0	11	75	12	11	532	3		1,040	1,043
20:00 - 21:00	249	146	1	1	12	77	7	26	634	2		1,153	1,155
21:00 - 22:00	144	71	1	0	6	47	5	8	442	3		727	730
Total (16h)	5,332	2,026	40	18	196	1,258	59	107	8,054	73	0	17,421	17,494



Traffic Count Survey(16hrs Count)

Date: 14-Mar-19 Location No: 16-10
 Location: Kampala- Entebbe Highway Surveyor Name: AMOS, ENOCK, LOICE
 Direction: From BUSEGA To ENTEBBE

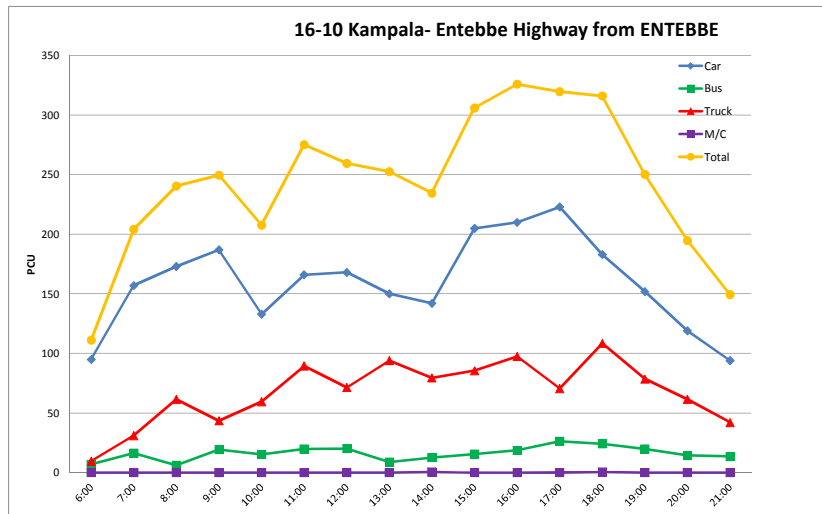
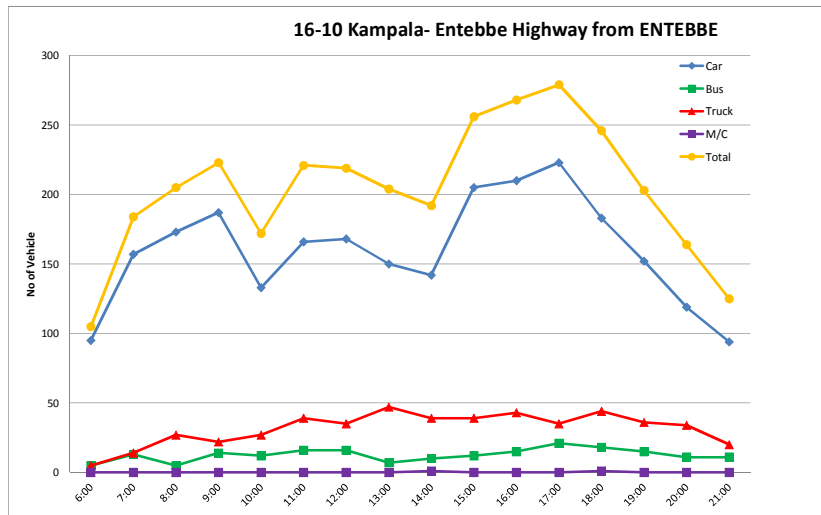
	Vehicle										NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11	Type (1-9)		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian			
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0				
6:00 - 7:00	74	1	0	0	4	10	3	0	0	0		92	92	
7:00 - 8:00	201	2	2	1	17	5	7	1	1	0		237	237	
8:00 - 9:00	204	8	0	0	18	15	9	0	0	0		254	254	
9:00 - 10:00	108	10	1	4	14	9	8	7	0	0		161	161	
10:00 - 11:00	126	3	0	1	10	9	11	9	0	0		169	169	
11:00 - 12:00	155	4	1	0	20	24	6	1	1	0		212	212	
12:00 - 13:00	155	2	1	0	24	12	5	3	1	0		203	203	
13:00 - 14:00	162	4	0	0	17	21	3	1	0	0		208	208	
14:00 - 15:00	125	22	2	0	9	19	6	5	0	0		188	188	
15:00 - 16:00	151	13	1	1	14	14	9	1	1	0		205	205	
16:00 - 17:00	162	8	1	0	15	19	11	0	0	0		216	216	
17:00 - 18:00	247	11	0	0	8	16	6	0	0	0		288	288	
18:00 - 19:00	234	12	0	0	6	23	10	0	0	0		285	285	
19:00 - 20:00	222	10	0	0	17	24	5	0	0	0		278	278	
20:00 - 21:00	159	11	0	0	5	22	10	0	0	0		207	207	
21:00 - 22:00	128	10	2	0	11	18	2	0	0	0		171	171	
Total (16h)	2,613	131	11	7	209	260	53	1	4	0	0	3,374	3,374	



Traffic Count Survey(16hrs Count)

Date: 14-Mar-19 Location No: 16-10
 Location: Kampala- Entebbe Highway Surveyor Name: MONDAY, GEOFREY, DENISE
 Direction: From ENTEBBE To BUSEGA

	Vehicle									NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type (1-9)	
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0			
6:00 - 7:00	95	4	0	1	2	3	0	0	0	0		105	105
7:00 - 8:00	157	11	2	0	4	8	1	1	0	0		184	184
8:00 - 9:00	173	5	0	0	10	8	8	1	0	1		205	206
9:00 - 10:00	187	9	3	2	11	6	5	0	0	0		223	223
10:00 - 11:00	133	11	0	1	10	10	4	3	0	0		172	172
11:00 - 12:00	166	14	2	0	10	22	5	2	0	0		221	221
12:00 - 13:00	168	13	3	0	14	16	4	1	0	0		219	219
13:00 - 14:00	150	6	1	0	21	18	8	0	0	0		204	204
14:00 - 15:00	142	8	2	0	16	17	5	1	1	0		192	192
15:00 - 16:00	205	10	1	1	12	21	6	0	0	1		256	257
16:00 - 17:00	210	13	2	0	12	23	8	0	0	0		268	268
17:00 - 18:00	223	19	1	1	14	17	3	1	0	0		279	279
18:00 - 19:00	183	11	6	1	7	28	7	2	1	0		246	246
19:00 - 20:00	152	9	6	0	9	25	2	0	0	0		203	203
20:00 - 21:00	119	9	1	1	17	15	2	0	0	0		164	164
21:00 - 22:00	94	10	1	0	8	8	4	0	0	0		125	125
Total (16h)	2,557	162	31	8	177	245	32	3	2	2	0	3,266	3,268



Intersection Directional Traffic Flow Counts (J-1 Kabusu JCT)

Traffic Count at Junction

Date: 13-Mar-19

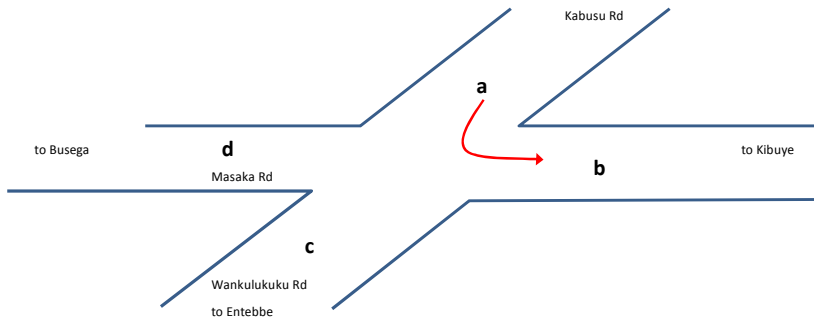
Location No: J-1

Location: Kabusu JCT.(Masaka roadx x Wankulukuku Road)

Direction: from a to b

Surveyor: SARAH, ELLY, JENIPHER

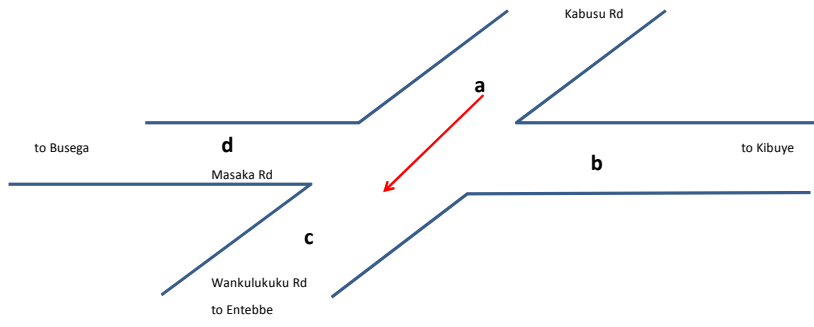
Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-9)		
7:00 - 7:30	2	1	0	0	0	0	0	0	14	1		17	18	
7:30 - 8:00	2	0	1	0	0	0	0	0	23	2		26	28	
8:00 - 8:30	0	1	1	0	0	0	0	0	17	0		19	19	
8:30 - 9:00	2	0	0	0	0	0	0	0	21	0		23	23	
SubTotal (morning)	6	2	2	0	0	0	0	0	75	3		85	88	
11:00 - 11:30	3	1	1	0	2	0	0	0	27	0		34	34	
11:30 - 12:00	4	1	0	0	2	0	0	0	43	0		50	50	
12:00 - 12:30	6	1	0	0	2	0	0	0	17	0		26	26	
12:30 - 13:00	5	0	0	0	0	0	0	0	27	0		32	32	
SubTotal (Noon)	18	3	1	0	6	0	0	0	114	0		142	142	
18:00 - 18:30	2	1	0	0	0	1	0	0	14	0		18	18	
18:30 - 19:00	2	0	0	0	0	0	0	0	19	0		21	21	
19:00 - 19:30	4	1	0	0	0	0	0	0	34	0		39	39	
19:30 - 20:00	1	0	0	0	0	0	0	0	20	0		21	21	
SubTotal (evening)	9	2	0	0	0	1	0	0	87	0		99	99	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-1**
 Location: **Kabusu JCT.(Masaka roadx x Wankulukuku Road)**
 Direction: from **a** to **C** Surveyor: **VICTORIA, AMBROSE**

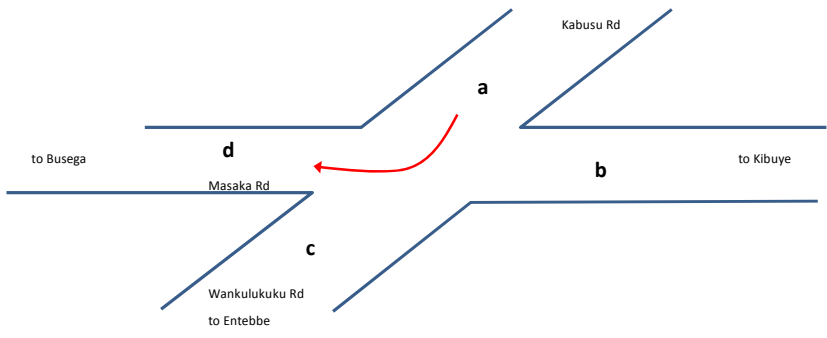
Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	65	40	0	1	1	0	0	0	181	0			288	288
7:30 - 8:00	48	40	0	0	1	3	0	0	206	2			298	300
8:00 - 8:30	32	43	2	0	3	4	1	0	228	2			313	315
8:30 - 9:00	26	32	0	1	4	1	0	0	216	3			280	283
SubTotal (morning)	171	155	2	2	9	8	1	0	831	7			1,179	1,186
11:00 - 11:30	45	28	0	0	4	4	0	1	165	1			247	248
11:30 - 12:00	64	18	0	0	1	5	0	1	176	2			265	267
12:00 - 12:30	40	22	0	0	8	4	0	0	156	1			230	231
12:30 - 13:00	32	19	0	0	2	5	1	1	123	2			183	185
SubTotal (Noon)	181	87	0	0	15	18	1	3	620	6			925	931
18:00 - 18:30	143	7	0	0	1	0	1	0	147	4			299	303
18:30 - 19:00	191	24	0	2	6	4	0	0	157	2			384	386
19:00 - 19:30	131	6	0	0	7	3	2	1	297	8			447	455
19:30 - 20:00	123	3	0	0	1	2	3	0	380	7			512	519
SubTotal (evening)	588	40	0	2	15	9	6	1	981	21			1,642	1,663



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-1**
 Location: **Kabusu JCT.(Masaka roadx x Wankulukuku Road)**
 Direction: from **a** to **d** Surveyor: **SHAMIM,IVERSON, AMALA**

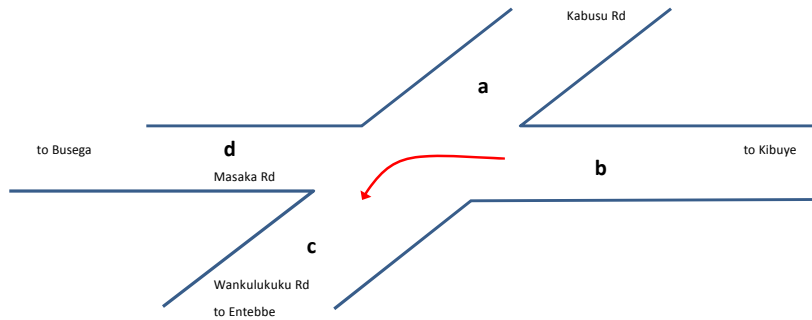
Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	5	10	1	0	0	0	0	0	58	3		74	77	
7:30 - 8:00	4	12	0	1	2	1	0	0	75	0		95	95	
8:00 - 8:30	1	7	1	0	0	2	0	1	64	2		76	78	
8:30 - 9:00	2	2	0	0	0	0	0	0	44	1		48	49	
SubTotal (morning)	12	31	2	1	2	3	0	1	241	6		293	299	
11:00 - 11:30	8	9	0	0	2	6	0	1	64	0		90	90	
11:30 - 12:00	18	14	0	1	4	4	0	0	63	0		104	104	
12:00 - 12:30	10	6	1	1	1	5	1	0	77	0		102	102	
12:30 - 13:00	14	6	0	1	5	3	0	0	42	0		71	71	
SubTotal (Noon)	50	35	1	3	12	18	1	1	246	0		367	367	
18:00 - 18:30	15	2	0	0	0	4	0	0	93	2		114	116	
18:30 - 19:00	12	2	0	0	1	5	0	1	86	0		107	107	
19:00 - 19:30	10	0	0	0	2	2	0	0	65	1		79	80	
19:30 - 20:00	8	0	0	0	0	1	0	0	84	5		93	98	
SubTotal (evening)	45	4	0	0	3	12	0	1	328	8		393	401	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-1**
 Location: **Kabusu JCT.(Masaka roadx x Wankulukuku Road)**
 Direction: from **b** to **C** Surveyor: **BENEDICTO,KAMARA,SPECHIOZA**

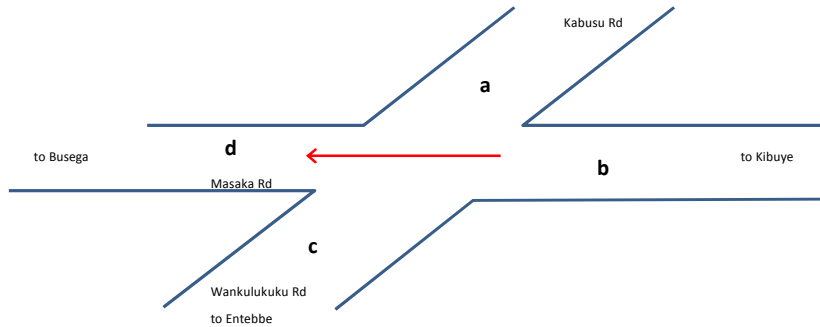
Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	22	7	0	0	0	1	0	1	81	4		112	116	
7:30 - 8:00	21	11	0	0	4	1	2	0	140	0		179	179	
8:00 - 8:30	14	11	0	0	1	0	1	0	150	1		177	178	
8:30 - 9:00	18	9	0	0	1	2	2	0	163	3		195	198	
SubTotal (morning)	75	38	0	0	6	4	5	1	534	8		663	671	
11:00 - 11:30	29	6	0	0	5	1	1	1	118	2		161	163	
11:30 - 12:00	37	4	0	0	0	1	2	2	115	3		161	164	
12:00 - 12:30	19	7	1	1	1	0	1	0	88	3		118	121	
12:30 - 13:00	34	3	0	0	3	1	1	1	112	1		155	156	
SubTotal (Noon)	119	20	1	1	9	3	5	4	433	9		595	604	
18:00 - 18:30	102	29	0	0	0	0	1	0	118	5		250	255	
18:30 - 19:00	102	30	1	0	5	2	2	1	119	10		262	272	
19:00 - 19:30	117	49	0	0	6	3	2	0	129	5		306	311	
19:30 - 20:00	145	43	1	0	3	2	1	0	175	17		370	387	
SubTotal (evening)	466	151	2	0	14	7	6	1	541	37		1,188	1,225	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-1**
 Location: **Kabusu JCT.(Masaka roadx x Wankulukuku Road)**
 Direction: from **b** to **d** Surveyor: **BALAAM,CHARLES, NORAH**

Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	36	37	0	0	11	3	8	1	149	8		245	253	
7:30 - 8:00	31	34	2	0	8	0	2	4	192	11		273	284	
8:00 - 8:30	47	50	1	0	11	2	6	0	199	7		316	323	
8:30 - 9:00	34	49	1	0	20	1	4	2	357	6		468	474	
SubTotal (morning)	148	170	4	0	50	6	20	7	897	32		1,302	1,334	
11:00 - 11:30	76	44	0	0	22	4	14	2	216	3		378	381	
11:30 - 12:00	61	34	0	0	23	1	12	2	226	7		359	366	
12:00 - 12:30	61	52	3	0	14	1	3	1	237	5		372	377	
12:30 - 13:00	67	55	2	0	22	4	16	2	228	7		396	403	
SubTotal (Noon)	265	185	5	0	81	10	45	7	907	22		1,505	1,527	
18:00 - 18:30	93	38	3	1	29	3	8	3	424	26		602	628	
18:30 - 19:00	81	51	1	0	14	6	13	3	570	27		739	766	
19:00 - 19:30	68	43	2	0	15	4	10	0	368	8		510	518	
19:30 - 20:00	70	51	0	0	19	2	11	1	433	18		587	605	
SubTotal (evening)	312	183	6	1	77	15	42	7	1,795	79		2,438	2,517	

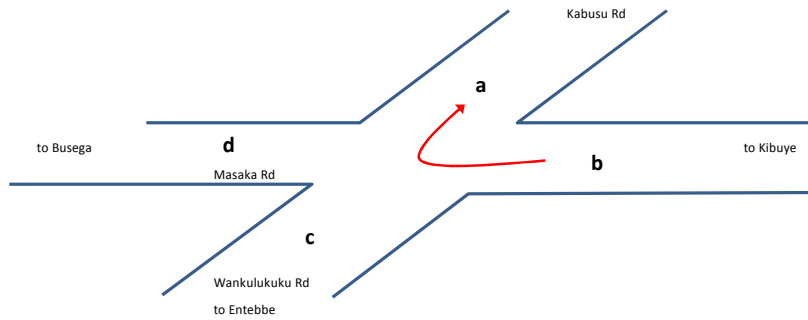


Traffic Count at Junction

Date: **13-Mar-19**
 Location: **Kabusu JCT.(Masaka roadx x Wankulukuku Road)**
 Direction: from **b** to **a**

Location No: **J-1**
 Surveyor: **CHRIS, BASIL, LUCKY**

Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	3	1	0	0	1	0	1	0	2	0		8	8	
7:30 - 8:00	3	1	0	0	0	0	0	0	2	0		6	6	
8:00 - 8:30	3	2	0	0	1	0	0	0	4	0		10	10	
8:30 - 9:00	1	1	0	0	0	3	0	0	2	0		7	7	
SubTotal (morning)	10	5	0	0	2	3	1	0	10	0		31	31	
11:00 - 11:30	8	3	0	0	2	0	0	0	2	0		15	15	
11:30 - 12:00	4	1	0	0	1	0	0	0	6	1		12	13	
12:00 - 12:30	5	3	0	0	1	0	0	0	2	0		11	11	
12:30 - 13:00	3	1	0	0	3	2	1	0	4	0		14	14	
SubTotal (Noon)	20	8	0	0	7	2	1	0	14	1		52	53	
18:00 - 18:30	9	0	0	1	0	0	0	0	0	0		10	10	
18:30 - 19:00	4	0	0	0	0	0	1	0	0	0		5	5	
19:00 - 19:30	3	1	0	0	0	0	0	0	0	0		4	4	
19:30 - 20:00	5	0	0	0	0	0	0	0	0	0		5	5	
SubTotal (evening)	21	1	0	1	0	0	1	0	0	0		24	24	

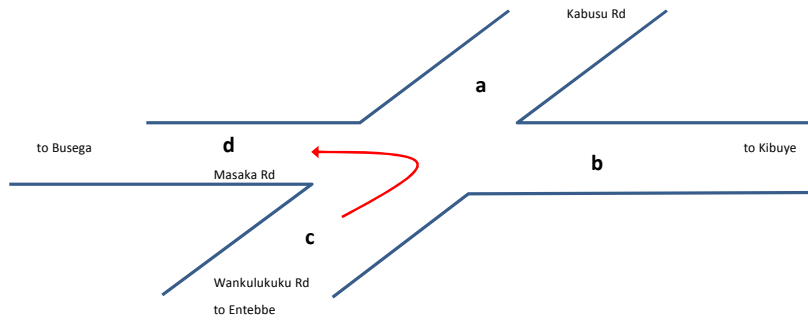


Traffic Count at Junction

Date: **13-Mar-19**
 Location: **Kabusu JCT.(Masaka roadx x Wankulukuku Road)**
 Direction: from **C** to **d**

Location No: **J-1**
 Surveyor: **ESTHER,PROSSY,AGGY**

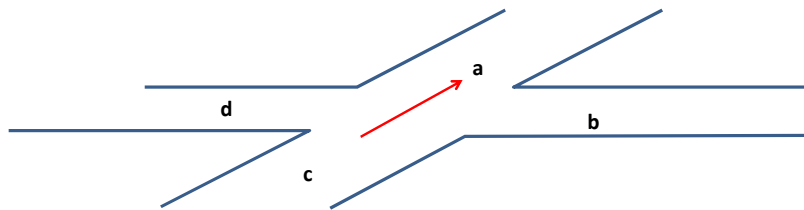
Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	17	5	0	0	1	1	0	1	41	0		66	66	
7:30 - 8:00	16	1	0	0	2	1	0	0	102	0		122	122	
8:00 - 8:30	12	1	0	0	0	0	1	2	78	0		94	94	
8:30 - 9:00	13	1	0	0	2	0	4	3	70	0		93	93	
SubTotal (morning)	58	8	0	0	5	2	5	6	291	0		375	375	
11:00 - 11:30	18	2	0	0	2	1	1	2	73	0		99	99	
11:30 - 12:00	11	2	0	0	3	2	0	2	60	0		80	80	
12:00 - 12:30	13	0	0	0	3	6	5	2	54	0		83	83	
12:30 - 13:00	13	2	0	0	1	3	3	3	51	0		76	76	
SubTotal (Noon)	55	6	0	0	9	12	9	9	238	0		338	338	
18:00 - 18:30	19	0	0	0	3	3	0	1	87	0		113	113	
18:30 - 19:00	16	1	0	0	2	2	0	1	55	0		77	77	
19:00 - 19:30	10	1	0	0	3	0	2	3	87	0		106	106	
19:30 - 20:00	15	0	0	0	1	2	3	1	96	0		118	118	
SubTotal (evening)	60	2	0	0	9	7	5	6	325	0		414	414	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-1**
 Location: **Kabusu JCT.(Masaka roadx x Wankulukuku Road)**
 Direction: from **C** to **a** Surveyor: **EDWARD, SANDE, BERNARD**

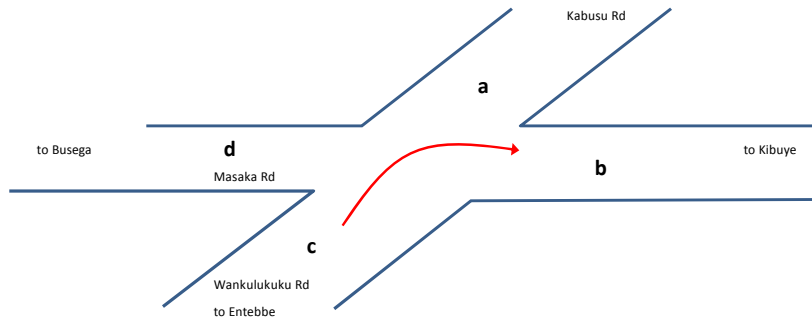
Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	180	0	1	0	2	5	0	0	315	8		503	511	
7:30 - 8:00	215	0	2	0	1	2	0	0	570	4		790	794	
8:00 - 8:30	167	0	0	0	4	2	0	0	391	3		564	567	
8:30 - 9:00	197	0	0	0	2	1	1	0	466	6		667	673	
SubTotal (morning)	759	0	3	0	9	10	1	0	1,742	21		2,524	2,545	
11:00 - 11:30	102	0	0	0	3	7	1	1	224	2		338	340	
11:30 - 12:00	63	1	0	0	2	2	3	0	299	0		370	370	
12:00 - 12:30	120	0	0	1	2	1	1	0	202	1		327	328	
12:30 - 13:00	68	0	0	0	1	0	1	0	154	0		224	224	
SubTotal (Noon)	353	1	0	1	8	10	6	1	879	3		1,259	1,262	
18:00 - 18:30	106	31	1	0	1	0	3	4	174	3		320	323	
18:30 - 19:00	75	35	0	0	4	0	1	0	175	0		290	290	
19:00 - 19:30	58	52	2	0	1	1	4	1	304	1		423	424	
19:30 - 20:00	47	57	1	0	1	1	3	0	311	0		421	421	
SubTotal (evening)	286	175	4	0	7	2	11	5	964	4		1,454	1,458	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-1**
 Location: **Kabusu JCT.(Masaka roadx x Wankulukuku Road)**
 Direction: from **C** to **b** Surveyor: **LILLIAN, SAM, BECKY**

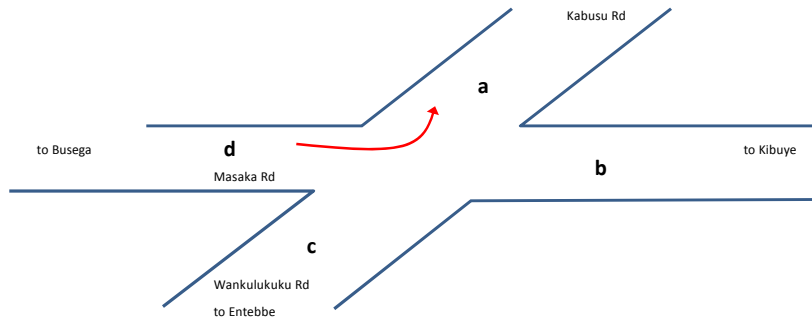
Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	161	4	0	0	6	4	0	2	50	6		227	233	
7:30 - 8:00	115	3	0	0	3	2	4	1	54	2		182	184	
8:00 - 8:30	98	2	0	0	3	3	1	2	52	3		161	164	
8:30 - 9:00	56	3	2	0	3	4	3	1	78	5		150	155	
SubTotal (morning)	430	12	2	0	15	13	8	6	234	16		720	736	
11:00 - 11:30	31	4	0	0	1	2	1	3	59	0		101	101	
11:30 - 12:00	31	3	0	0	1	0	1	0	47	0		83	83	
12:00 - 12:30	32	3	0	0	4	0	0	1	25	0		65	65	
12:30 - 13:00	32	6	0	0	8	0	1	3	40	1		90	91	
SubTotal (Noon)	126	16	0	0	14	2	3	7	171	1		339	340	
18:00 - 18:30	16	8	0	0	4	3	2	2	64	3		99	102	
18:30 - 19:00	17	10	0	0	2	1	0	1	27	0		58	58	
19:00 - 19:30	13	8	0	0	4	0	2	1	40	0		68	68	
19:30 - 20:00	19	6	0	0	1	2	0	0	42	0		70	70	
SubTotal (evening)	65	32	0	0	11	6	4	4	173	3		295	298	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-1**
 Location: **Kabusu JCT.(Masaka roadx x Wankulukuku Road)**
 Direction: from **d** to **a** Surveyor: **JOEL,PRIMAH, ELIZABETH**

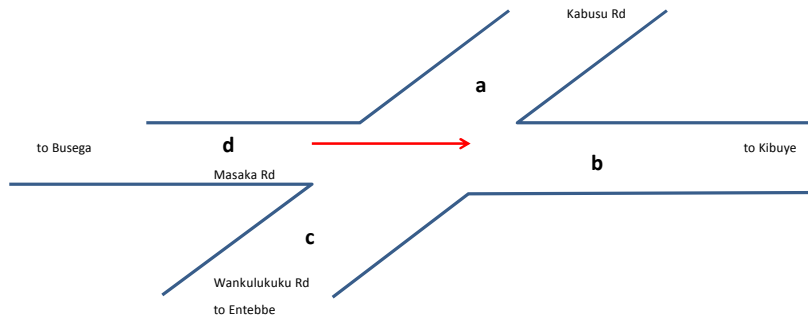
Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	17	14	0	0	4	2	0	0	107	8		144	152	
7:30 - 8:00	16	9	0	0	6	3	0	0	65	8		99	107	
8:00 - 8:30	8	11	0	0	5	1	0	0	73	5		98	103	
8:30 - 9:00	15	17	0	0	7	1	0	0	83	4		123	127	
SubTotal (morning)	56	51	0	0	22	7	0	0	328	25		464	489	
11:00 - 11:30	23	16	0	0	3	3	1	0	84	3		130	133	
11:30 - 12:00	20	15	0	0	4	3	2	0	70	4		114	118	
12:00 - 12:30	15	19	0	0	6	3	2	1	67	0		113	113	
12:30 - 13:00	15	9	1	0	2	3	1	1	53	3		85	88	
SubTotal (Noon)	73	59	1	0	15	12	6	2	274	10		442	452	
18:00 - 18:30	23	17	1	1	0	1	0	2	89	2		134	136	
18:30 - 19:00	15	18	0	0	2	0	0	0	80	2		115	117	
19:00 - 19:30	7	13	1	1	4	1	0	0	69	1		96	97	
19:30 - 20:00	10	6	1	0	0	0	0	2	97	1		116	117	
SubTotal (evening)	55	54	3	2	6	2	0	4	335	6		461	467	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-1**
 Location: **Kabusu JCT.(Masaka roadx x Wankulukuku Road)**
 Direction: from **d** to **b** Surveyor: **DANIEL,WISELY,OCIRA**

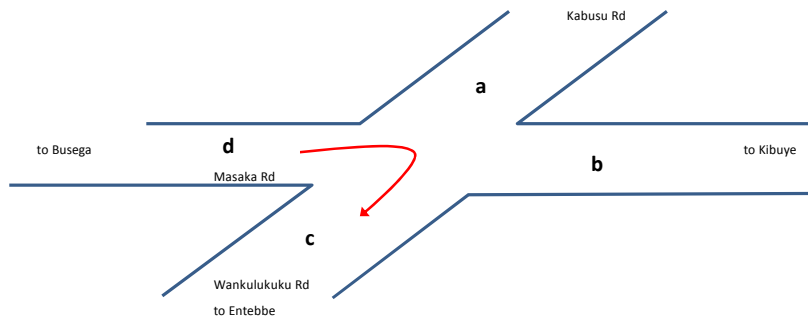
Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	252	42	1	0	12	22	11	6	261	11			607	618
7:30 - 8:00	204	49	3	1	12	10	10	3	443	33			735	768
8:00 - 8:30	181	43	2	0	9	8	13	2	574	181			832	1,013
8:30 - 9:00	148	30	1	0	8	11	8	1	560	148			767	915
SubTotal (morning)	785	164	7	1	41	51	42	12	1,838	373			2,941	3,314
11:00 - 11:30	99	35	1	0	7	19	14	0	360	6			535	541
11:30 - 12:00	129	41	1	0	4	11	24	2	305	10			517	527
12:00 - 12:30	115	51	2	0	11	10	19	5	289	4			502	506
12:30 - 13:00	128	17	0	0	5	11	9	2	337	5			509	514
SubTotal (Noon)	471	144	4	0	27	51	66	9	1,291	25			2,063	2,088
18:00 - 18:30	79	49	1	1	7	4	9	4	289	6			443	449
18:30 - 19:00	65	47	0	0	3	7	19	11	294	9			446	455
19:00 - 19:30	84	46	1	0	5	7	4	5	344	4			496	500
19:30 - 20:00	119	55	3	0	3	4	7	3	385	3			579	582
SubTotal (evening)	347	197	5	1	18	22	39	23	1,312	22			1,964	1,986



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-1**
 Location: **Kabusu JCT.(Masaka roadx x Wankulukuku Road)**
 Direction: from **d** to **C** Surveyor: **GECK,ELLIA,SAM**

Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	9	0	0	0	1	3	1	0	41	2		55	57	
7:30 - 8:00	7	0	0	0	14	2	3	4	72	1		102	103	
8:00 - 8:30	7	1	0	0	1	1	1	3	51	1		65	66	
8:30 - 9:00	2	0	0	0	1	1	0	0	51	5		55	60	
SubTotal (morning)	25	1	0	0	17	7	5	7	215	9		277	286	
11:00 - 11:30	7	0	0	0	5	3	0	1	35	2		51	53	
11:30 - 12:00	10	2	0	0	0	1	0	2	25	0		40	40	
12:00 - 12:30	14	0	0	0	3	3	0	0	18	2		38	40	
12:30 - 13:00	10	0	1	0	3	2	0	2	24	1		42	43	
SubTotal (Noon)	41	2	1	0	11	9	0	5	102	5		171	176	
18:00 - 18:30	35	3	0	0	6	3	0	0	55	1		102	103	
18:30 - 19:00	26	0	0	0	5	3	1	1	87	5		123	128	
19:00 - 19:30	36	2	1	0	4	1	0	1	83	2		128	130	
19:30 - 20:00	57	0	1	0	0	2	2	2	86	5		150	155	
SubTotal (evening)	154	5	2	0	15	9	3	4	311	13		503	516	



Intersection Directional Traffic Flow Counts (J-2 Natete JCT)

Traffic Count at Junction

Date: 13-Mar-19

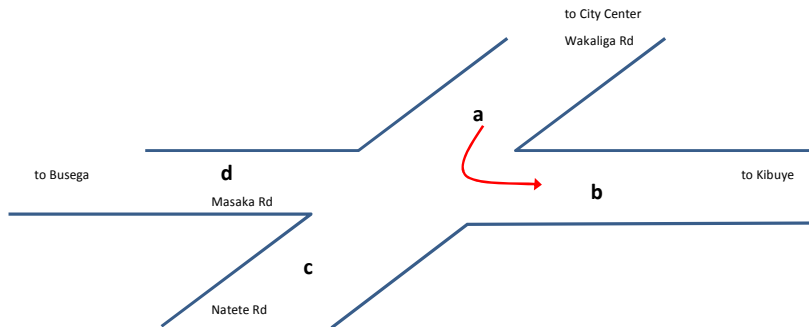
Location No: J-2

Location: Natete JCT.(Masaka roadx Natete Road)

Direction: from a to b

Surveyor: JIMMY,ELIAS,ANIFA

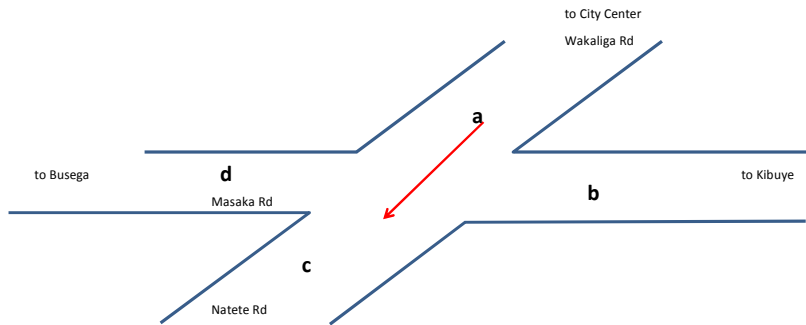
Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-9)		
7:00 - 7:30	19	2	0	0	1	0	1	0	59	6		82	88	
7:30 - 8:00	10	0	0	0	1	0	1	0	81	10		93	103	
8:00 - 8:30	10	1	0	0	1	1	0	0	134	12		147	159	
8:30 - 9:00	5	0	0	0	0	1	0	0	86	13		92	105	
SubTotal (morning)	44	3	0	0	3	2	2	0	360	41	0	414	455	
11:00 - 11:30	5	3	0	0	1	1	0	0	55	11		65	76	
11:30 - 12:00	6	1	0	0	0	0	0	0	54	7		61	68	
12:00 - 12:30	7	0	0	0	2	1	1	0	56	5		67	72	
12:30 - 13:00	6	2	0	0	0	0	1	0	63	8		72	80	
SubTotal (Noon)	24	6	0	0	3	2	2	0	228	31	0	265	296	
17:00 - 17:30	10	0	0	0	1	1	0	0	65	3		77	80	
17:30 - 18:00	7	0	0	0	0	1	0	1	68	5		77	82	
18:00 - 18:30	8	0	0	0	0	0	0	0	56	4		64	68	
18:30 - 19:00	9	0	0	0	1	0	0	0	89	3		99	102	
SubTotal (evening)	34	0	0	0	2	2	0	1	278	15	0	317	332	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-2**
 Location: **Kabusu JCT.(Masaka roadx x Natete Road)**
 Direction: from **a** to **C** Surveyor: **CHRISTINE, MOSES, LUKEMAN**

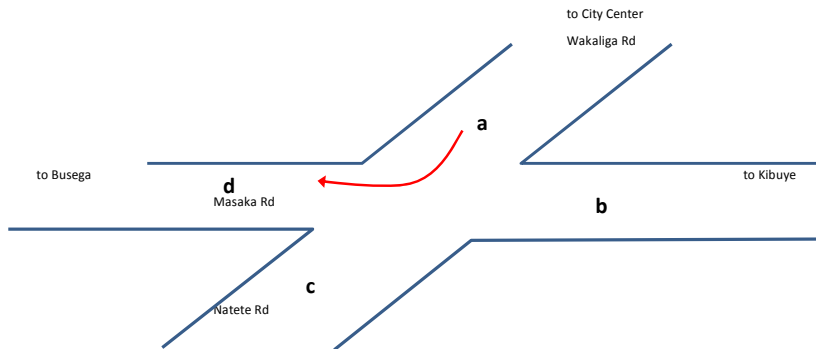
Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	8	4	0	0	1	0	0	0	45	13		58	71	
7:30 - 8:00	11	5	0	0	3	0	0	0	73	4		92	96	
8:00 - 8:30	9	10	0	0	6	1	0	0	78	6		104	110	
8:30 - 9:00	13	2	0	0	1	2	0	0	93	5		111	116	
SubTotal (morning)	41	21	0	0	11	3	0	0	289	28	0	365	393	
11:00 - 11:30	31	5	0	1	2	0	0	0	85	2		124	126	
11:30 - 12:00	44	4	1	1	6	1	2	0	73	6		132	138	
12:00 - 12:30	35	4	0	0	7	1	0	0	74	3		121	124	
12:30 - 13:00	28	8	2	0	3	0	0	0	79	3		120	123	
SubTotal (Noon)	138	21	3	2	18	2	2	0	311	14	0	497	511	
17:00 - 17:30	58	21	2	0	1	1	0	0	68	2		151	153	
17:30 - 18:00	58	28	0	0	4	1	1	0	81	2		173	175	
18:00 - 18:30	60	9	1	0	3	1	1	1	71	1		147	148	
18:30 - 19:00	93	4	2	0	0	1	0	0	70	3		170	173	
SubTotal (evening)	269	62	5	0	8	4	2	1	290	8	0	641	649	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-2**
 Location: **Kabusu JCT.(Masaka roadx Natete Road)**
 Direction: from **a** to **d** Surveyor: **JAMES, AIDAH, LUCY**

Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	53	43	2	5	1	4	0	0	91	12			199	211
7:30 - 8:00	34	57	0	1	1	4	0	0	169	22			266	288
8:00 - 8:30	28	59	1	1	1	1	0	0	169	13			260	273
8:30 - 9:00	28	37	4	1	0	1	1	0	218	11			290	301
SubTotal (morning)	143	196	7	8	3	10	1	0	647	58	0		1,015	1,073
11:00 - 11:30	53	50	1	3	5	6	0	0	230	8			348	356
11:30 - 12:00	55	60	1	2	3	4	0	0	196	6			321	327
12:00 - 12:30	56	41	2	3	0	2	1	0	155	4			260	264
12:30 - 13:00	50	50	0	1	8	3	0	0	173	5			285	290
SubTotal (Noon)	214	201	4	9	16	15	1	0	754	23	0		1,214	1,237
17:00 - 17:30	58	29	0	0	1	4	1	0	260	3			353	356
17:30 - 18:00	68	26	2	1	4	3	2	0	310	5			416	421
18:00 - 18:30	70	34	1	1	3	3	1	1	480	4			594	598
18:30 - 19:00	48	15	1	1	1	2	2	0	590	16			660	676
SubTotal (evening)	244	104	4	3	9	12	6	1	1,640	28	0		2,023	2,051

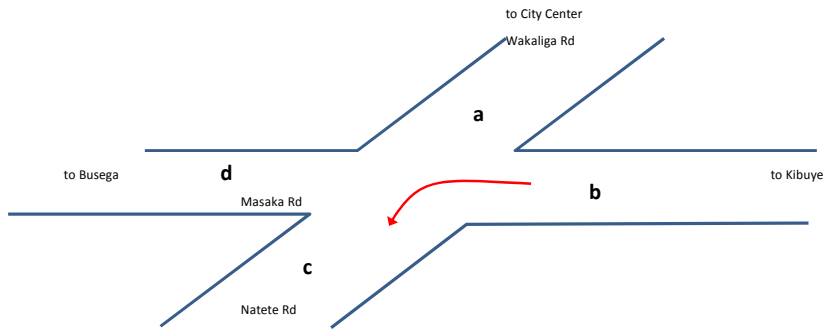


Traffic Count at Junction

Date: **13-Mar-19**
 Location: Kabusu JCT. (Masaka roadx x Natete Road)
 Direction: from b to C

Location No: J-2
 Surveyor: **STEVEN, MORRIS, NIGHT**

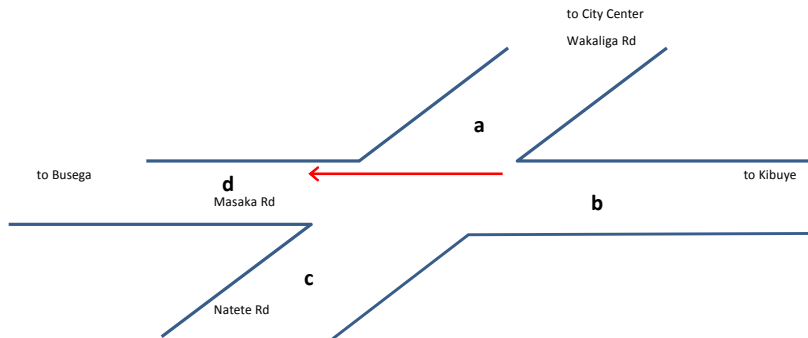
Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	4	0	0	0	1	1	2	0	17	5		25	30	
7:30 - 8:00	3	1	1	0	1	2	0	0	30	1		38	39	
8:00 - 8:30	8	1	2	0	1	2	1	0	38	10		53	63	
8:30 - 9:00	5	1	1	2	3	3	0	0	20	4		35	39	
SubTotal (morning)	20	3	4	2	6	8	3	0	105	20	0	151	171	
11:00 - 11:30	14	0	0	1	4	3	0	0	35	2		57	59	
11:30 - 12:00	5	0	0	0	4	3	0	0	20	1		32	33	
12:00 - 12:30	9	1	0	0	3	1	1	1	29	2		45	47	
12:30 - 13:00	2	1	1	0	1	4	1	3	12	5		25	30	
SubTotal (Noon)	30	2	1	1	12	11	2	4	96	10	0	159	169	
17:00 - 17:30	5	1	0	0	2	3	2	0	36	2		49	51	
17:30 - 18:00	4	1	3	2	2	1	2	1	23	3		39	42	
18:00 - 18:30	13	12	2	0	1	2	1	0	23	1		54	55	
18:30 - 19:00	3	3	0	1	1	3	0	1	30	1		42	43	
SubTotal (evening)	25	17	5	3	6	9	5	2	112	7	0	184	191	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-2**
 Location: **Kabusu JCT.(Masaka roadx x Natete Road)**
 Direction: from **b** to **d** Surveyor: **ANDREW, LIZA, NORAH**

Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	99	47	0	0	2	17	2	1	265	9		433	442	
7:30 - 8:00	104	31	0	0	11	8	1	5	215	11		375	386	
8:00 - 8:30	78	44	0	0	1	9	1	2	260	11		395	406	
8:30 - 9:00	87	45	0	0	1	11	1	6	270	13		421	434	
SubTotal (morning)	368	167	0	0	15	45	5	14	1,010	44	0	1,624	1,668	
11:00 - 11:30	46	43	13	3	2	10	0	7	250	11		374	385	
11:30 - 12:00	62	52	0	0	14	17	5	5	295	21		450	471	
12:00 - 12:30	44	53	0	1	12	16	0	11	310	14		447	461	
12:30 - 13:00	54	28	1	2	12	10	2	12	285	22		406	428	
SubTotal (Noon)	206	176	14	6	40	53	7	35	1,140	68	0	1,677	1,745	
17:00 - 17:30	60	52	0	0	11	6	3	8	420	5		560	565	
17:30 - 18:00	77	43	0	0	10	18	9	9	420	6		586	592	
18:00 - 18:30	147	21	2	0	1	10	3	14	275	9		473	482	
18:30 - 19:00	64	22	0	0	12	14	7	1	335	12		455	467	
SubTotal (evening)	348	138	2	0	34	48	22	32	1,450	32	0	2,074	2,106	

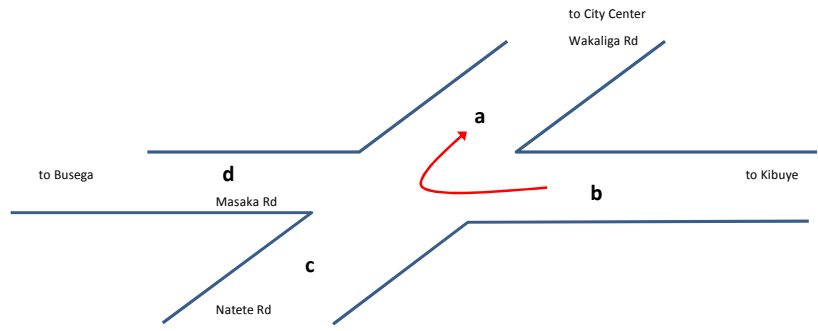


Traffic Count at Junction

Date: **13-Mar-19**
 Location: Kabusu JCT.(Masaka roadx x Natete Road)
 Direction: from b to a

Location No: J-2
 Surveyor: **PATIENCE, RITA, PAUL**

Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	9	25	1	0	4	6	0	0	67	15			112	127
7:30 - 8:00	12	41	2	0	7	3	0	0	71	10			136	146
8:00 - 8:30	12	24	2	0	6	8	0	0	82	28			134	162
8:30 - 9:00	9	21	0	0	3	3	1	0	88	15			125	140
SubTotal (morning)	42	111	5	0	20	20	1	0	308	68	0		507	575
11:00 - 11:30	23	13	1	0	8	3	0	1	140	28			189	217
11:30 - 12:00	8	22	1	0	8	9	0	0	116	27			164	191
12:00 - 12:30	19	20	1	0	12	4	1	0	131	28			188	216
12:30 - 13:00	24	22	0	0	11	4	1	0	115	16			177	193
SubTotal (Noon)	74	77	3	0	39	20	2	1	502	99	0		718	817
17:00 - 17:30	14	10	0	0	2	2	1	2	179	32			210	242
17:30 - 18:00	10	1	2	0	1	0	2	0	227	27			243	270
18:00 - 18:30	8	11	1	3	2	6	1	0	188	26			220	246
18:30 - 19:00	39	48	0	0	8	4	0	0	188	9			287	296
SubTotal (evening)	71	70	3	3	13	12	4	2	782	94	0		960	1,054

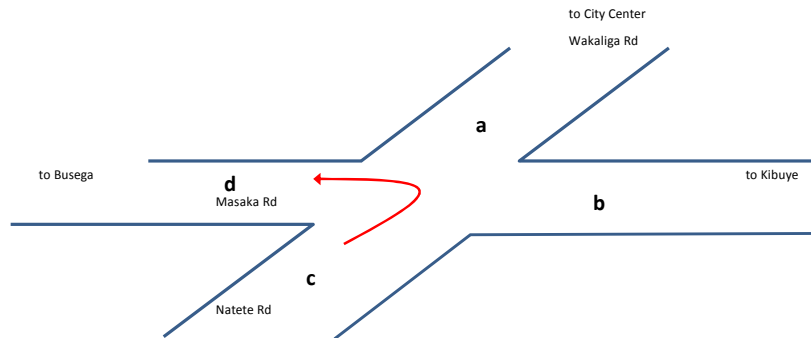


Traffic Count at Junction

Date: **13-Mar-19**
 Location: Kabusu JCT.(Masaka roadx x Natete Road)
 Direction: from C to d

Location No: J-2
 Surveyor: **MUKASA, ISMA, MOSES**

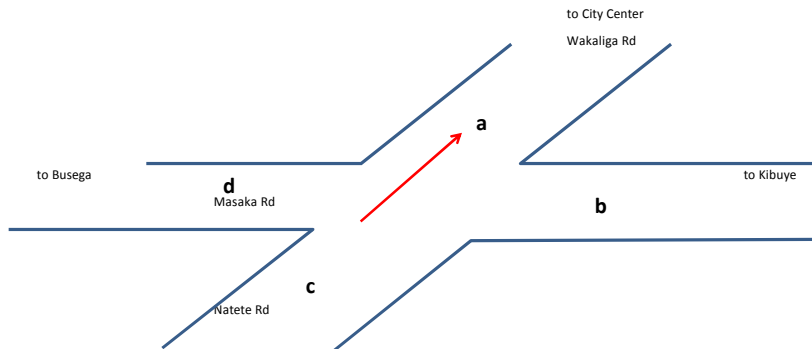
Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	19	6	3	0	5	5	1	0	34	8		73	81	
7:30 - 8:00	21	7	1	1	7	3	2	2	39	39		83	122	
8:00 - 8:30	34	9	2	0	13	5	3	1	25	25		92	117	
8:30 - 9:00	19	7	2	2	11	5	3	3	25	20		77	97	
SubTotal (morning)	93	29	8	3	36	18	9	6	123	92	0	325	417	
11:00 - 11:30	13	7	3	2	4	4	2	3	44	7		82	89	
11:30 - 12:00	10	6	3	3	12	5	2	2	50	4		93	97	
12:00 - 12:30	17	6	3	2	12	8	4	2	27	7		81	88	
12:30 - 13:00	15	5	4	1	7	8	2	3	28	2		73	75	
SubTotal (Noon)	55	24	13	8	35	25	10	10	149	20	0	329	349	
17:00 - 17:30	21	3	3	1	4	6	4	1	11	2		54	56	
17:30 - 18:00	23	4	3	1	7	3	3	0	29	3		73	76	
18:00 - 18:30	19	3	1	0	6	2	2	3	55	2		91	93	
18:30 - 19:00	18	2	1	1	3	1	0	0	72	3		98	101	
SubTotal (evening)	81	12	8	3	20	12	9	4	167	10	0	316	326	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-2**
 Location: **Natete JCT.(Masaka roadx x Natete Road)**
 Direction: from **C** to **a** Surveyor: **ROBERT, LULE, MERCY**

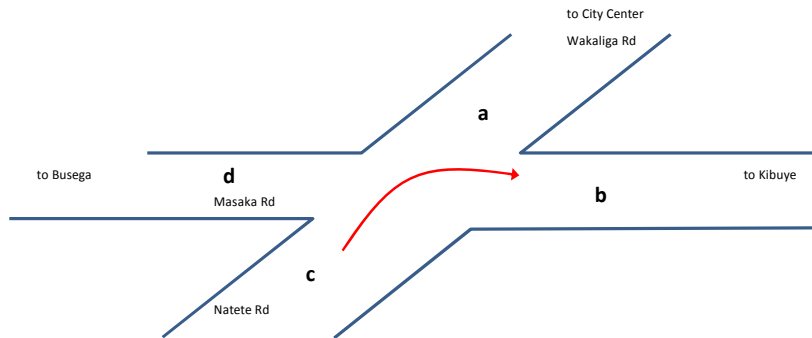
Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	46	24	0	0	4	5	0	0	60	6		139	145	
7:30 - 8:00	64	29	1	1	0	0	0	0	70	9		165	174	
8:00 - 8:30	75	13	0	0	1	1	0	0	72	2		162	164	
8:30 - 9:00	75	33	0	1	5	1	0	1	66	3		182	185	
SubTotal (morning)	260	99	1	2	10	7	0	1	268	20	0	648	668	
11:00 - 11:30	33	10	0	0	9	3	1	0	41	2		97	99	
11:30 - 12:00	34	14	0	0	3	3	0	0	50	2		104	106	
12:00 - 12:30	33	22	1	0	1	4	0	0	56	5		117	122	
12:30 - 13:00	29	12	1	0	2	2	0	0	50	1		96	97	
SubTotal (Noon)	129	58	2	0	15	12	1	0	197	10	0	414	424	
17:00 - 17:30	27	6	0	0	3	0	0	0	38	5		74	79	
17:30 - 18:00	30	5	0	0	4	5	0	0	23	0		67	67	
18:00 - 18:30	20	9	1	0	3	1	1	1	74	0		110	110	
18:30 - 19:00	31	4	2	0	2	1	0	0	47	0		87	87	
SubTotal (evening)	108	24	3	0	12	7	1	1	182	5	0	338	343	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-2**
 Location: **Kabusu JCT.(Masaka roadx x Natete Road)**
 Direction: from **C** to **b** Surveyor: **BERNA, JACK, MARTHA**

Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	55	53	3	0	8	9	0	0	32	11		160	171	
7:30 - 8:00	58	47	1	0	6	2	1	0	28	5		143	148	
8:00 - 8:30	37	40	0	0	8	6	1	0	32	7		124	131	
8:30 - 9:00	43	29	0	1	6	8	1	1	41	11		130	141	
SubTotal (morning)	193	169	4	1	28	25	3	1	133	34	0	557	591	
11:00 - 11:30	24	28	0	0	6	5	2	0	38	6		103	109	
11:30 - 12:00	19	26	1	0	5	5	2	2	43	13		103	116	
12:00 - 12:30	30	38	1	0	4	4	1	0	32	2		110	112	
12:30 - 13:00	18	30	0	0	2	4	2	0	34	6		90	96	
SubTotal (Noon)	91	122	2	0	17	18	7	2	147	27	0	406	433	
17:00 - 17:30	24	27	2	0	2	6	0	1	43	8		105	113	
17:30 - 18:00	14	28	0	0	3	5	1	0	54	8		105	113	
18:00 - 18:30	34	40	1	0	5	5	1	0	33	4		119	123	
18:30 - 19:00	20	23	4	0	3	4	2	0	35	6		91	97	
SubTotal (evening)	92	118	7	0	13	20	4	1	165	26	0	420	446	

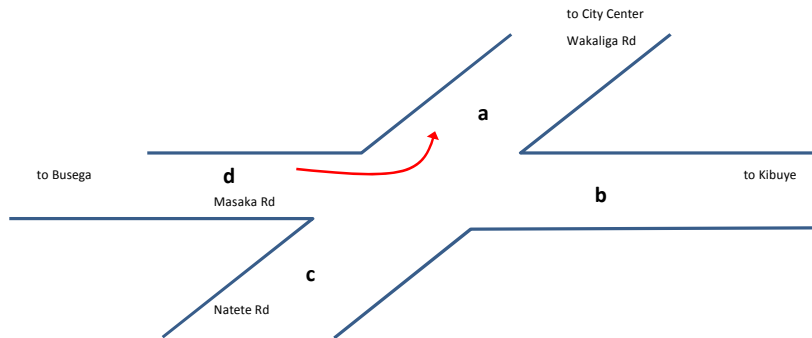


Traffic Count at Junction

Date: **13-Mar-19**
 Location: Kabusu JCT.(Masaka roadx x Natete Road)
 Direction: from d to a

Location No: J-2
 Surveyor: **FIONA, GRACE, JULIUS**

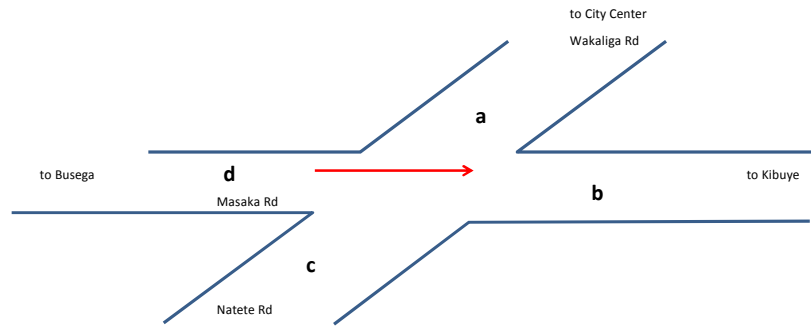
Vehicle Type Time	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	81	79	1	2	3	1	0	0	270	12		437	449	
7:30 - 8:00	39	49	3	1	1	3	0	0	407	8		503	511	
8:00 - 8:30	59	48	3	0	1	1	2	0	435	5		549	554	
8:30 - 9:00	40	56	2	0	1	1	2	1	217	4		320	324	
SubTotal (morning)	219	232	9	3	6	6	4	1	1,329	29	0	1,809	1,838	
11:00 - 11:30	44	61	0	1	6	0	4	2	144	0		262	262	
11:30 - 12:00	36	39	0	0	1	3	5	1	123	0		208	208	
12:00 - 12:30	36	37	0	2	6	4	1	1	133	2		220	222	
12:30 - 13:00	38	46	0	2	5	1	2	1	171	7		266	273	
SubTotal (Noon)	154	183	0	5	18	8	12	5	571	9	0	956	965	
17:00 - 17:30	34	38	1	4	1	2	0	0	91	0		171	171	
17:30 - 18:00	29	21	0	5	2	2	0	1	127	0		187	187	
18:00 - 18:30	32	26	1	0	2	3	1	0	150	0		215	215	
18:30 - 19:00	35	41	1	4	1	0	1	0	105	0		188	188	
SubTotal (evening)	130	126	3	13	6	7	2	1	473	0	0	761	761	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-2**
 Location: **Kabusu JCT. (Masaka roadx x Natete Road)**
 Direction: from **d** to **b** Surveyor: **STANLEY, MANDE, ALVIN**

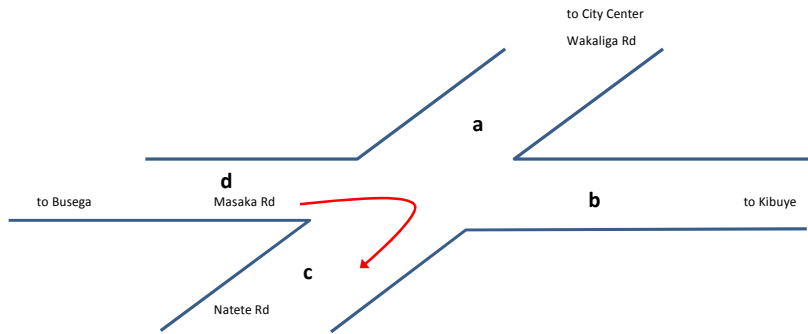
Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	126	120	2	1	27	8	1	3	844	42		1,132	1,174	
7:30 - 8:00	149	89	4	0	27	11	6	6	1,114	41		1,406	1,447	
8:00 - 8:30	88	94	3	0	28	8	2	2	928	36		1,153	1,189	
8:30 - 9:00	127	96	4	0	26	11	4	5	689	40		962	1,002	
SubTotal (morning)	490	399	13	1	108	38	13	16	3,575	159	0	4,653	4,812	
11:00 - 11:30	83	99	2	1	44	6	4	3	316	12		558	570	
11:30 - 12:00	75	81	1	3	41	9	4	4	157	10		375	385	
12:00 - 12:30	83	80	1	1	37	7	4	2	165	6		380	386	
12:30 - 13:00	65	83	0	0	40	6	5	6	129	7		334	341	
SubTotal (Noon)	306	343	4	5	162	28	17	15	767	35	0	1,647	1,682	
17:00 - 17:30	50	94	2	4	35	3	3	2	192	7		385	392	
17:30 - 18:00	51	95	1	7	29	12	3	4	296	12		498	510	
18:00 - 18:30	31	64	2	0	14	2	4	4	163	9		284	293	
18:30 - 19:00	34	83	1	1	16	11	3	3	253	7		405	412	
SubTotal (evening)	166	336	6	12	94	28	13	13	904	35	0	1,572	1,607	



Traffic Count at Junction

Date: **13-Mar-19** Location No: **J-2**
 Location: **Kabusu JCT.(Masaka roadx x Natete Road)**
 Direction: from **d** to **C** Surveyor: **SALIMA, BRIAN, JANE**

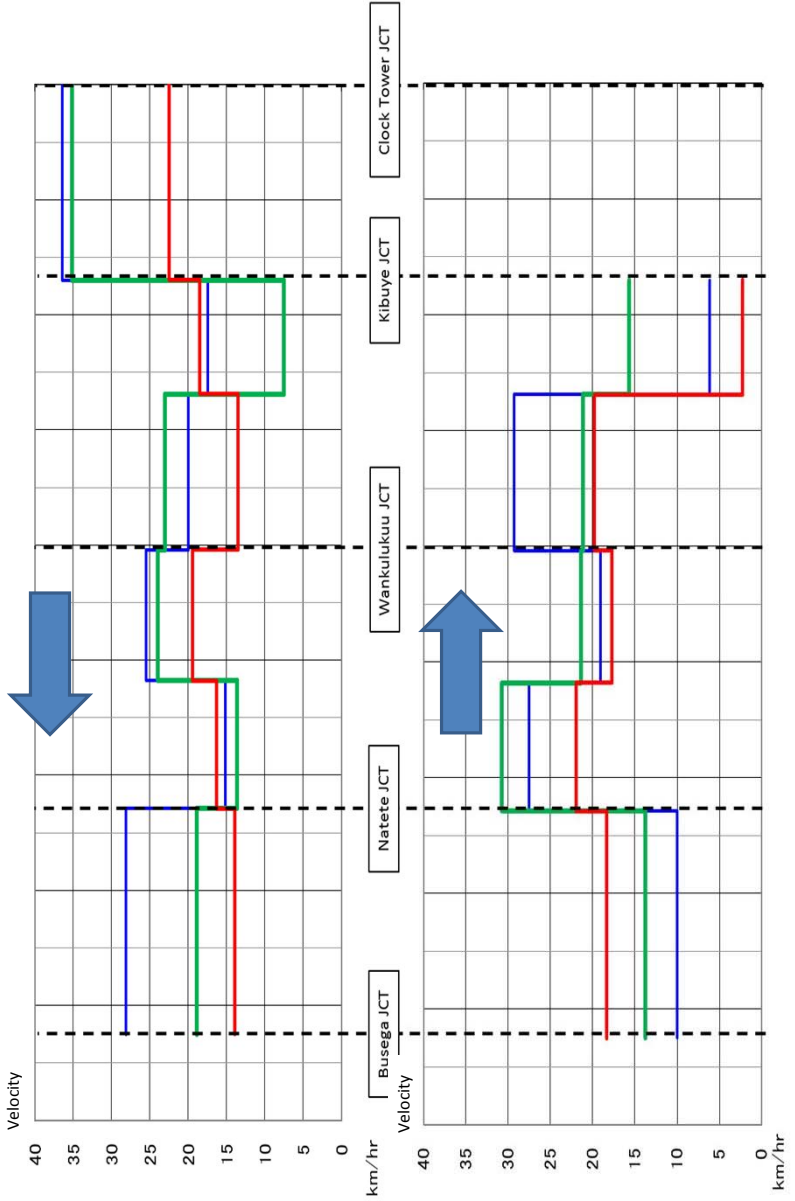
Vehicle Type	Vehicle										NMT		Sub Total (Vehicle)	Total
	1	2	3	4	5	6	7	8	9	10	11			
Time	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian	Type(1-8)		
7:00 - 7:30	10	0	0	0	0	1	2	2	20	3		35	38	
7:30 - 8:00	14	0	0	0	1	3	1	0	45	20		64	84	
8:00 - 8:30	7	0	0	0	0	0	2	0	51	19		60	79	
8:30 - 9:00	8	0	0	0	2	2	1	1	39	11		53	64	
SubTotal (morning)	39	0	0	0	3	6	6	3	155	53	0	212	265	
11:00 - 11:30	10	0	0	0	3	0	3	1	38	5		55	60	
11:30 - 12:00	12	0	0	0	2	2	5	2	32	4		55	59	
12:00 - 12:30	5	0	1	0	3	3	4	1	34	4		51	55	
12:30 - 13:00	4	0	1	0	7	4	2	1	24	3		43	46	
SubTotal (Noon)	31	0	2	0	15	9	14	5	128	16	0	204	220	
17:00 - 17:30	20	1	0	0	2	7	7	2	33	2		72	74	
17:30 - 18:00	32	1	0	0	5	4	3	1	37	10		83	93	
18:00 - 18:30	7	0	4	0	6	5	4	0	39	2		65	67	
18:30 - 19:00	17	0	4	0	6	7	3	0	52	3		89	92	
SubTotal (evening)	76	2	8	0	19	23	17	3	161	17	0	309	326	



Travel Time Survey

KIBUYE → BUSEGA	Clock Tower → Kibuye		Kibuye → Kalind		Kalind → Wankulukuku		Wankulukuku → Nalukolungo		Nalukolungo → Natete		Natete → Busega	
	Time (min)	Length (km)	Time (min)	Length (km)	Time (min)	Length (km)	Time (min)	Length (km)	Time (min)	Length (km)	Time (min)	Length (km)
Morning (8:00~9:00)	2.8	1.7	3.4	1.0	4.0	1.4	2.7	1.1	4.4	1.1	4.2	2.0
Noon (12:00~13:00)	2.9	1.7	7.9	1.0	3.5	1.4	2.8	1.1	4.9	1.1	6.2	2.0
Evening (18:00~19:00)	4.5	1.7	3.2	1.0	6.0	1.4	3.5	1.1	4.1	1.1	8.4	2.0

BUSEGA → KIBUYE	Clock Tower ~ Kibuye		Kibuye ← Kalind		Kalind ← Wankulukuku		Wankulukuku ← Nalukolungo		Nalukolungo ← Natete		Natete ← Busega	
	Time (min)	Length (km)	Time (min)	Length (km)	Time (min)	Length (km)	Time (min)	Length (km)	Time (min)	Length (km)	Time (min)	Length (km)
Morning (8:00~9:00)			9.6	1.0	2.8	1.4	3.6	1.1	2.4	1.1	11.7	2.0
Noon (12:00~13:00)			3.8	1.0	3.8	1.4	3.2	1.1	2.2	1.1	8.5	2.0
Evening (18:00~19:00)			25.7	1.0	4.1	1.4	3.9	1.1	3.0	1.1	6.4	2.0



(2) Traffic Survey in Karuma

Traffic surveys have been conducted as shown in Table 2.3.

Table 2.3 Summary of Traffic Survey in Karuma

Study item	Contents	Target	Field Work
Traffic Volume Count	To capture traffic volume on weekday by counting number of vehicles	1 points (24 hr 1day)	6(Wed) /March /2019

Source: JST

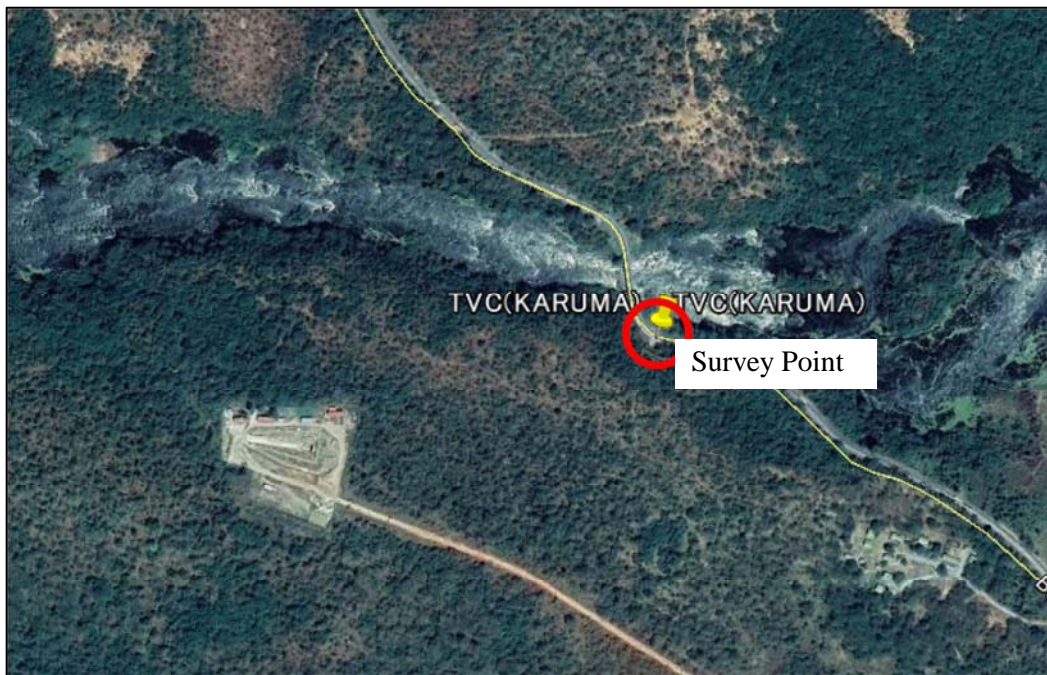


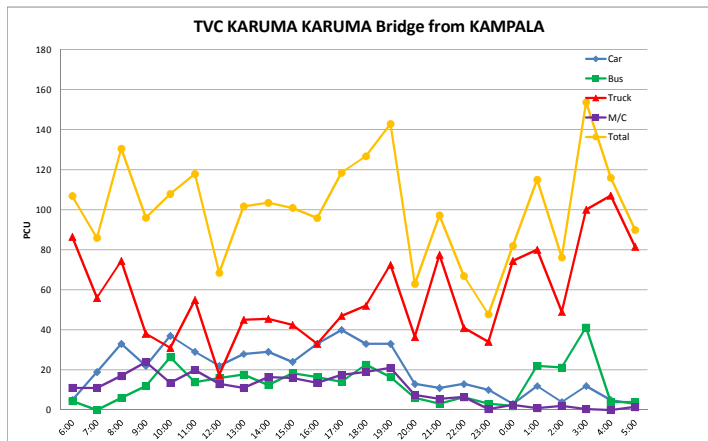
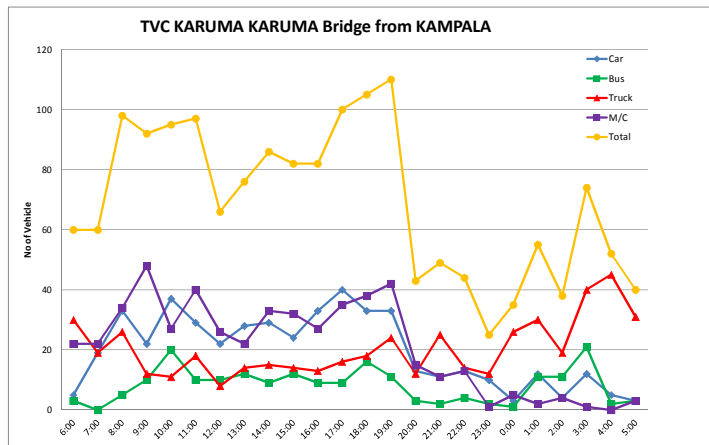
Figure 2.2 Traffic Survey Location Map

Result of Traffic Survey in Karuma shows following pages.

Traffic Count Survey(24hrs Count)

Date: 6-Mar-19 Location No: TVC KARUMA
 Location: KARUMA Bridge Surveyor Name: MALINGA LENNY MARVIN & ACHAYO RACI
 Direction: From KAMPALA To GULU

	Vehicle											NMT		Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11	Type (1-9)			
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian				
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0	0				
6:00 - 7:00	5	2	0	1	1	16	8	5	22	2	2	60	64		
7:00 - 8:00	19	0	0	0	1	8	7	3	22	4	2	60	66		
8:00 - 9:00	33	5	0	0	1	14	7	4	34	4	1	98	103		
9:00 - 10:00	22	10	0	0	0	4	5	3	48	0	3	92	95		
10:00 - 11:00	37	17	0	3	1	5	2	3	27	7	7	95	109		
11:00 - 12:00	29	7	1	2	0	8	4	6	40	5	8	97	110		
12:00 - 13:00	22	5	0	5	3	3	2	0	26	5	8	66	79		
13:00 - 14:00	28	6	3	3	0	4	2	8	22	6	10	76	92		
14:00 - 15:00	29	5	3	1	0	7	5	3	33	3	10	86	99		
15:00 - 16:00	24	7	0	5	1	4	4	5	32	9	13	82	104		
16:00 - 17:00	33	2	0	7	3	5	4	1	27	0	19	82	101		
17:00 - 18:00	40	5	0	4	2	4	6	4	35	7	16	100	123		
18:00 - 19:00	33	11	1	4	2	6	7	3	38	1	10	105	116		
19:00 - 20:00	33	7	0	4	1	9	13	1	42	0	10	110	120		
20:00 - 21:00	13	0	0	3	1	3	6	2	15	0	0	43	43		
21:00 - 22:00	11	1	0	1	0	10	13	2	11	0	0	49	49		
22:00 - 23:00	13	2	0	2	2	3	4	5	13	0	0	44	44		
23:00 - 24:00	10	1	0	1	0	8	4	0	1	2	0	25	27		
0:00 - 1:00	3	0	0	1	1	14	11	0	5	0	0	35	35		
1:00 - 2:00	12	0	0	11	2	20	6	2	2	0	0	55	55		
2:00 - 3:00	4	1	0	10	3	10	4	2	4	0	0	38	38		
3:00 - 4:00	12	1	0	20	6	25	8	1	1	0	0	74	74		
4:00 - 5:00	5	0	0	2	13	18	13	1	0	0	0	52	52		
5:00 - 6:00	3	2	1	0	2	22	7	0	3	0	0	40	40		
Total (24h)	473	97	9	90	46	230	110	29	503	55	119	1,664	1,838		



Traffic Count Survey(24hrs Count)

Date: 6-Mar-19

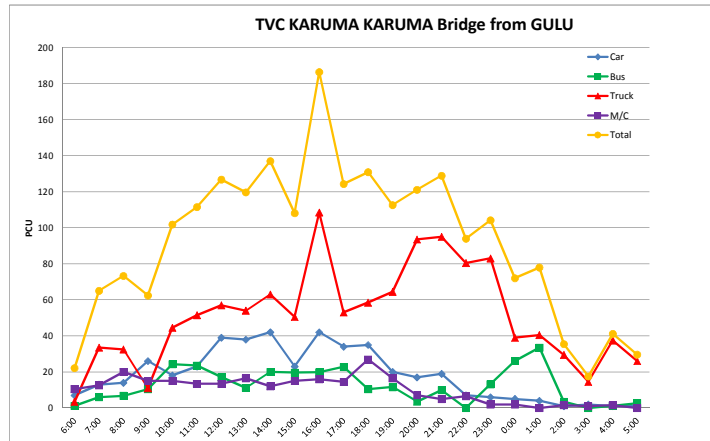
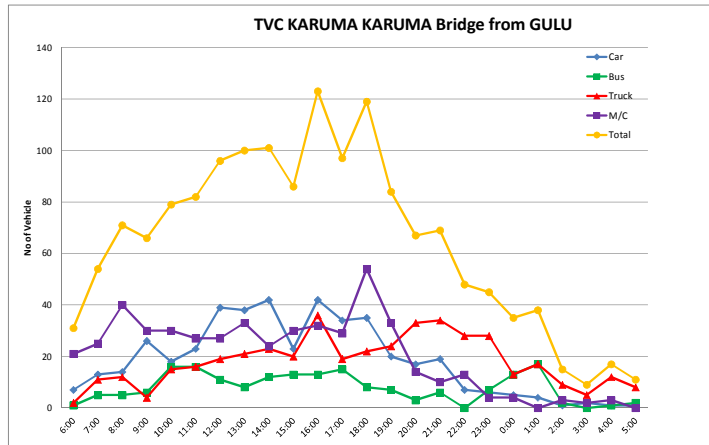
Location No: TVC KARUMA

Location: KARUMA Bridge

Surveyor Name: ATUGONZA ADINANI & AYELLA RICHARD

Direction: From GULU To KAMPALA

	Vehicle											Sub Total	Total
	1	2	3	4	5	6	7	8	9	10	11		
	Passenger / Taxi	Mini Bus	Medium Bus	Large Bus/ Coach	Light Goods Vehicle (LGV)	Medium Goods Vehicle (MGV)	Heavy Goods Vehicle (HGV)	Semi-Trailer	Motorcycle	Bicycle	Pedestrian		
PCU	1	1.2	1.5	2	1	2.5	3.5	3.5	0.5	0		Type (1-9)	
6:00 - 7:00	7	1	0	0	1	1	0	0	21	0	4	31	35
7:00 - 8:00	13	5	0	0	0	5	6	0	25	3	7	54	64
8:00 - 9:00	14	4	0	1	3	2	6	1	40	3	9	71	83
9:00 - 10:00	26	2	0	4	0	3	1	0	30	11	0	66	77
10:00 - 11:00	18	9	1	6	2	3	10	0	30	9	11	79	99
11:00 - 12:00	23	10	1	5	1	2	3	10	27	5	5	82	92
12:00 - 13:00	39	6	0	5	1	7	4	7	27	2	1	96	99
13:00 - 14:00	38	6	0	2	5	7	8	1	33	5	4	100	109
14:00 - 15:00	42	5	0	7	3	10	5	5	24	2	6	101	109
15:00 - 16:00	23	8	0	5	5	7	2	6	30	1	2	86	89
16:00 - 17:00	42	7	1	5	5	5	12	14	32	2	5	123	130
17:00 - 18:00	34	9	0	6	3	6	3	7	29	2	1	97	100
18:00 - 19:00	35	7	0	1	5	6	4	7	54	8	2	119	129
19:00 - 20:00	20	3	0	4	3	12	6	3	33	1	1	84	86
20:00 - 21:00	17	3	0	0	4	12	2	15	14	0	0	67	67
21:00 - 22:00	19	2	1	3	4	14	5	11	10	0	0	69	69
22:00 - 23:00	7	0	0	0	3	10	2	13	13	0	0	48	48
23:00 - 24:00	6	1	0	6	2	10	7	9	4	0	0	45	45
0:00 - 1:00	5	0	0	13	1	4	0	8	4	0	0	35	35
1:00 - 2:00	4	0	1	16	2	14	1	0	0	0	0	38	38
2:00 - 3:00	1	0	1	1	0	2	1	6	3	0	1	15	16
3:00 - 4:00	2	0	0	0	0	3	2	0	2	0	0	9	9
4:00 - 5:00	1	1	0	0	1	2	7	2	3	0	0	17	17
5:00 - 6:00	1	1	1	0	0	2	3	3	0	0	1	11	12
Total (16h)	437	90	7	90	54	149	57	104	488	54	60	1,543	1,657



Data Collection on Infrastructure Development for Northern Economic Corridor in Uganda

Interview to Pedestrian & Bicycle at Karuma Bridge

SB: South Bound

NB: North Bound

Direction	Kampala	Gulu	Movement		SB/NB	Purpose					Frequency			
Time	Pedestrian	Bicycle	from	to	SB/NB	School	Nursery / Clinic / Hospital	Market	Business	other	everyday	3days /week	1day / week	
1	06:25am		Y	Karuma	Kamdini	NB				Y		1		
2	06:32am		Y	Karuma	Kamdini	NB					Home	1		
3	07:00am	Y		Karuma	Riverside	NB					Fishing	1		
4	07:08am		Y	Karuma	Kamdini	NB					Home	1		
5	07:21am		Y	Karuma	Kamdini	NB				Y				1
6	07:32am		Y	Karuma	Dicwinyi	NB				Y		1		
7	07:32am		Y	Karuma	Kamdini	NB				Y				1
8	07:58am	Y		Karuma	Ogello	NB				Y		1		
9	08:05am		Y	Nora	Karuma	SB					Work		1	
0	08:08am		Y	Karuma	Achimi	NB					Home			1
11	08:20am		Y	Karuma	Lii	NB					Garden	1		
12	08:57am		Y	Karuma	Zambia	NB					Home	1		
13	09:00am	Y		Karuma	Kamdini	NB					Bank			1
14	09:22am	Y		Karuma	Nora	NB				Y		1		
15	09:22am	Y		Karuma	Nora	NB				Y		1		
16	10:02am		Y	Karuma	Apalla B	NB					Home	1		
17	10:20pm	Y		Karuma	Nora	NB					Home	1		
18	10:20pm	Y		Karuma	Nora	NB					Home	1		
19	10:21am		Y	Karuma	Zambia	NB				Y			1	
20	10:23am		Y	Karuma	Nora	NB					Home	1		
21	10:59am		Y	Karuma	Nora	NB					Home			1
22	11:16am		Y	Karuma	Nora	NB				Y				1
23	11:27am		Y	Abindu A	Kamdini	NB				Y				1
24	11:33am		Y	Karuma	Nwoya	NB					Home			1
25	11:35am		Y	Karuma	Edebo	NB				Y				1
26	11:47am		Y	Karuma	Aber	NB					Home			1
27	12:07pm		Y	Diima	Alworpil	NB				Y				1
28	12:45pm		Y	Karuma	Nora	NB					Home			1
29	12:48pm		Y	Karuma	Nwoya	NB				Y		1		
30	12:48pm		Y	Karuma	Nwoya	NB				Y		1		
31	01:05pm		Y	Karuma	Kamdini	NB				Y				1
32	01:10pm		Y	Karuma	Zambia	NB					Home			1
33	01:15pm		Y	Karuma	Kamdini	NB					Home			1
34	01:20pm	Y		Karuma	Nora	NB		Y						1
35	01:33pm		Y	Karuma	Kamdini	NB			Y					1
36	01:34pm		Y	Karuma	Bombe	NB				Y				1
37	01:35pm		Y	Karuma	Tit	NB				Y				1
38	03:00pm	Y		Karuma	Kamdini	NB				Y		1		
39	03:05pm		Y	Karuma	Nwoya	NB				Y		1		
40	03:05pm		Y	Karuma	Nwoya	NB				Y		1		
41	03:07pm	Y		Karuma	Kamdini	NB	Y							1
42	03:07pm	Y		Karuma	Kamdini	NB	Y							1
43	03:15pm		Y	Karuma	Zambia	NB				Y		1		
44	03:22pm		Y	Karuma	Dwogcen Pacu	NB				Y		1		
45	03:28pm		Y	Karuma	Aber	NB		Y						1
46	04:15pm	Y		Kamuli	Pakwach	NB				Y				1
47	04:20pm	Y		Karuma	Nora	NB				Y				1
48	05:01pm	Y		Karuma	Kamdini	NB					Home	1		
49	05:01pm	Y		Karuma	Kamdini	NB					Home	1		
50	05:40pm		Y	Nwoya	Karuma	SB		Y					1	
51	05:41pm		Y	Karuma	Atapara	NB					Home	1		
52	05:45pm		Y	Karuma	Nora	NB					Home	1		
53	06:00pm		Y	Karuma	Zambia	NB					Home	1		
54	06:43pm	Y		Ayudu	Nora	NB					Home		1	
55	07:04pm	Y		Karuma	Kamdini	NB		1				1		
56														

Data Collection on Infrastructure Development for Northern Economic Corridor in Uganda

Interview to Pedestrian & Bicycle at Karuma Bridge

SB: South Bound

NB: North Bound

Direction	Gulu ----> Kampala		Date: 6-Mar-19			Purpose							Frequency		
	Type		Movement		SB/NB	School	Nursery / Clinic / Hospital	Market	Business	other	everyday	3days /week	1day/ week		
1	06:25am	Y		Karuma	Adeklango	NB					Hunting	1			
2	06:44am		Y	Zambia	Karuma	SB					Work	1			
3	06:52am	Y		Riverside	Karuma	SB					Fishing	1			
4	06:58am	Y		Riverside	Bedmot	SB					Hunting	1			
5	07:02am	Y		Adeklango	Karuma	SB					Work	1			
6	07:21am	Y		Adeklango	Karuma	SB					Work	1			
7	07:31am		Y	Zambia	Karuma	SB					Work		1		
8	07:35am		Y	Lii	Okweche	SB					Home		1		
9	07:45am	Y		Riverside	Abindu	SB					Fishing		1		
10	07:47am		Y	Kagera	Karuma	SB					Job See	1			
11	07:59am		Y	Zambia	Karuma	SB					Job Seeking		1		
12	08:02am	Y		Riverside	Karuma	SB			Y					1	
13	08:18am	Y		Watmon	Ogengo	SB					Fishing			1	
14	08:18am	Y		Watmon	Ogengo	SB					Fishing			1	
15	08:18am	Y		Watmon	Ogengo	SB					Fishing			1	
16	08:18am	Y		Watmon	Ogengo	SB					Fishing			1	
17	08:30am		Y	Lela	Karuma	SB					Work	1			
18	08:38am	Y		Riverside	Nyalip	SB					Fishing		1		
19	08:38am	Y		Riverside	Nyalip	SB					Fishing		1		
20	08:57am		Y	Ogello	Karuma	SB			Y				1		
21	09:10am		Y	Shobi	Karuma	SB			Y			1			
22	09:10am		Y	Shobi	Karuma	SB			Y			1			
23	09:13am		Y	Apalla	Karuma	SB			Y			1			
24	09:13am		Y	Shobi	Karuma	SB			Y			1			
25	09:25am		Y	Aber	Karuma	SB			Y					1	
26	09:30am		Y	Nora	Karuma	SB					Home	1			
27	09:43am		Y	Adebe	Diima	SB			Y			1			
28	09:46am		Y	Nwoya	Karuma	SB			Y			1			
29	09:48am		Y	Nwoya	Karuma	SB			Y			1			
30	09:53am		Y	Bombe	Karuma	SB				Y		1			
31	09:54am		Y	Tiit	Diima	SB			Y					1	
32	10:06am	Y		Adeklango	Karuma	SB					Work	1			
33	10:06am	Y		Adeklango	Karuma	SB					Work	1			
34	10:06am	Y		Adeklango	Karuma	SB					Work	1			
35	10:06am	Y		Adeklango	Karuma	SB					Work	1			
36	10:10am		Y	Amari	Karuma	SB				Y		1			
37	10:11am		Y	Adebu	Karuma	SB				Y		1			
38	10:11am		Y	Adebu	Karuma	SB				Y		1			
39	10:11am		Y	Adebu	Karuma	SB				Y		1			
40	10:11am		Y	Adebu	Karuma	SB				Y		1			
41	10:11am		Y	Adebu	Diima	SB				Y		1			
42	10:20am		Y	Alwor Pi	Diima	SB				Y				1	
43	10:21am		Y	Kamdini	Karuma	SB					Work	1			
44	10:39am	Y		Riverside	Karuma	SB					Fishing	1			
45	10:39am	Y		Riverside	Karuma	SB					Fishing	1			
46	10:39am	Y		Riverside	Karuma	SB					Fishing	1			
47	10:41am	Y		Karuma	Riverside	NB					Fishing	1			
48	10:42am	Y		Bridge	Karuma	SB					Fishing	1			
49	10:42am	Y		Bridge	Karuma	SB					Fishing	1			
50	10:47am		Y	Zambia	Karuma	SB				Y		1			
51	10:55am		Y	Apol	Karuma	SB				Y		1			
52	10:58am	Y		Zambia	Karuma	SB		Y				1			
53	11:06am		Y	Oyam	Karuma	SB					Work	1			

Data Collection on Infrastructure Development for Northern Economic Corridor in Uganda

Interview to Pedestrian & Bicycle at Karuma Bridge

SB: South Bound

NB: North Bound

Direction	Gulu ----> Kampala		Movement		SB/NB	Purpose					Frequency			
	Time	Pedestrian	Bicycle	from		to	School	Nursery / Clinic / Hospital	Market	Business	other	everyday	3days /week	1day/ week
54	11:06am		Y	Oyam	Karuma	SB					Work	1		
55	11:22am		Y	Omari	Karuma	SB				Y		1		
56	11:25am		Y	Omari	Karuma	SB				Y		1		
57	11:32am	Y		Riverside	Karuma	SB					Fishing	1		
58	11:32am	Y		Riverside	Karuma	SB					Fishing	1		
59	11:32am	Y		Riverside	Karuma	SB					Fishing	1		
60	11:37am	Y		Kamdini	Karuma	SB					Bank			1
61	11:37am	Y		Kamdini	Karuma	SB					Bank			1
62	11:42am		Y	Riverside	Karuma	SB				Y		1		
63	11:43am		Y	Nora	Karuma	SB					Bank			1
64	11:48am		Y	Riverside	Karuma	SB				Y		1		
65	11:48am	Y		Riverside	Karuma	SB					Fishing	1		
66	12:03pm		Y	Cochlii	Karuma	SB	Y							1
67	12:10pm	Y		Karuma	Riverside	NB					Fishing	1		
68	12:16pm	Y		Riverside	Karuma	SB					Fishing	1		
69	12:20pm	Y		Karuma	Riverside	NB					Fishing	1		
70	12:32pm	Y		Ober	Karuma	SB		Y						1
71	12:41pm	Y		Karuma	Riverside	NB					Fishing	1		
72	12:41pm	Y		Karuma	Riverside	NB					Fishing	1		
73	12:52pm	Y		N/Park	Karuma	SB					Home	1		
74	12:53pm		Y	Riverside	Karuma	SB					Fishing	1		
75	01:08pm		Y	Kamdini	Karuma	SB				Y		1		
76	01:08pm		Y	Kamdini	Karuma	SB				Y		1		
77	01:23pm	Y		Karuma	Riverside	NB					Fishing	1		
78	01:23pm		Y	Atapara	Karuma	SB					Visiting			1
79	01:23pm		Y	Atapara	Karuma	SB					Visiting			1
80	01:34pm		Y	Kamdini	Alindo	SB					Home			1
81	01:55pm		Y	Zambia	Karuma	SB				Y		1		
82	01:58pm		Y	Nora	Karuma	SB					Job See	1		
83	03:10am	Y		Karuma	Gulu	NB					Tour			1
84	03:10am	Y		Karuma	Gulu	NB					Tour			1
85	03:31pm		Y	Nora	Karuma	SB					Home			1
86	03:32pm		Y	Ngai	Gwara	SB					Home			1
87	04:30pm		Y	Nora	Karuma	SB					Bank	1		
88	04:30pm		Y	Nora	Karuma	SB					Bank	1		
89	04:36pm	Y		Ogero	Karuma	SB				Y		1		
90	04:44pm		Y	Banya	Karuma	SB					Work	1		
91	05:42pm		Y	Nora	Karuma	SB					Home	1		
92	05:42pm		Y	Nora	Karuma	SB					Work	1		
93	06:26pm		Y	Nora	Karuma	SB					Work	1		
94	06:27pm		Y	Kamdini	Diima	SB					Home			1
95	06:28pm		Y	Nora	Karuma	SB					Tour		3	
96	06:41pm		Y	Amari	Karuma	SB					Work	1		
97	06:42pm		Y	Kamdini	Karuma	SB					Work	1		
98	06:43pm	Y		Nora	Karuma	SB				Y		1		
99	06:43pm	Y		Nora	Karuma	SB				Y		1		
100	06:49pm		Y	Amwa	Karuma	SB					Work	1		
101	06:54pm		Y	Kamdini	Karuma	SB					Work	1		
102	06:58pm		Y	Nora	Karuma	SB					Work	1		
103	07:00pm	Y		Karuma	Nora	NB					Work	1		
104	07:00pm	Y		Karuma	Nora	NB					Work	1		
105	07:03pm		Y	Nora	Karuma	SB					Home			1

ANNEX-3 AXEL LOAD SURVEY

ANNEX 3. AXEL LOAD SURVEY



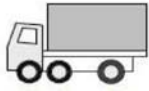




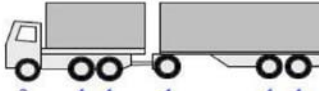

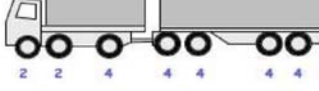




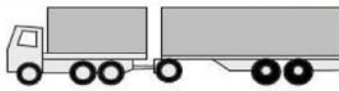

(1) LOCATION MAP

UNRA Weighbridges location map shows below.


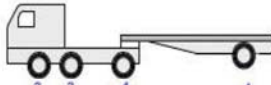

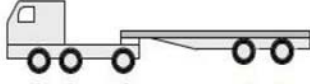


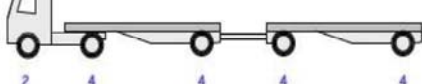
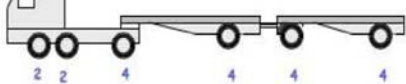

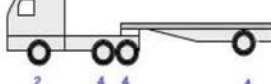

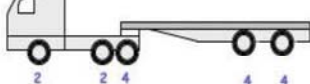



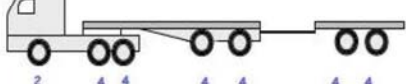
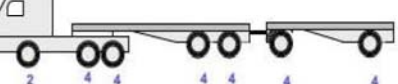
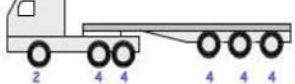
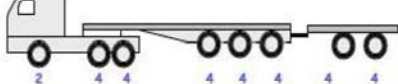


Source: UNRA

(2) AXLE CONFIGURATION AND LOAD LIMIT

TRUCK		Permissible gross vehicle weight	TRUCK AND TRAILER		Permissible gross vehicle weight
	No. of wheels 2 4	18		No. of wheels 2 4 4 4 4	46
Permissible axle limits	8 10		8 10 10 18		
	No. of wheels 2 2 4	26		No. of wheels 2 2 4 4 4 4	48
Permissible axle limits	8 8 10		16 10 10 18		
	No. of wheels 2 4 4	26		No. of wheels 2 4 4 4 4 4	48
Permissible axle limits	8 18		8 10 18 18		
	No. of wheels 2 2 4 4	34		No. of wheels 2 4 4 4 4 4	54
Permissible axle limits	16 18		8 18 10 18		
TRUCK AND TRAILER					
	No. of wheels 2 4 4 4	38		No. of wheels 2 2 4 4 4 4	48
Permissible axle limits	8 10 10 10		16 10 18 18		
	No. of wheels 2 2 4 4 4	46		No. of wheels 2 4 4 4 4 4	56
Permissible axle limits	16 10 10 10		8 18 18 18		
	No. of wheels 2 4 4 4 4	46		No. of wheels 2 4 4 4 4 4 4	56
Permissible axle limits	8 18 10 10		8 18 10 24		
All weights are in tonnes vehicles have conventional tyres					
Examples with super single tyres					
	No. of wheels 2 4 4 4 2 2 Super Single	52		No. of wheels 2 4 2 2 2 Super Single	40.5
Permissible axle limits	8 18 10 16		8 10 22.5		

Source: UNRA

TRUCK TRACTOR AND SEMI-TRAILER		Permissible gross vehicle weight	TRUCK TRACTOR AND SEMI-TRAILER		Permissible gross vehicle weight
	No. of wheels	2 4 4			
	Permissible axle limits	8 10 10	8 8 10 10		36
	No. of wheels	2 4 4 4			
	Permissible axle limits	8 10 18	8 8 10 18		44
	No. of wheels	2 4 4 4 4			
	Permissible axle limits	8 10 24	8 8 10 24		48
	No. of wheels	2 4 4 4 4			
	Permissible axle limits	8 10 10 10 10	8 8 10 10 10 10		48
	No. of wheels	2 4 4 4 4			
	Permissible axle limits	8 10 18 10 10	8 18 10		36
	No. of wheels	2 4 4 4 4			
	Permissible axle limits	8 10 18 18	8 18 18		44
	No. of wheels	2 4 4 4 4 4			
	Permissible axle limits	8 18 24	8 18 10 10 10		56
	No. of wheels	2 4 4 4 4 4			
	Permissible axle limits	8 18 10 10 18	8 18 18 18		56
	No. of wheels	2 4 4 4 4 4			
	Permissible axle limits	8 18 18 10 10	8 18 24		48
					
			8 18 24 18		56

All weights are in tonnes
 vehicles have conventional tyres

Source: UNRA

(3) RESULT OF AXEL LOAD SURVEY

Summary of Axel Load Survey shows below table.

Table 3.1 Summary of Axel Load Survey

Location		Monthly Average Number of Vehicle										Monthly Average Number of Overloading Vehicle	Ratio
		2 Axle	3 Axle	4 Axle	5 Axle	6 Axle	7 Axle	8 Axle	9 Axle	10 Axle	Total		
1	Magamaga	5,457	9	1,736	514	1,011	2,018	15,213	14	290	26,261	105	0.4%
2	Luwero	6,178	23	1,488	353	698	572	3,384	2	574	13,272	263	2.0%
3	Mbale	2,121	5	705	181	740	741	6,320	65	227	11,105	151	1.4%
4	Mubende	4,391	2	648	99	581	291	2,070	1	209	8,292	84	1.0%
5	Lukaya	8,248	11	1,582	268	996	392	5,209	2.0	592.0	17,300	479	2.8%
6	Busitema	2,547	33	1,315	1,099	2,840	558	15,309	3	179	23,883	300	1.3%

Location		Average Weight (ton)									
		2 Axle	3 Axle	4 Axle	5 Axle	6 Axle	7 Axle	8 Axle	9 Axle	10 Axle	
1	Magamaga	14.0	22.0	23.0	28.0	34.0	36.0	43.0	51.0	52.0	
2	Luwero	15.0	21.0	23.0	29.0	33.0	36.0	44.0	46.0	53.0	
3	Mbale	16.0	24.0	24.0	29.0	36.0	37.0	46.0	50.0	54.0	
4	Mubende	15.0	23.0	22.0	28.0	33.0	38.0	45.0	49.0	52.0	
5	Lukaya	16.0	22.0	22.0	30.0	32.0	37.0	44.0	51.0	52.0	
6	Busitema	14.0	22.0	24.0	29.0	36.0	37.0	45.0	50.0	53.0	

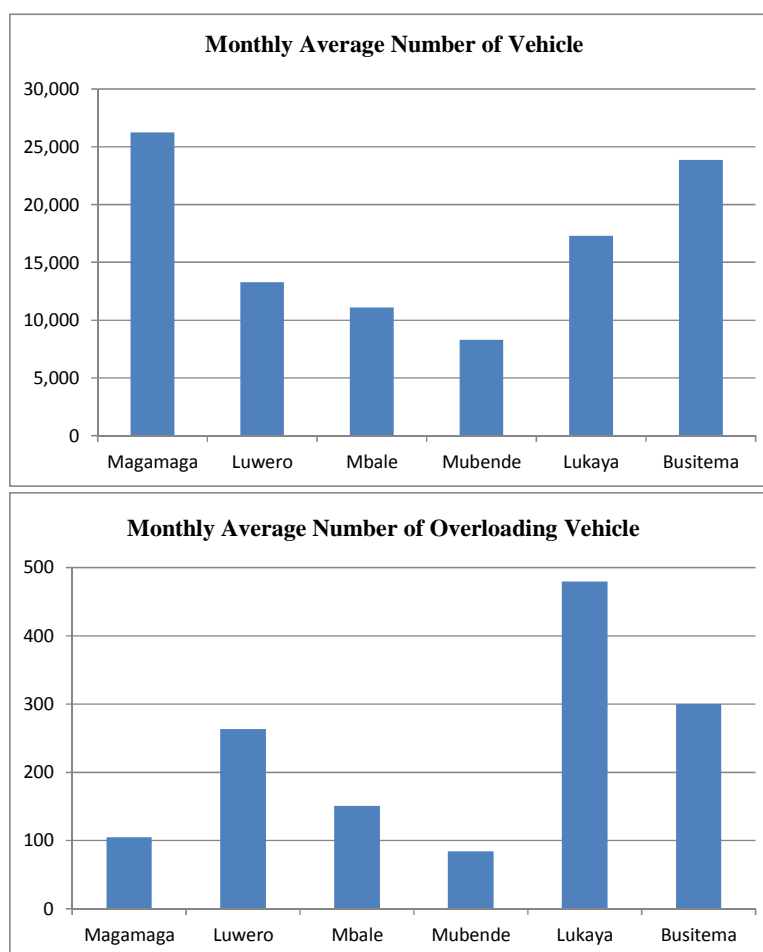
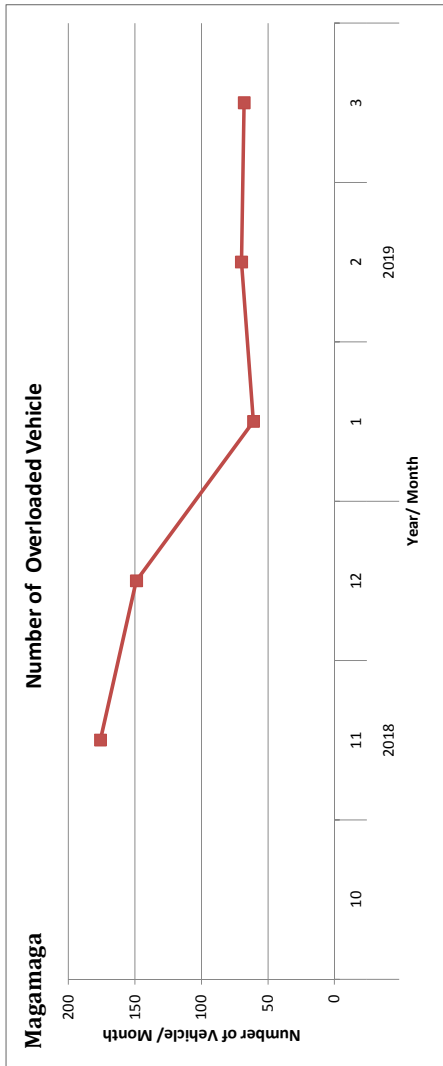
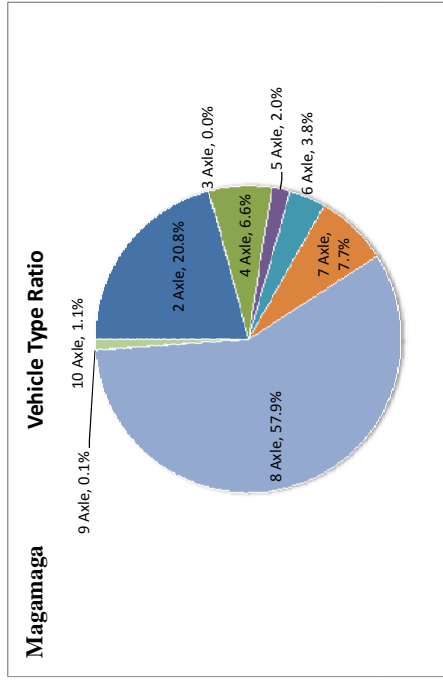
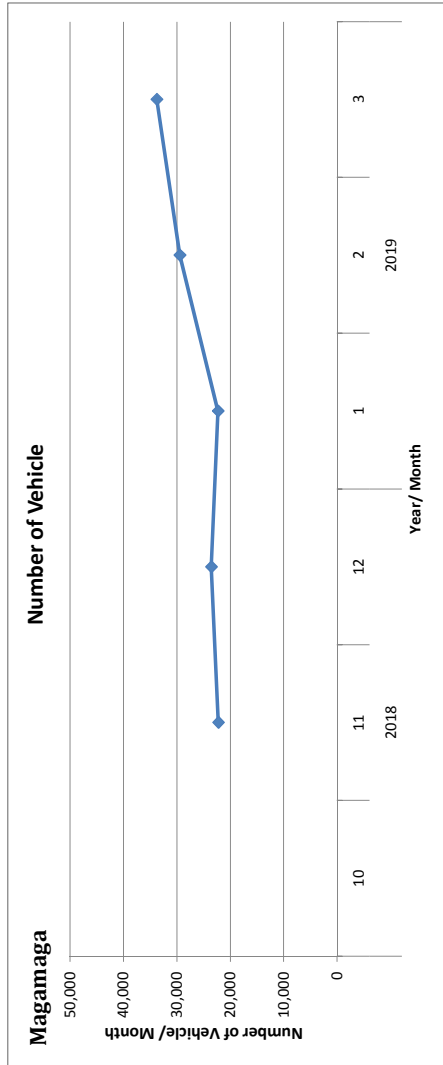


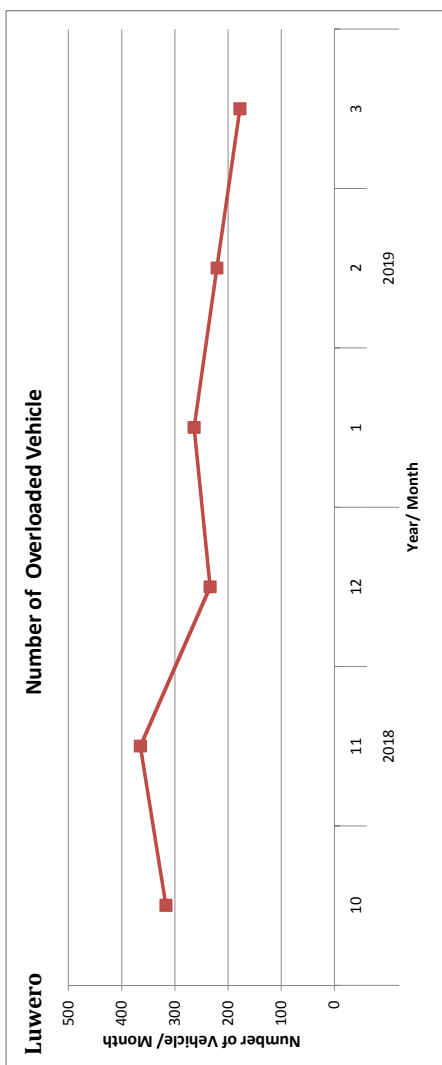
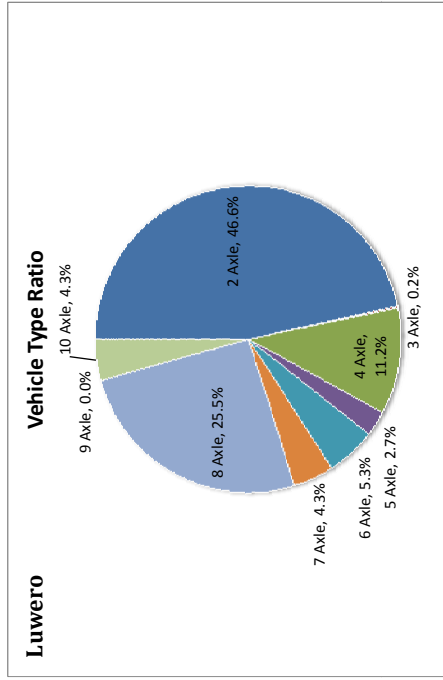
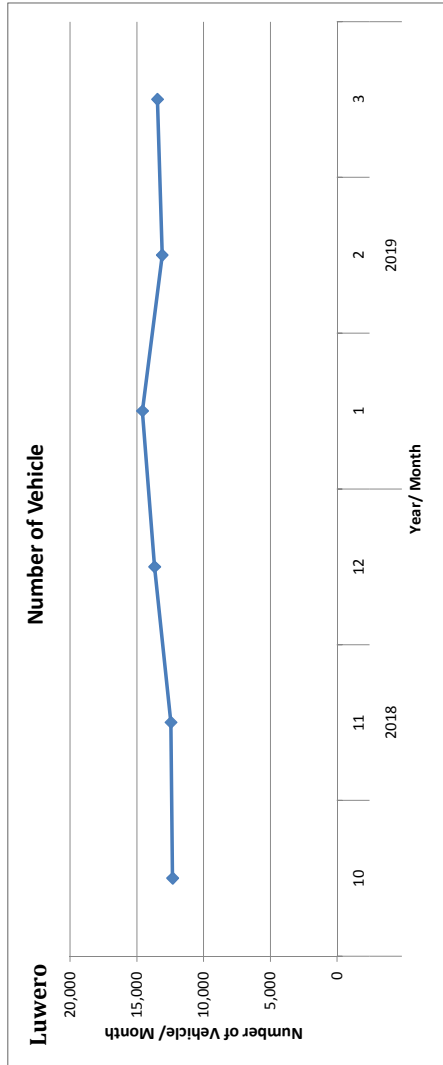
Figure 3.1 Summary of Axel Load Survey

Result of Axel Load Survey shows following pages

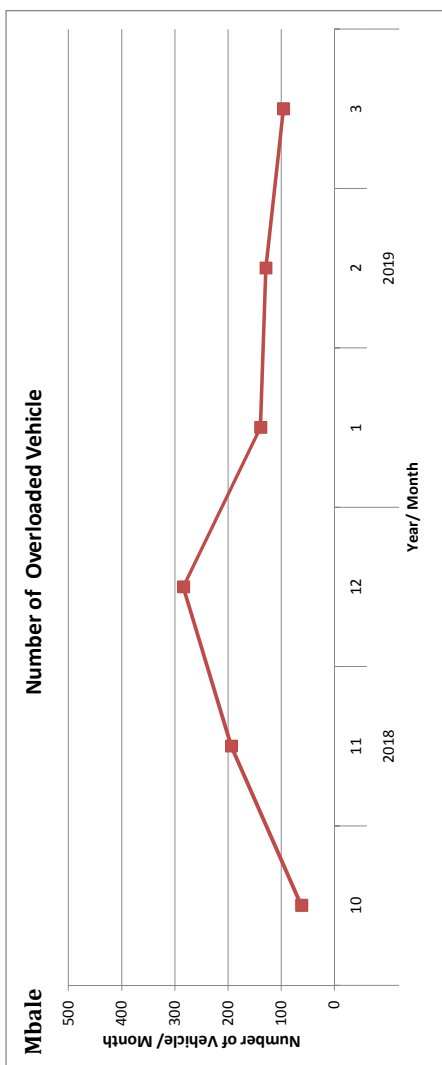
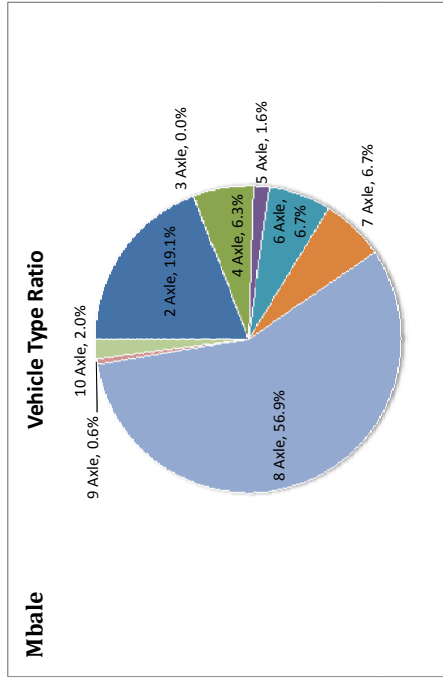
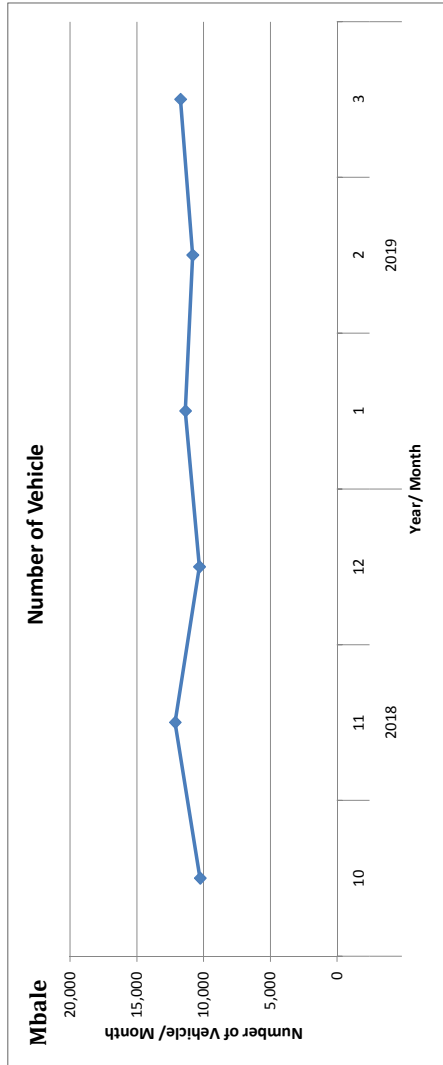
Location Item	Magamaga																								Ratio (B/A)							
	2018						2019						Average						2018							2019						Average (B)
	10	11	12	1	2	3	10	11	12	1	2	3	10	11	12	1	2	3	10	11	12	1	2	3								
Month	4,393	4,819	4,524	6,509	7,042	5,457	4,393	4,819	4,524	6,509	7,042	5,457	4,393	4,819	4,524	6,509	7,042	5,457	15	10	1	10	3	8	15	10	1	10	3	8	0.1%	
2 Axle	8	7	12	10	9	9	8	7	12	10	9	9	8	7	12	10	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
3 Axle	1,458	1,495	1,372	1,926	2,429	1,736	1,458	1,495	1,372	1,926	2,429	1,736	1,458	1,495	1,372	1,926	2,429	1,736	29	14	9	21	15	18	29	14	9	21	15	18	1.0%	
4 Axle	451	432	432	579	674	514	451	432	432	579	674	514	451	432	432	579	674	514	10	12	4	7	15	10	10	12	4	7	15	10	1.9%	
5 Axle	597	760	729	1,404	1,563	1,011	597	760	729	1,404	1,563	1,011	597	760	729	1,404	1,563	1,011	11	9	11	11	13	11	11	9	11	11	13	11	0.3%	
6 Axle	1,666	1,429	1,879	2,286	2,832	2,018	1,666	1,429	1,879	2,286	2,832	2,018	1,666	1,429	1,879	2,286	2,832	2,018	8	8	7	8	5	7	8	8	7	8	5	7	0.3%	
7 Axle	13,315	14,262	13,104	16,471	18,913	15,213	13,315	14,262	13,104	16,471	18,913	15,213	13,315	14,262	13,104	16,471	18,913	15,213	81	77	21	9	12	40	81	77	21	9	12	40	0.3%	
8 Axle	7	52	8	0	2	14	7	52	8	0	2	14	7	52	8	0	2	14	0	1	0	0	0	0	0	1	0	0	0	0	0.0%	
9 Axle	336	300	246	266	301	290	336	300	246	266	301	290	336	300	246	266	301	290	22	18	8	4	5	11	22	18	8	4	5	11	3.8%	
10 Axle	22,231	23,555	22,301	29,453	33,766	26,261	22,231	23,555	22,301	29,453	33,766	26,261	22,231	23,555	22,301	29,453	33,766	26,261	176	149	61	70	68	104.8	176	149	61	70	68	104.8	0.4%	
Total																																



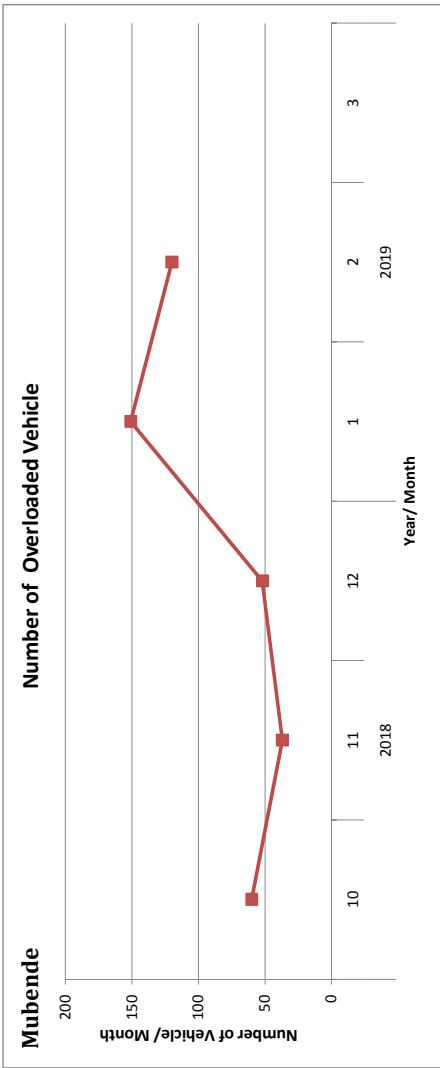
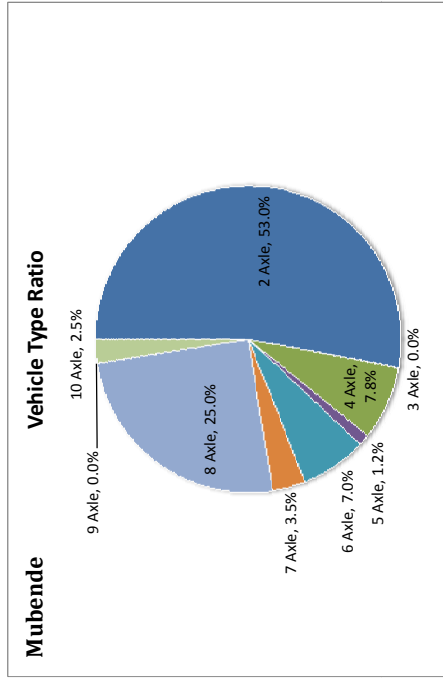
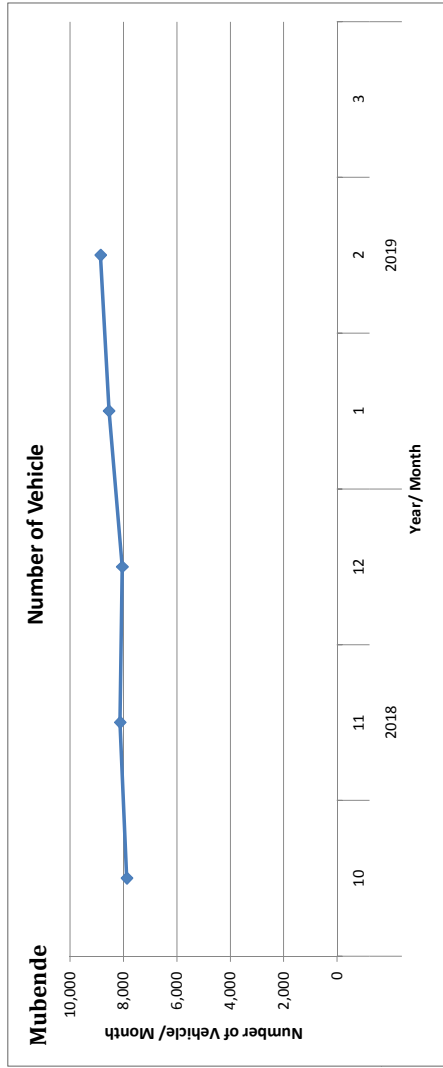
Location Item	Luwero												Ratio (B/A)												
	Number of Vehicle						Average WEIGHT							Number of Overloaded Vehicle											
	2018		2019		Average (A)		2018		2019		Average			2018		2019		Average (B)							
Month	10	11	12	1	2	3	10	11	12	1	2	3	10	11	12	1	2	3	10	11	12	1	2	3	
2 Axle	5,901	5,911	5,958	6,786	6,054	6,455	15.2	15.3	15.1	15.2	15.1	15.0	145	144	113	109	104	81	116	116	116	116	116	116	1.9%
3 Axle	0	4	16	2	0	115	23	21.0	23.1	17.2	-	22.1	0	0	1	0	0	0	0	0	0	0	0	0	0.0%
4 Axle	1,241	1,375	1,496	1,565	1,408	1,488	22.5	22.8	22.8	22.8	22.4	22.4	77	79	46	71	43	41	60	60	60	60	60	60	4.0%
5 Axle	356	332	420	351	347	314	353	28.8	28.9	29.1	29.1	28.2	22	29	20	22	17	18	21	21	21	21	21	21	5.9%
6 Axle	679	722	724	718	668	675	698	33.3	33.6	33.0	32.8	32.3	21	32	22	26	18	17	23	23	23	23	23	23	3.3%
7 Axle	410	471	653	672	690	537	572	35.8	36.2	36.2	36.4	36.0	0	3	1	0	0	1	1	1	1	1	1	1	0.2%
8 Axle	3,118	3,110	3,813	3,911	3,347	3,006	3,384	43.4	43.9	44.1	43.9	43.6	19	31	24	26	31	7	23	23	23	23	23	23	0.7%
9 Axle	1	1	6	1	0	0	2	44.2	33.7	50.6	56.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
10 Axle	624	527	595	580	595	520	574	53.0	53.5	52.9	53.4	53.0	33	47	7	10	8	13	20	20	20	20	20	20	3.5%
Total	12,330	12,453	13,681	14,586	13,109	13,464	13,271	34.5	34.0	34.1	34.0	34.1	317	365	234	264	221	178	263	263	263	263	263	263	2.0%



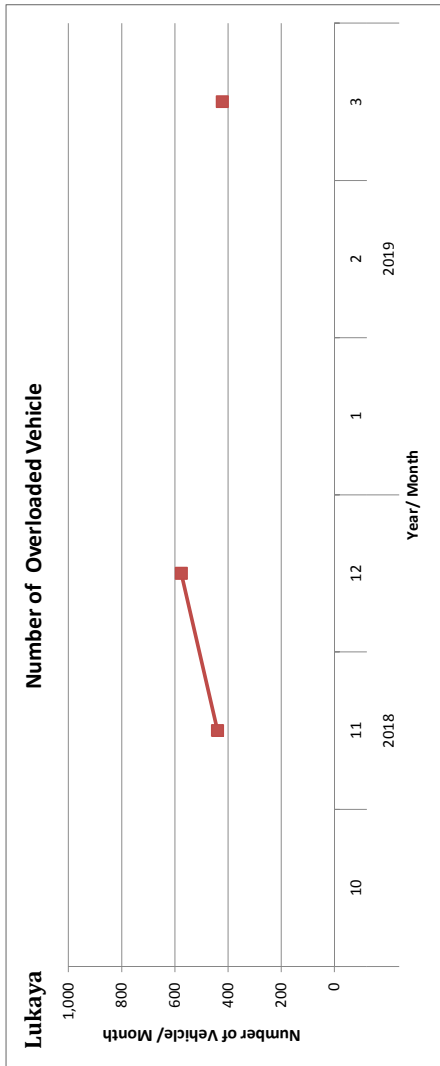
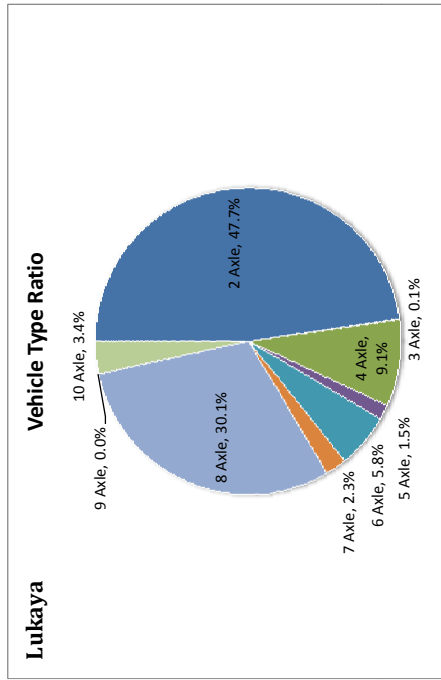
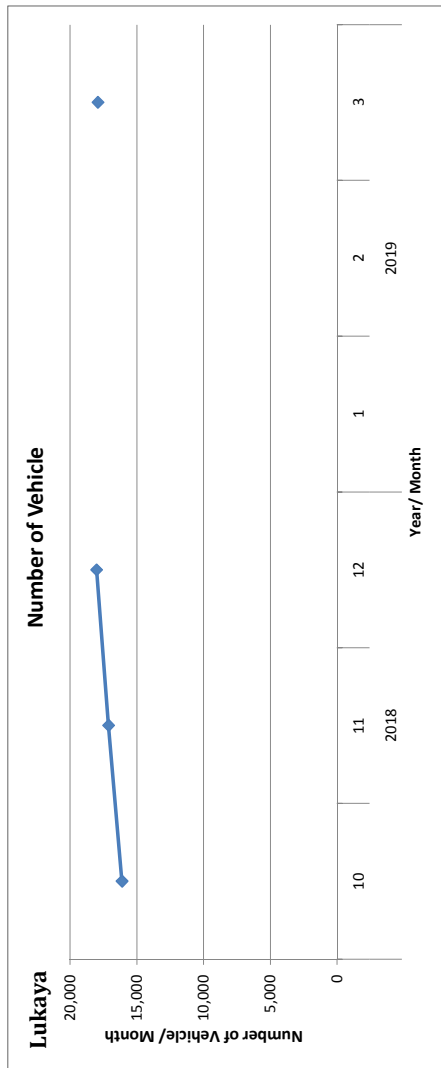
Location Item	Mbale												Ratio (B/A)												
	Number of Vehicle						Average WEIGHT							Number of Overloaded Vehicle											
	2018			2019			Average (A)			2018				2019			Average								
Year	Month	10	11	12	1	2	3	2,121	1,914	1,849	1,914	15.6	15.9	16.2	15.8	16.0	15.6	10	11	12	1	2	3	Average (B)	
2 Axle	2,188	1,992	2,741	2,039	1,849	1,914	2,121	15.6	15.9	16.2	15.8	16.0	15.6	16.0	15.6	10	43	59	28	27	12	0	0	30	1.4%
3 Axle	14	4	6	0	6	2	5	24.7	21.5	23.8	-	25.6	24.0	24.0	0	1	0	0	0	0	0	0	0	0	0.0%
4 Axle	711	645	821	746	607	698	705	24.0	24.3	24.8	24.0	24.4	24.1	24.0	13	16	30	10	14	4	4	4	15	2.1%	
5 Axle	197	148	184	240	184	83	181	27.6	27.7	29.1	28.3	29.1	29.7	29.0	5	3	14	9	5	1	1	6	6	3.3%	
6 Axle	682	1,136	866	709	709	260	740	35.7	35.4	36.8	35.7	36.6	34.4	36.0	2	9	29	12	15	3	1	2	12	1.6%	
7 Axle	887	651	733	903	959	313	741	36.6	37.4	38.0	36.7	37.8	37.7	37.0	2	1	3	1	1	1	1	2	2	0.3%	
8 Axle	5,343	6,173	5,564	6,385	6,239	8,213	6,320	44.7	45.8	46.4	45.2	45.8	45.7	46.0	25	113	142	75	61	75	61	75	82	1.3%	
9 Axle	29	105	52	57	92	57	65	49.0	50.5	50.7	50.9	50.7	51.0	50.0	0	1	1	2	2	2	2	0	0	1	1.5%
10 Axle	212	349	223	207	177	193	227	53.1	54.6	54.6	53.0	53.2	53.0	54.0	4	8	6	2	4	4	2	4	4	4	1.8%
Total	10,263	12,130	10,313	11,366	10,822	11,733	11,105	34.6	34.8	35.6	36.2	35.5	34.9	35.0	62	194	284	139	129	96	151	151	151	151	1.4%



Location Item	Mubende												Average (A)	Average WEIGHT						Average (B)	Ratio (B/A)
	2018						2019							Number of Overloaded Vehicle							
	2018			2019			2018			2019				2018		2019		2019			
Year	Month	10	11	12	1	2	3	10	11	12	1	2	3	10	11	12	1	2	3		
2 Axle	Month	4,294	4,585	3,901	4,419	4,755		4,391	14.6	14.5	14.1	14.8	14.8	15.0	10	5	6	30	19	14	0.3%
3 Axle	Month	5	1	1	2	1		2	24.7	28.5	17.1	17.8	28.6	23.0	1	0	0	0	0	0	0.0%
4 Axle	Month	572	615	655	725	673		648	21.5	21.0	21.0	21.9	22.1	22.2	16	16	18	46	31	25	3.9%
5 Axle	Month	115	128	89	74	87		99	27.5	27.8	27.9	29.2	27.4	28.0	4	3	2	3	9	4	4.0%
6 Axle	Month	602	573	646	562	524		581	33.6	33.6	33.5	33.8	32.7	33.0	12	6	8	14	15	11	1.9%
7 Axle	Month	264	263	240	319	368		291	37.9	36.7	36.5	38.2	38.1	38.0	3	0	0	0	0	1	0.3%
8 Axle	Month	1,846	1,780	2,287	2,230	2,207		2,070	43.8	43.4	44.4	46.2	45.6	45.0	10	7	14	40	29	20	1.0%
9 Axle	Month	2	1	0	0	0		1	50.4	47.4	-	-	-	49.0	0	0	0	0	0	0	0.0%
10 Axle	Month	176	181	230	215	244		209	50.7	50.2	51.4	54.5	53.8	52.0	4	0	4	18	17	9	4.3%
Total	Month	7,876	8,127	8,049	8,546	8,859		8,291	33.9	33.7	30.8	32.0	33.2	33.3	60	37	52	151	120	84	1.0%



Location Item	Lukaya												Average (A)	Average WEIGHT			Number of Overloaded Vehicle						Average (B)	Ratio (B/A)
	2018						2019							2018			2019							
	2018		2019		Average		2018		2019		Average			2018		2019		Average						
Year	Month	10	11	12	1	2	3	10	11	12	1	2	3	10	11	12	1	2	3					
2 Axle	Month	7,112	8,125	8,520	8,248	9,234	15.4	15.4	15.4	15.5	15.7	15.7	16.0	161	201	224	195	195	224	195	2.4%			
3 Axle	Month	12	16	9	11	7	21.4	24.3	23.0	22.4	19.5	22.0	22.0	1	0	0	0	0	0	0	0.0%			
4 Axle	Month	1,661	1,612	1,604	1,582	1,452	22.2	22.1	22.4	22.4	22.5	22.0	22.0	88	92	60	80	60	80	80	5.1%			
5 Axle	Month	287	342	283	268	159	30.1	30.1	30.1	30.1	30.4	30.0	30.0	38	42	25	35	25	35	35	13.1%			
6 Axle	Month	981	1,043	1,127	996	831	32.4	33.1	32.9	32.9	31.3	32.0	32.0	54	83	46	61	46	61	61	6.1%			
7 Axle	Month	337	362	528	392	340	37.0	37.0	37.1	37.1	35.4	37.0	37.0	1	2	0	1	0	1	1	0.3%			
8 Axle	Month	5,123	5,007	5,337	5,209	5,367	43.6	43.3	43.7	43.7	43.7	44.0	44.0	88	133	53	91	53	91	91	1.7%			
9 Axle	Month	0	4	4	2	0	-	52.9	49.9	51.0	-	51.0	51.0	0	0	0	0	0	0	0	0.0%			
10 Axle	Month	605	615	614	592	534	51.7	52.1	53.2	53.2	51.5	52.0	52.0	9	23	14	15	14	15	15	2.5%			
Total	Month	16,118	17,126	18,026	17,299	17,924	31.6	34.5	34.2	34.2	31.3	33.0	33.0	440	576	422	479	422	479	479	2.8%			



Location Item	Busitema																																	Ratio (B/A)
	Number of Vehicle												Average WEIGHT						Number of Overloaded Vehicle										Average (B)					
	2018			2019			Average (A)	2018		2019		Average	2018			2019			2018			2019												
10	11	12	1	2	3		10	11	12	1	2	3		10	11	12	1	2	3		10	11	12	1	2	3								
Month	2,510	2,400	2,700	2,490	2,255	2,925	2,547	14.1	13.8	14.3	14.5	14.4	14.2	14.0	2	3	2	4	2	1	2	1	2	4	2	1	2	0.1%						
2 Axle	6	6	11	86	56	30	33	24.1	18.6	22.7	21.5	22.0	22.9	22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%						
3 Axle	1,263	1,152	1,523	1,458	1,076	1,417	1,315	23.5	23.5	24.1	23.7	23.4	23.8	24.0	21	32	41	19	6	15	22	6	15	22	6	15	22	1.7%						
4 Axle	420	314	511	3,382	1,615	349	1,099	28.2	27.9	28.5	28.8	29.2	30.6	29.0	20	6	28	44	23	33	26	44	23	33	23	33	26	2.4%						
5 Axle	2,076	2,076	2,881	5,162	3,029	1,441	2,840	35.5	35.2	36.0	37.3	37.3	36.0	36.0	68	49	108	160	60	49	82	60	49	82	60	49	82	2.9%						
6 Axle	328	258	599	1,337	424	402	558	36.7	36.4	36.9	37.2	36.5	35.8	37.0	0	0	3	7	1	0	2	1	0	2	1	0	2	0.4%						
7 Axle	16,399	13,847	18,464	9,913	13,067	20,166	15,309	44.5	44.3	45.0	45.5	44.6	44.6	45.1	135	182	295	125	35	184	159	125	35	184	159	35	1.0%							
8 Axle	3	2	3	4	2	1	3	52.1	51.3	53.5	50.0	49.8	44.6	50.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%						
9 Axle	207	167	204	147	153	193	179	53.0	53.1	53.8	54.2	53.0	52.8	53.0	8	4	16	7	0	2	6	7	0	2	6	2	3.4%							
10 Axle	23,588	20,222	26,896	23,979	21,677	26,924	23,881	34.6	33.8	35.0	34.8	34.5	34.0	34.0	254	276	493	366	127	284	300	366	127	284	300	127	1.3%							
Total																																		

