

Appendix-1

Minutes of Meeting and Presentation Materials on Key Meetings

- 1st Joint Coordination Committee Meeting held in 23 March 2017
- 2nd Joint Coordination Committee Meeting held in 20th July 2017
- 3rd Joint Coordination Committee Meeting held in 27th September 2017
- 4th Joint Coordination Committee Meeting held in 11th April 2018

1st JCC Meeting

Minutes of Meeting and Presentations

NAIROBI CITY COUNTY GOVERNMENT

MINUTES OF MEETING

FOR

1ST JOINT COORDINATING COMMITTEE (JCC)

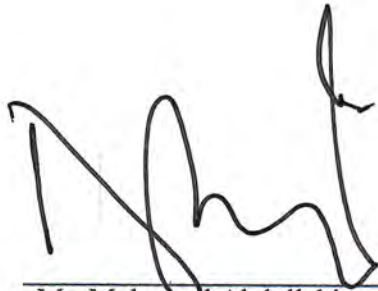
ON

THE PROJECT ON DETAILED PLANNING OF INTEGRATED
TRANSPORT SYSTEM

AND LOOP LINE IN THE NAIROBI URBAN CORE

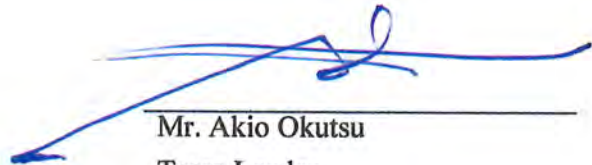
IN THE REPUBLIC OF KENYA

23 MARCH 2017



Mr. Mohamed Abdullahi

County Executive,
Transport, Roads and Public
Works,
Nairobi City County Government



Mr. Akio Okutsu

Team Leader
JICA Study Team



Mr. Irungu Nyakera

Principal Secretary - Transport,
Ministry of Transport,
Infrastructure, Housing and Urban
Development

1ST JOINT COORDINATING COMMITTEE (JCC) MEETING
FOR
THE PROJECT ON DETAILED PLANNING OF INTEGRATED TRANSPORT
SYSTEM AND LOOP LINE IN THE NAIROBI URBAN CORE
IN THE REPUBLIC OF KENYA

- Date and Time: 23rd March, 2017 at 15:00
- Venue: Transcom House 8th Floor, Board Room
- Agenda:
1. Opening Remarks by NCCG
 2. Overview of the Study (Inception Report) by JICA Study Team
 - (1) Background
 - (2) Objectives
 - (3) Issues
 - To Serve Mobility Improved Transport
 - To Grasp Traffic Movement
 - (4) Technical Approach
 - (5) Methodology
 - (6) The Study Team
 3. Question and Answer Session
 4. Closing Remarks by NCCG

Proceedings of the Meeting

1. Opening Remarks by NCCG

- (1) Mr. Mohamed Abdullahi
 - Welcomed all the participants to the session, he asked participants to be mindful of the time since there was to be another meeting at the same board room.
- (2) Mr. Irungu Nyakera
 - Welcomed all those present to the session and hoped that the session shall be fruitful. He also shared his support for the initiative being undertaken with support of JICA.
- (3) Introduction
 - Members present introduced themselves.
- (4) Remarks by JICA Kenya – Mr. Sugimoto (JICA Kenya)
 - As JICA, they are happy to attend the forum.

- Due to time constraints, he shall not give his remarks and would like to allow JST to proceed with their presentation.

2. Introduction of JICA Study; Background and study objectives

- Mr. Okutsu (JST) & Mr. Nakagawa (JST)

Overview of the Presentation

- i. Background
- ii. Objectives
- iii. Issues
 - o To Serve Mobility Improved Transport
 - o To Grasp Traffic Movement
- iv. Technical Approach
- v. Methodology
- vi. The Study Team

- The proposal for the loop line is one of the proposed priority projects that are contained in the NIUPLAN that the team leader had previously worked on as the railways expert in 2013-2014. This master plan was funded by JICA.
- At the time, the Nairobi Metropolitan Region System Report (2011) by the Ministry of Transport and Infrastructure (MoTI) done in 2011 for a Nairobi Mass Rapid Transport System (NMRTS) which consisted of 3 lines each for BRT, LRT and Metro Rail. All these corridors came into the City Centre. The loop line proposal was meant for the purpose of traffic diversion. NIUPLAN also proposed for sub-centers within the county. The loop line was to be an elevated rail system.
- The study objectives include:
 - o Stage 1:
 - To review the existing urban policies e.g. BRT, Road Development, Railway Development Project, etc.
 - To grasp detailed traffic movement in the Urban Core
 - To formulate measures for mobility improvement

Expected Outcome: Integrated Transport Policies for Mobility Improvement in the Urban Core

- o Stage 2: (If Rail Based Transport is Justified)
 - Framework of rail based urban transportation system

Expected Outcome: The Project Framework of Rail Based FS Including Business and Operation Scheme

- JST needs to study detailed movements within the CBD. To this end, the study team shall install AMP sensors strategically placed in 40 locations

within the Nairobi Urban Core to detect detailed movements within the city. These sensors can continuously collect accurate data. This shall be used to update the OD data collected during the formulation of the NIUPLAN. The use of the AMP sensors can be seen as an improvement from the conventional roadside surveys. The data collected can be used for real-time reporting and can generate 24-Hr OD, Weekend OD, Peak Time OD, etc.

- If the OD from the collected Data suggests for the need of MRT within Nairobi, JST shall proceed to Stage 2 of the study.
- Generally, there is need for operation of the metro in cities with a population of between 3 M- 10 M population and a GDP per capita of 700-1,200. Nairobi has a population of 4 M and a GDP per capita of 1,133 but still has no metro operation. Going by this, Nairobi thus needs a rail based system.
- During the planning stages for BRT, there is need for provision of space for future upgrading to MRT. This is as BRT is not the final solution. Based on lessons from other countries, only in extreme cases like in Bogota can BRT achieve 40,000 PPHPD¹. In Bogota, there is provision for more space for use by BRT (4 lanes). In other cases, e.g. in Jakarta, BRT (1 lane) can only achieve a maximum of 3,600 PPHPD. However, Jakarta is currently being supported by JICA to construct an underground metro. A well-planned BRT can achieve 20,000 PPHPD. If the demand forecast for the study indicates that the demand in future shall be more than 20,000 PPHPD, JST shall propose for a rail based system.
- Japan has a range of mass transit systems ranging from Monorail which can achieve 30,000 – 35,000 PPHPD (3m wide by 15 m long coach), AGT (rubber tyre based.) which is smaller in capacity due to the size of the coach (2.5m wide by 12 m long). Its capacity is 10,000 – 12,000 PPHPD. MRT has the largest capacity and can carry up to 80,000 PPHPD. The coach is also bigger (3m wide by 20m long). BRT has a capacity of 10,000-20,000 PPHPD)
- It takes time to construct a rail based system. if started in 2017, the metro should be ready by 2023/2024. BRT also takes time. It is not as complicated as the metro but currently, no work has started and is proposed to be ready in 2022. It is important to underscore the fact that during planning, the consultants should provide for upgrading to MRT. Population of Nairobi is steadily on the increase and shall soon reach 10 million persons. This indicates the fact that Nairobi needs MRT more.
- Within the CBD, JST proposes for an underground railway network as the land is already developed. Nairobi has a good geological condition.

¹ PPHPD: Passengers Per Hour Per Direction

- The team has visited all the proposed BRT routes

3. Question and Answer Session: Comments on the Presentation

- i. Mr. Mohamed – NCC
 - Excused the PS for another meeting
- ii. Mr. Sugimoto – JICA Kenya
 - JST shall be involved in the study and complete the study by February 2018.
- iii. Dr. Mogere – JICA Kenya
 - Considering the case studies shared for other cities in East and South East Asia, there is need to look at whether Kenya is ready for an MRT. As a City, we cannot afford not to plan for an MRT system for the City.
 - The GDP per capita of Nairobi compared to the East and South East Asia indicates that we can afford MRT.
- iv. Mr. Mohamed – NCC
 - Challenged NAMATA to think outside the box, within the next one year
 - He was impressed that JST shall embrace technology making use of AMP Sensors to track movements within the urban core. This data shall in turn be utilized for the purposes of improving mobility.
 - There is need to dilute the preoccupation with BRT as a solution to mass transit in Nairobi and look towards mobility solutions for the people of Kenya
 - He supported the direction of Rail based transport rather than BRT
 - What are the next steps?
- v. Eng. Omer - KeNHA
 - Excited with the presentation, thinks it's good and could solve Urban mobility within Nairobi.
 - The way forward is to promote transit oriented development projects. This should synergize with the plans proposed by JST.
 - There is need to look at phasing and prioritization to determine the priority areas thus ensure that the achievement of maximum returns at each stage.
- vi. Mr. Mohamed – NCCG
 - There is still sufficient time as the study is still in its initial stages. Could the participants share their initial thoughts and further review the proposals shared and help come up with a solution that is best for Nairobi?
- vii. Eng. Oginga – KURA
 - Looking at Ngong Road, the traffic volumes is already too high thus the congestion on the road. Why are we still thinking of BRT on that road instead of going straight to MRT?

- Thika Road is already congested and there might not be space for BRT installation. This corridor can also be considered as a MRT route.
- viii. Eng. Muchiri – KURA
- It is important to look ahead, we have surpassed capacity for BRT in some corridors. BRT might be useful as a feeder mode to MRT routes.
 - We need to look ahead and see what will work and not waste Resources.
 - Thika Road serves not only Nairobi but also Murang'a County. People can live in Murang'a and work in Nairobi using the MRT line for their daily commute.
- ix. Dr. Mucemi - KRC
- The NMRTS report saw all the major routes in Nairobi being served by the metro. BRT was agreed on as it was viewed as easy to implement. However, the Harmonization Report also proposes for rail based solutions by 2025. Based on the ongoing trend, shall BRT be implemented in time?
 - There is need to look at MRT in specific routes within the city.
- x. Mr. Mwangi – NCCG
- Any project requires Land example ongoing outer ring road construction, expansion for BRT not possible, planning for expansion is key in every project. Land is a finite resource. It may be cheaper to go straight to MRT in certain corridors as the population for the City is also increasing and projections indicate that it shall reach 10 million by 2025.
- xi. Mr. Okutsu – JST
- Ngong Road expansion is taking up the full 40m ROW. The project has provided for 9m for BRT. The 9m is sufficient for MRT installation. This might be a good location to upscale straight to MRT. There is also no study ongoing on Thika Road. Thika Road was already expanded but there was no provision for BRT.
- xii. Eng. Muchiri – KURA
- Concerned AMP sensor may not account for the people who are not connected to Wi-Fi
- xiii. Mr. Nakagawa – JST
- He has noted that most people turn off their Wi-Fi. This shall lead to most people not being captured during the census.
 - However, through sensitization on the need to have their Wi-Fi on, more people could be captured. Even in the normal person trip surveys, approximately 1% of the total trips can be collected. The main advantage of this method is that using AMP Sensors, we are able to collect much more data.

4. Closing Remarks by NCCG

- i. Mr. Mohamed – NCC
 - This is a good beginning as we have discussed BRT in many forums for too long. There is need to look at MRT as the best solution for Nairobi.
- ii. Mr. Sugimoto – JICA Kenya
 - He noted that it was important to look into the future for Nairobi.
 - JST shall present outcomes of their study backed with evidence to further the ongoing discussions.

5. A.O.B.

- Mr. Mohamed
 - He suggested if there could be monthly reviews just to share the progress.
 - He was also happy to see NAMATA ably represented in the forum. He hoped for more engagement in future amongst the various stakeholders.

Attachment:

- (1) Participants of the Meeting
- (2) Presentation Material for the Joint Coordinating Committee Meeting on 23 March 2017

The end

Attachment 1: Participants of the Meeting

Attendance:

NAME	INSTITUTION	POSITION
Mr. Irungu Nyakera	MOTIHUD ²	Principal Secretary - Transport
Mr. Mohamed Abdullahi	NCCG	CECM ³ Transport
Eng. Muchiri DG	KURA	Ag. General Manager Planning & Environment
Eng. W.R. Oginga	KURA	Manager Planning
Eng. Samuel O. Omer	KeNHA	General Manager (Planning & Environment)
Mr. S.G. Mwangi	NCCG	Chief Officer - Lands
Mr. James Maina	NAMATA	SASD
Eng. Abigail Muigai	NAMATA Kiambu	
Mr. Paul Kingori	NAMATA/ MOTIHUD	Economist
Mr. Justin Gatuita	NAMATA	Secretariat
Mr. Abdi Ibrahim	NAMATA	Under Secretary
Mr. Gichohi Mwaniki	MOTIHUD	PS Office
Mr. Sammy Muthama	NCCG – Roads and Transport	Deputy Director (Roads)
Ms. Maki Hasegawa	NCCG/JICA	Urban Development Masterplan Advisor
Mr. Kithinji Kanyaura	Kenya Railways	Project Manager (Infrastructure)
Mr. Mucemi Gakaru	Kenya Railways	Team Leader (World Bank Projects)
Mr. Raphael Kazungu	NCCG -Urban Planning	Urban Planner
Mr. Wycliffe Nyasende	NCCG	Urban Planner
Mr. Satoshi Sugimoto	JICA Kenya	Senior Representative
Dr. Steve Mogere	JICA Kenya	Infrastructure and Evaluation Advisor

JICA Study Team:

Name	Position
Mr. Akio Okutsu	Team Leader/Urban Transport Planning Specialist
Mr. Yoshiya Nakagawa	Deputy Team Leader/Public Transport Planning Specialist
Mr. Tadaaki Murakami	TDM/Mobility Management 1
Mr. Shuichi Tanimoto	TDM/Mobility Management 2
Mr. Tomomi Fujita	Strategic Environmental Assessment Specialist
Mr. Babu Mukoko	Traffic Survey Assistant
Mr. Akbar Ahmed	GIS Assistant
Ms. Anne Ogola	Secretary

² MOTIHUD: Ministry of Transport, Infrastructure, Housing and Urban Design

³ CECM: County Executive Committee Member

The project on Detailed Planning of Integrated Transport System and Loop Line in the Nairobi Urban Core

1st Joint Coordination Committee

JICA study team

23 March 2017



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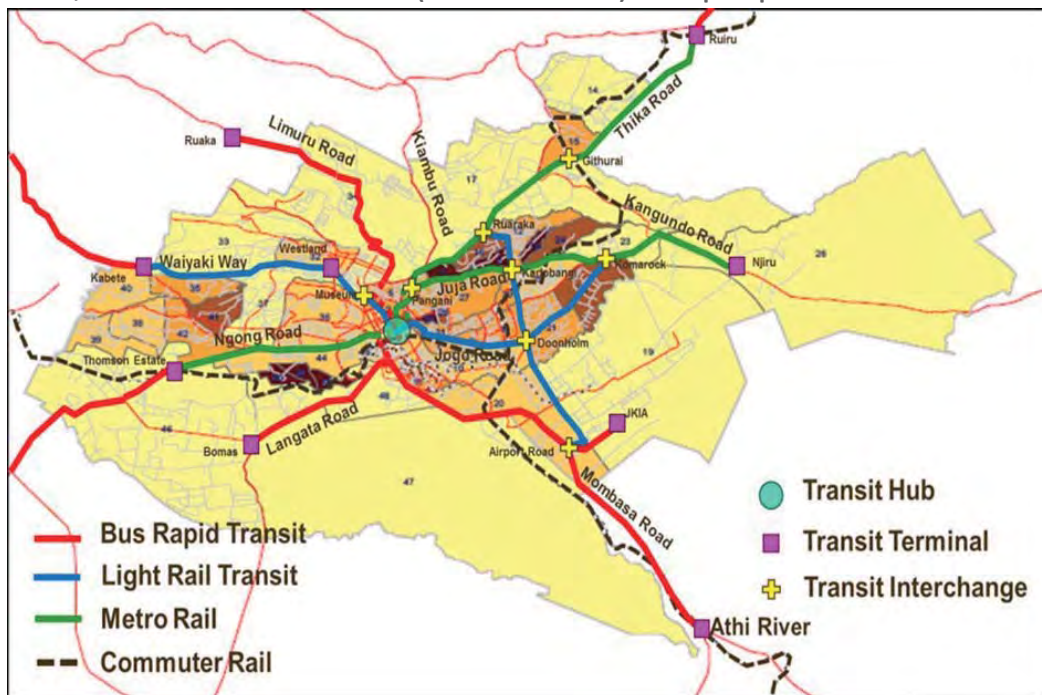
Contents

1. Background
2. Objectives
3. Issues
 - To Serve Mobility Improved Transport
 - To Grasp Traffic Movement
4. Technical Approach
5. Methodology
6. The Study Team

Background

NMRTS* Network for NMR (MoTI, 2011)

- BRT, LRT and Metro Rail (each 3 lines) are proposed.



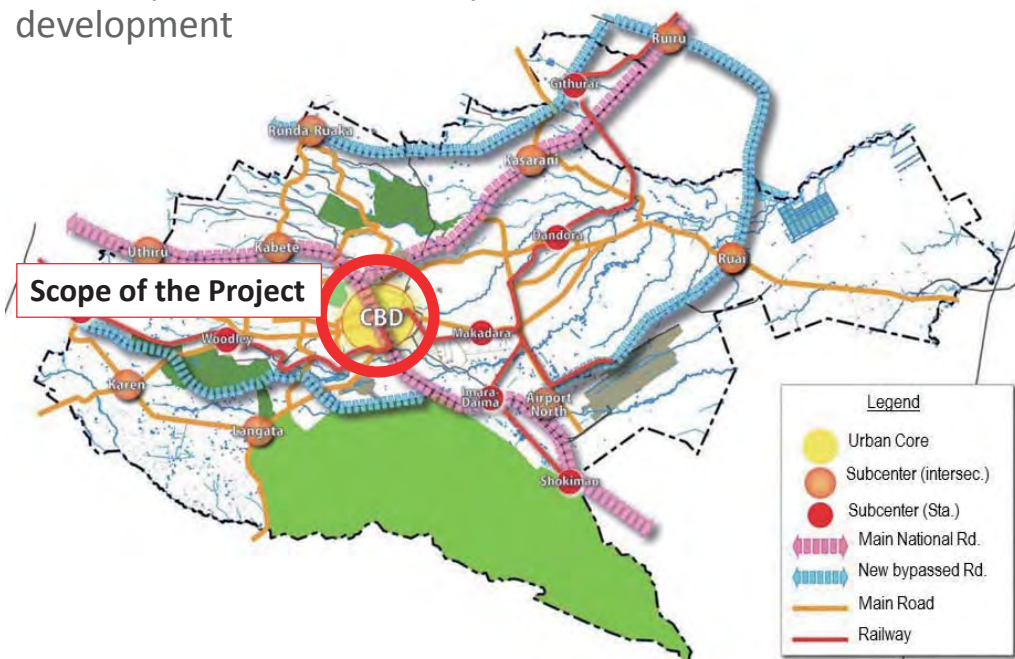
* Feasibility Study Technical Assistance for Mass Rapid System for Nairobi Metropolitan Region (MOTI, 2011)



Background

NIUPLAN* (JICA, 2014)

- Roadmap for Nairobi Metropolitan Area with sub-center development



* The Project on Integrated Urban Development Master Plan for the City of Nairobi (JICA, 2014)



Background

NUTRANS + NIUPLAN Loop Line

- BRT lines (NUTRANS) and 1 LRT Line(NIUPLAN) are proposed.



Background

Harmonisation Study (MoTI, 2015)

- Loop Line is replaced as BRT lines

NIUPLAN (up to 2030)

Harmonisation Study (up to 2030)

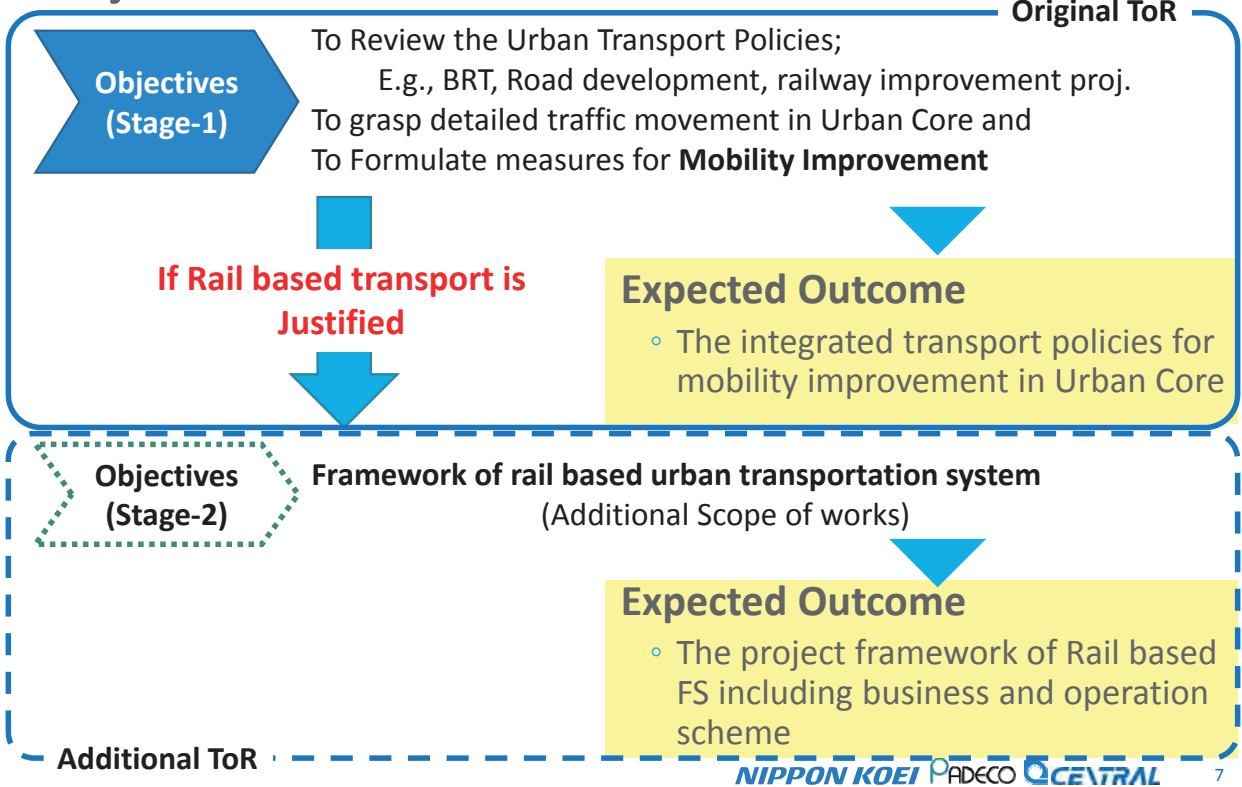


Transport development is on-going as referring “Harmonisation Study” basis



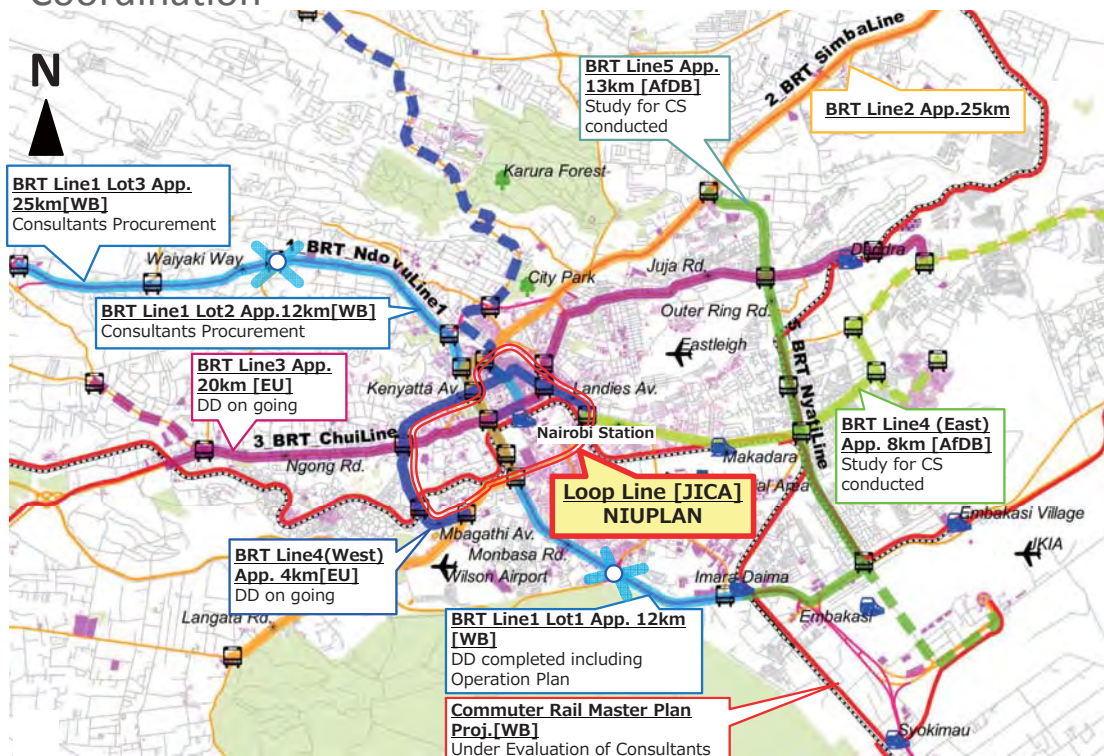
Objectives and Expected Output

Objectives



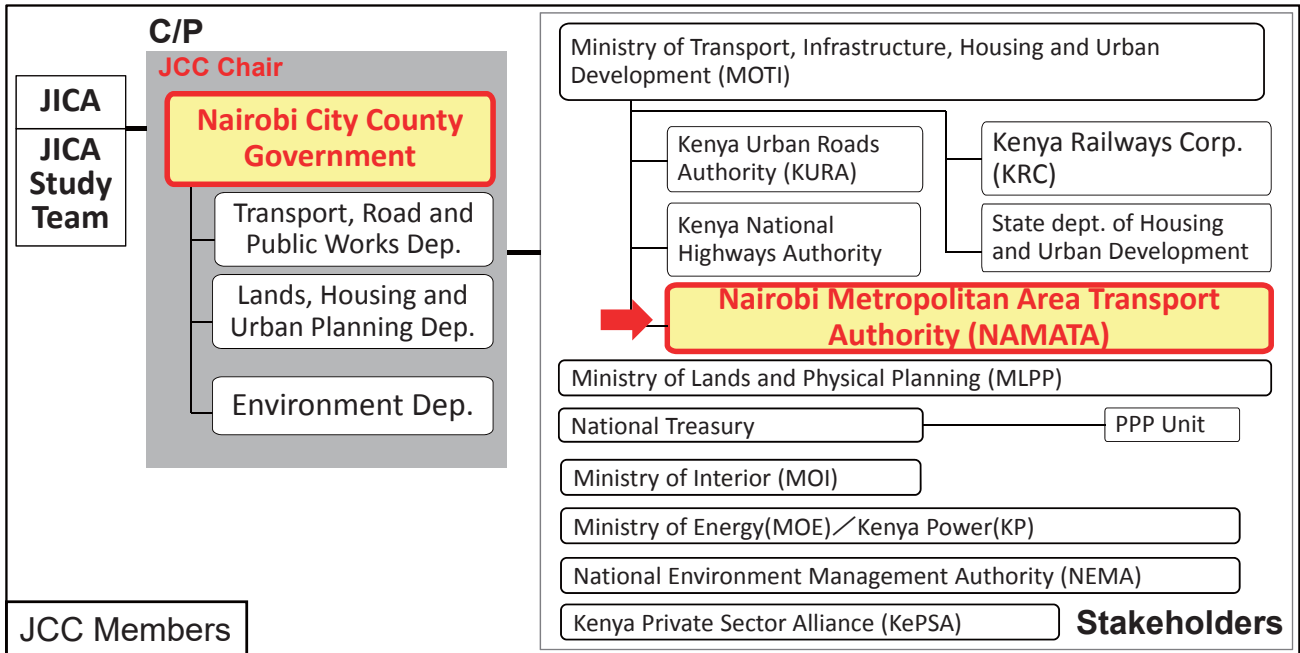
Issues: To Serve Mobility Improved Transport

Issue-1: Multiple Urban Transportation Projects without Coordination



Issues: To Serve Mobility Improved Transport

Issue-2: Coordination among Authorities Concerned was inefficient



The rail based transport executing agency is not clear.



Issues: To Serve Mobility Improved Transport

Issue-3: Inefficient Mobility in Urban Core

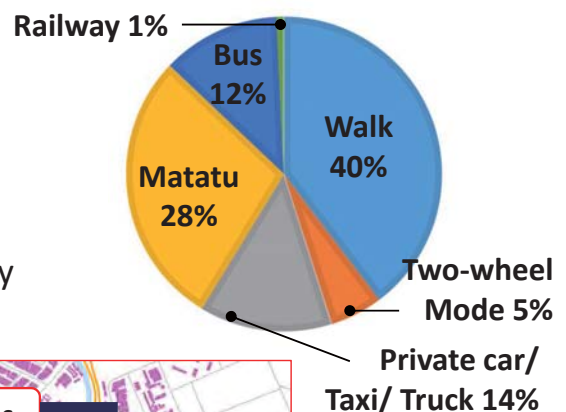
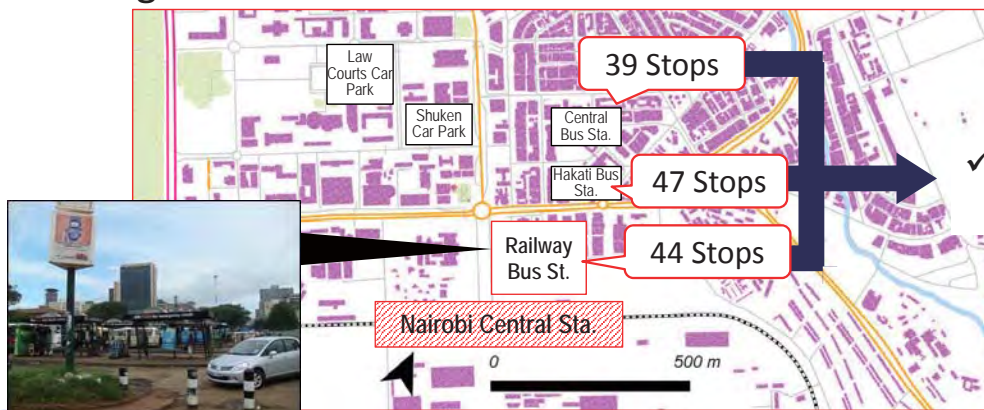
Modal Share

- 40% of trip is walk
- Bus mode is shared only 12%



May caused by Inefficient Mobility

Existing Bus Terminal



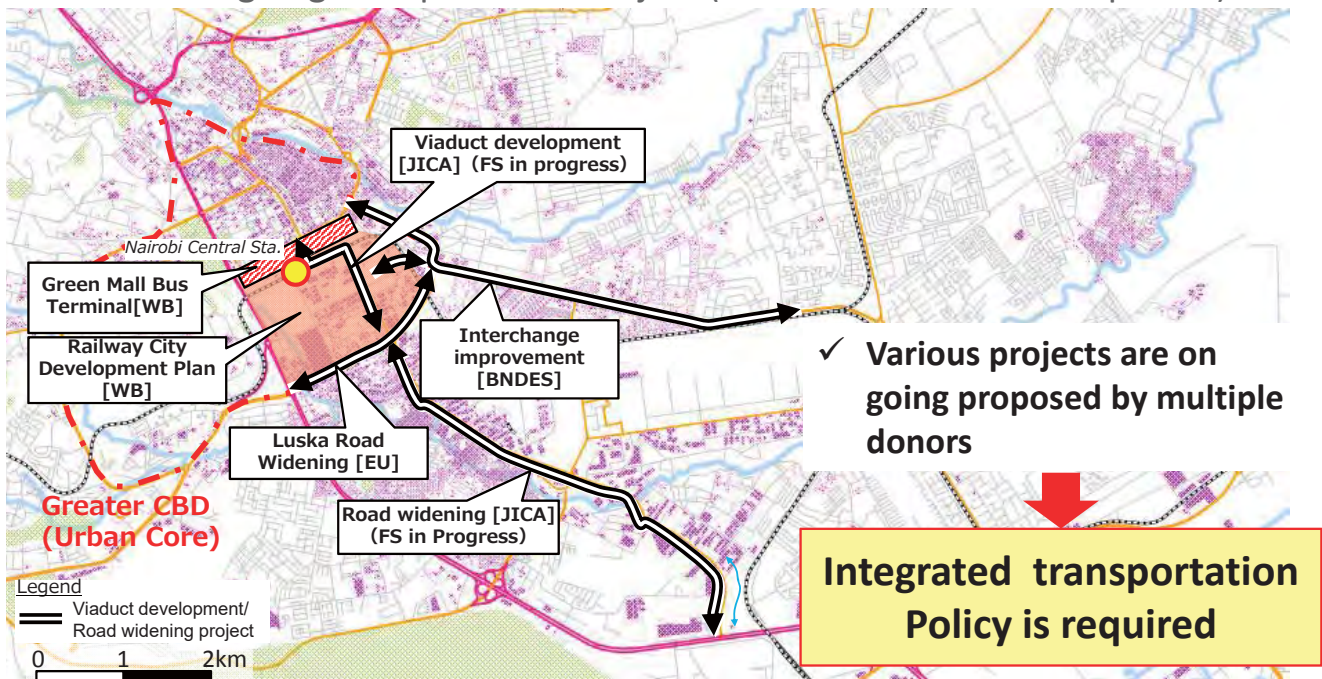
Not arranged by direction



Issues: To Serve Mobility Improved Transport

Issue-3: Inefficient Mobility in Urban Core

- On going transportation Project (Road and Urban Development)



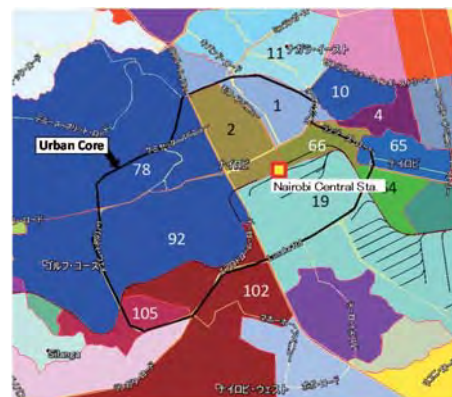
Issues: To Grasp Traffic Movement

Issue-4: Large Scaled Zoning System in Urban Core

- Existing CBD area is set as one zone in NIUPLAN
- Movement in same zone is not counted as trip



Subdivide zoning system shall be prepared to grasp trip movement in detail



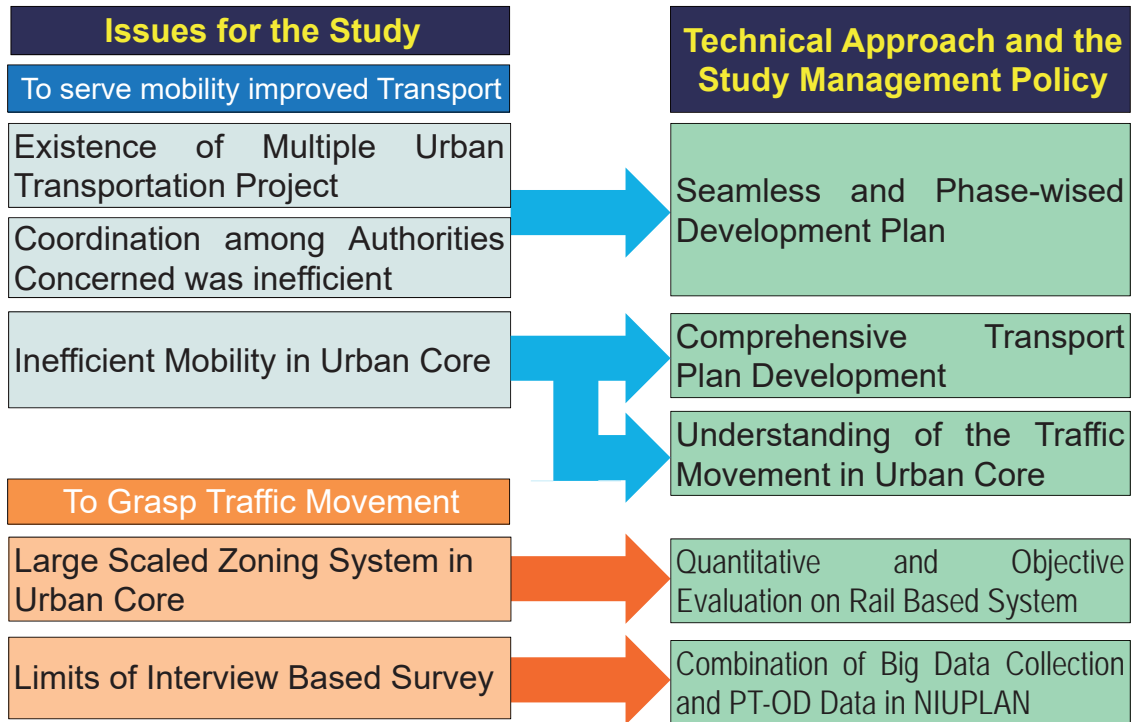
Zoning system in Urban Core (NIUPLAN)

Issue-5: Limits of Interview Based Survey

- Large scaled interview survey is necessary for Mass Transport
- Pilot survey to grasp trip movement is conducted (e.g., Smartphone, GPS logger etc.)

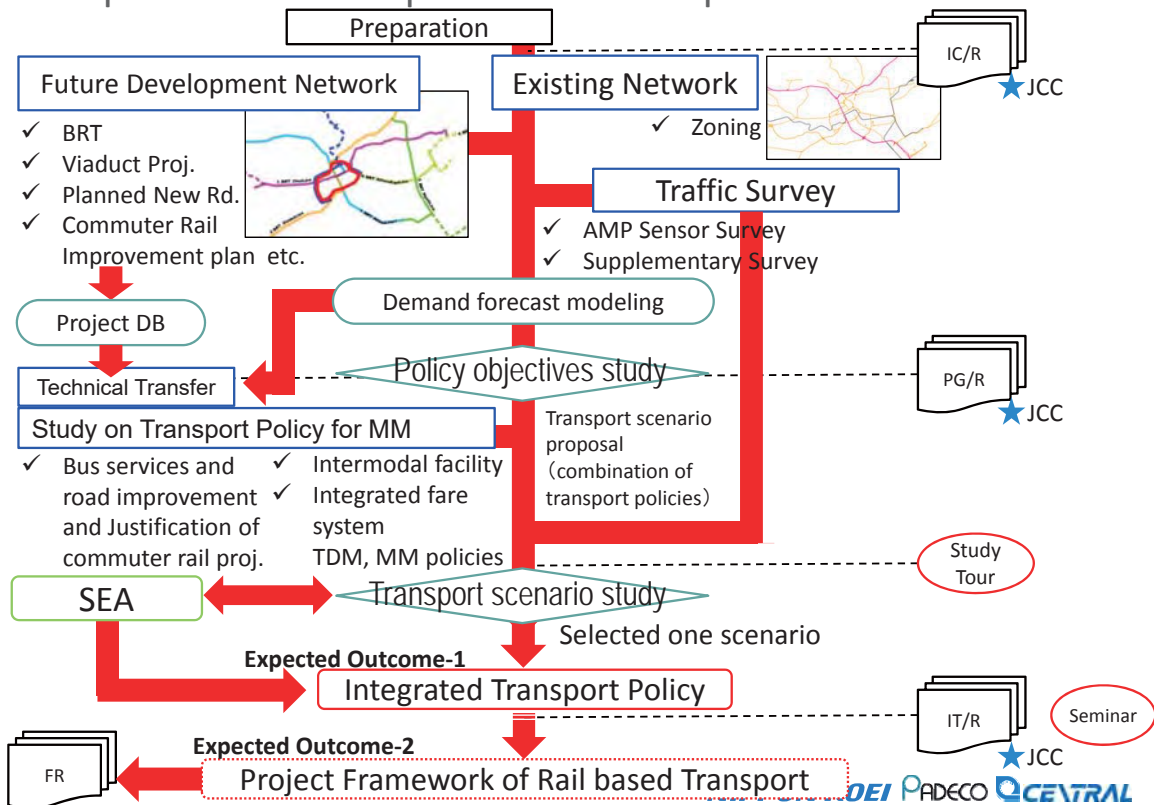
Technical Approach

Issues and The Approach linkage



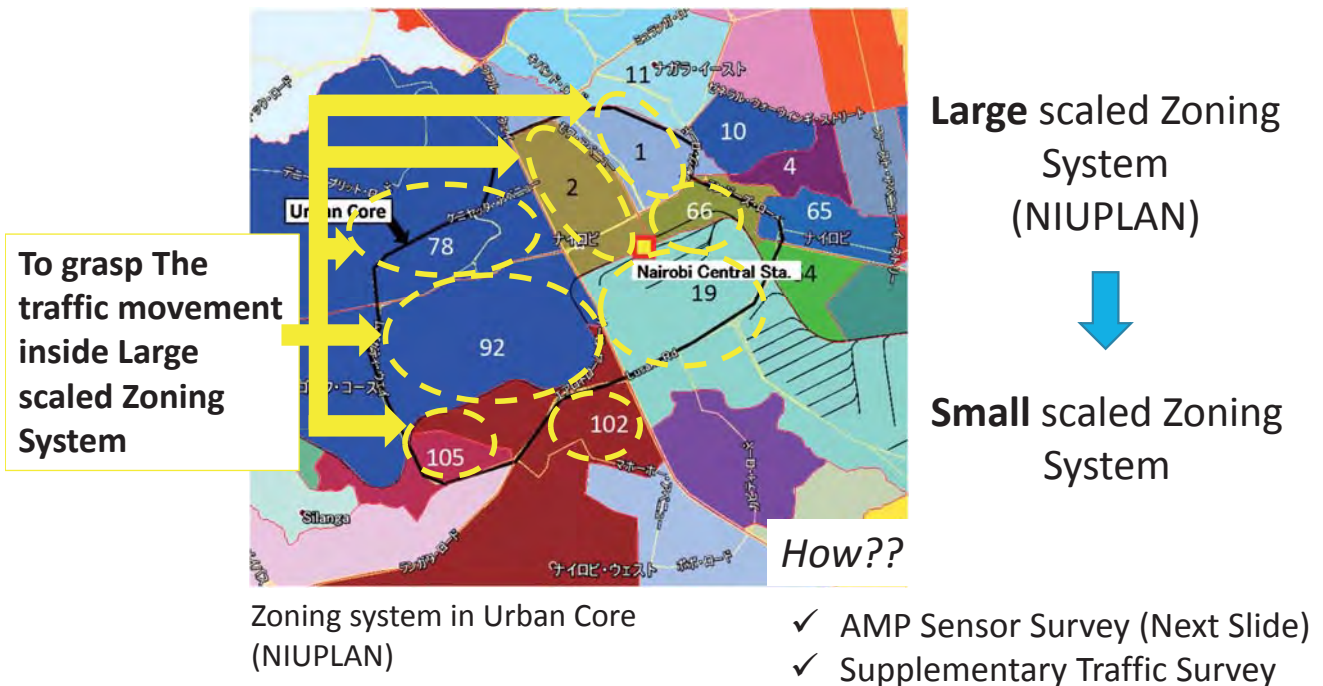
Technical Approach-1

Comprehensive Transport Plan Development



Technical Approach-2

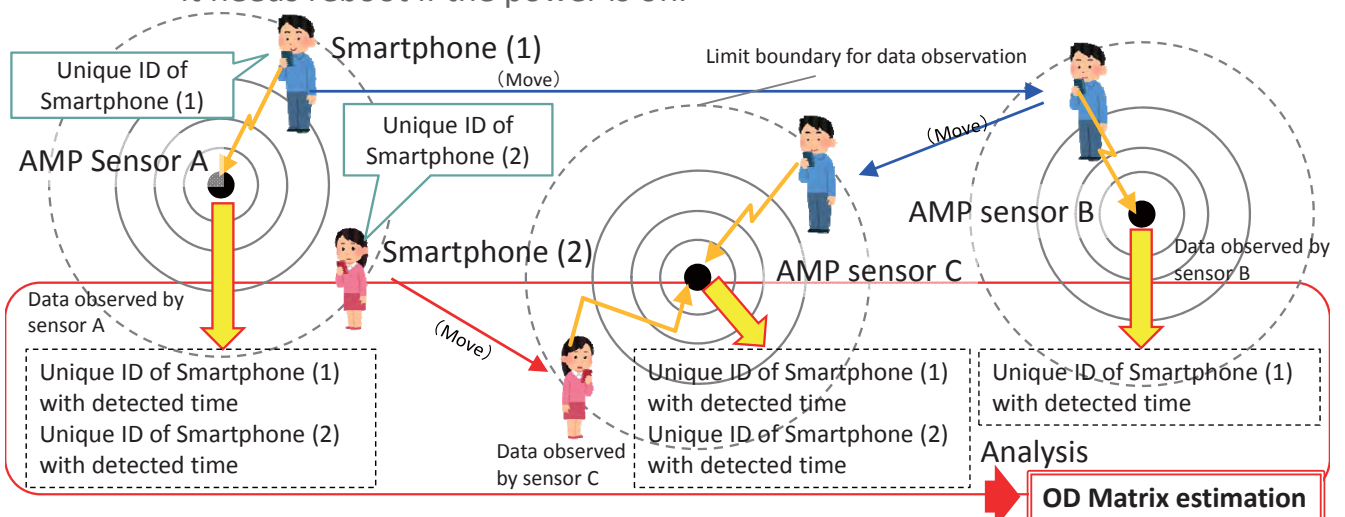
Understanding of the Traffic Movement in Urban Core



Technical Approach-3

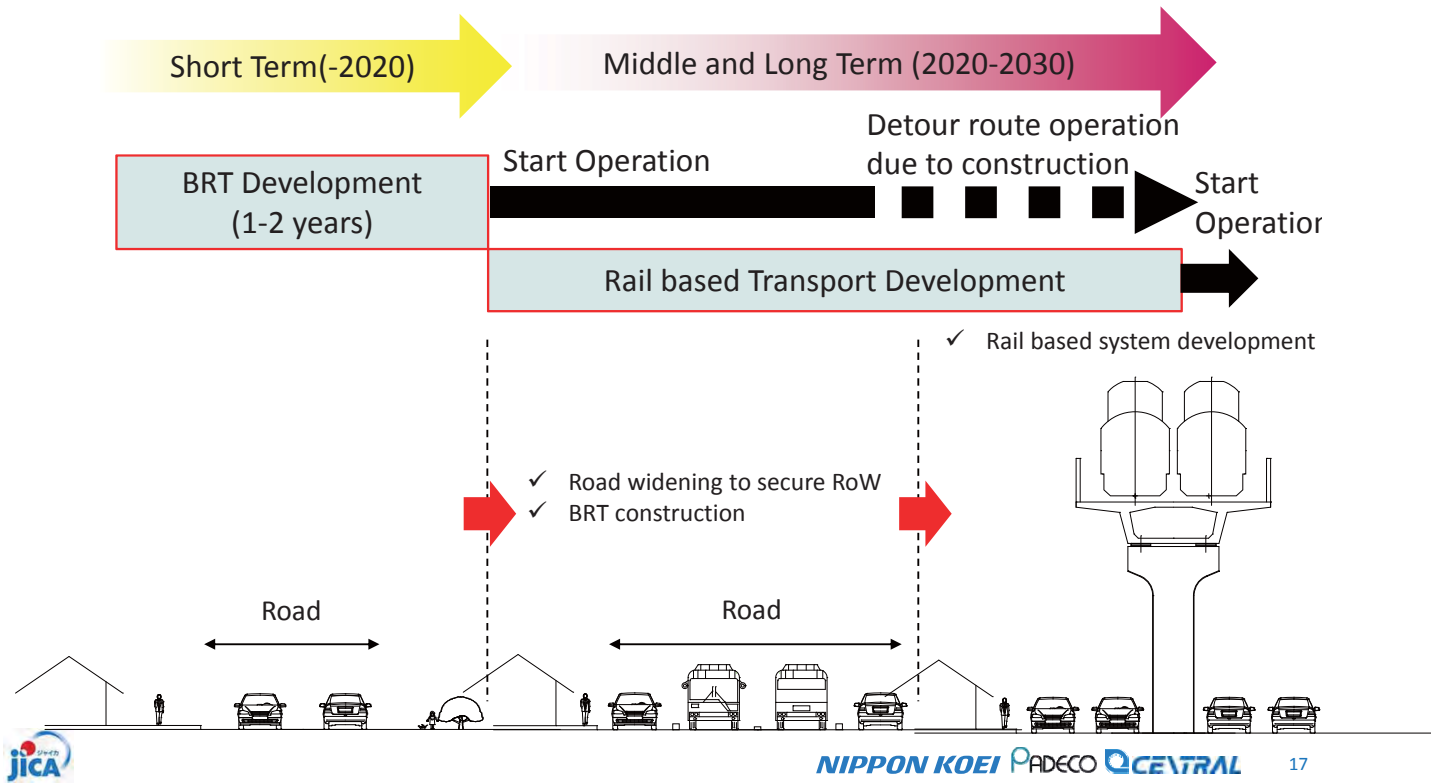
Combination of Big Data Collection and PT-OD Data in NIUPLAN

- AMP sensor collects unique ID for smartphone as much as possible Wi-Fi signal detected (24/7).
- OD Matrix is estimated according to the analysis of the collected data.
- It needs reboot if the power is off.



Technical Approach-4

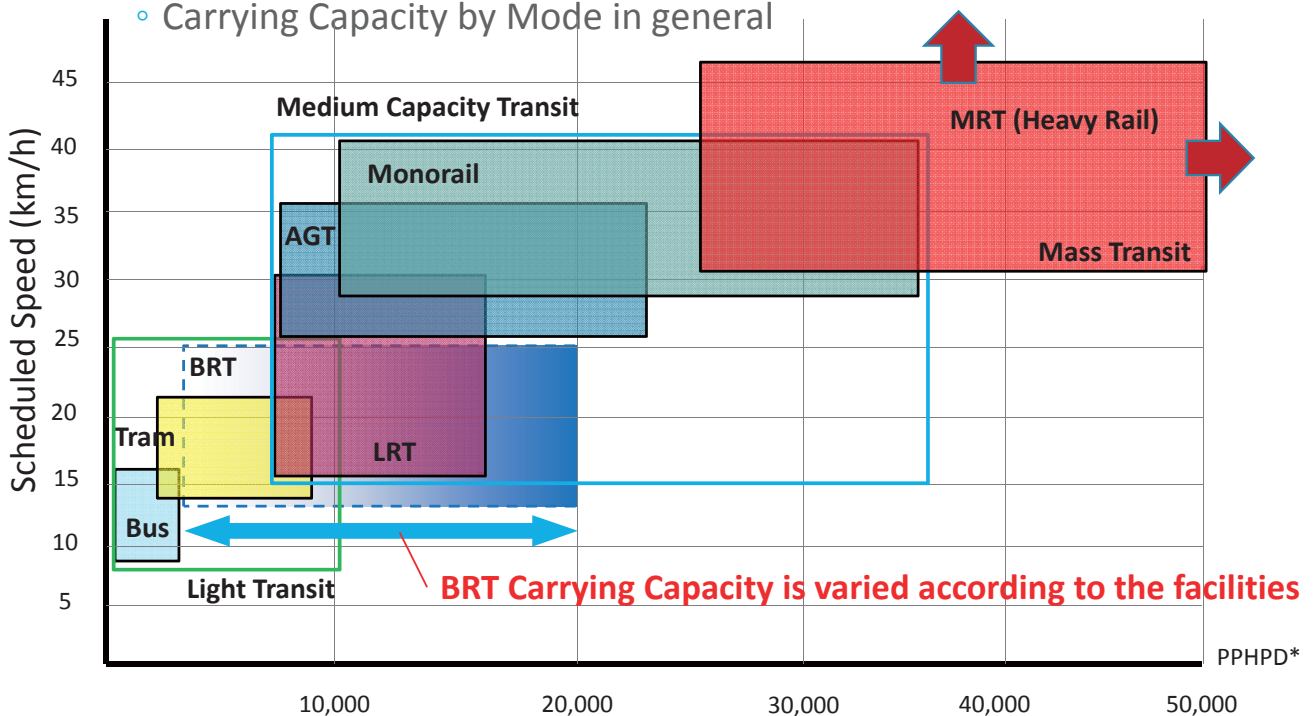
Seamless and Phase-wised Development Plan



Technical Approach-5

Quantitative and Objective Evaluation on Rail Based System

◦ Carrying Capacity by Mode in general



* PPHPD: Passengers per hour per direction

Technical Approach-5

Quantitative and Objective Evaluation on Rail Based System

- BRT carrying capacity is depending on the facility



Bogota BRT

2 Dedicated lanes with 6 slots

PPHPD:40,000
(Exceptional case)



Trans Jakarta

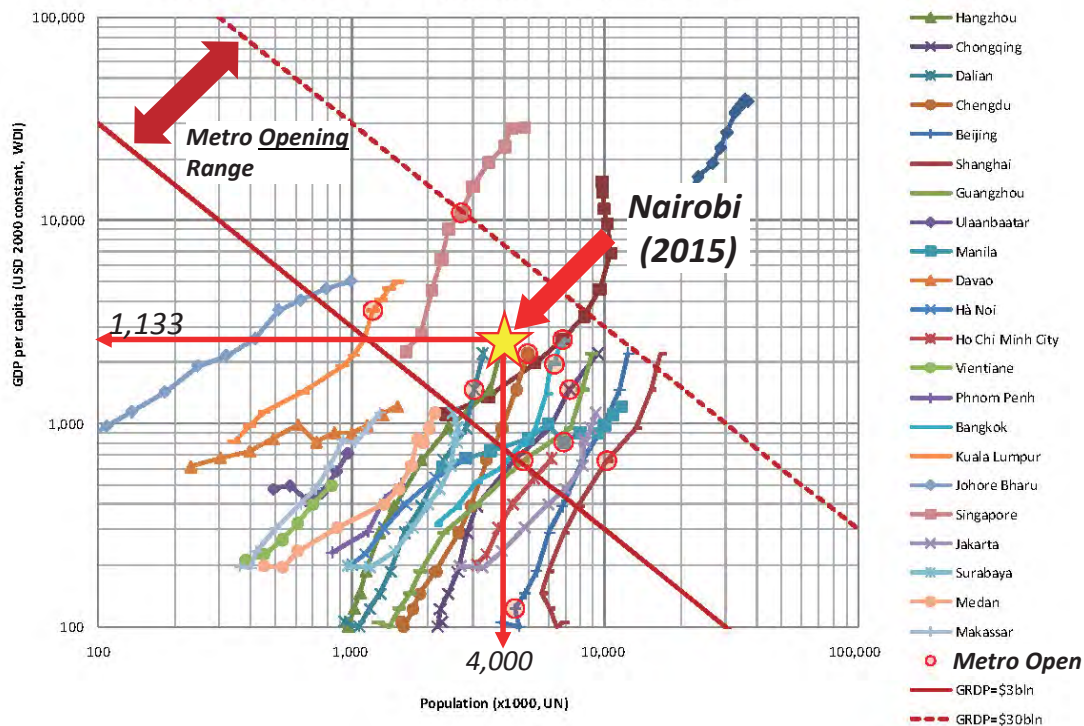
1 Dedicated lane with 1slot

PPHPD: 3,600

Applicable system shall be selected according to demand forecasting with feasibility in view of engineering

Technical Approach-5

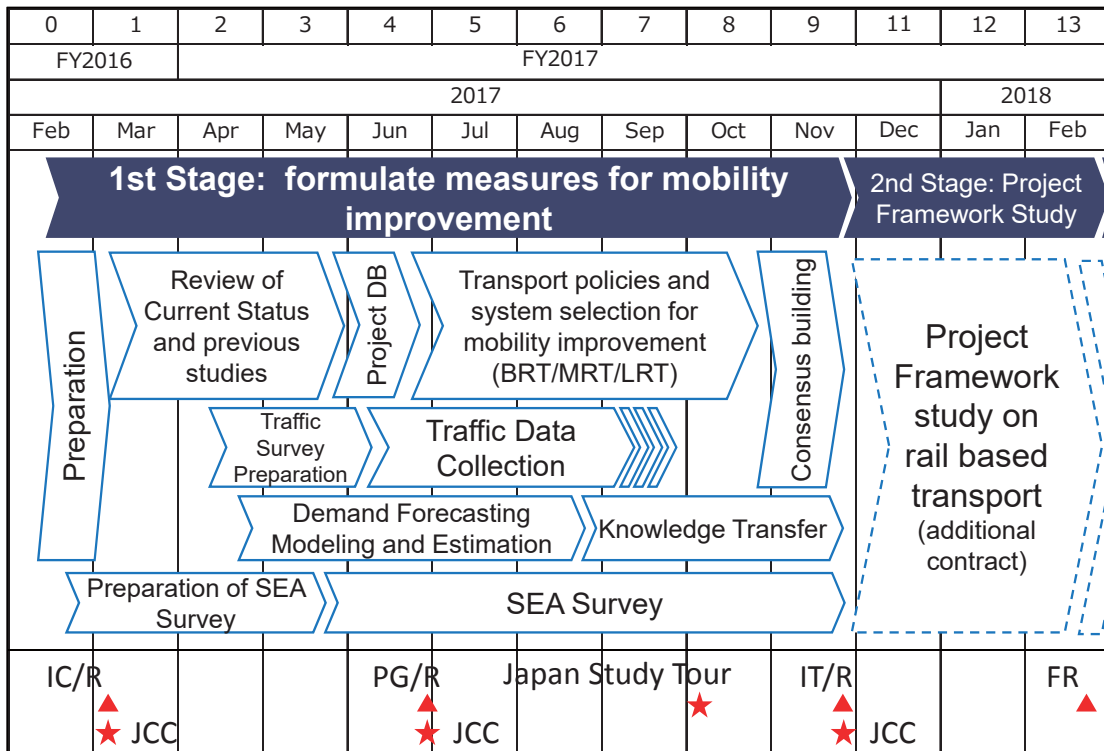
GDP per Capita to Urban Population (1960-2010) -East Asia, Southeast Asia-



Methodology

Work Plan

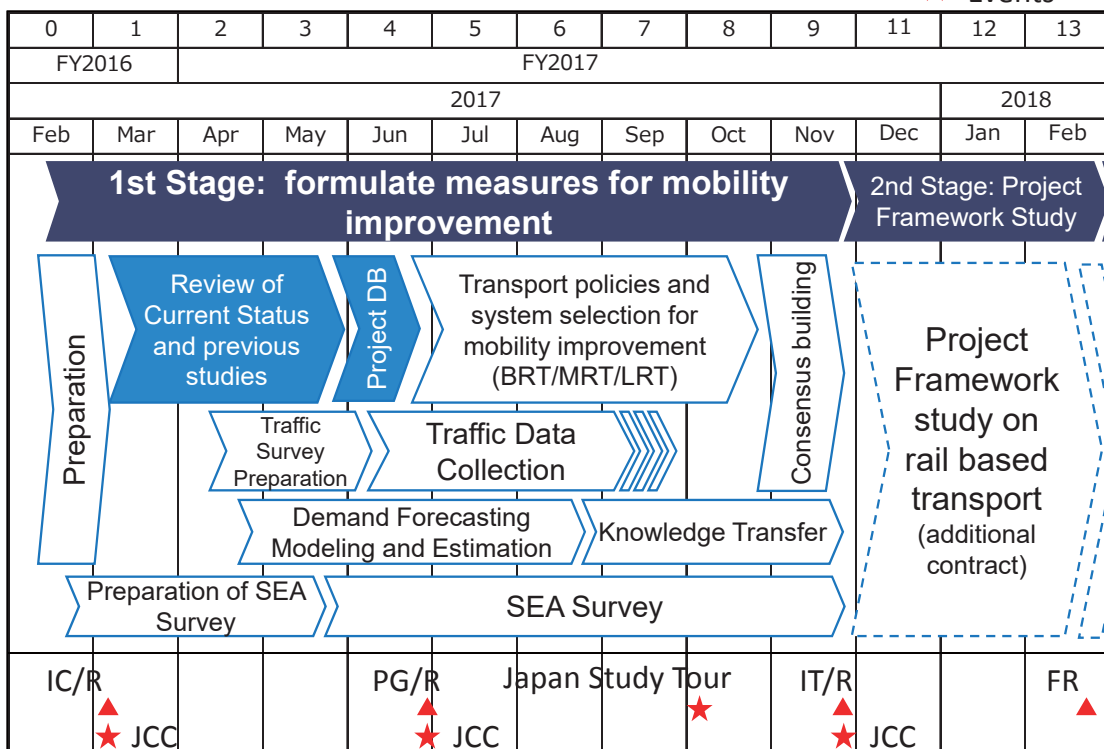
Legend ▲ Reports
★ Events



Methodology

Work Plan

Legend ▲ Reports
★ Events



Methodology

Review on Major Transport Development Projects

Identified studies and projects for urban development

item	Project	Source
On-Planning	Railway City project	WB, contracted consultants
	PPP Urban development	NCCG, PPP Unit
On-going	Upper Hill Urban development	NCCG
	Westland Urban development	NCCG
	Karen, Langata Urban development	NCCG

#pls refer to the IC/R for actual name of the projects

Methodology

Review on Major Transport Development Projects

Identified studies and projects for urban transport

Studies and projects in Nairobi (including ongoing, under preparation)	Executive body
AfDB/ FS on NMRTS June 2011	MOTI
AfDB/ Harmonisation of Activities on the Development of MRTS Oct 2013	MOTI
Urban Mobility Plan, Oct 2013 (need to collect details)	
WB / National Urban Transport Improvement Project (in Aug 2012)	
Commuter Rail Master Plan (under process of consultant bidding)	KRC
D/D and C/S of BRT Infrastructure; (under process of consultant bidding)	KNHA
F/S and Design for Selected BRT and Preparation of Bidding Documents (under process of consultant bidding)	KURA
ITS /traffic management and ICT solutions; (under process of consultant bidding)	KURA
WB / Nairobi Metropolitan Services Improvement (in May 2012)	
Railway City Project (under implementation phase)	MLPP, KRC, NCCG
FS-DD-TD-SV on Selected Roads and a Green Mall Street Bus Station (under implementation phase)	MLPP, KRC NCCG
NCCG / Traffic Decongestion Plan in Nairobi CBD (under implementation phase)	NCCG
JICA / Preparatory surveys on Flyovers development and road widening	KURA
NAMA - Facility / Mass Rapid Transport System in Nairobi (KfW?/GIZ?)	MOTI, KURA

#pls refer to the IC/R for actual name of the projects

Methodology

Review on Major Urban Development Projects

- Interview to Real Estate firm, Architect firm and so forth.
- Collect and review detailed information on the ongoing planning and projects on urban development, such as in Upper-Hill, Railway City, Kilimani, Westland, Thika Road, Karen.
- Analyze issues on urban development in Nairobi.
- Outlook existing situation on PPP.

Project Database in GIS

- To manage projects properly, GIS database might be established as a part of Capacity Building.



Methodology

Work Plan

Legend ▲ Reports
★ Events

0	1	2	3	4	5	6	7	8	9	11	12	13	
FY2016			FY2017									2018	
2017											2018		
Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
1st Stage: formulate measures for mobility improvement										2nd Stage: Project Framework Study			
Preparation	Review of Current Status and previous studies		Project DB	Transport policies and system selection for mobility improvement (BRT/MRT/LRT)					Consensus building	Project Framework study on rail based transport (additional contract)			
	Traffic Survey Preparation			Traffic Data Collection									
	Demand Forecasting Modeling and Estimation					Knowledge Transfer							
	Preparation of SEA Survey		SEA Survey										
IC/R	▲			PG/R	▲	Japan Study Tour	★	IT/R	▲			FR	▲
	★	JCC			★	JCC			★	JCC			

Methodology

❑ Traffic Survey for CBD Mobility

Proposed the following 6 items for traffic survey. Other than item 6, those surveys will be implemented in earlier stage of the study.

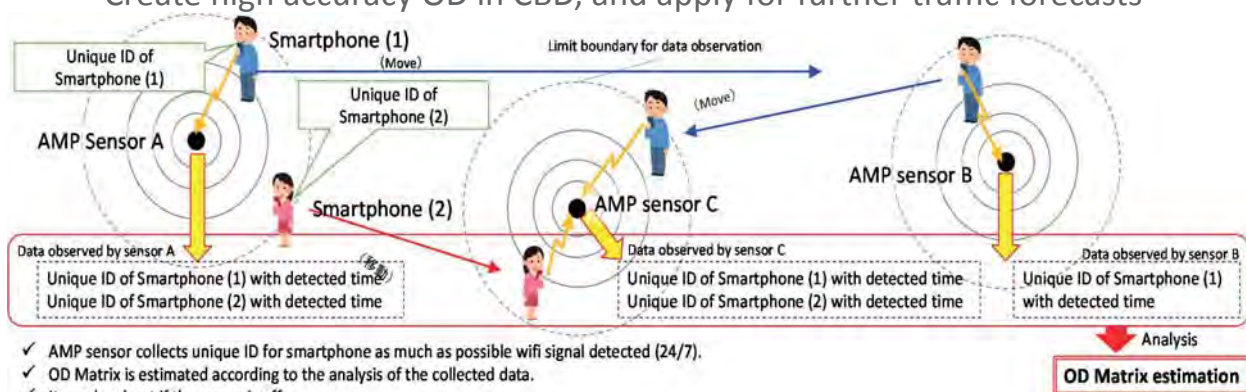
Item	Methodology	Size
1. Traffic Counting by using AMP sensor	To detect passenger demand, passenger behavior characteristics and OD detection, egress and access	40 locations (provisional)
2. Passenger counting	Count the average number of passengers on board	4 locations
3. Freight interview	Freight traffic movement in CBD	10 locations
4. Facility Inventory	Identify major facilities related to transport service and traffic generation	CBD area
5. Smartphone ownership survey	For calibration of the 1. AMP sensor detection	500 samples
6. SP survey	To detect personal preference for future interventions for mobility improvement	500 samples

Methodology

❑ Traffic Survey with AMP sensor (1)

Application of the state of art in transport survey.

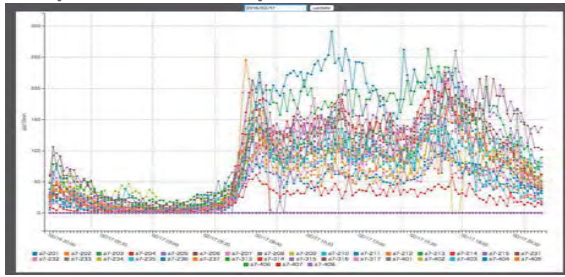
- Facilitate 40 AMP sensors in CBD area,
- By detecting movement of Wi-Fi signals of smartphones in CBD, estimate major passenger movements with high accuracy in 24/7 basis
- Create high accuracy OD in CBD, and apply for further traffic forecasts



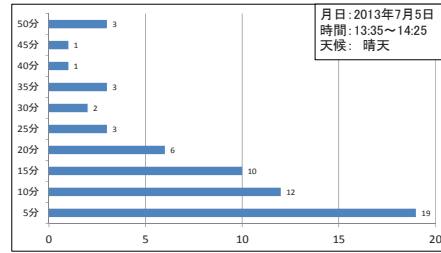
Methodology

Traffic Survey with AMP sensor (2)

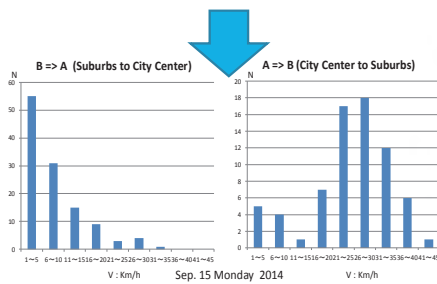
Expected Outputs;



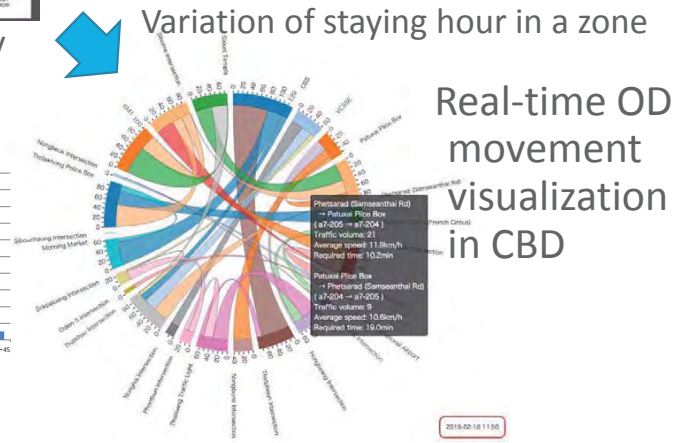
Real time passenger counting by 24/7 hours for 40 zones in CBD



Variation of staying hour in a zone



Estimation of zone-zone travel speed variation



Methodology

Traffic Survey with AMP sensor (3)

Need cooperation of Nairobi County Transport Office

Approval of traffic survey with AMP sensors in March

- The study team will keep compliance with privacy concern of Kenya, EU and Japan standard.
- The facility will be handed over to the Nairobi County Transport Office with proper training in the end of the study

Cooperation on Setting of AMP sensors;

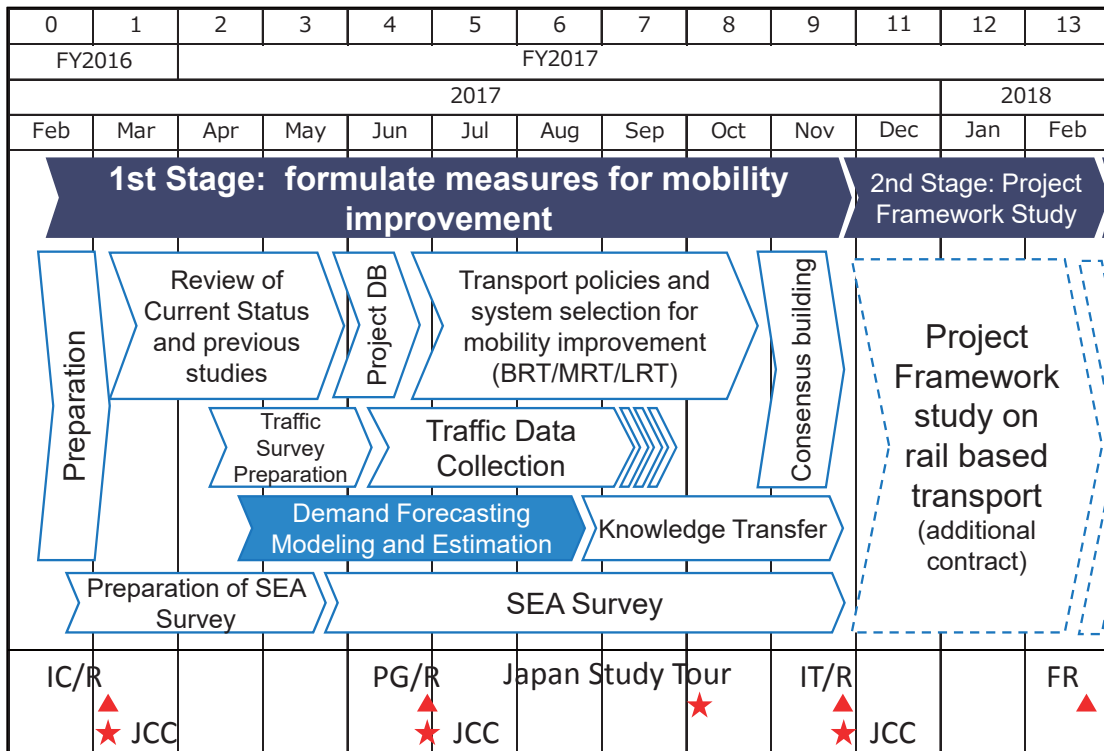
- Facilitate setting of AMP sensors, with proper power supplies.
- The study team identified 40 locations as initial trial, including major bus terminal, parking, business centers, and so on.
- It could be replaced during the survey period.



Methodology

Work Plan

Legend ▲ Reports
★ Events

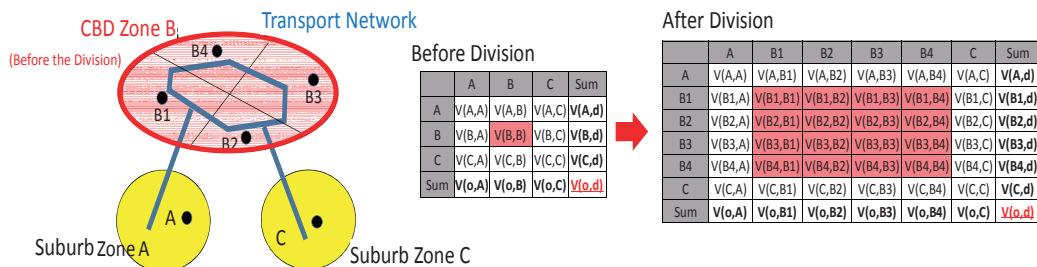


Methodology

□ Demand Forecast Modeling

New D.F. models for Urban Core will be made by revising the NIUPLAN models for Nairobi City

1) Division of TAZs in CBD



2) Review and revision of NIUPLAN modal-choice model

If we apply the NIUPLAN m-c model to divided TAZs in CBD, walk share may be calculated higher than actual share. If so, we will fix the model by the results of traffic surveys.



Methodology

□ Demand Forecast Modeling

3) Set of traffic simulation data

We will set the impedance between zones and transport network data to simulate the mobility management (MM) measures by scenarios.

4) Implementation of SP survey

We may implement the Stated Preference (SP) survey to build the modal choice model when the MM measures will be implemented in the future

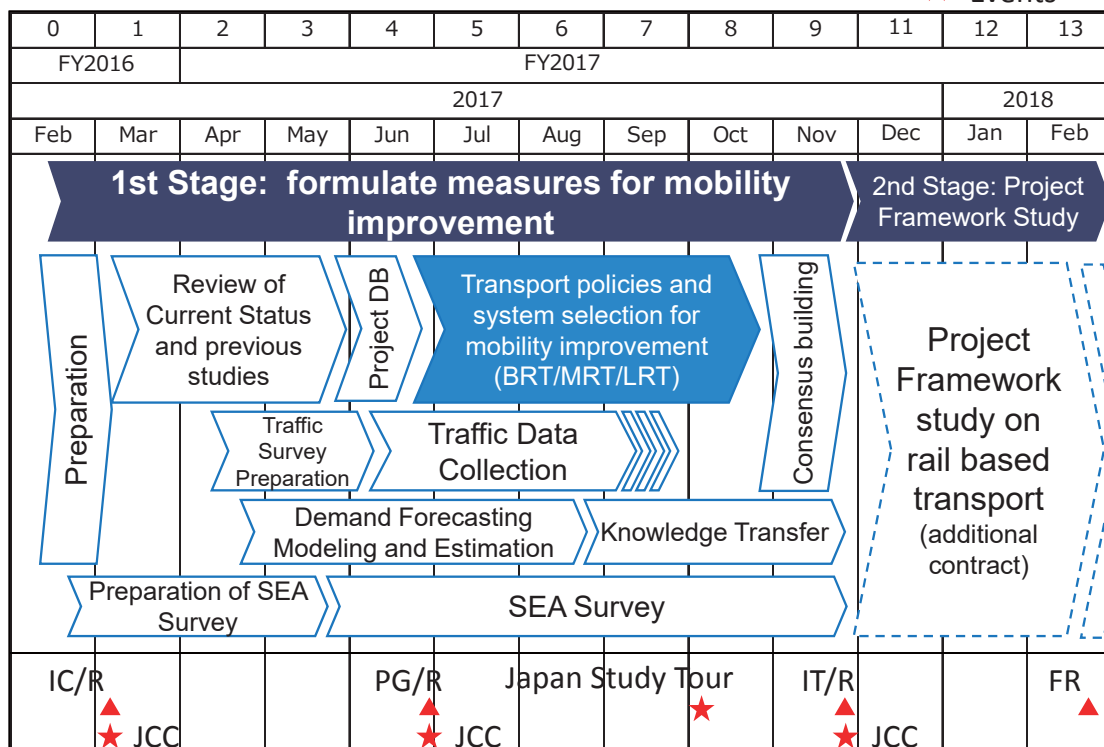
5) Calculation of traffic assignment

We will calculate the traffic assignment by scenarios and then select the best scenario case to satisfy the goal of policy objectives in transport sector up to 2030 in Urban Core.

Methodology

Work Plan

Legend ▲ Reports
★ Events



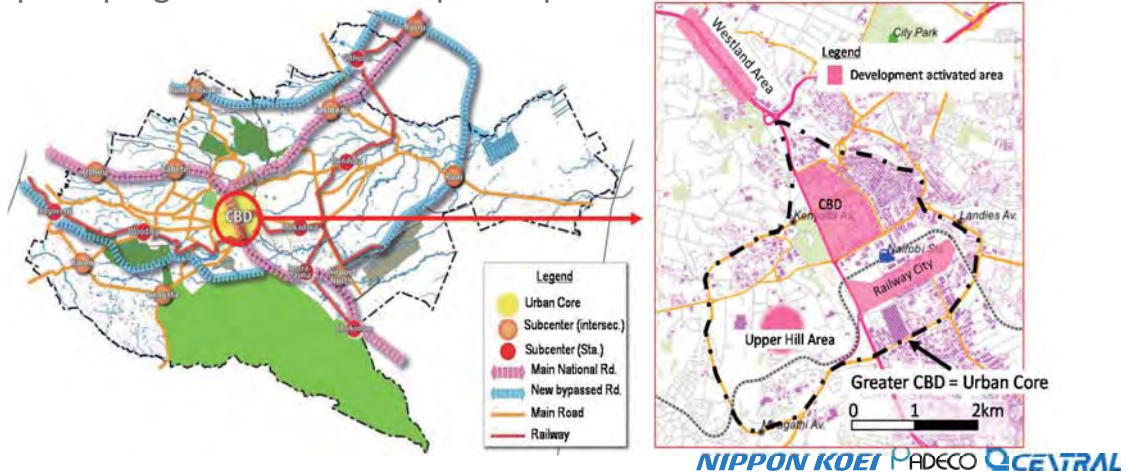
Methodology

□ Review of development vision and plan in Urban Core proposed in NIUPLAN

In NIUPLAN, "sub-center system" that connects CBD and seven (7) sub-centers was proposed with improving and developing of radial roads, railways and intermodal facilities.

Now, the Railway City development project is ongoing, the Upper-hill Area is developed and the city function has been centralized in Urban Core.

We will check the difference between the original plan and current plan, and grasp the progress of the development plans in Urban Core.



35

Methodology

□ Policy objectives in transport sector

We will set the goal of policy objectives in transport sector up to 2030 in Urban Core.

For example,

- 1) Daily vehicle capacity ratio (VCR) ≤ 1.0
- 2) Average travel time between two points in the CBD by the public transportation ≤ 30 minutes

and so on.

To satisfy above goals, the TDM/MM measures will be implemented.

Methodology

□ Approach of Transportation Demand Management (TDM)

【STEP1】 Review of the current traffic situation which needs appropriate management.

- Traffic congestion and service level of bus will be investigated.

【STEP2】 Study of the traffic improvements by implementing and integrating the BRT and commuter rail projects.

- Performance and frameworks of the planned BRT and commuter rail systems will be taken into account.

【STEP3】 Consideration of the TDM scenarios to enhance the abilities of BRT and Commuter Rail systems which will be operating as trunk lines.

- TDM scenarios which facilitate converting from private car to public transport will be considered..

【STEP 4】 Carrying out the Stated Preferences survey to evaluate the TDM scenarios.

- About 500 samples will be collected.

【STEP 5】 Selection of the TDM scenario based on the result of SP survey and a preliminary demand forecast.

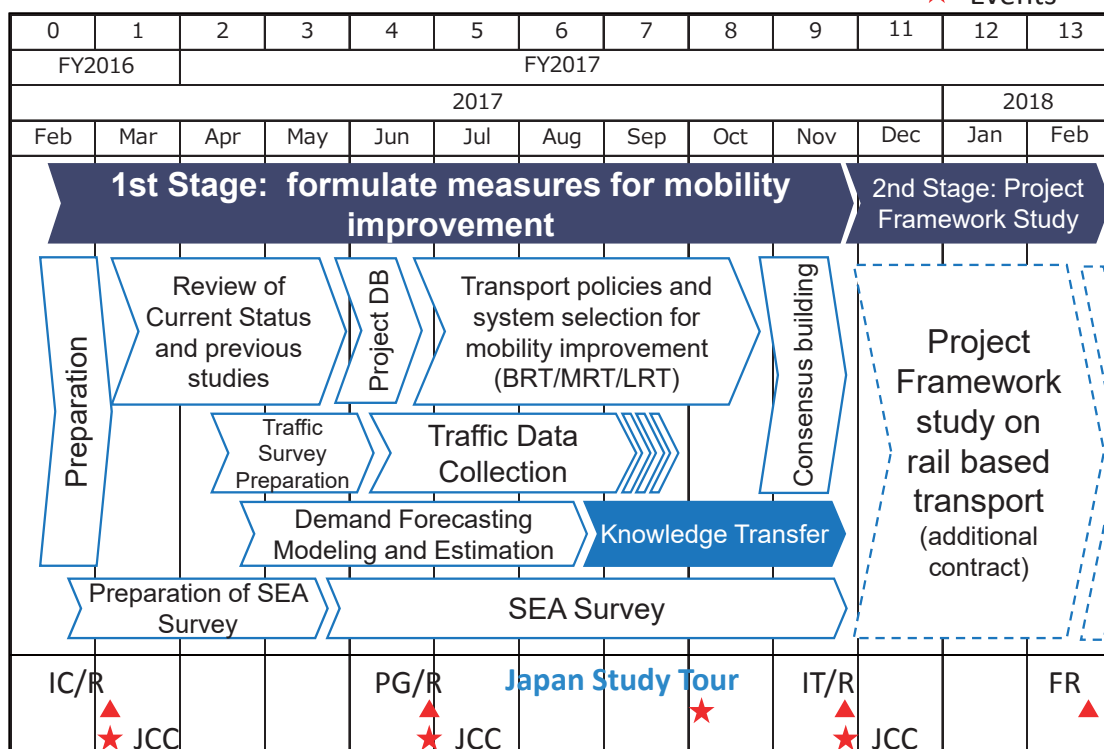
- Continues to the Demand Forecast and SEA.



Methodology

Work Plan

Legend ▲ Reports
★ Events



Methodology

Knowledge Transfer

- **Technical Working Group:**
Discussion on Technical Issues
- **Workshop:**
Teaching each other between JST and C/P



AMP Sensor

- ✓ AMP sensor equipment and the survey methodology
- ✓ Demand forecasting Model
- ✓ Development Plan Database



Project Database in GIS (Image)



Methodology

Japan Tour (Draft)

Monorail



Guideway Bus



Automated Guideway Transit (AGT)



MRT



Liner Metro



LRT



- ✓ Public Transport Mode Introduction in Japan
- ✓ Lecture on Transport Demand Management and Mobility Management
- ✓ Land readjustment Scheme
- ✓ Introduction of Transport Policies in Japan

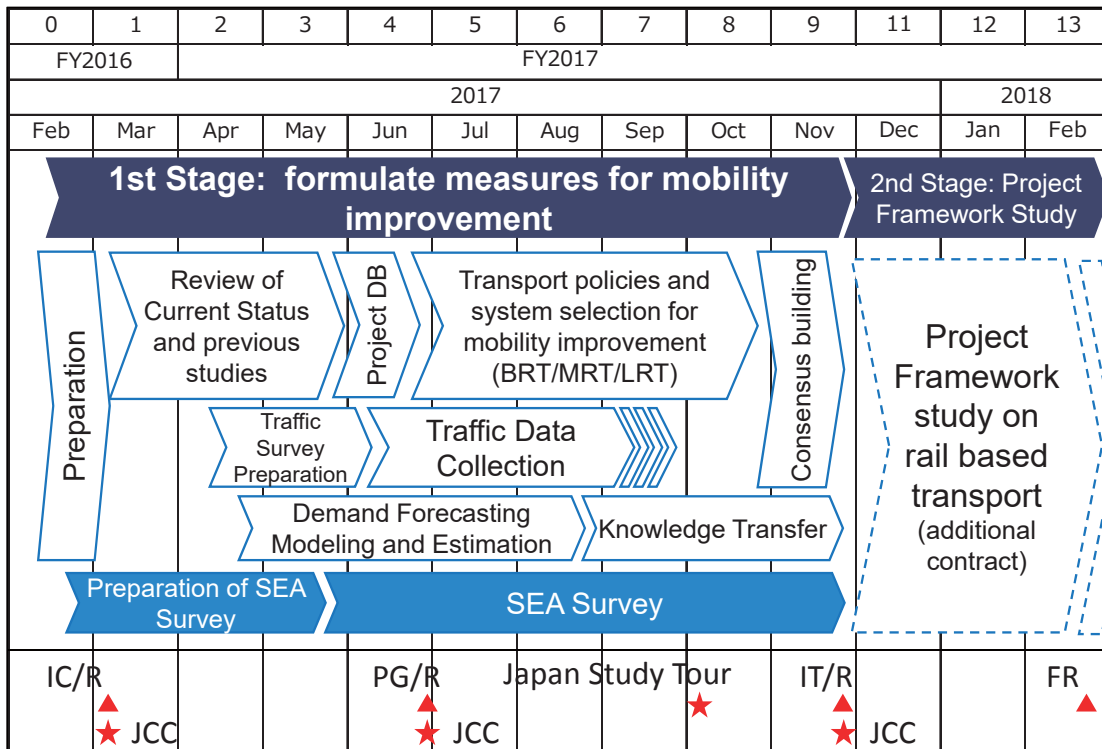
Details will be coordinated



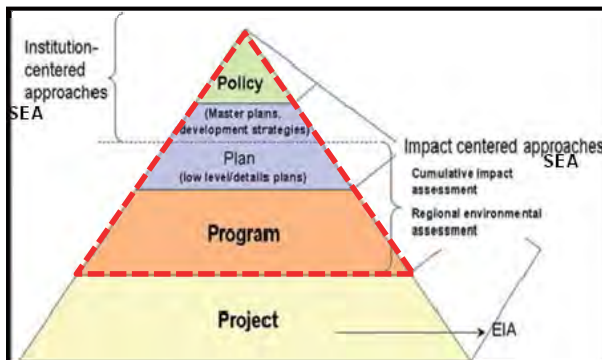
Methodology

Work Plan

Legend ▲ Reports
★ Events

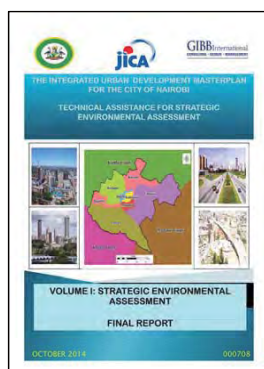


Strategic Environmental Assessment (SEA)



(Source: NIUPLAN SEA)

SEA is aiming to ensure that environmental aspects are considered effectively in policy, plan and program making. (Fischer 2007)

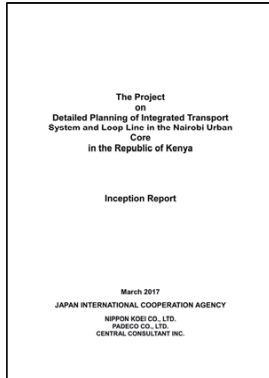


NIUPLAN SEA

- ✓ Covers policies, plans or programs of various sectors. (land use, transportation, energy, water supply, drainage, sewage etc.)
- ✓ Approved by NEMA (Nov. 2014) with its specific conditions.



Strategic Environmental Assessment (SEA)



The Project on Detailed Planning of Integrated Transport System and Loop Line in the Nairobi Urban Core

- ✓ Pre-Feasibility Study as extended planning of NIUPLAN regarding transport sector plan in Nairobi City Council.



In terms of environmental and social consideration issue

Study to support NIUPLAN SEA will be required

- ✓ Can be recognized as the **Environmental Assessment Study** for the Detailed Planning to avoid confusion with NIUPLAN SEA.
- ✓ Apart from the EA study, if significance of the loop line in the Nairobi Urban Core is clarified, Preliminary Environmental and Social Study will be carried out.

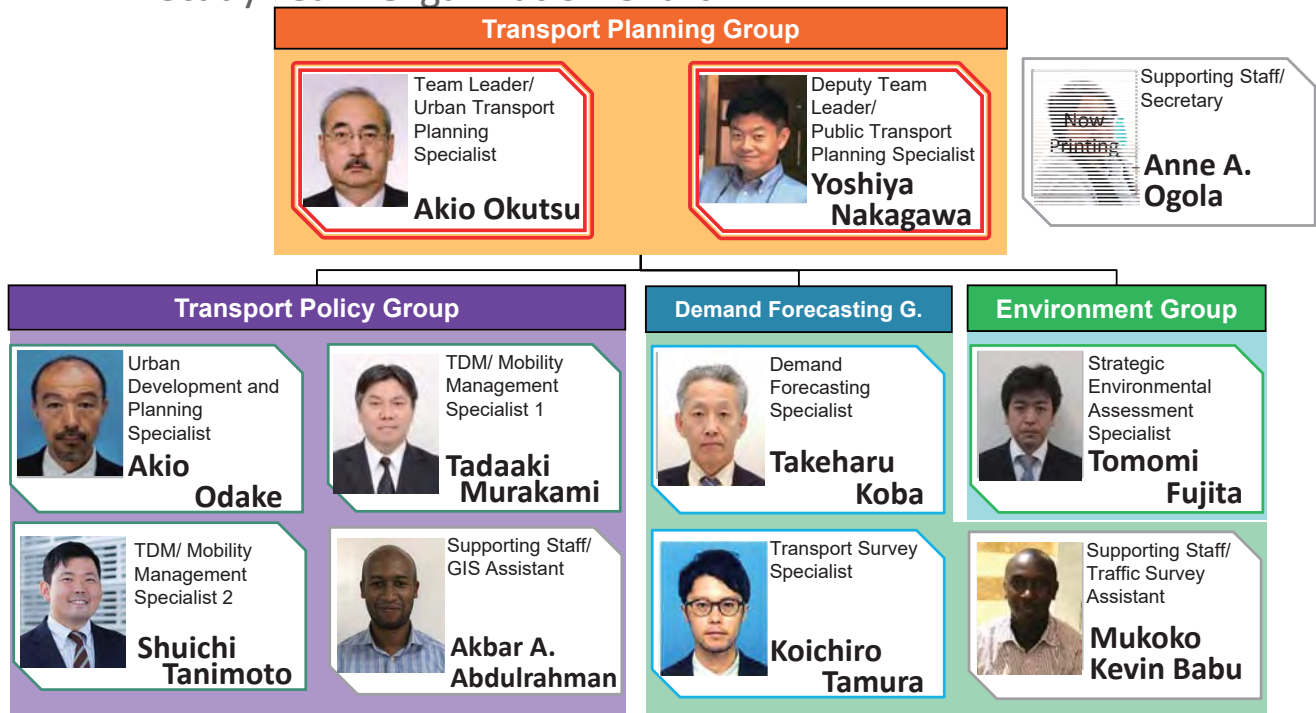
Strategic Environmental Assessment (SEA)

Environmental Assessment Study (EA Study)

- ✓ The EA Study will be followed by the Kenya's SEA Guideline as well as JICA's Environmental and Social Consideration Guideline.
- ✓ However, the EA study can be abbreviated through either applying analytical methodology or utilizing the study results of NIUPLAN SEA.
- ✓ The EA Study report will be attached to NIUPLAN SEA.
- ✓ Reviews by NEMA will be necessary in certain stage of the EA study.
- ✓ No need to apply for the new license.
- ✓ Attaching the record of NEMA's review to the NIUPLAN SEA license is applicable.

JICA Study Team

Study Team Organization Chart



JICA Study Team

Staffing Schedule

- Dispatched from latter of February 2017

#	Position	Name	2017												2018	
			Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	
1	Team Leader/ Urban Transport Planning Specialist	Akio Okutsu		35			30	22		27			27		9	
2	Sub Team Leader/ Public Transport Planning Specialist	Yoshiya Nakagawa		10	20			30		30			21		9	
3	Demand Forecasting Specialist	Takeharu Koba					21		21							
4	Transport Survey Specialist	Koichiro Tamura			22		22		16							
5	Urban Development and Planning Specialist	Akio Odake	17				27			16			15			
6	TDM/ Mobility Management-1	Tadaaki Murakami		22				22		23			23			
7	TDM/ Mobility Management-2	Shuichi Tanimoto		37				22		13			9			
8	Strategic Environmental Assessment Specialist	Tomomi Fujita		22				22		23			23			
Reports			IC/R ▲					PG/R ▲					IT/R ▲			FR ▲

Asante Sana!



2nd JCC Meeting

Minutes of Meeting and Presentations

NAIROBI CITY COUNTY GOVERNMENT

MINUTES OF MEETING

FOR

2ND JOINT COORDINATING COMMITTEE (JCC)

ON

THE PROJECT ON DETAILED PLANNING OF INTEGRATED
TRANSPORT SYSTEM

AND LOOP LINE IN THE NAIROBI URBAN CORE

IN THE REPUBLIC OF KENYA

20 JULY 2017



Eng. F.N Karanja
Ag. Chief Officer,
Transport, Roads and Public Works,
Nairobi City County Government



Mr. Akio Okutsu
Team Leader
JICA Study Team

2ND JOINT COORDINATING COMMITTEE (JCC) MEETING
FOR
THE PROJECT ON DETAILED PLANNING OF INTEGRATED TRANSPORT
SYSTEM AND LOOP LINE IN THE NAIROBI URBAN CORE
IN THE REPUBLIC OF KENYA

Date and Time: 20th July, 2017 at 1430H

Venue: Committee Room, City Hall

Agenda:

1. Introductions
2. Opening Remarks by NCCG
3. Progress Report
 - Project Status at Present
 - Traffic Movement Survey; Demand Forecast and AMP Sensor Survey
4. System Selection for Mobility Improvement
5. Introduction of Concept Design of Nairobi Metro Line 1
6. Discussions
7. Closing Remarks

Proceedings of the Meeting

1. Opening Remarks by NCCG

(1) Eng. Muthama

- The project came from a proposal contained in the NIUPLAN.
- It is a transport project that is geared towards the improvement of access and ease of movement within the urban core.
- The aim of the meeting today is to share on the progress of the project and also get comments from the present JCC members.

2. Progress Report; Present project status and traffic movement survey

– Mr. Okutsu – JST

Overview of the Presentation

- i. Background
- ii. Present status of the project
- iii. Traffic Movement survey
 - Review of Demand forecast of BRT Lines
 - AMP Counter Survey
- iv. System Selection for mobility movement

- Mr. Okutsu shared his apologies that he would not be able to share the proposal for the Nairobi Metro Line 1 as earlier indicated in the invitation letters and the agenda for the meeting. He has been requested not to share this at the moment as the idea is still in the early stages. It shall be however shared in later forums.
- The proposal for the loop line is one of the proposed priority projects that are contained in the NIUPLAN that the team leader had previously worked on as the railways expert in 2013-2014. This master plan was funded by JICA.
- At the time, the Nairobi Metropolitan Region System Report (2011) by the Ministry of Transport and Infrastructure (MoTI) done in 2011 for a Nairobi Mass Rapid Transport System (NMRTS) which consisted of 3 lines each for BRT, LRT and Metro Rail. All these corridors came into the City Centre. The loop line proposal was meant for the purpose of traffic diversion. NIUPLAN also proposed for sub-centers within the county. The loop line was to be an elevated rail system. The Harmonization study proposed for all the proposed MRT and LRT lines to all be BRT lines. A section of the loop line was also running along the same alignment proposed for BRT Line 4W.
- As an important step, JST needed to study the detailed movements in and around the CBD. To this end, several surveys were undertaken and also JST has installed 42 AMP counters in various sites in and around the CBD. The data from this survey is still being analyzed and shall be presented in later sessions.
- From the reports that JST have reviewed on the BRT projects, 3 BRT lines all meet along the Uhuru Highway. These shall pose a challenge especially at the intersections given that the proposal is for articulated buses with a 30 second headway for Line 1, 15 second headway for Line 2 and a 10 second headway for Line 4. For ease of operations, there may be need for overpasses at the intersections.
- It is important that by the provision of large capacity system for transportation, there shall be a marked reduction in the use of private cars to access the CBD. There is need for interconnectivity with both the commuter rail and BRT.
- Thika Road is already very congested and there is no ongoing study on BRT for this corridor. It needs a higher capacity mode as the capacity for BRT is already surpassed along this corridor.
- As it stands, the loop line was envisioned to act as a diversion for all the proposed MRT, LRT and BRT projects that were converging in the CBD. To date, none of the said projects has been implemented. To that effect, the loop line shall not be feasible if implemented with the current conditions as there shall not be sufficient demand to justify its operations. Therefore, the loop line is no longer a priority at the moment. JST thus recommends the need to consider improvement of the trunk connections first.
- The proposal for the Nairobi Metro Line 1 in brief is in line with the proposals contained in the NMRTS study. It links Thika Road and Ngong Road and is 20km long. It links with the commuter rail along Ngong Road and shall have interchange stations that connect to the BRT network along the corridor (Line 5 along Outering Road, Line 3 on Ngong Road, Line 1 on Uhuru Highway, Line 4W at KNH and the

commuter rail on Ngong Road and at the Nairobi Central Station. It shall allow one to move from the suburbs to the CBD in 15 minutes from either end. This shall in turn help reduce congestion.

- There shall also be provisions for future expansion.

3. Question and Answer Session: Comments on the Presentation

i. Eng. Muthama – NCC

- Thanked Mr. Okutsu for the presentation.
- It is important for the people tasked with improving transport within the City to start really looking at whether BRT shall really have sufficient capacity to meet the demand for Nairobi.
- Based on the current situation, there is need to look at Thika Road and Ngong Road due to the congestion that is evident on the two corridors. There is need to evaluate the demand forecast for the two corridors and come with a suitable solution. JST shares that the demand forecast shall be ready by September. It can be shared at that stage.
- The use of AMP Counters for data collection is very innovative and this shall help in the collection of data for use during the demand forecasting.

ii. Eng. Njunge – NAMATA

- There has been a consultation between the BRT consultant for Line 3 and KURA. The consensus is that the current ongoing upgrade of Ngong Road shall not be destroyed during the implementation of BRT along the corridor. An alternative is being looked for with regards to the location of the BRT. The team is considering either lateral BRT or splitting the lines into 2 directions (North and South).
- How do the AMP Counters work?
- How were the capacities for bus operations (Slide 14) arrived at?

iii. Mr. Okutsu – JST

- The shared bus capacities were extracted from the consultants' reports. The capacity for an articulated bus is 100 persons but in some instances, the buses can fit 140 persons. Theoretical calculation can also be used but it will not alter actual operations much.
- Along Ngong Road, 9m is reserved along the road for BRT. This however may not be enough, especially at the station areas. More space shall need to be acquired.
- AMP counters collect data through picking the probe request sent out by Wi-Fi enabled devices as they seek for connection. This data is collected from smartphones and tablets that are in the possession of persons as they move around the CBD. A smartphone ownership survey was done by JST and it was established that up to 30% of smartphone owners within the CBD have Wi-Fi-on on their devices as they move around the CBD.

iv. Eng. Muthama – NCC

- At the start, NCCG was also worried about the smartphone ownership level and number of people who have their Wi-Fi on. However, the results indicate that very many people do have Wi-Fi switched on while in the CBD. This can be illustrated by the peak counts at Ngara (1598) and on Haile Selassie (1910)
- v. Eng. Karanja - NCCG
 - How many devices shall be detected for example in a moving PSV?
- vi. Eng. Muthama – NCCG
 - The AMP Counter can pick each individual device carried per person as long as the Wi-Fi is on.
 - It shall greatly help in indicating the direction of movement within the CBD
- vii. Mr. Okutsu - JST
 - The AMP Counters also have a higher sampling rate than the ordinary surveys carried out.
- viii. Mr. Maina – NAMATA
 - What is the average smartphone ownership level?
- ix. Mr. Okutsu - JST
 - JST carried out smartphone ownership surveys to ascertain this. The results showed that up to 80% of the people interviewed owned smartphones and 30% of these had Wi-Fi on.
- x. Mr. Maina – NAMATA
 - Data for Line 3 has been updated. There is need for JST to look at the revisions. The consultant (Ingerop) is no longer using 24,000 PPHPD and 39,000 PPHPD.
 - What are the recommendations of JST on the loop line?
- xi. Mr. Okutsu – JST
 - It is important to appreciate that the consultant (Ingerop) is referring to data that was contained in the NIUPLAN report. Ingerop did not carry out primary data collection to determine demand forecast but rather they relied on NIUPLAN data.
 - As currently none of the proposed MRT, BRT and LRT projects are in operation, there is need to shift focus to the provision of trunk services and the loop line implemented at a later date when all this is in place.
 - The proposed metro line links 2 major corridors and also forms an interlink between the other modes (BRT and Commuter Rail).
- xii. Eng. Muthama – NCCG
 - The loop line was proposed as it was envisioned that the other mass transit projects would be in place by 2018. However, nothing has been done to date. It would thus not be feasible to implement the loop line project.
 - At the moment, it is important to plan the radial routes as this is the most important priority for the city currently.

- MRT implementation takes time. It is thus good to start planning early for MRT whilst the BRT projects are also ongoing implementation.
- xiii. Eng. Karanja - NCCG
- When is the earliest the MRT project can be completed?
 - Thika Road is currently very congested. This can be observed during the peak hours. The same can be said on the other major corridors and this thus provides the justification for a quick solution to congestion in Nairobi.
 - NCCG had planned to relocate matatu termini to the peripheral areas of the CBD. The loop line would have helped in the dispersion of traffic from the peripherals thus ease congestion in the CBD.
- xiv. Mr. Okutsu – JST
- Currently, JST is still doing the Stage 1 of the study. If this justifies for the need of a rail based system, JST can go into Stage 2 immediately. If JICA sees the importance of the same, other steps can follow.
 - Basic design takes up to 2 years while negotiations for financing can take up to a year. If the design and build option is adapted, the tender stage can start and shall shorten the period also. From other such projects previously undertaken, construction can start in 5 years. Construction of 20km can take between 4yrs – 5yrs. The same time span would also have been taken if the loop line was to be constructed.
 - The maximum capacity for the monorail that was to be adapted for the loop line is 36000 PPHPD. The maximum capacity of BRT is 10,000 PPHPD. This is not sufficient ridership to make the loop line project feasible. There is a marked growth in development to the East of the City. There is also a large demand for mass transit along Thika Road which can be resolved by adaption of higher capacity transportation. BRT can still operate on Line 4W.
- xv. Eng. Njonge – NAMATA
- There is need to carefully review the arguments that were used to arrive at the BRT proposals for Nairobi.
 - The loop line was an easy sale to the general public as it was in no direct competition with other modes of travel. The social, economic and political implications were easier to manage. How do we advise our leaders concerning the loop line?
 - There is need for further studies on the metro line so as to easily justify it to the policy makers.
- xvi. Mr. Okutsu – JST
- There is no sufficient ridership to justify for the loop line. BRT can be used on corridors as an intermediate solution as MRT is being developed along the major corridors. The loop line can then be implemented.
- xvii. Mr. Kazungu – NCCG

- The NIUPLAN is an approved policy document for Nairobi. There is thus need for all studies related to the City to be in line with the proposals contained therein.
- As such, the studies need to understand the traffic dispersion effect that the sub-centers shall have. These may lead to a change in traffic patterns. Of interest also would be the viaduct project and also the Haile Selassie intersection. Might there be need to divert traffic from the intersection?

xviii. Madam Ruth – NCCG

- Thanked the team for the progress report shared. The project is aimed towards improving mobility within the CBD and is in line with the Kenya Vision 2030, The Nairobi Metropolitan Plan and the NIUPLAN.
- There is need for the consultants working on various projects within the CBD to interact and share ideas. Of interest are the Railway City, Viaduct, BRT and the loop line projects. There is need to harmonize the ongoing projects so as to ensure no resources are wasted.
- Since there are no BRT projects implemented as yet, there is need to review and analyze the various alternative with regards to mass transit in the city.
- There is need to not only look at the socio-economic cost but also the environmental impact of the proposed project.

xix. Eng. Mburu – NCCG

- He would like to congratulate the team for a work well done.
- There is need to review the proposals contained in the NIUPLAN.
- There is a good correlation between land use and transportation. There are many changes in place along Thika Road as a result of the highway project. The same can be observed along Ngong Road and Waiyaki Way.
- Road construction does not always improve congestion but there is a direct increase in the cost of land per person. There is need to look at the movement of the masses vs the value of land. Benefit from improved transport is derived from the economic benefit gained.
- Congestion has been experienced over the years on the major roads leading into the CBD. There is need for a solution to this.

xx. Mr. Kost – ITDP

- The shift from BRT to MRT makes a lot of sense.
- The BRT network shall allow for direct linkage with minimal transfers to the CBD.
- What is the demand analysis conducted by JST so far? Why is BRT not sufficient?
- Except for Line 4W, all the other BRT lines shall have passing lines. They shall be able to achieve 20,000 PPHPD.
- It is ok to assume a capacity of 140 for the articulated bus. Bi-articulated buses shall however be able to carry more.

- The use of AMP counters for data collection looks very interesting. Can the data collected be shared?
 - There is need to compare the cost vs the capacity. The metro can be a relatively expensive venture.
- xxi. Eng. Koiyaki – NCCG
- The use of AMP counters is a good way of capturing the OD patterns. How does this relate with the data captured before during the NIUPLAN study?
 - It would be interesting to see the movement patters along the various corridors and compare with other studies undertaken.
- xxii. Mr. Yakota – JICA Kenya
- JICA understands that the implementation of the metro can take some time and is a costly venture.
 - There is also need for an environmental study to be undertaken. In addition, an operation and maintenance plan needs to be in place. There is need to assess who shall run this (KRC or NCCG). There are so many other items that are yet to be addressed before the actualization of the metro vision.
 - In this session, KRC and MoTI are not present. JCC is a decision making forum and there is need to have all the partners represented so as to avoid leaving any one out. There is thus need to consult widely and involve all key actors.
- xxiii. Eng. Muthama – NCCG
- All the members of the JCC were invited to the forum. However, some did not attend the session and gave no confirmation of attendance. It was decided that it was best to proceed with the meeting but there is need to appreciate that no decisions can be made in this session as some of the key actors are not represented. A follow up session needs to be organized to this effect.
 - The proposal of the metro is viewed by the JST as a solution to congestion in Nairobi.
 - It is important to appreciate that other factors led to the Harmonization Study concluding that BRT would be the preferred mode.
- xxiv. Madam Ruth – NCCG
- The NIUPLAN was formulated on the backdrop of integration an involvement of all key actors. There is need to not lose any stakeholder along the way at the implementation stage. There is thus need for a follow up sessions where all actors shall be present. It shall be too costly not to consult widely and with all relevant stakeholders.
 - There are plans ongoing on A104. These may include some land acquisition along the corridor. The consultant needs to also get this information.
- xxv. Mr. Okutsu – JST

- The congestion within the CBD can be attributed to the heavy use of passenger cars. Most of these cars are half-occupied or only have one person. To improve the situation, there is need to reduce the dependency on passenger cars. People use cars because of the comfort and convenience associated in comparison to the matatus. With the improved speeds and comfort that the metro shall bring, the trend may shift in favor of the metro over passenger cars. This shall in turn reduce the number of cars and congestion on our roads. In Tokyo, many people use the train for daily commute as it is comfortable and reliable.
- Mobility improvement in the CBD will not ease congestion in the CBD if not also supported by the introduction of large capacity buses
- There is also need to look at the hours saved by having an efficient mode of public transport.
- Nairobi is due for a modern system of public transport. Based on the population and GDP there is need for even two or three lines. There is need to start planning for MRT in Nairobi.

4. Closing Remarks by NCCG

i. Eng. Muthama – NCC

- Planning for the future of Nairobi starts from such a forum.
- He was thankful for the participation of all the members and organizations represented. Hoped to have more participants in the future forum that shall be hopefully held in September. At this time, JST could highlight more on the demand forecasting and the transport policy.

5. A.O.B.

There being no other business, the meeting was concluded at 1623H.

Attachment:

(1) Participants of the Meeting

(2) Presentation Material for the Joint Coordinating Committee Meeting on 20 July 2017

The end

Attachment 1: Participants of the Meeting

Attendance:

NAME	INSTITUTION	POSITION
Eng. F. W Karanja	NCCG	Chief Officer, Transport, Roads and Public Works NCCG.
Mr. Sammy Muthama	NCCG – Roads and Transport	Deputy Director (Roads)
Mr. James Maina	NAMATA	Secretariat Member
Mrs. Margaret Kariuki	NCCG	Environment Sector
Mr. Chris Kost	ITDP	Africa Programs Director
Mr. Peter Thairu	KEPSA	Assistant DDD Officer
Ms. Ruth Waruguru	NCCG	Ag. Director Urban Planning
Mr. John K. Mwangi	NAMATA	Secretariat Member
Mr. Moses N. Kuyiki	NCCG	Engineer 1
Eng. M. Koitalek	KURA	
Ms. Martha Muthoni	NCCG	Urban Planner
Ms. Maki Hasegawa	JICA/NCCG	NCCG Urban Planning
Mr. Raphael Kazungu	NCCG -Urban Planning	Urban Planner
Eng. S. K Mburu	NCCG	Director of Roads
Mr. Kenji Yokota	JICA Kenya	Representative, Transport
Ms. Caroline Nzioka	JICA Kenya	Project Officer Transport

JICA Study Team:

Name	Position
Mr. Akio Okutsu	Team Leader/Urban Transport Planning Specialist
Mr. Tadaaki Murakami	TDM/Mobility Management 1
Mr. Babu Mukoko	Traffic Survey Assistant
Mr. Akbar Ahmed	GIS Assistant
Ms. Anne Ogola	Secretary

The Project on Detailed Planning of Integrated Transport System and Loop Line in the Nairobi Urban Core

2nd Joint Coordination Committee Meeting

JICA Study Team

20th July 2017



Nairobi City County Government



Japan International Cooperation Agency

NIPPON KOEI NIPPON KOEI CO., LTD.

PADECO PADECO Co., Ltd.

QCENTRAL CENTRAL CONSULTANT Inc.

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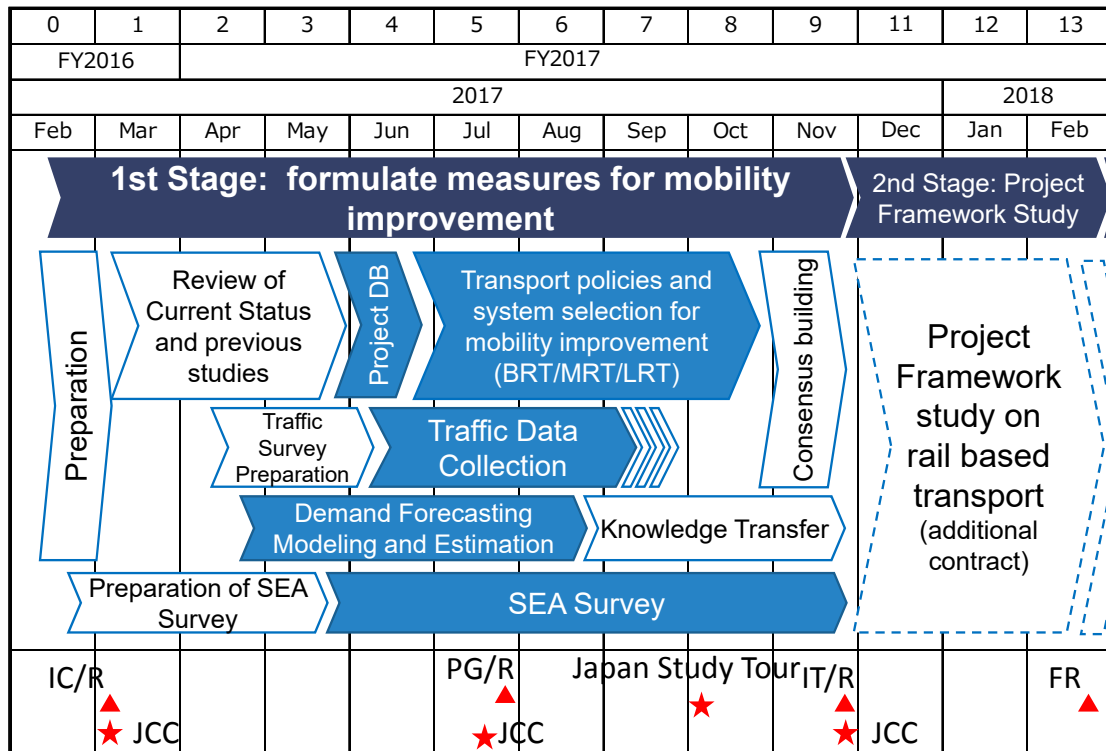
Contents

1. Background
2. Project Status at Present
3. Traffic Movement Survey
 - Review of Demand Forecast of BRT Lines
 - AMP Counter Survey
4. System Selection for Mobility Improvement

Project Status at Present

Work Plan

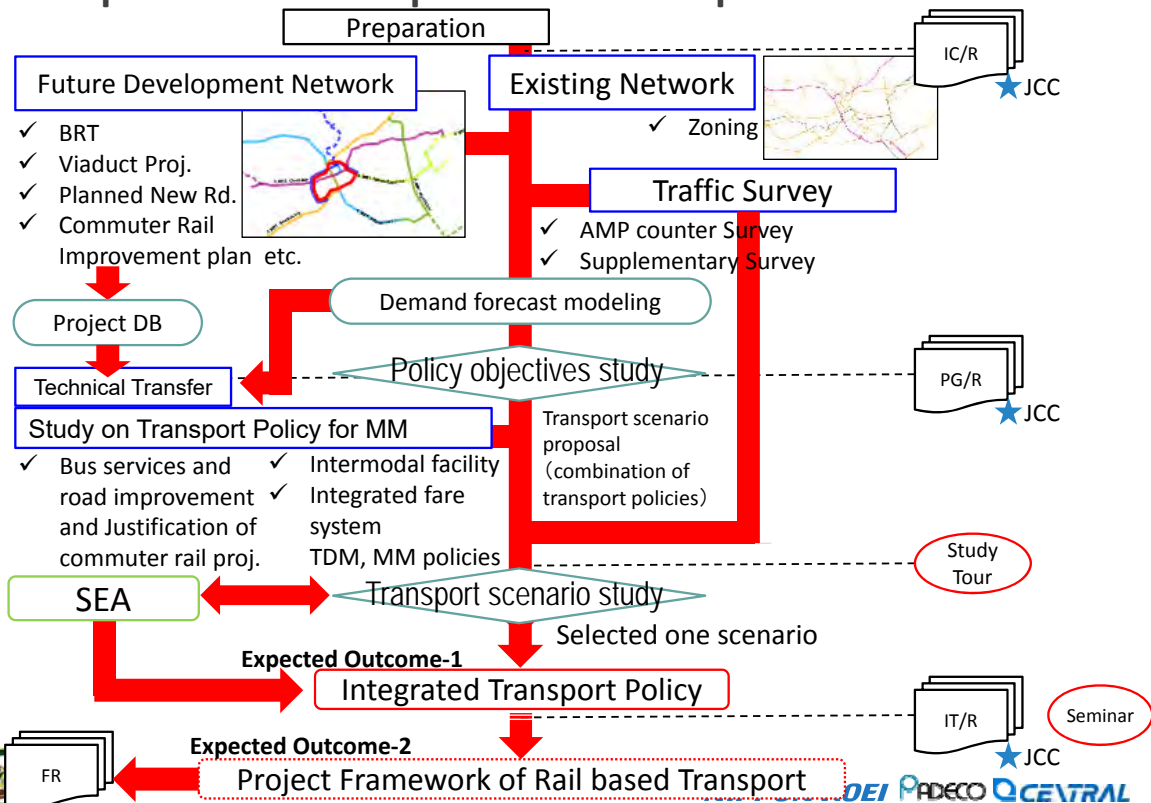
Legend ▲ Reports
★ Events



NIPPON KOEI P&DCO OCEANAL

Technical Approach

Comprehensive Transport Plan Development



DEI P&DCO OCEANAL

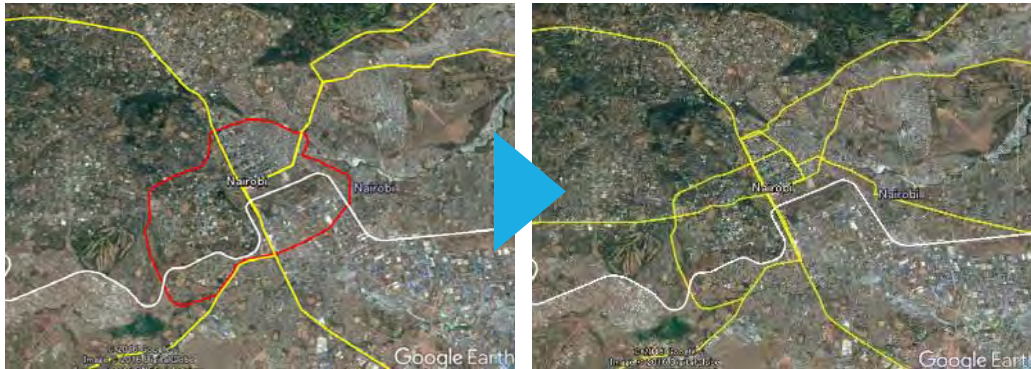
Background of the Study

Harmonisation Study (MoTI, 2015)

- Loop Line is partly overlapped by BRT line 4 West.

NIUPLAN (up to 2030)

Harmonisation Study (up to 2030)

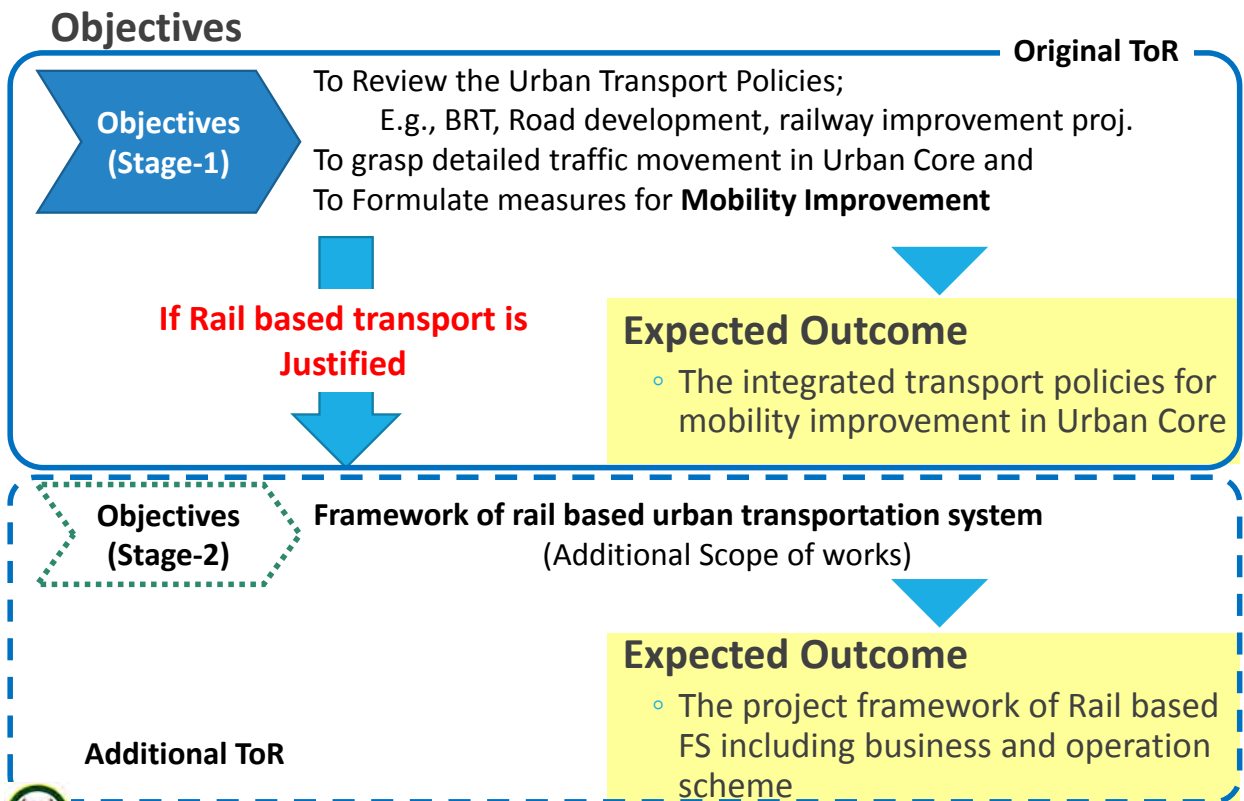


Legend — : Existing Railway — : BRT — : LRT

Transport development is on-going as referring “Harmonisation Study” basis

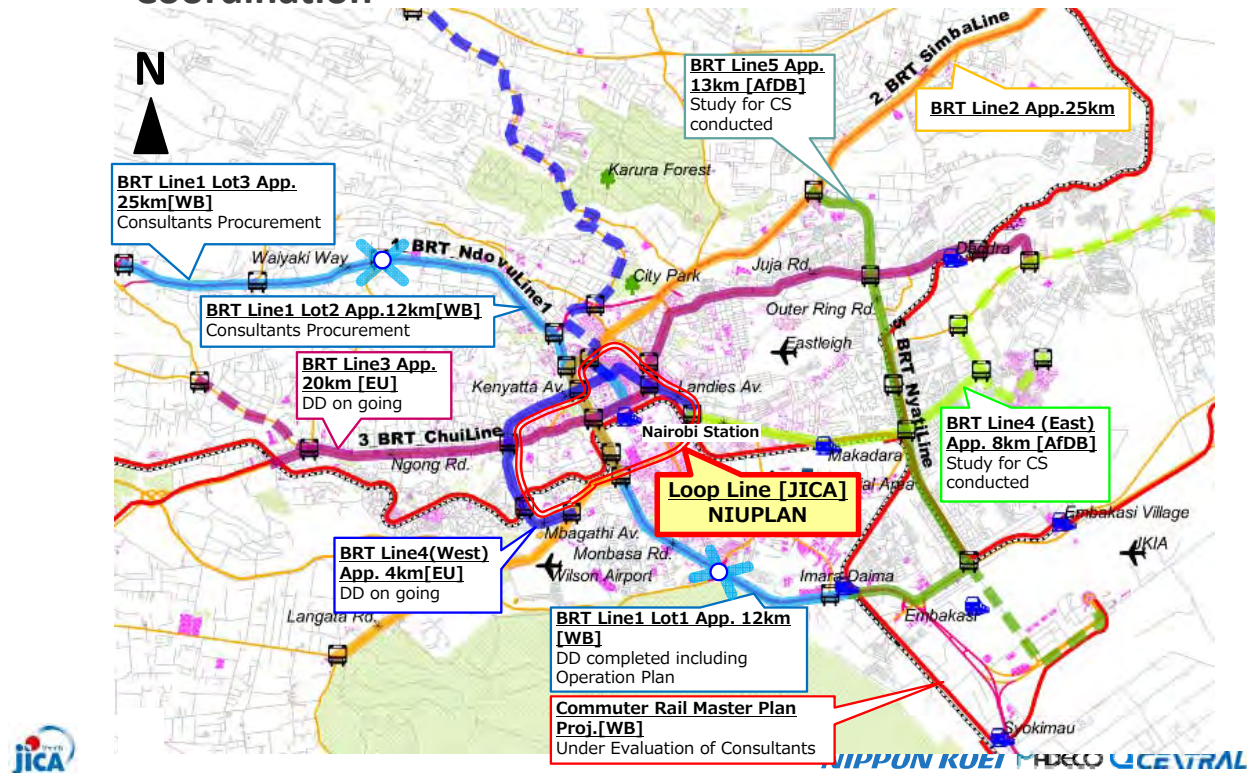


Objectives and Expected Output



Issues: To Serve Mobility Improved Transport

Issue-1: Multiple Urban Transportation Projects without Coordination



Existing Status of BRT Projects

Line No.	BRT Route	Section	Existing Status of BRT Project	Remarks
1	Waiyaki way – Uhuru Highway – Mombasa road	Lot 1 (Mombasa road) Imara Daima – Nyayo Stadium	DD completed including operation plan	Financed by WB. Implementation agency is KeNHA.
		Lot 2 (Uhuru highway) Nyayo Stadium – Univ. way RA	No activity	No information
		Lot 3 (Waiyaki way) Univ. way RA – Kangami	Study re-started by new consultant	Supported by WB.
2	Langata road – Uhuru Highway – Thika road	Line 2 East (Thika road) CBD – Ruiru	No activity	Road widening has been completed. However, there is no room for BRT at Thika road.
		Line 2 West (Langata road) Bomas Kenya – CBD	No activity	Road widening has been completed between Langata cemetery and Bomas. There is no space for BRT.
3	Ngong road – Haile Selassie ave – Juja road	Line 3 East (Juja road) CBD – Njiru	DD has been completed between KNH to Dandra	Supported by EU. Implementating agency is KURA. Consultant is Ingerop.
		Line 3 West (Ugong road) Show ground – CBD	DD is on-going.	Supported by EU. Implementing agency is KURA. Consultant is Ingerop. There will be reserved space for bus lane (9m width) after the road widening project by JICA. However, BRT plan requires demolish of the on-going new road.
4	Mbagath way – Kenyatta ave – Landhies road – Jogoo road – Mayanja road –	Line 4 East City Stadium – Mama Lucy	DD is on-going.	Supported by AfDB. Implementing agency is KURA. Consultant is Gauff.
		Line 4 West T Mall – City Stadium	No information.	Supported by EU. Implementation agency is KURA. Consultant is Ingerop.
5	Outer Ring road – Airport North road	Balozi – Imara	Basic design is on-going.	Supported by AfDB. Implementing agency is KURA. Road expansion project is on-going.

Traffic Movement Survey

Review on BRT Line 3&4W Study - No PPHPD value

Ingerop full FS study (2015) did not show any PPHPD value in their study.

The Peak hour passenger volume was estimated as 29-34 thousand in 2020, but this is for both direction, not PPHPD

Table 5-4 – Passenger Demand for BRT (Fare Box)

Line	Passenger Demand - Medium Growth Scenario			
	2020		2045	
	Peak	Daily	Peak	Daily
3W	29,000	494,000	31,000	514,000
3E	34,000	416,000	40,000	530,000
4W*	12,000 (27,000)*	210,000 (372,000)*	14,000 (30,000)*	263,000 (440,000)*

Note : * includes for line 4E passengers as in 2020 it has been assumed that Line 4E will be opened and connected to line 4W. As a result passengers wishing to access CBD and beyond on Line 4E can do so via Line 4W.

Review on BRT Line 3&4W Study - Doubt in the value in 2030 (1)

The estimated peak hour passenger in 2020 and 2045 are not different much because;

- Assuming the other BRT services will be added;
- Also private car traffic will absorb the demand

Table 5-4 – Passenger Demand for BRT (Fare Box)

Line	Passenger Demand - Medium Growth Scenario			
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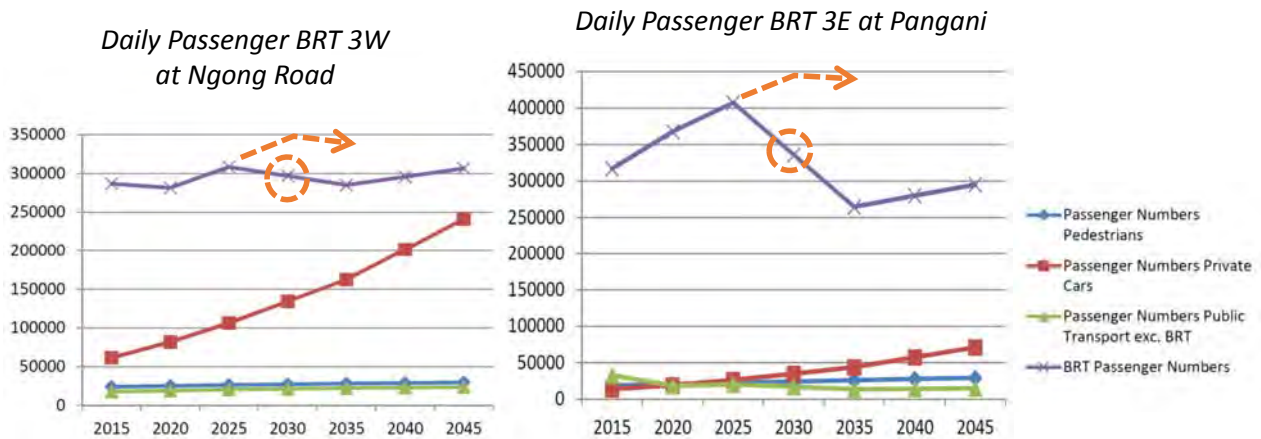
Note : * includes for line 4E passengers as in 2020 it has been assumed that Line 4E will be opened and connected to line 4W. As a result passengers wishing to access CBD and beyond on Line 4E can do so via Line 4W.

Review on BRT Line 3&4W Study - Doubt in the value in 2030 (2)

Ingerop estimated the value in 2025, 2035 and 2045 only, and the value of the daily number of passenger in 2030 was prepared by interpolation with the values of 2025 and 2035.

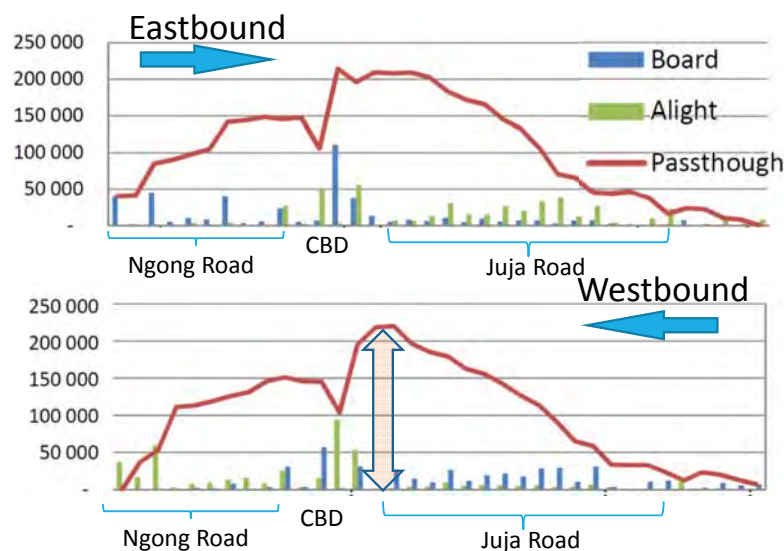
- The value could be more increased in 2030.

The influence of the other BRT line (line 2 Thika) open in 2035 is quite large for 3E section.



Review on BRT Line 3&4W Study - PPHPD Estimation

The Ingerop study gives daily line loading estimation for 2020, and this can be used for PPHPD estimation.



This 220,000 in the westbound direction of the Line 3 at the race course bus terminal in CBD is the Max passenger per day per direction (PPHPD). By applying peak hour ratio, PPHPD can be estimated.

Review on BRT Line 3&4W Study - PPHPD Estimation

PPHPD (in thousand)	2020	2025	2035	2045
Line 3	19.8 – 26.4	22-29	14-19	15-21
Line 3 without other BRT lines	19.8 – 26.4	22-29	24-32	26-34
Line 4W	16.2 – 21.6	16-21	10-14	10-14
Line 4W with 4E available	28-38	--	--	--

Applied 9-12% for the peak hour ratio

For line 3, it will be 22,000-29,000 in 2025.

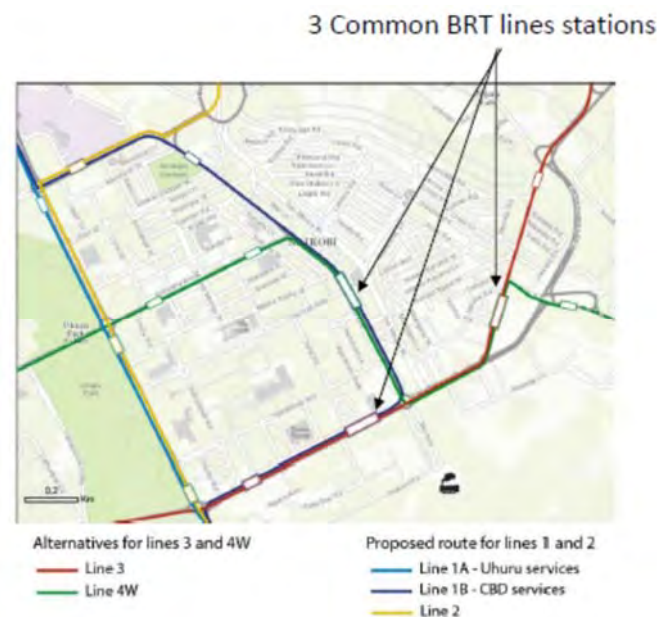
- This value will increase until 2034.
- If the Thika Line 2 will not be opened, it will be 24,000-34,000

For Line 4, it will be 16,000-21,000 in 2025,

- If the connected with Line 4E, it will be 28,000-38,000.

Issues in BRT Installation

- BRT Line 1: According to the presentation, the PPHPD of Line 1 is 10,000 to 12,000. However Line 1 FS team has not issued yet any reference of PPHPD.
- Traffic Control in CBD, Line 1 and Line 3+4 Crossing: There is no analysis how the CBD will be paralyzed by accumulated BRT lines of Line 1 and Line 3+4, as well as private cars. Particularly, E-W crossing points along the Uhuru highway will be critical unless flyovers will be constructed from Haile Selassie Avenue to Jomo Kenyatta Avenue.
- Bus operation intervals; Line 1: every 30 sec. (PPHPD 12,000), Line 3: every 15 sec. (PPHPD 24,000), and Line 4: every 10 sec. (PPHPD 36,000) by articulated bus (capacity 100 passengers)



Source: CBD BRT routes Assessment of Alternative scheme (1 Feb. 2017)

BRT Operation Examples in the World

Quantitative and Objective Evaluation on Rail Based System

- BRT carrying capacity is depending on the facility



Bogota BRT

2 Dedicated lanes with 6 slots

PPHPD:40,000 (Exceptional case)



Trans Jakarta

1 Dedicated lane with 1slot

PPHPD: 3,600

But can it accommodate increasing demand?



1 Dedicated lane with 2slots

PPHPD: 12,000



Delhi

Applicable system shall be selected according to demand forecasting with feasibility in view of engineering

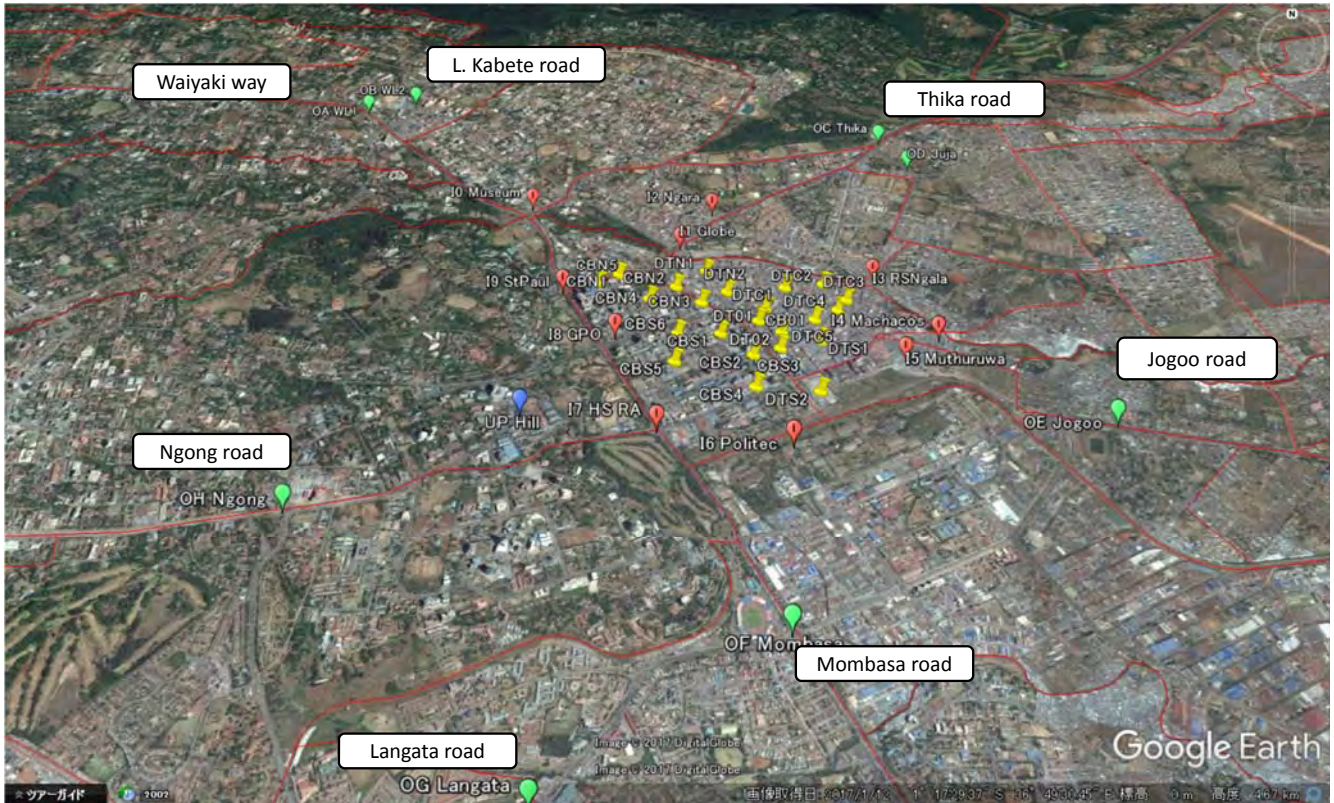


AMP Counter Survey

The 42 AMP Survey Commenced

- On 14 July, all AMP were connected with permanent electricity supply and started 24/7 counting.
- The study team did smartphone/tablet ownership and wi-fi-on survey, and 30% of the people keeps wi-fi on.
 - Less ownership in downtown than CBD. The 30% is average.
- Location of 42 AMP, schematic drawing of locations
- 24H profiles for 12 July
- Chord Diagram

Location of AMP Counters



Installed AMP Counters



City Hall



City Market



Glove Cinema



Sarit Center



University Way



Westlands Bus Park



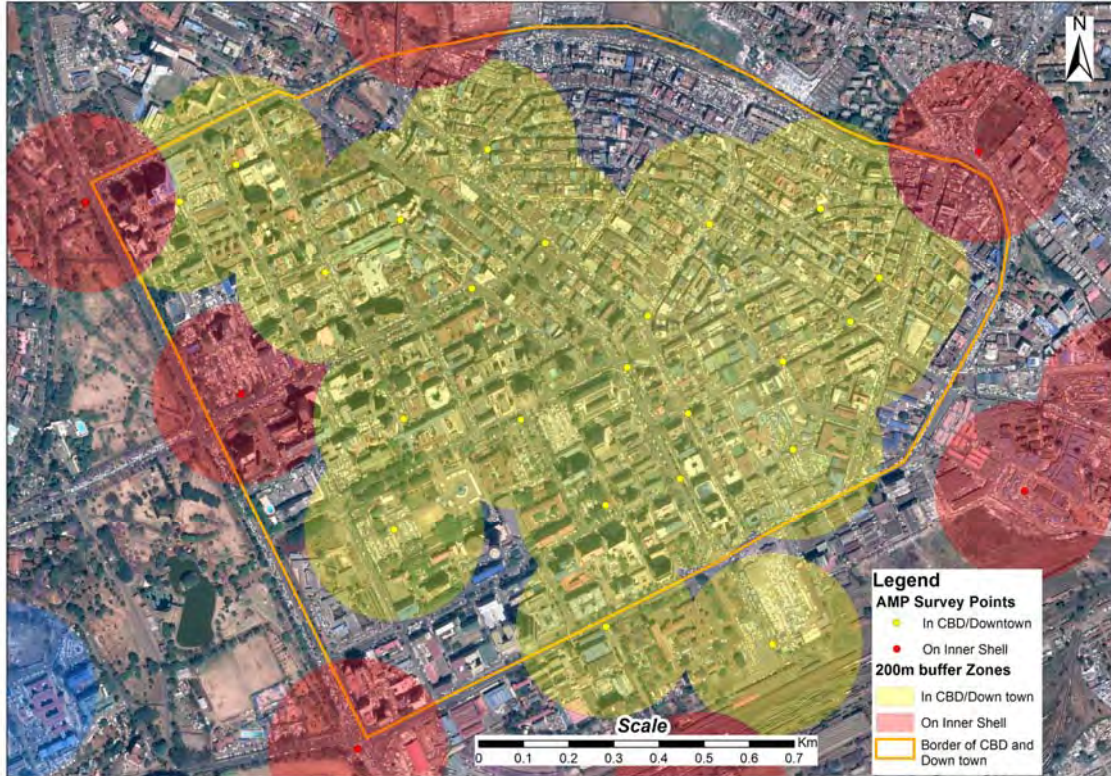
Near KRC HQ



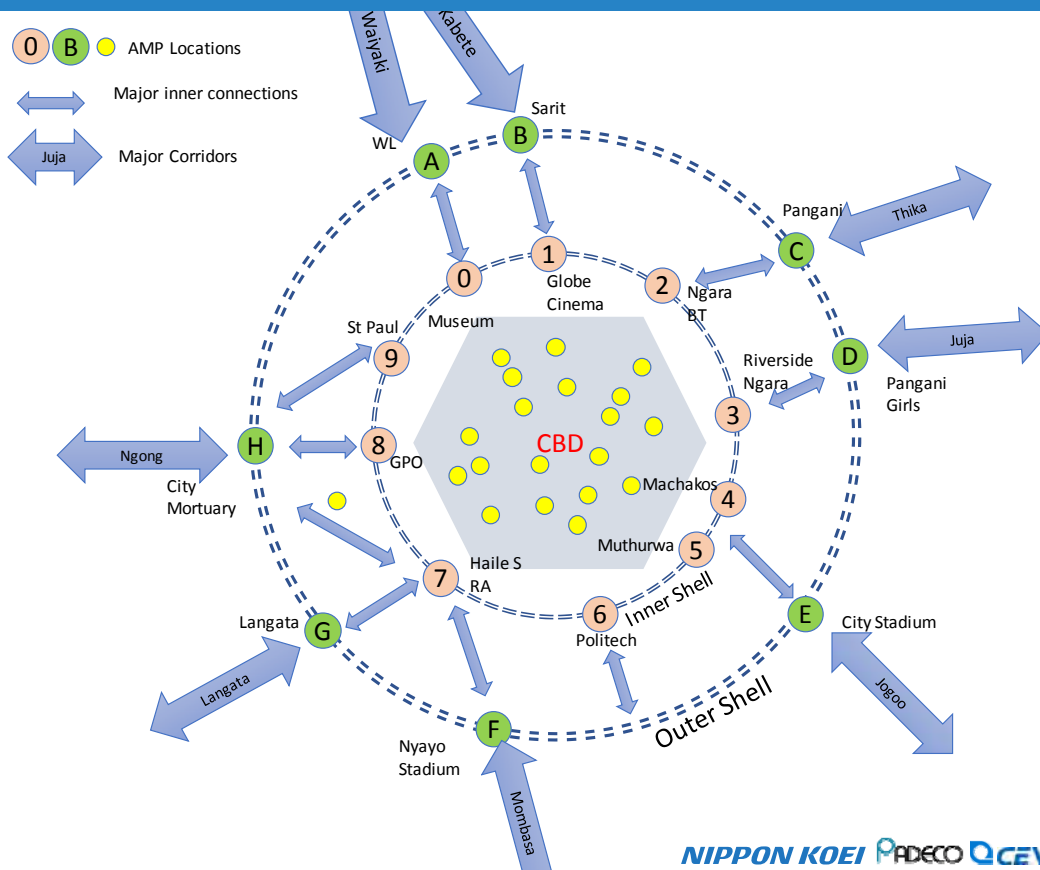
Kenyatta Ave.



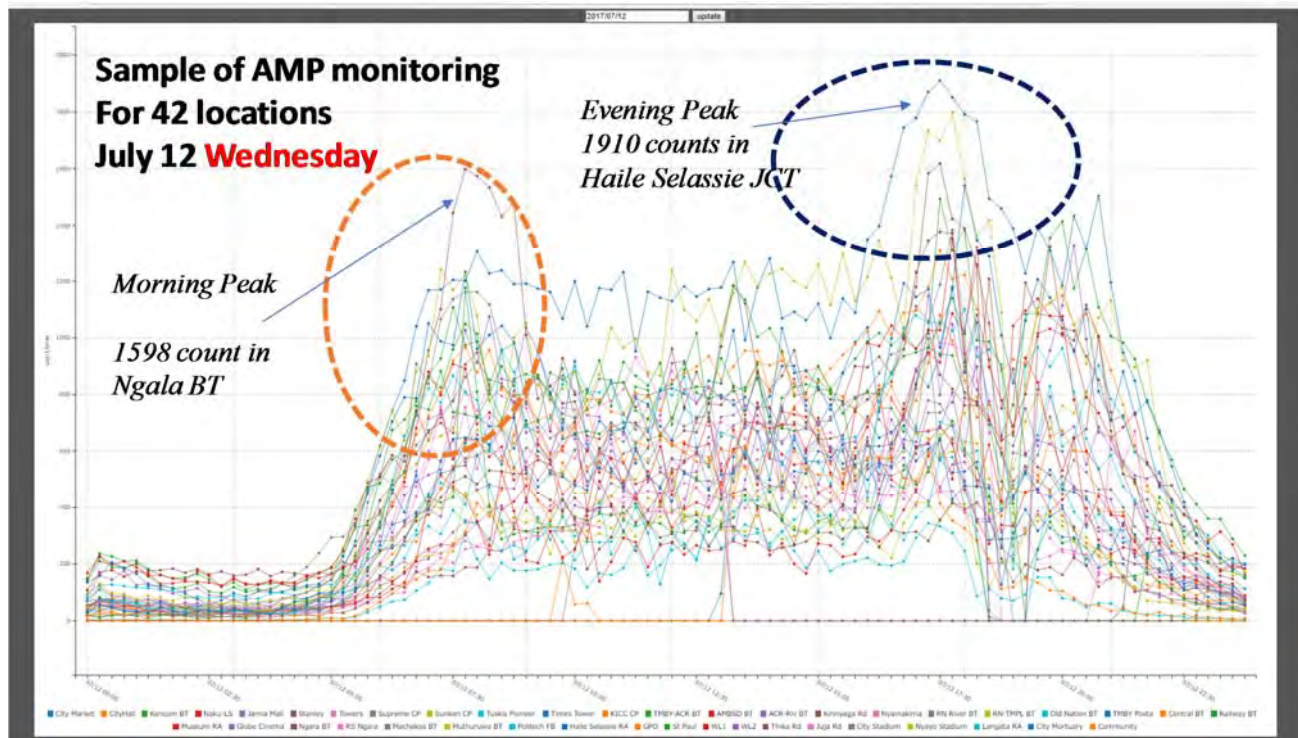
Coverage of AMP Counters in CBD



Allocation of AMP Counters in CBD and Surrounding



Sample of AMP Monitoring on July 12

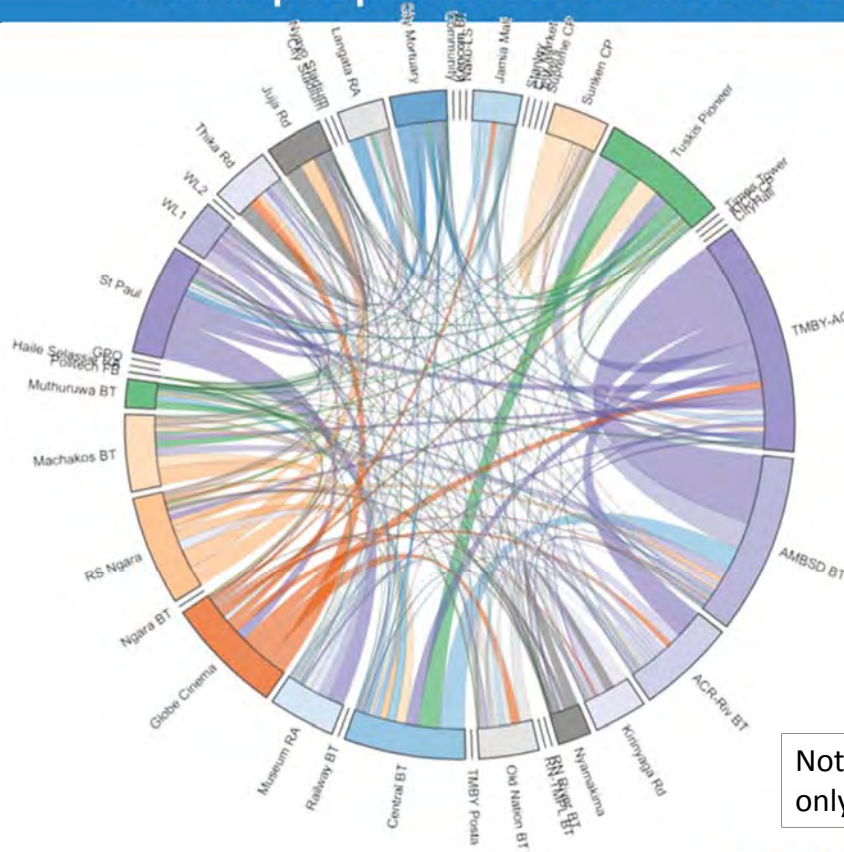


Automatic Daily OD Preparation

24 hours passenger OD for 42 AMP locations on 5th July, with grouping. Some of AMP are not yet connected with power.

block	CBD	DT	Inner Shell	Outer Shell	Total
CBD	6542	10875	3817	2688	23922
DT	11117	45594	17425	6012	80148
Inner Shell	4162	17833	17670	13025	52690
Outer Shell	2190	4771	11323	9294	27578
Total	24011	79073	50235	31019	184338

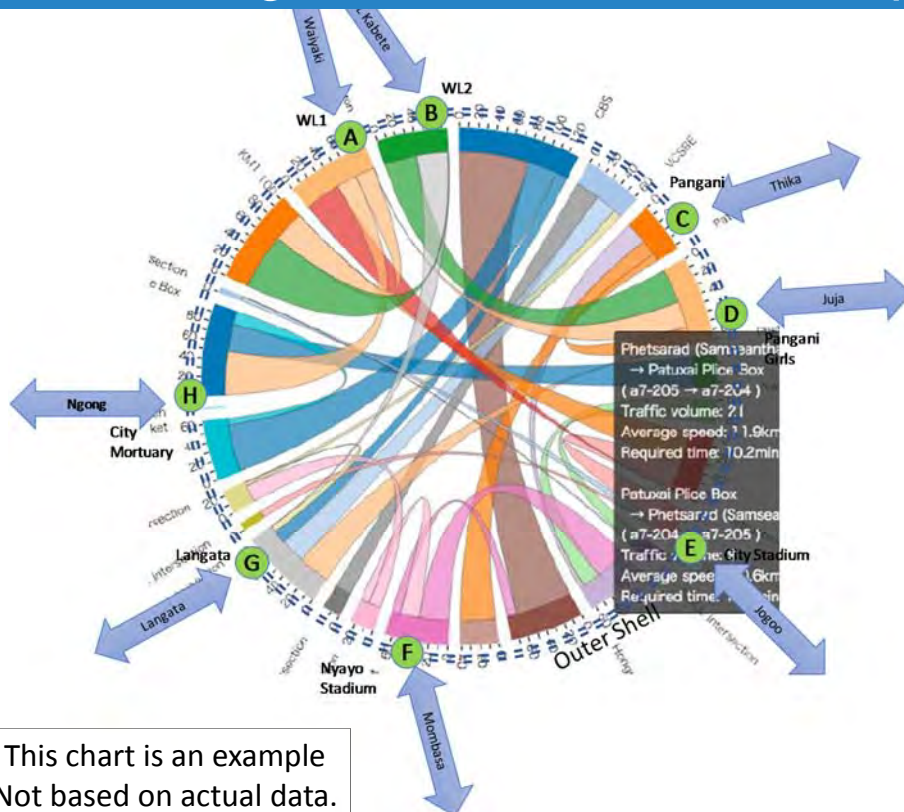
Initial preparation of Chord Diagram



24 hours passenger OD for 42 AMP locations, on 5th July. Some of AMP are not yet connected with power.

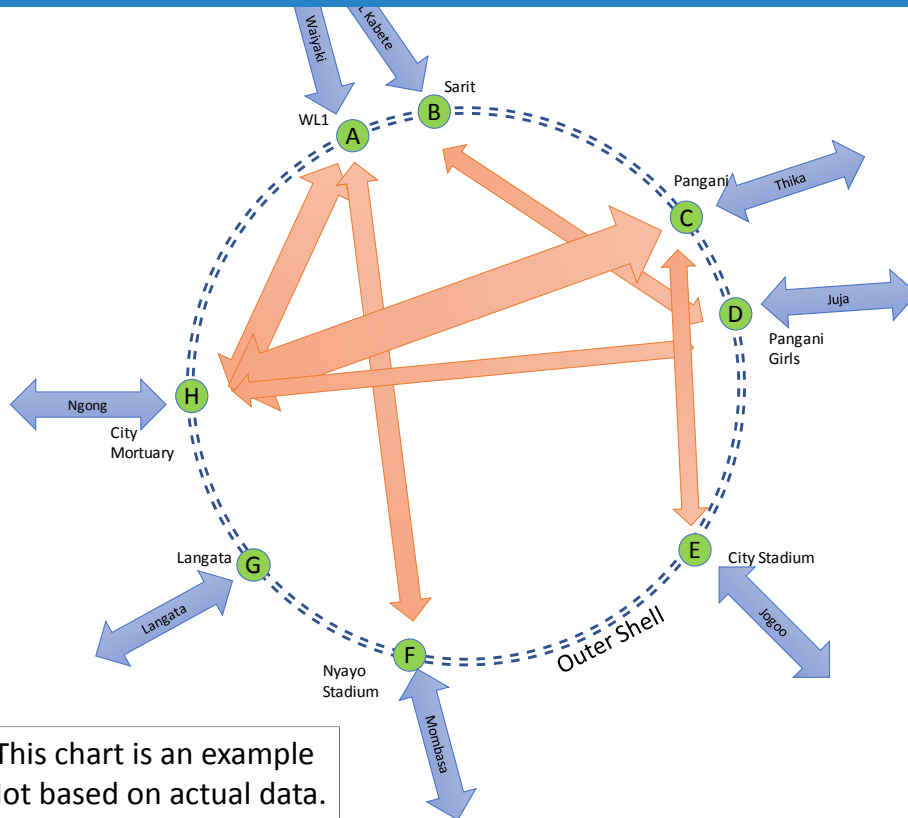
Note: This chart is an example only. Not based on actual data.

Chord Diagram of Outer Shell Group



Note: This chart is an example only. Not based on actual data.

Estimation of Priority Route by Chord Diagram



Transport Demand Management (TDM) - For the safety passenger transportation with BRTs -



According to BRT projects, a lot of passengers will utilize the BRT stations located at the central reservation in CBD. In order to make BRT successful, the following measures are recommended.

- 1) Safety measures for the pedestrians who have to cross a carriageway.
- 2) The measure against illegal parking around the stations.
- 3) Good connectivity between BRT and feeder service.

Station square for the Major stations

- For the passengers' convenience and comfortableness -

The Station Square has the role of traffic hub and provides the convenient and comfortable connectivity for users.
The necessity of the station square will be investigated in this study.

Buses and private cars will use the dedicated Bus bays, K&R space and parking lot allocated in the station square instead of occupying the road space in front of the station.

For the passengers, the waiting room, information board, illumination and bench are provided.

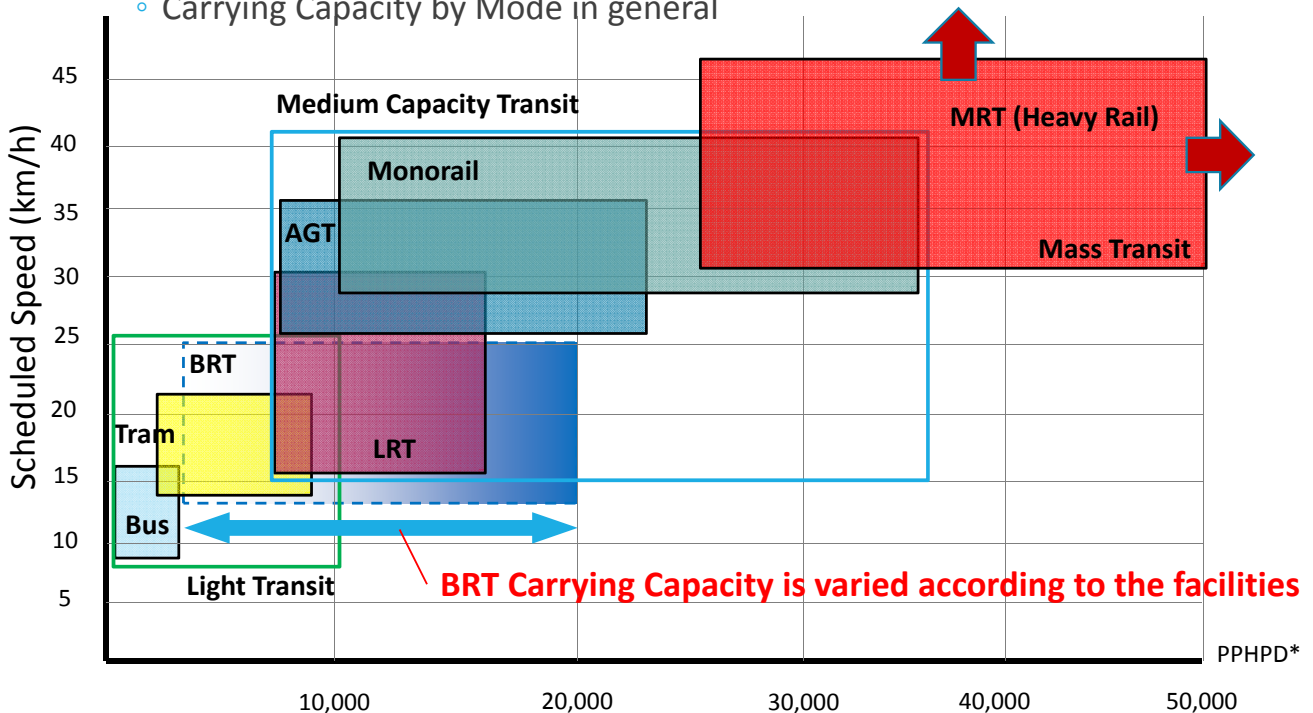


Source: Uenohara city

Urban Transportation System Selection Chart

Quantitative and Objective Evaluation on Rail Based System

◦ Carrying Capacity by Mode in general



* PPHPD: Passengers per hour per direction

Various Urban Transportation Systems

Monorail



Guideway Bus



Automated Guideway Transit (AGT)



MRT



Liner Metro



LRT



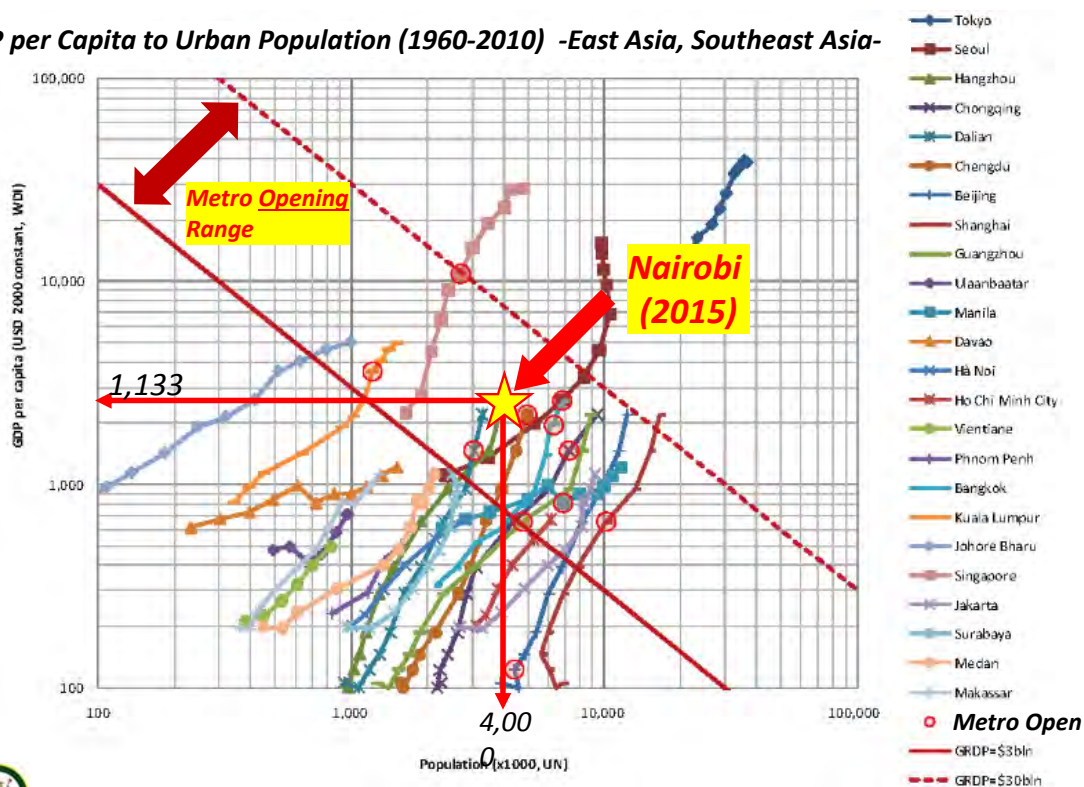
Purpose of Training Program in Japan

- ✓ Public Transport Mode Introduction in Japan
- ✓ Lecture on Transport Demand Management and Mobility Management
- ✓ Land readjustment Scheme
- ✓ Introduction of Transport Policies in Japan



Timing of Metro Opening in the World

GDP per Capita to Urban Population (1960-2010) -East Asia, Southeast Asia-



Requirements of Large Capacity Urban Transportation System

- Transportation demands to/from CBD are keep increasing. Number of incoming vehicles shall be decreased by introduction of large capacity urban transportation system.
- BRT Lines running inside of CBD shall not be disturbed.
- Severe congestion of Thika road shall be improved.
- Connection with Commuter Rail shall be considered.



- Considering road condition of Nairobi, large capacity transportation system which connects BRT lines and Commuter rail shall be introduced in early stage in order to vitalize urban transportation network.
- Since Loop Line was planned to divert passengers from MRT/LRT/BRT lines, priority of Loop Line become lower than trunk line project.

Thank you

3rd JCC Meeting

Minutes of Meeting and Presentations

NAIROBI CITY COUNTY GOVERNMENT

MINUTES OF MEETING

FOR

3RD JOINT COORDINATING COMMITTEE (JCC)

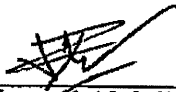
ON

THE PROJECT ON DETAILED PLANNING OF INTEGRATED
TRANSPORT SYSTEM

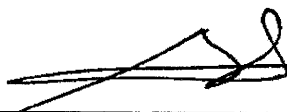
AND LOOP LINE IN THE NAIROBI URBAN CORE

IN THE REPUBLIC OF KENYA

27 SEPTEMBER 2017

for 

Mr. Mohamed Abdullahi
County Executive,
Transport, Roads and Public
Works,
Nairobi City County Government



Mr. Akio Okutsu
Team Leader
JICA Study Team

Prof. Arch. Paul M. Maringa (PhD)
CBS, Corp. AAK, MaaK, MKIP
Principal Secretary - Transport,
Ministry of Transport,
Infrastructure, Housing and Urban
Development

3RD JOINT COORDINATING COMMITTEE (JCC) MEETING
FOR
THE PROJECT ON DETAILED PLANNING OF INTEGRATED TRANSPORT
SYSTEM AND LOOP LINE IN THE NAIROBI URBAN CORE
IN THE REPUBLIC OF KENYA

Date and Time: 27th September, 2017 at 1430H

Venue: Reforms Secretariat Meeting Room, City Hall Annex

Agenda:

1. Introductions
2. Opening Remarks by NCCG
3. Progress Report
 - Project Status at Present
 - SEA
 - Traffic Movement Survey; Demand Forecast and AMP Sensor Survey
4. Discussions
5. Closing Remarks

Proceedings of the Meeting

1. Introductions

The meeting started by self-introductions by all the participants present.

2. Opening Remarks by NCCG

(1) Eng. Karanja – Ag. Chief Officer (Transport, Roads and Public Works)

- Called the meeting to order.
- Mentioned that there were other participants expected. They will join as the meeting proceeded.

(2) Eng. Muthama – Ag. Deputy Director Roads

- The project came from a proposal contained in the NIUPLAN. It was one of the priority projects.
- The team has been working since February 2017.
- It is a transport project that is geared towards the improvement of access and ease of movement within the urban core.
- As a deliverable, the team shall also come up with an integrated transport plan for the CBD.

3. Progress Report; Present project status, SEA and traffic movement survey

- Mr. Okutsu – JST

Overview of the Presentation

- i. Current status of the Project
- ii. Background, Objectives and Expected Outputs
- iii. Schedule of the Project
- iv. Achievement 1: Project Status Summary
- v. Achievement 2: Necessity of Coordination amongst Agencies
- vi. Further Steps

- The study team has noted the lack of coordination amongst the various implementing partners and stakeholders.
- JST proposes to hold a series of working groups to help bring together all the various actors in the sector. For this, NaMATA can help coordinate the sessions as it is one of their mandates.
- JST shall review the various projects within the study area including the Railway City Project.
- In the next JCC, JST shall share the demand forecasts.
- Mr. Nakagawa – JST
 - JST has evaluated the various projects that are taking place within and around the CBD. It is emerging that most of the consultants work independently and thus do not consult each other. This is an area of conflict. There is need for coordination of the various projects ongoing.
 - Some BRT lines are also using estimates that may not be ideal for Nairobi. These estimates are based on lessons from areas like Bogota which is a special case thus can achieve 30,000PPHPD.
 - BRT can achieve 10,000 PPHPD – 30,000 PPHPD. However, for it to reach 30,000 PPHPD, it is in special cases and also requires more ROW. Usually, the maximum is 10,000 PPHPD.
 - For example, the consultant for Line 3 reports that the maximum capacity is 25,000 – 27,000 PPHPD in the future. This is three times the capacity for BRT which may not be achievable. The roads in Nairobi do not have sufficient capacity to meet this demand. In some, there is no space to put up exclusive lanes for BRT.
 - Also, there are overlaps at intersections by the various BRT Lines. However, the consultants responsible all propose for level crossing. This may be a challenge for smooth BRT operations.
 - JST also carried out supplementary traffic surveys using AMP Counters. There are being used to detect the detailed movements around the CBD.
- Mr. Fujita – JST
 - SEA for the NIUPLAN project was approved in 2014 by NEMA.
 - The project is undertaking a study to supplement tie NIUPLAN SEA. Currently, the study is still at the scoping stage.
 - JST plan to have a stakeholder meeting on October 4: 2017.

4. Discussion: Comments on the Presentation

- i. Eng. Karanja – NCCG
 - NCCG can support in setting up the Working Groups. However, it is important to note that as most of the other actors are from the Central Government, NaMATA also being an agency under the Central Government plays an important role in coordination.
- ii. Eng. Muthama - NCCG
 - There have been attempts by NaMATA to have all the actors meet.
- iii. Mwangi –
 - There is a consultant who is also working to identify emerging issues from the projects taking place within the CBD.
 - As a start, the stakeholders can be identified with relation to each BRT line and they form members of the Working Groups.
- iv. Mr. Nakagawa - JST
 - It is important to remember that the project by JST is limited to the Urban Core.
- v. Madam Rose - NCCG
 - As the study team is only here for a limited period, can the various stakeholders be called to the Working Group meeting next week as most of the study team members leave in the coming week.
- vi. Eng. Muthama – NCCG
 - Currently, the challenge is the BRT consultants are working independently without consulting other actors. Attempts have been made to get all the consultants to the same session.
 - It is possible to organize an initial Working Group next week.
- vii. Mr. Nakagawa - JST
 - Pleased to hear that both NCCG and NaMATA are willing to facilitate such a meeting.
 - JST is willing to share the current situation and highlight areas of conflict during the meeting.
- viii. Madam Ruth - NCCG
 - From the presentation, it is clear that we cannot proceed and succeed without coordination.
- ix. Mr. Maina - NaMATA
 - Can the limitation in capacity for BRT be clarified?
- x. Mr. Nakagawa - JST
 - For example, in order to achieve 25,000 – 30,000 PPHPD along Juja Road as per the consultant’s report, there is need to have up to 4 exclusive BRT lanes. Juja Road does not have sufficient ROW to achieve this.

- xi. Mr. Maina - NaMATA
 - The consultant has revised the forecast and currently the proposal is 12,000 PPHPD.
- xii. Mr. Nakagawa - JST
 - 12,000 PPHPD is achievable and can be managed by BRT.
- xiii. Madam Rose - NCCG
 - From the foregoing, it is evident that the issues emerging are based on the reports provided by the consultants for the various projects. There is need to better review and analyze these reports. There may be need to revise proposals.
 - It is important to have accurate estimates so as to avoid providing the wrong solutions for the City.
- xiv. Eng. Karanja - NCCG
 - It is also clear that there is a challenge with regards to the level crossings for BRT.
- xv. Eng. Muthama - NCCG
 - From the shared demand forecast for BRT Line 3E (Juja Road), there shall be a bus every 60 seconds, thus 60 buses per hour on the road. This mimics a train in simple terms. Can this be achievable?
 - The experts need to review and implement the best solution for the City and not just implement for the sake of it. If achievable, the consultants need to justify and illustrate how.
 - There is also need to look at the possibility for future upgrading.
- xvi. Madam Rose - NCCG
 - Having 60 buses per hour on the road will not ease congestion on the roads. It may further worsen it.
- xvii. Eng Mburu – NCCG
 - Such a frequency is too high for BRT operations.
 - There is also need to look at providing a solution for NMT. In the recent past, there has been a marked increase in fatalities on the roads as our roads are designed with no provision for pedestrians.
 - We cannot dedicate the whole of Juja Road to BRT and disregard other road users. As it is, the existing reserve is already too small.
- xviii. Plan. Masaka - NCCG
 - We need to bear in mind that on most of our roads, there is no reserve thus no space for expansion.
- xix. Madam Rose – NCCG
 - It is clearly coming out that we may be better off with a train.
- xx. Eng. Njonge - NaMATA
 - For which year was the shared demand forecast for BRT targeting?

- xxi. Mr. Nakagawa - JST
 - The over-estimation is for present case. Also, there is a big gap in the future forecast e.g. by 2030, the forecast is 25,000 – 27,000 PPHPD but the designer has planned for 30,000 PPHPD.
- xxii. Eng. Njonge - NaMATA
 - We need to also understand that the proposed BRT shall not be operating in isolation. There shall also be other modes in operation thus there is need to look at the picture in totality and come up with a wholesome solution. There is need to criticize based on the actual situation.
 - We also need to remember that BRT was achieved as after consultations and studies. The consultants evaluated it from all aspects be it social, economic or technical.
- xxiii. Mr. Okutsu - JST
 - As a learning example, he would like to propose that the participants at one time visit Dar es Salaam and learn from the BRT project implemented there.
- xxiv. Eng. Njonge - NaMATA
 - As an agency, NaMATA understands that they cannot proceed with the implementation of one line in isolation. There shall be need to look at it wholistically and tackle any emerging issues.
- xxv. Mr. Nakagawa – JST
 - JST understand that there is need for coordination and will share proposals.
- xxvi. Eng. Muthama – NCCG
 - There are some issues that need to be discussed in the Working Groups as per Slide 21.
 - In addition, there is need to clearly define the Urban Core and demarcate its extents.
 - There is also need to review the BRT plans and make proposals based on the demand forecast.
 - Based on some reports, the CBD can accommodate up to 1.5 million persons during the day. How do these people move around? Is BRT enough to serve them?
 - There is also need to harmonize with the pedestrian corridors. The CBD needs NMT and this goes hand in hand with a proper public transport system.
- xxvii. Madam Rose – NCCG
 - There is need to clearly define the Urban Core and also understand its functions.
 - From a planning perspective, the Urban Core is proposed to be a compact, high density and mixed use area.
 - This study could have gone hand in hand with a land use plan for the urban core.

- As per the presentation, it is emerging that the BRTs converge in the CBD.
- If the CBD was converted to a mixed use area, there will be more trips made on foot thus reduce the need for motorization. Nairobi needs to be all inclusive with more corridors for MRT and a few motorized corridors.
- There is also need to critically evaluate the capacity of BRT.
- Railway City Planning also needs to be harmonized with the study being undertaken by JST. From the meetings attended, it seems that the consultant is at a very advanced stage. There is also need to avoid overlaps.

xxviii. Eng. Njonge – NaMATA

- There is need for coordination. This is clearly illustrated by Slide 20.
- It is also important to ensure that whichever option for MRTS is adapted, there is need to provide for pedestrians to acceptable international standards. The transit stops should be within a 500-800m radius.
- There is also need to look at the CBD in detail so as to look at the feasibility of the proposals.
- It is important to also have a detailed land use plan for the CBD.

xxix. Madam Rose – NCCG

- The Central Government and NCCG have been in discussions to come up with solutions to the problems facing Nairobi. One deliverable that is expected to come out of the deliberations is an land use plan for the CBD. The main focus shall be urban safety and security with the view of making the CBD more attractive so that people can come back to the CBD and make it more vibrant.
- JSTs study should ideally go hand in hand with the development of a land use plan for the CBD. This is to avoid future revisions when the land use plan is done.
- The only limitation facing the team is budgetary constraints.

xxx. Eng. Muthama – NCCG

- He was pleased to hear that there are plans in place and there are interventions ongoing for the CBD. This shall be very beneficial as currently, plans and studies have been proposed and implemented without a land use plan in place to guide interventions.
- However, does that mean that the team waits for the land use plan to be completed?

xxxi. Madam Rose – NCCG

- The land use plan is a priority and should be delivered within 6 months.
- It shall be advantageous as this study can be harmonized with the land use plan and also come up with a transportation plan for the CBD.

xxxii. Plan. Maina – NaMATA

- NaMATA has a budget for the development of a transportation plan for the CBD. Instead of replicating what JST is doing, this fund can be diverted to the development of a land use plan. A transport plan cannot be done without a land use plan.
- xxxiii. Madam Rose – NCCG
- Can the funds NaMATA has thus be used for the land use plan? NCCG can work with NaMATA and fast track this.
- xxxiv. Eng. Karanja – NCCG
- There is need to establish the best mode of transport for the City.
 - Currently, the preference of private cars is based on the service level and comfort drawn from their use compared to matatus. However, in future, matatus may not be able to meet the demand for the city.
- xxxv. Madam Rose – NCCG
- The local experts in the field of transport need to meet separately and guide on the best direction for the City.
- xxxvi. Eng. Mburu – NCCG
- In future, there shall be heavy congestion in the city especially in Upper Hill between Haile Selassie and Matumbato Road, and Westlands. This is because of the tall skyscrapers that are coming up and these shall lead to an increase of population in these areas.
 - Currently, congestion starts from 3pm and it can only get worse if no proper solution is developed for the city.
 - There is need for mass transit. We can even utilize underground systems.
 - There is need for the local experts to meet and chart a way forward.
- xxxvii. Plan. Maina – NaMATA
- It is very important for the local experts to meet and make decisions then invite the foreign experts to share the outcomes of such deliberations.
- xxxviii. Mr. Yokota– JICA Kenya
- It is noteworthy that it is emerging that there has been need for inter-agency meetings but this has not been taking place.
 - As JICA, they would appreciate getting the direction from the local experts. However, proposals from the international experts should not be shunned.
- xxxix. Mr. Wahome – KRC
- The best time to make decisions is now. There is also need for joint consultation meetings to share proposals by the various actors so as to avoid replication.
 - The consultant for the Commuter Rail Master Plan commenced with his work today.
- xl. Eng. Karanja – NCCG

- If services on the current commuter rail were improved, congestion in the City would be eased. For example, we are proposing for BRT along Jogoo Road while there is a commuter rail running parallel, the same can be said for Mombasa Road. If the stations are improved to allow for a Park and Ride system like in Syokimau and Imara Daima, there will be a marked decrease in the use of private cars. There is also need to increase frequency of service.
- xli. Madam Rose – NCCG
 - Can the highlights of what is entailed in the railway master plan be shared?
- xlii. Mr. Wahome – KRC
 - The study shall look at the existing routes and propose for rehabilitation. It shall even propose for new lines.
- xliii. Eng. Karanja – NCCG
 - What can be done immediately to ease congestion in Nairobi?
- xliv. Madam Rose – NCCG
 - There shall be need to meet with all stakeholders. This can be under the working group proposed by JST.
 - Also, there is need to bear in mind the planned SEA stakeholders meeting on October 4, 2017 This shall be at St. Andrews Church. The working Group can be held on October 5, 2017.
- xlv. Eng. Muthama – NCCG
 - He seconds the proposal to have the Working Group session on the 5th in the Morning. The venue can be NCCG (City Hall Annex – Reforms Secretariat Meeting Room)
- xlvi. Plan. Maina – NaMATA
 - The afternoon is better for NaMATA.
- xlvii. - NCCG
 - With proper planning, the population of Eastlands can be managed.
 -

(3) Closing Remarks

- i. Mr. Yokota – JICA Kenya
 - He was pleased with the discussions and decisions made during the session.
 - JCC is the highest decision making level for the project. As per the RD, there is need for representation from the Governor, Deputy Governor, Principal Secretary, Minister, etc. As these have been lacking in the past 2 sessions, there is need to be very careful to reach at decisions only to have them quashed when the study is at the critical stages.
 - NaMATA and NCCG need to ensure that the senior representatives from the Ministry and County Government are kept informed.
- ii. Eng. Njonge - NaMATA

- Some decisions require information and data. He is happy that the team has embraced technology in data collection.
- iii. Eng. Muthama – NCC
 - Thanked all those present and hoped for their participation and support in future.
 - JST had also submitted 50 copies of the Progress Report. This shall be shared to the various institutions.
- iv. Eng. Karanja – NCCG
 - Happy for the sharing in the forum and pleased to see that there are steps being made towards improving and decongesting the urban core.
- (4) A.O.B.**
 - i. Eng. Muthama – NCC
 - JCC had placed a request to have a meeting with the Governor and his deputy. As soon as a date is set it shall be communicated to the team.
 - ii. Mr. Nakagawa – JST
 - JST has also shared a table to be filled by participants. This is for the purpose of collection of additional information. The study team would appreciate if they can have back the filled form in a week.
 - The NaMATA Eng. Njunge accepted to work on it.
 - iii. Mr. Odake – JST
 - Reminded all those participating in the Japan Training Programme that time is very limited and there is need to beat the deadline day for submission.
 - A land use working group shall be held in November.

Attachment:

- (1) Participants of the Meeting
- (2) Presentation Material for the Joint Coordinating Committee Meeting on 27 September, 2017

The end

Attachment 1: Participants of the Meeting

Attendance:

NAME	INSTITUTION	POSITION
Eng. F. N. Karanja	NCCG	Chief Officer, Transport, Roads and Public Works NCCG.
Mr. Sammy Muthama	NCCG – Roads and Transport	Deputy Director (Roads)
Mr. James Maina	NaMATA	Secretariat Member
Ms. Rose Muema	NCCG	
Mr. Victor Wahome	KRC	Surveyor Planner
Eng. M.M. Njonge	NaMATA/KURA	
Ms. Ruth Waruguru	NCCG	Ag. Director Urban Planning
Mr. John K. Mwangi	NaMATA	Secretariat Member
Mr. Nimrod H. Masaka	NCCG/ Urban Planning	Director
Mr. Moses N. Kuyiki	NCCG	Engineer 1
Ms. Maki Hasegawa	JICA/NCCG	NCCG Urban Planning
Ms. Janet Murakira	Repcon	Stakeholder organization
Eng. S. K Mburu	NCCG	Director of Roads
Eng. J. K. M'iriria	NCCG	Director Public Works
Mr. Masinde Wilfred	NCCG	Building Inspector
Mr. Toru Arai	MOTIHU	Technical Advisor
Mr. Kenji Yokota	JICA Kenya	Representative, Transport

JICA Study Team:

Name	Position
Mr. Akio Okutsu	Team Leader/Urban Transport Planning Specialist
Mr. Yoshiya Nakagawa	Deputy Team Leader/ Public Transport Planning Specialist
Mr. Tadaaki Murakami	TDM/Mobility Management 1
Mr. Akio Odake	Urban Development Specialist
Mr. Takeharu Koba	Demand Forecast Specialist
Mr. Tomomi Fujita	Strategic Environmental Assessment Specialist
Mr. Naoki Kakuta	Transport Survey Specialist
Mr. Babu Mukoko	Traffic Survey Assistant
Mr. Akbar Ahmed	GIS Assistant
Ms. Anne Ogola	Secretary

The Project on Detailed Planning of Integrated Transport System and Loop Line in the Nairobi Urban Core

3rd Joint Coordination Committee: Progress Report

JICA Study Team

27th September 2017



Nairobi City County Government



Japan International Cooperation Agency



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PADECO PADECO Co., Ltd.

OCESTRAL CENTRAL CONSULTANT Inc.

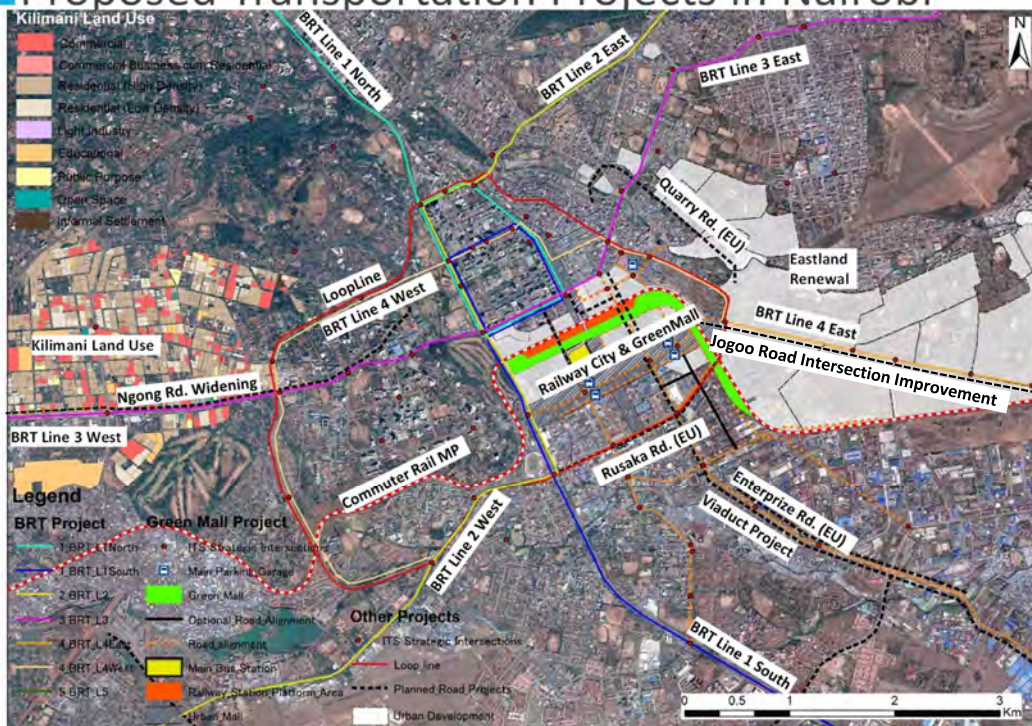
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Contents

1. Project Status at Present
2. Background, Objectives and Expected Output
3. Schedule of the Project
4. Achievement 1: Project Status Summary Preparation  Discussion 1
Review on Institutional Arrangement
5. Achievement 2: Necessity of Coordination among Projects (e.g. BRT projects)  Discussion 2
Issues for BRT system introduction
6. Further Steps: Further Steps

Projects Status at Present

Proposed Transportation Projects in Nairobi



➔ Various transport projects are planned without coordination



Background, Objectives and Expected Output

Background

- Transportation projects are planned by various **Executing Agencies** and donors but those projects have not been coordinated each other

Objectives

- To Review the Urban Transport Policies;
E.g., BRT, Road development, Railway improvement project etc.
- To grasp detailed traffic movement in Urban Core and
- To Formulate measures for **Mobility Improvement**

Expected Output

- To collect and summarize information on transportation projects in the Urban Core
- To clarify issues on the transportation projects
- To prepare mobility index for urban core

Expected Outcome

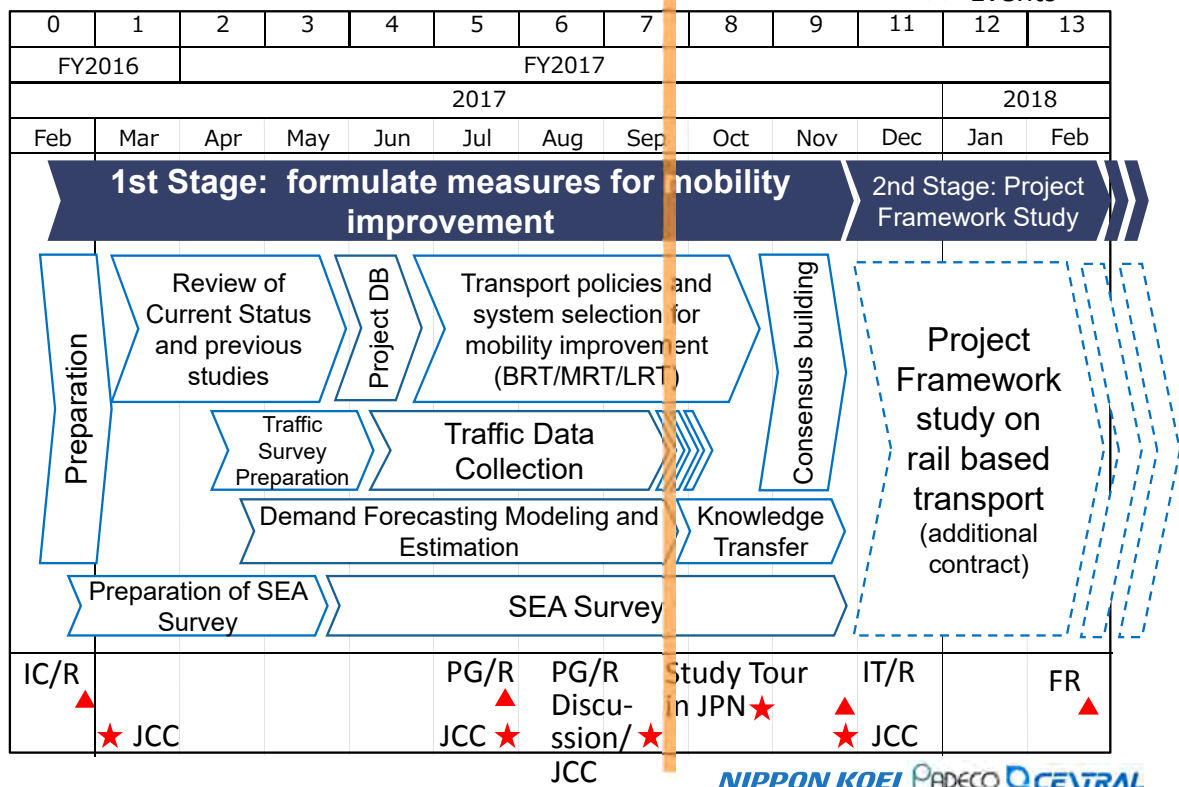
The integrated transport policies for mobility improvement in Urban Core



Schedule of the Project

Work Plan

Legend ▲ Reports
★ Events



NIPPON KOEI PADECO OCEVTRAL

5

Achievement 1: Project Status Summary Preparation

JICA Study Team has prepared the 1st draft of the Project Status Summary for Nairobi (Slide 7-15). This is the first trial in Nairobi to comprehend the all transport project status at a glance.

→ This works should be handed over to NaMATA who is the coordinator of the Nairobi transport project.

→ JST still miss several information and we want to collect through NaMATA

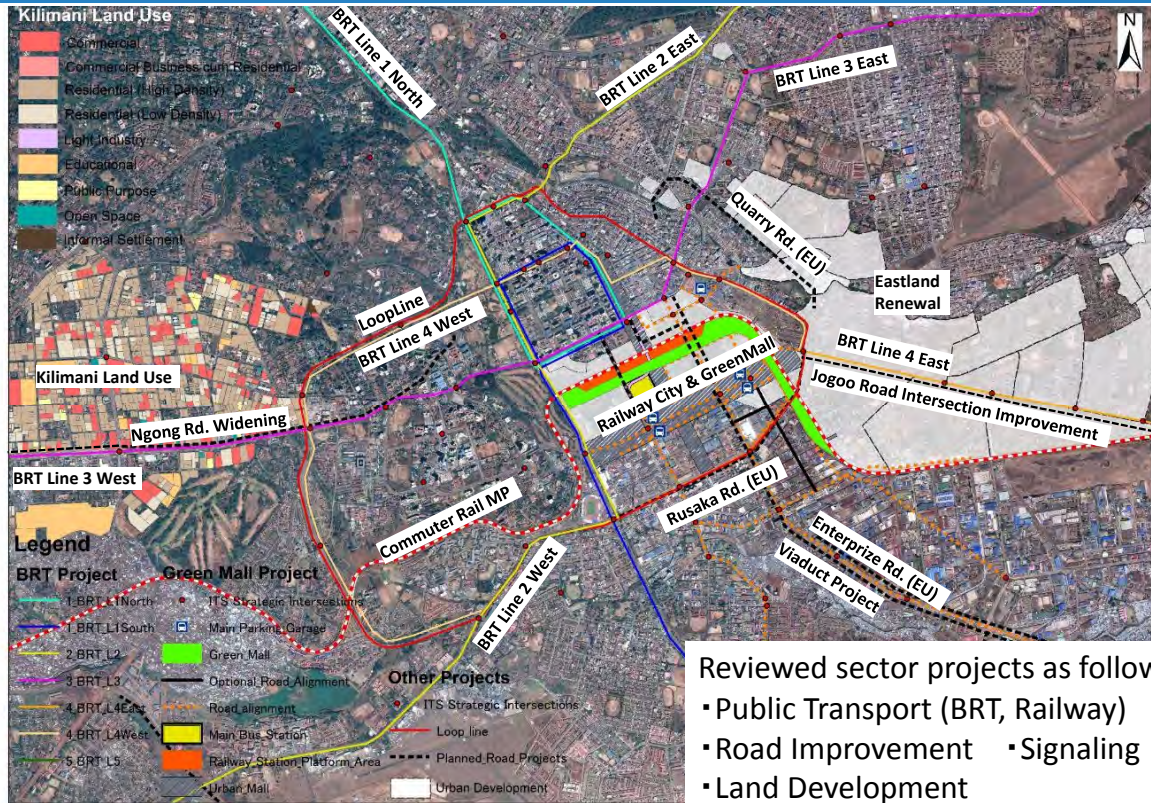
→ JST proposes to collect those missing data from agencies with NaMATA's arrangement and direct appointment to related agencies



NIPPON KOEI PADECO OCEVTRAL

6

Detailed Project Review-Overview



Reviewed sector projects as follows;

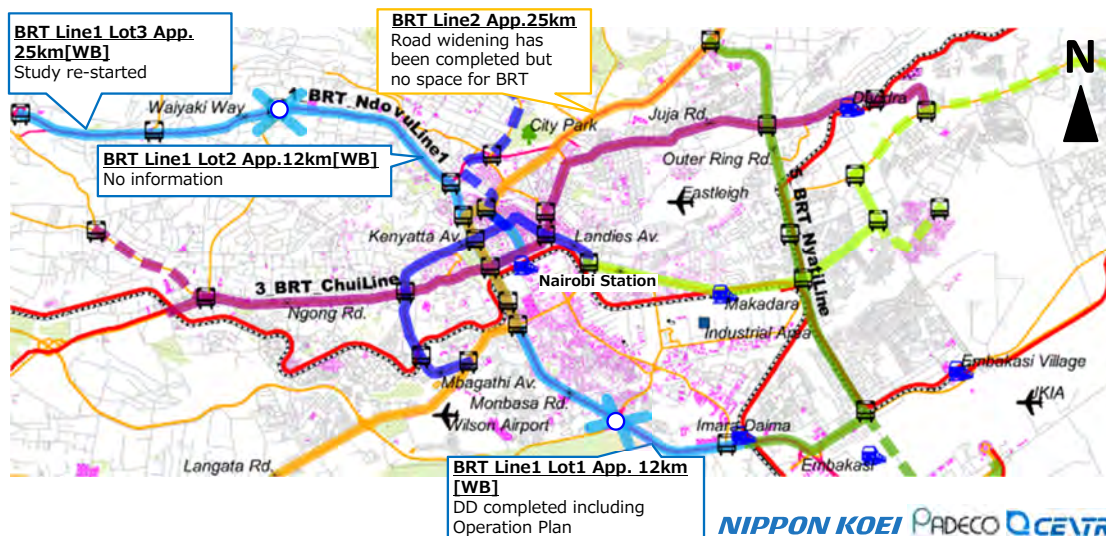
- Public Transport (BRT, Railway)
- Road Improvement
- Signaling
- Land Development



Public Transport (BRT System) (1)

Current Progress of BRT Projects (Line 1 and Line 2)

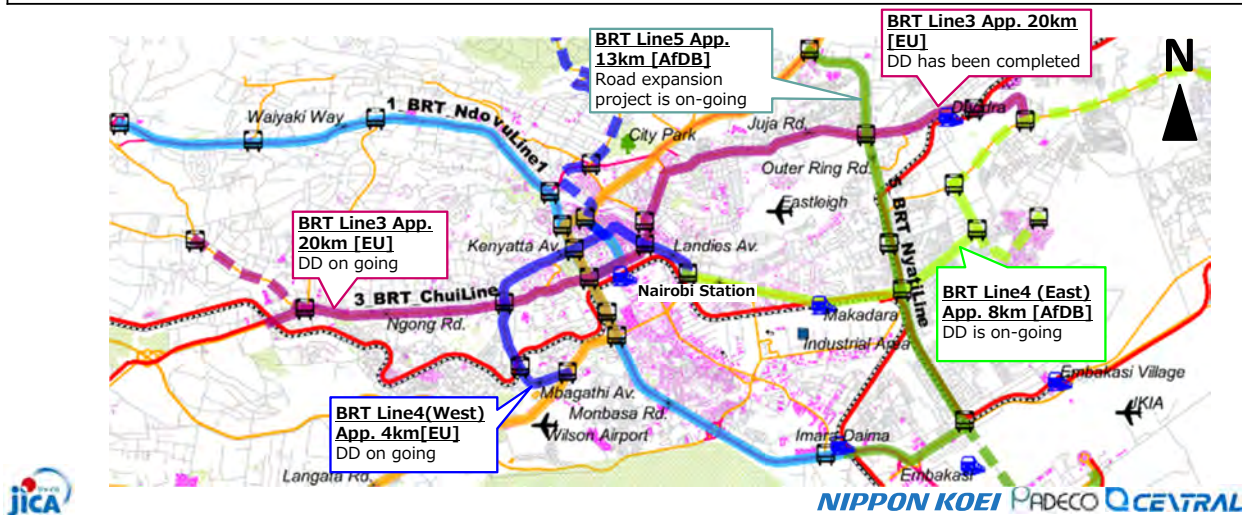
No.	BRT Route	Section	Org.	Existing Status	Fund/Support	Remarks
Line Waiyaki way - Uhuru Highway - Mombasa road	1	Lot 1 (Mombasa rd)	KeNHA	DD completed including operation plan	WB	-
		Lot 2 (Uhulu highway)	KeNHA	No activity	-	Information was not available on BRT Line 1 Lot 2
		Lot 3 (Waiyaki way)	KeNHA	Study re-started by new consultant	WB	-
Line Langata rd - Uhuru Highway - Thika rd	2	Line 2 East (Thika rd)	KeNHA	No activity	-	Road widening has been completed. However, there is no room for BRT at Thika road.
		Line 2 West (Langata rd)	KeNHA	No activity	-	Road widening has been completed between Langata cemetery and Bomas. There is no space for BRT.



Public Transport (BRT System) (2)

➤ Current Progress of BRT Projects (Line 3, Line 4 and Line 5)

No.	BRT Route	Section	Org.	Existing Status	Fund/Support	Remarks
Line 3	Ngong rd – Haile Selassie av – Juja rd	Line 3 East (Juja rd) CBD – Njiru	KURA	DD has been completed by Ingerop between KNH to Dandra	EU	There will be reserved space for bus lane (9m width) after the road widening project by JICA. However, BRT plan requires demolish of the on-going new road.
		Line 3 West (Ngong rd)	KURA	DD is on-going by Ingerop	EU	
Line 4	Mbagath way – Kenyatta av - Landhies rd - Jogoo rd - Mayanja rd - Kayole Spine rd	Line 4 East	KURA	DD is on-going by Gauff	AfDB	Consultant is Ingerop.
		Line 4 West	KURA	No information.	EU	
Line 5	Outer Ring rd - Airport North rd	Balozi – Imara	KURA	Basic design is on-going.	AfDB	Road expansion project is on-going.

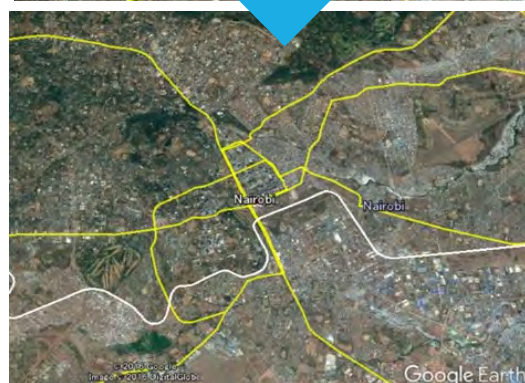


Public Transport (Railways) (1)

Loop Line Project

- Loop Line is planned in NIUPLAN (2014) to mitigate the passengers' concentration to CBD on the condition that arterial railway network is constructed in accordance with MRTS (2011)
- In accordance with the harmonization plan, the arterial railway network planned in MRTS has been changed to BRT routes, and the BRT routes are planned along a part of the loop line. The priority of construction of the rail-based loop line became low, due to less projected ridership.

NIUTRANS + NIUPLAN (up to 2030)



Harmonisation Study (up to 2030)

Public Transport (Railways) (2)

Commuter Rail Project

- Commuter train service is in operation with only 3 round trips per day between Nairobi Central and Syokimau station.
- Because of the Diesel Locomotive haulage, increasing the numbers of train operation is difficult.



Nairobi Commuter Train Route Map



Planned KRC Commuter Rail Network

Road Projects

Ngong Road Improvement

- Granted by Japan
- Consists 5.6km Phase-1 and 2
- Under Construction for Phase-1
- BRT Lane is left 9m but the design is out of scope

Viaduct and Road Construction project

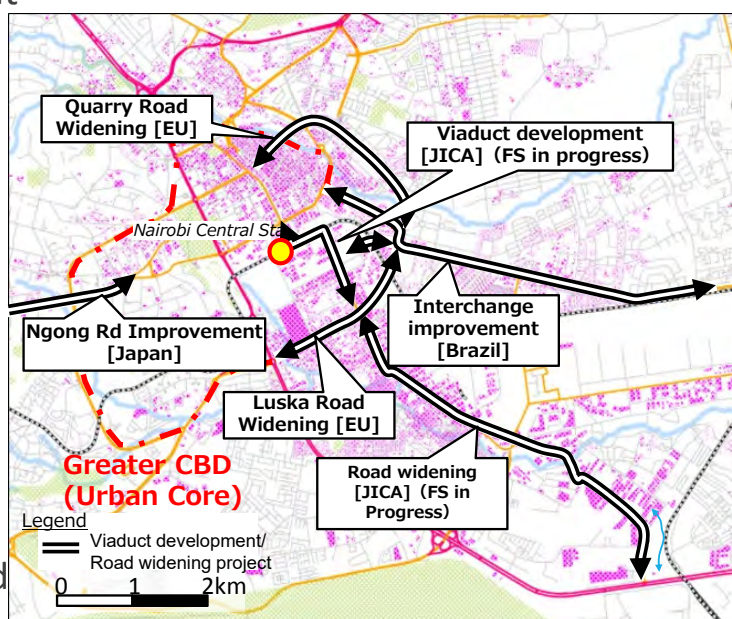
- F/S in progress

Quarry Road Construction

- Funded by EU
- Under Construction

Improvement of Jogoo Road Interchange

- Funded by Brazilian Exim Bank
- Project suspended due to fund shortage



Road Projects Location MAP in Urban Core

Non Motorized Transport (NMT)

Non Motorized Transport Policy (NMTP)

- Established by NCCG in 2015
- Vision: To be a County where NMT is the mode of choice for short and medium trips*

Implementation Action Plan

Action	Description
Implementation Committee	NCCG should immediately take up the responsibility of setting up a “Steering Committee” to implement the policy.
Funding arrangement	Special NMT Fund should be created
Priority Policy Actions	<ul style="list-style-type: none"> a. Development of a Nairobi Streets and Roads Design Manual (NSRDM) b. Data collection to help in identifying problems, designing interventions, prioritizing projects and monitoring progress c. Development of master plans for pedestrian, cyclists and human-drawn carts d. Development of the Highway Code and other materials for education and publicity campaigns e. Passing the necessary by-laws to enable proper planning, effective enforcement, adequate funding and effective land use planning and control.
“Quick Wins” Package	the package should include interventions that address safety of NMT users; security along the routes; and elimination of missing links (detours) and barriers.
Pilot Projects Package	Two NMT route pilot project packages are proposed. In addition, pedestrianization of the CBD should be in the priority package.
Investment Matrix for the STAP*	The time frame for implementation of the STAP is 2 years starting in 2015.

* STAP: Short Term Action Plan



Urban Development Project (1)

Railway City Project

- Consultant is DOHWA and GIBB Africa, the study is on-going until March 2018.
- One of NaMSIP project funded by WB supervised by MoTIH&UD, Kenya Railways and NCCG
- To prepare urban plan and design to complete and expand Nairobi CBD by filling in the missing gaps in development and integrating with CBD spatial structure
- Project Area: 118 ha of KRC Land and 31ha of surrounding private lands, total 149ha.



Location Map of Railway City Project

Green Mall Project

- Consultant is Gauff and the study is on-going.
- Development of selected roads, having 15.8km and the Green Mall street bus station in Nairobi Central Station.
- Includes F/S, detailed design, preparation of tender documents and construction supervision.



Location Map of Green Mall Project



Urban Development Project (2)

Interdisciplinary Land-Use and Transport Metropolitan Analysis within the Nairobi Metropolitan Region (ILUT)

- Consultant is Egis and the study is completed under NaMSIP supervised by MoTIH&UD.
- Proposing integration of intermodal transfer among different modes, land use development plan around the main intermodal nodes and providing detailed engineering design for selected infrastructure around selected commuter rail station.



Location of the commuter rail station

Urban Renewal for Eastlands

- Consultant is RPC and the study is on-going under NaMSIP support.
- Includes development framework for 20years, action area plan, public transport solution, etc. to re-develop old residential area in Eastlands.
- Target area is 11.54km² expecting additional 0.1~0.2 million population.



Area of urban renewal for Eastlands



Discussion 1: Necessity of Updates

JST found there are many projects in Urban Core, not only Mass Transit System including BRT but also flyover, intersection design, NMT, Urban development and monitoring system.



Due to insufficient coordination among those projects, conflicts may occur on those aspects shown on the slide 17-18, 20.



To avoid the conflicts, JST propose to organize a series of working group (WG) by sectors, **in order to update the project details**, with initialization of NaMATA. Let's have the first WG by the end of first week of October. JST propose to involve KeNHA, KURA, KRC, NCCG, NTSA, Police, Railway City consultant with JICA Study Team.



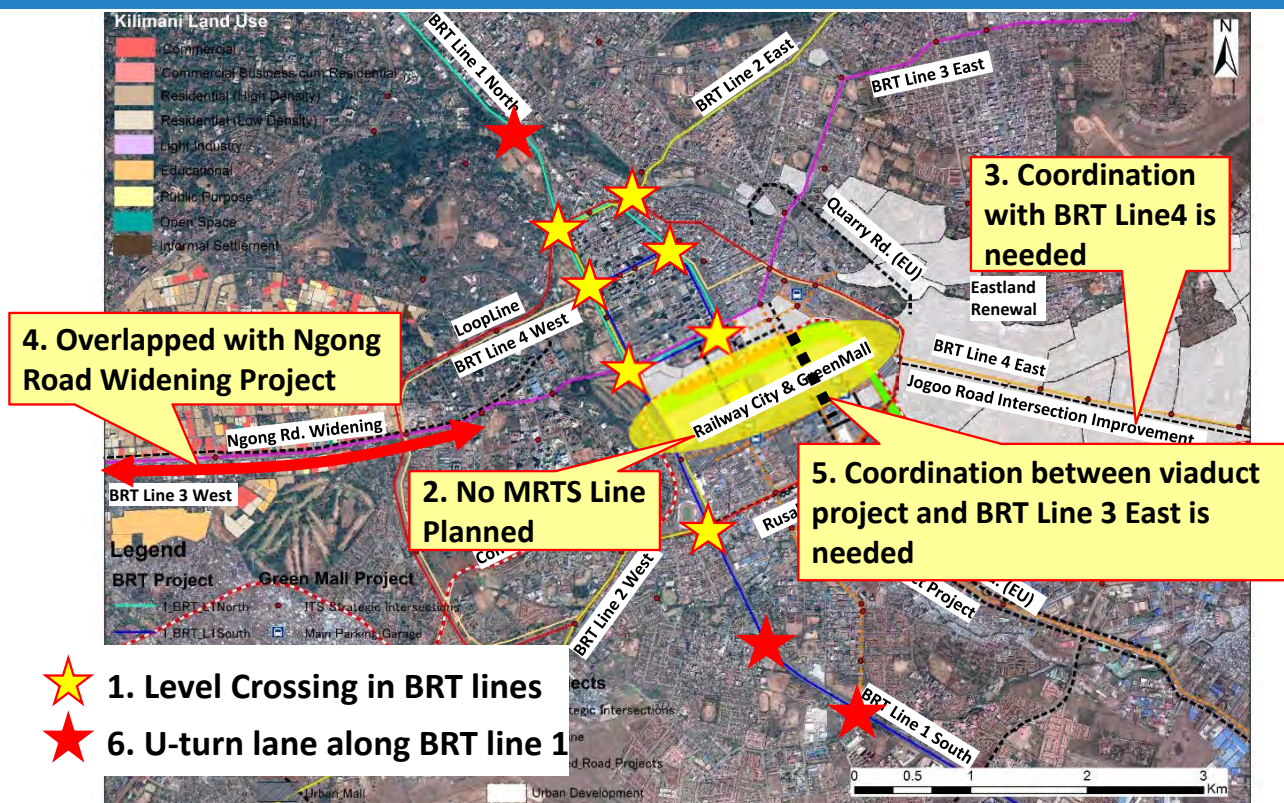
Conflicts may occur (for example) (1)

No.	Conflicts	Stakeholders (perhaps)
1	Level Crossings in BRT lines	KURA, KeNHA, WB and EU
2	No MRTS Line planned along Green Mall Area	NaMSIP (WB), KURA, EU and KRC
3	Jogoo Road intersection improvement project needs BRT Line 4 East consideration	KURA and Brazil Exim Bank
4	BRT Line 3 and Ngong Road widening project	KURA(EU) and JICA
5	Viaduct Project and BRT Line 3 East	KURA (EU), KeNHA (WB) and JICA
6	U-turn lane arrangement along Line 1	KeNHA and WB

And more...



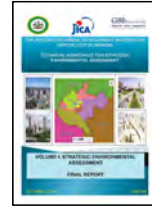
Conflicts may occur (for example) (2)



Strategic Environmental Assessment

(Status of the Environmental Study)

- ❑ NIUPLAN SEA, covering various sectors, has been approved by NEMA in 2014.
- ❑ This environmental study will be categorized as supplemental environmental assessment study to reinforce the NIUPLAN SEA.



(Recent Activity)

- ❑ Stakeholder Meeting will be held on 4th Oct to share information and collect opinions from various sectors regarding environmental & social issues.

(Key Environmental and Social Issues (expected impacts of integrated policy))

- ❑ Socio-economic and cultural issue
 - ✓ Better economic status through improvement of business environment, increase of regional development in NUC and surrounding districts.
- ❑ Environmental issue
 - ✓ Possible increase of dust, gas emission and noise nuisance. Land acquisition and resettlement requirement. Various development disorder. Deterioration of solid waste management. Destruction of flora and fauna triggered by expansion of areal development.
- ❑ Political issue
 - ✓ Reinforcement of other programs associated with road development or rehabilitation. Raising issues related with environmental regulation such as pollution control or natural resource protection.

Achievement 2 – Necessity of Coordination among Projects

Achievement 2: Necessity of Coordination

BRT plans are flagship projects in Nairobi transport projects but JST found the following issues;

- All BRT Routes concentrates at CBD
- Difficulty in operation Plans, particularly in terminals and CBD circulates
- The Line 1 FS & Line3/4West FS are not coordinated each other
- Level Crossing of BRTs in CBD
- Over estimation of BRT capacity



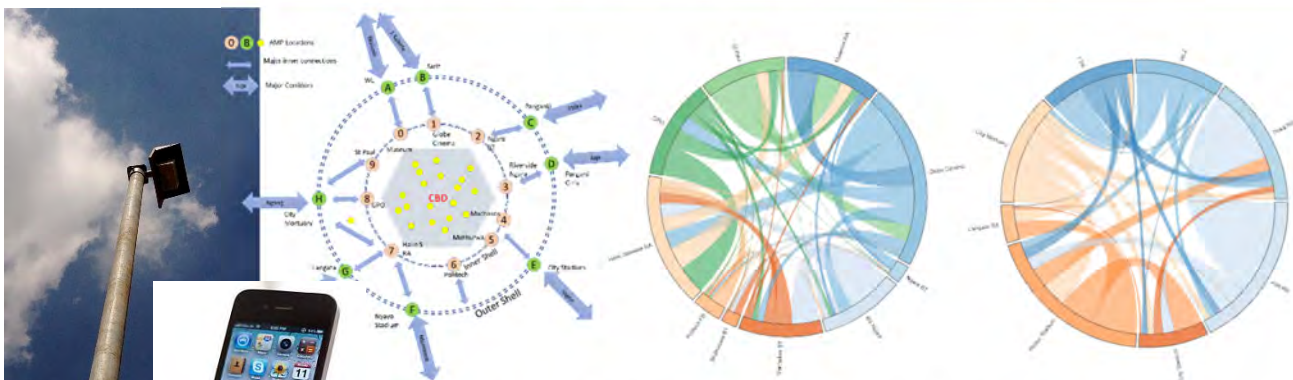
Do you have any opinions to the pointed issues?

Further Steps: Necessity of Coordination

JST will propose some mitigation approaches to harmonize those issues among transport projects.

- Adjust the transport projects with expanding “Urban Core”, and traffic demands
 - Initial review on urban road network capacity with BRT, flyovers, signalizations, and private car demand increase
 - Review on BRT Plans. Necessity of higher capacity transport system based on the demand forecasts
 - Harmonization with Pedestrians
- Review on Demand Projection with latest land use trends
- JST will work for above in Sep. to Nov. 2017

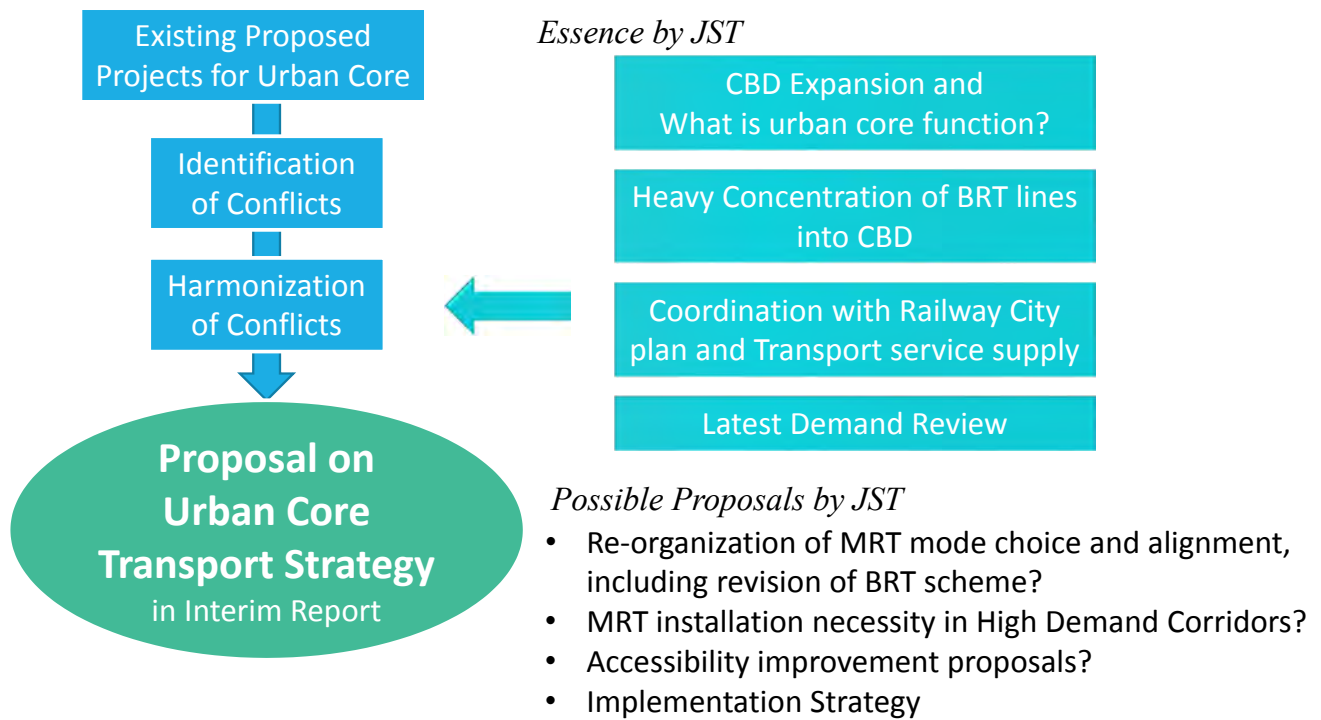
Ref. AMP Traffic Data Collection



□ JST developed the real-time passenger traffic counting system in 24/7 basis (called as “AMP”) in July and collects passenger movements in CBD with high accuracy in never expected than before.

□ This data can substantiate the needs of transport service in CBD expanded area, in which direction in CBD and with how much capacity.

Further Steps: Urban Core Transport Strategy



Asante Sana!

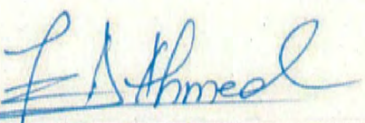
4th JCC Meeting

Minutes of Meeting and Presentations

NAIROBI CITY COUNTY GOVERNMENT

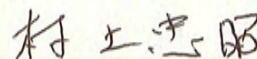
MINUTES OF MEETING
FOR
4TH JOINT COORDINATING COMMITTEE (JCC)
ON
THE PROJECT ON DETAILED PLANNING OF INTEGRATED
TRANSPORT SYSTEM
AND LOOP LINE IN THE NAIROBI URBAN CORE
IN THE REPUBLIC OF KENYA

11 APRIL 2018



Mr. Mohamed Dagane
County Executive,
Transport, Roads and Public
Works,
Nairobi City County Government

for



Mr. Akio Okutsu
Team Leader
JICA Study Team

4TH JOINT COORDINATING COMMITTEE (JCC) MEETING
FOR
THE PROJECT ON DETAILED PLANNING OF INTEGRATED TRANSPORT
SYSTEM AND LOOP LINE IN THE NAIROBI URBAN CORE
IN THE REPUBLIC OF KENYA

Date and Time: April 11, 2018 at 0900H

Venue: Committee Room, City Hall

Agenda:

1. Introductions
2. Opening Remarks by NCCG
3. Presentation by JICA Study Team
 - Final Report
 - Way forward
4. Discussions
5. Closing Remarks

Proceedings of the Meeting

1. Introductions

The meeting started by self-introductions by all the participants present.

2. Opening Remarks by NCCG

(1) Hon. Mohamed Dagane – County Executive Committee Member (Transport, Roads and Public Works)

- Called the meeting to order.
- Welcomed all the participants present to the meeting.
- He also observed that previously, the study team had briefed him on the progress of the study and the county had placed forth the request for support in proceeding to stage two of the study.

(2) Eng. Muthama – Ag. Deputy Director Roads

- The project came from a proposal contained in the NIUPLAN. It was one of the priority projects. The team was to look at the loop line around the CBD but however, all other requisite projects have not been implemented thus the study team recommended that it was too early to have the loop line implemented.
- The NIUPLAN report observes that to revitalize the CBD, there needed to be a rail based system serving the CBD to assist in moving the masses to

various destinations around the urban core. This in turn would go a long way in reducing congestion in the urban core.

- The team has been working since February 2017.
- It is a transport project that is geared towards the improvement of access and ease of movement within the urban core.
- As a deliverable, the team shall also come up with an integrated transport plan for the CBD.

3. Final Report and Way forward

- Mr. Murakami – JST

Overview of the Presentation

- i. Present Project Status
- ii. Final Report (Executive Summary) and Way forward
- iii. Main contents of Final Report (Stage 1)
 - Part I: Current Conditions and Situational Analysis in the Nairobi Urban Core
 - Part II: Future Urban Transportation Plan in Nairobi
 - Part III: Action Plan for Comprehensive Mobility Improvement

- The study team has noted the lack of coordination amongst the various implementing partners and stakeholders.
- Study team also made proposals for BRT re-alignment so as to mitigate conflicts during operation in future.
- From the traffic surveys, the study team established that the corridors with the most traffic volumes were Thika/Juja Roads and Ngong’/Lang’ata Road.
- JST shall reviewed the various projects within the study area including the Railway City Project and BRT projects.
- JST proposed 3 policies to counter the foreseen challenges with regards to mobility in the urban core;
 - Policy I: Establishment of comprehensive mobility management
 - Policy II: Proposal for future re-alignment of BRT
 - Policy III: Application of rail based transport system

4. Discussion: Comments on the Presentation

i. Mr. Sugimoto – JICA Kenya

- The project was formulated with the intention of updating the existing data concerning the urban core and it has highlighted the need for coordination of

interventions within the urban core. It is important to look at road improvement projects at the network level instead of individual projects.

- The loop line was one of the proposed priority projects in NIUPLAN. However, during this study, JST established that it was still too early to implement it, but there are other priority projects that first need to be considered before the loop line.
- There is also need to incorporate and review the ongoing BRT project and mitigate conflicts that may arise during implementation.
- The final report shall in detail discuss the proposals shared by the study team.

ii. Eng. Muthama - NCCG

- He thanked the JST for the work undertaken. The data collected is needed for the purposes of improvement of mobility in the CBD.
- As established, it is still too early for the loop line thus it shall remain a long term proposal. However, there are other priorities that need to be considered immediately and such include the introduction of a payment card system for PSV (cashless payment), improvement of NMT facilities and pedestrian access and also improvement of mobility in the CBD.
- There is need to formulate solutions that shall best serve the Nairobi CBD.
- He also thanked JICA for the continued support to the county government.

iii. Hon. Mohamed Dagane - NCCG

- From the presentation, it is safe to conclude that the report shall be very comprehensive and the county is happy that JICA supported them in undertaking the study.
- There is need to streamline the interventions proposed for the city. As a government, the county would like to decongest the city and thus improve accessibility. A taskforce has been established comprising of MoTIHUD, NCCG, NaMATA, KRC, KeNHA and KURA.
- Currently, the various government agencies and the county are working together to decongest the city.
- MoTIHUD is spearheading the BRT project. BRT Line 3 is at an advanced stage and may be in operation in the next two to three years.
- The County is planning to relocate matatus from the CBD to the dedicated terminal facilities. However, the challenge is space to accommodate the matatus. This is why PSVs resort to dropping and carrying passengers on main streets.
- NaMATA was established to coordinate transport related matters for the Nairobi metropolitan region. However, it is faced with some challenges such as financing. Also, the NaMATA Bill has been withdrawn from parliament for redrafting. Also, transport is a devolved function as per the Constitution of Kenya 2010.

- County is also working with KRC and have proposed to KRC to increase the capacity and frequency of the commuter rail. Also, under the ongoing station improvement project, county proposes that KRC make a provision for space to allow matatus to pick and drop off passengers for the commuter rail service.
- NCCG will review the recommendations put forth by JST in the final report and look at implementation.
- He hoped that JICA shall support Phase II of the study.

iv. Hon. Kerich - NCCG

- Appreciated the input by JST in preparing the report and also appreciated the fact that JICA has been very active in Nairobi and have prepared various studies. However, the problem has been implementation. It would be very unfortunate if this study is also not implemented.
- In the section on the proposed projects, the proposed funding is said to be from JICA. Is this a confirmation of commitment from JICA to fund the proposed interventions?
- Pedestrian Footbridge
There is need to check the pedestrian bridge proposal across Uhuru Highway with KeNHAY. There is need to implement such proposals the cheapest way possible to avoid spending money on infrastructure improvement only for this to be pulled down later on. It is also noteworthy that if Westlands is taken as an example, most of the traffic is due to pedestrians crossing the road and the matatus loading and offloading on the highway instead of the terminal facility that was set up for that use.
- Cashless Payment:
The idea of cashless payment was tried a few years ago but this failed due to many challenges. However, it is the right way to go with regards to fare collection. Matatu owners are willing to utilize such facilities if their concerns are addressed. The government is piloting the Huduma Card for cashless payment for various services. Can this also be integrated with a fare collection system for matatus? There is need to further explore this option since it is backed by the government.
- The governor, as part of his legacy, would like to see pedestrian walkways improved and put up in all residential areas in the city. The contractor for Ngong' Road has provided for a pedestrian walk way that is not used for not only walking to and from work but also exercising and other leisure activities by the residents.
- There is also need to further look at improving the 8 gridlocked intersections that shall be crossed by the BRT lines.

- As mentioned earlier, there is a taskforce set up involving the various agencies and ministry concerning transport in the city. It may be prudent to bring development partners on board.
- v. Mr. Sugimoto – JICA Kenya
- He was thankful for the comments shared.
 - JICA is considering to continue with the study. However, discussions are still ongoing and this may take some time.
- vi. Dr. Mogere – JICA Kenya
- NIUPLAN was completed in 2014 and it took a year for it to be passed at the county assembly. Currently, in 2018/2019, no BRT has yet been finalized thus it is not yet a good time to implement the loop line. Going by this trend, by the time the NIUPLAN study lapses in 2030, we may have not implemented a single thing. This poses the risk of going the same way as the 1973 master plan.
 - There is need to align the county budget to the NIUPLAN proposals. This is the best way to achieve implementation of the proposed projects.
 - The report also outlines the important role that NaMATA is to play in coordination and also reviews all other ongoing studies.
 - There is need to make all amendments to the BRT network before any implementation takes place as it shall be difficult to do this once it is implemented. There is also need to provide a BRT service into the Railway City. Current proposals do not have this.
 - There is also need to properly define the CBD extent physically.
 - All actors within the Transport Sector need to come together and deal with the challenges facing the City. It is also important to appreciate that currently, NaMATA is facing many challenges.
- vii. Eng. Wamugunda - NCCG
- It is noteworthy to observe that there is a communication gap. Therefore, it is important to come up with a communication strategy for the study. This is for the purposes of dissemination and publicizing the project to the general populace.
 - There is also need to reduce congestion in the city. This can go hand in hand with city branding.
 - There is also need to look at the proposals that shall require the least capital input urgently. These include BRT realignment as they are not yet operational.
 - There is also need to clearly define the boundaries of the CBD.
 - What is the time period envisaged by JST as immediate with regards to implementation schedule for the proposed BRT realignment?

viii. Eng. Muthama - NCCG

- There is an ongoing activity by NCCG seeking to define the boundaries of the CBD. This is spearheaded by the Planning Department. The team involved in the CBD boundary definition is also looking at hiring a consultant to support in the development of a land use plan which shall in turn help define the CBD and activities therein.

ix. Madam Ruth - NCCG

- She commended JST for the progress made this far. It is a step in the right direction as in 2014, NCCG had promised Nairobians that the NIUPLAN shall be implemented. People have been exhausted by studies being done and no implementation taking place. It is good that this study has proposed some quick wins that the county can implement.
- The study also incorporated SEA. As this has not been mentioned in the presentation, she hopes that the Final Report shall include the SEA component as the projects to be implemented shall have impacts on both the social and environment of Nairobi.
- All consultants working within the City have observed that there is need for better coordination. There is thus need for a way to incorporate the various studies in the city.
- Other than the definition of the spatial scope of the CBD, there is also need to look at the expanded CBD. This has emerged in several forums. As per the definition in the NIUPLAN, this area has emerged to be small compared to the general area of influence that it has. NCCG is working on this.

x. Eng. Muchiri - KURA

- As there is goodwill from the National Government, there is need to tap in to this and implement what is possible.
- There is also need to look at the implementation of NIUPLAN in a better way compared to the fragmented approach by the various agencies. MoTIHUD and NCCG need to take the lead in this.
- There is also need to provide BRT access through the Railway City.
- Concerning footbridges, there is no need to wait for KeNHA, an affordable one can be fabricated and this can later be relocated to other areas when KeNHA improves the road.
- There is a lapse between study and implementation. This needs to be bridged. Ngong' Road was planned for in 2011 but implementation began in 2016. This lapse may be also attributed to the fragmented approach in implementation.
- NaMATA was established earlier this year. However, it is still facing some challenges with concern to their coordination capacity. This needs to be

enhanced. Also, the NaMATA Bill was also recently withdrawn from parliament for redrafting.

xi. Hon. Kerich - NCCG

- There is thus need to come up with quick wins that can be implemented in the immediate future. NCCG can concentrate in what is possible.
- There is also need to come up with a comprehensive way forward.

xii. Hon. Dagane - NCCG

- What is the time frame envisioned as immediate?
- Can NCCG initiate discussions with JICA concerning implementation of some of the proposals? This shall help in keeping the costs manageable as with the lapse of time, costs also increase.
- Can the areas that need footbridges be identified? What can be done in 6 months?
- Can JICA work with the County to come up with possible interventions for immediate consideration?

xiii. Mr. Sugimoto – JICA Kenya

- JICA will look at ways of supporting in the implementation and shall discuss with Eng. Muthama.

(3) Closing Remarks

Hon. Dagane - NCCG

- He was pleased with the discussions and decisions made during the session.
- He was also happy that there are some proposals that have been made toward the improvement of mobility in the urban core.

(4) A.O.B.

There being no there business, the meeting ended at 1053H

Attachment:

(1) Participants of the Meeting

(2) Presentation Material for the Joint Coordinating Committee Meeting on April 11, 2018

The end

Attachment 1: Participants of the Meeting

Attendance:

NAME	INSTITUTION	POSITION
Mr. Mohamed Dagane	NCCG	CECM Roads & Transport
Mr. Charles Kerich	NCCG	CECM Lands, Housing and Urban Planning
Eng. F. N. Karanja	NCCG	Chief Officer, Transport, Roads and Public Works NCCG.
Mr. Sammy Muthama	NCCG	Deputy Director (Roads)
Eng. D. G. Muchiri	KURA	Ag. Director Planning and Environment
Eng. M. Y. Telieny	KURA	Deputy Director ES
Mr. E. Murimi	NCCG	Assistant Director Environment
Ms. Ruth Waruguru	NCCG	Ag. Director Urban Planning
Ms. Maki Hasegawa	JICA/NCCG	NCCG Urban Planning
Mr. Raphael Kazungu	NCCG	Urban Planner
Ms. Abigail Muigai	NAMATA	Engineer
Eng. K. Wamugunda	NCCG	Deputy Director
Mr. Toru Arai	MOTIHUD	Advisor
Mr. Satoshi Sugimoto	JICA Kenya	Senior Representative
Mr. Tatsuya Nikai	JICA Kenya	Representative Transport
Dr. Steve Mogere	JICA Kenya	Advisor Infrastructure

JICA Study Team:

Name	Position
Mr. Tadaaki Murakami	TDM/Mobility Management 1
Mr. Shuichi Tanimoto	TDM/Mobility Management 2
Mr. Babu Mukoko	Traffic Survey Assistant
Mr. Akbar Ahmed	GIS Assistant
Ms. Anne Ogola	Secretary

The Project on Detailed Planning of Integrated Transport System in the Nairobi Urban Core

4th JCC Meeting – Final Report

JICA Study Team



Nairobi City County Government



Japan International Cooperation Agency

NIPPON KOEI NIPPON KOEI CO., LTD.

PADECO PADECO Co., Ltd.

CENTRAL CENTRAL CONSULTANT Inc.

1

Contents

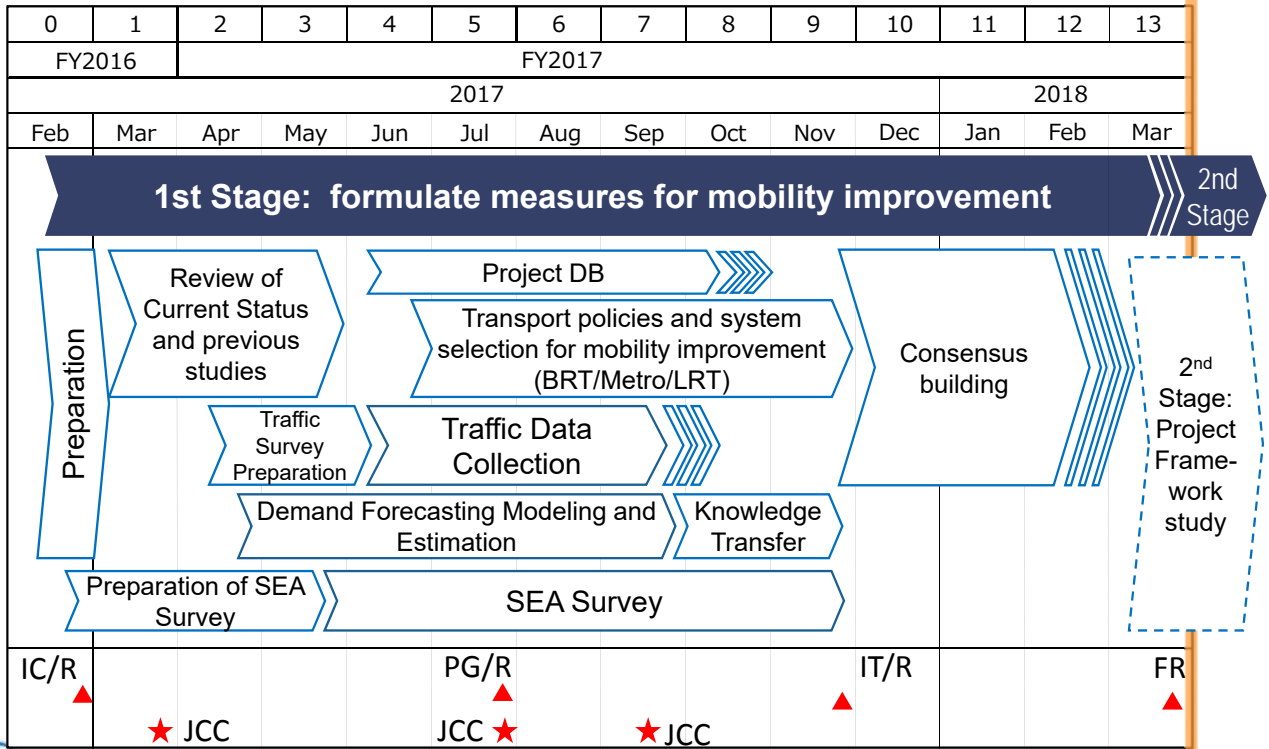
1. Project Status at Present
2. Final Report (Executive Summary) and Way Forward
3. Main Contents of Final Report (Stage-1)

<input type="checkbox"/> Chapter 1: Background, Objectives and Expected Output	Part-I Current Conditions and the Analysis in the Nairobi Urban Core
<input type="checkbox"/> Chapter 2: Present Situation of Urban Development and Transportation	
<input type="checkbox"/> Chapter 3: On-going and Planning Projects Review	
<input type="checkbox"/> Chapter 4 and 5: Urban Core Mobility Improvement; - Data Driven Planning and Comprehensive Approaches -	Part-II Future Urban Transportation Plan in Nairobi
<input type="checkbox"/> Chapter 6: Metro Plan Preliminary	
<input type="checkbox"/> Chapter 7: Mobility Assessment	
<input type="checkbox"/> Chapter 8: Strategic Environmental Assessment	
<input type="checkbox"/> Chapter 9: Way Forward	Part-III Action plan for Comprehensive Mobility Improvement

Project Status at Present

Work Plan

Legend ▲ Reports
★ Events



NIPPON KOEI PADECO QCENTRAL

Final Report
(Executive Summary)
and
Way Forward

Background, Objectives and Output

Background

- Transportation projects are planned by various Executing Agencies and donors but those projects have not been coordinated with each other

Objectives on Stage-1

- To Review the Urban Transport Policies;
E.g., BRT, Road development, Railway improvement project etc.
- To grasp detailed traffic movement in Urban Core and
- To Formulate measures for **Mobility Improvement**

Output

- To collect and summarize information on transportation projects in the Urban Core
- To clarify issues on the transportation projects
- To prepare mobility index and Transport Policies for urban core

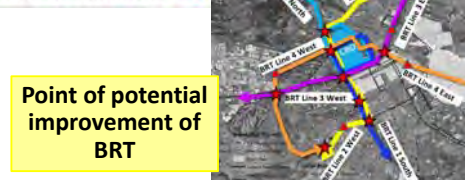
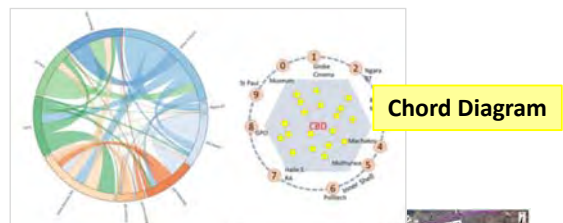
Outcome

The integrated transport policies for mobility improvement in Urban Core



Outputs of Stage 1

- By conducting the Anomalous MacAddress Probe (AMP) counter survey, Overall Passenger Traffic Volume, Daily Passenger Traffic patterns and Passenger Movements in Urban core could be made explicit.
- GIS Database has been developed as the first tool which can grasp the ongoing and planning project in Nairobi. It will contribute to the Urban development and transportation planning.
- The degree of a contribution of BRT and the necessity of Metro could be demonstrated by Demand Forecast. Also, the impact on the general road traffic by BRT segregated lanes has been estimated.
- Point of potential improvement of BRT projects could provide the opportunity to discuss about optimizing future BRT alignment.



Issues

Issues

- 1) Expansion of urban core function to Thika/Westlands, Upper Hill
- 2) NaMATA roles and the challenges
- 3) Little Concern for Matatu Industry, and Ordinary Bus Services
- 4) Factitious CBD influx pattern in evening
- 5) BRT Traffic control in CBD, Line 1 and Line 3+4 crossing
- 6) Little Concern of KRC to urban transport
- 7) NE-SW traverse passenger movement in CBD

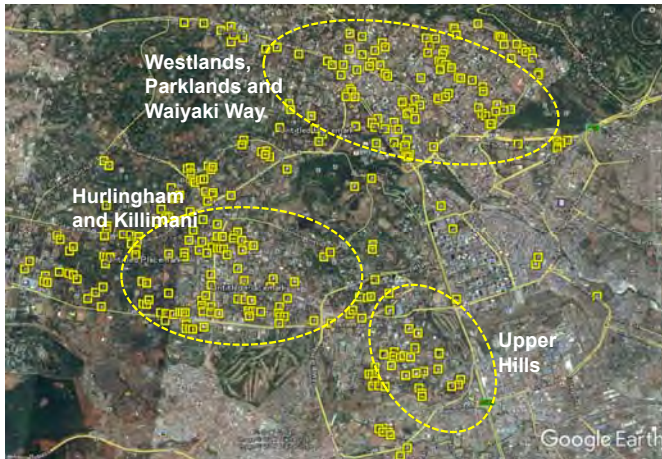


Fig: Urban Development Activities in Past 10 yrs

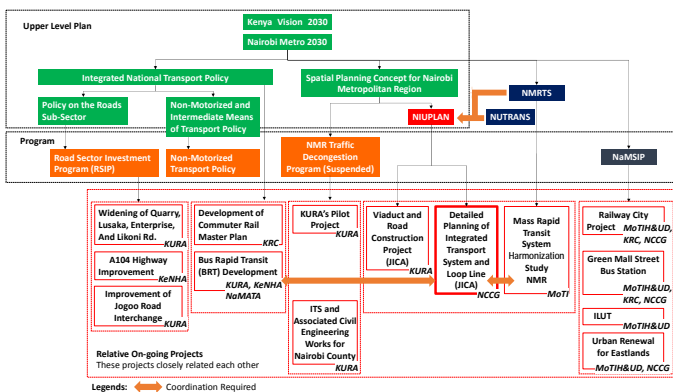
During last decade, development activities in Nairobi were mushrooming in the Westlands, Kilimani, and Upperhill.

Due to the recent Thika highway development, new estate development expanded to the northeastern corridors.

Issues

Issues

- 1) Expansion of urban core function to Thika/Westlands, Upper Hill
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- 7) NE-SW traverse passenger movement in CBD



The study team identified the major plans for Nairobi, summarized these ideas in GIS, and identified the need for coordination amongst the involved agencies .

NaMATA is not yet fully established but several plans had already been considered without proper coordination. Investment in urban core mobility is the mandate of Nairobi County.

Issues

Issues

- 1) Expansion of urban core function to Thika/Westlands, Upper Hill
- 2) NaMATA roles and the challenges
- 3) **Little Concern for Matatu Industry, and Ordinary Bus Services**
- 4) Factitious CBD influx pattern in evening
- 5) BRT Traffic control in CBD, Line 1 and Line 3+4 crossing
- 6) Little Concern of KRC to urban transport
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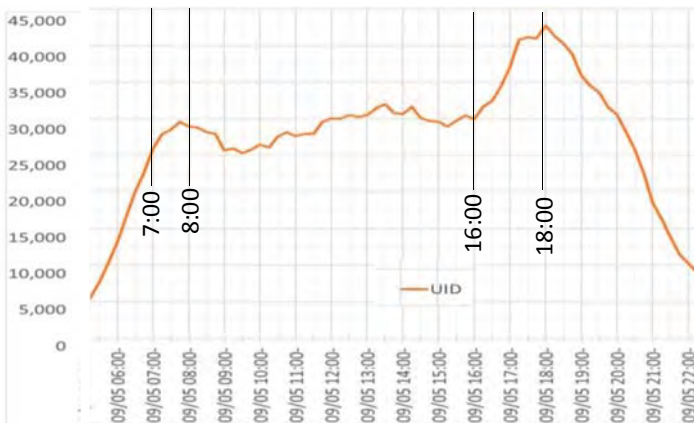
Comparison of situation at the Central Bus Station in Nairobi

The present BRT plans could improve by providing more detailed plans on how the BRT shall harmonize with existing bus and matatu services. Not only bus services itself, but also local bus producing industries. Institutional arrangement should be discussed.

Issues

Issues

- 1) Expansion of urban core function to Thika/Westlands, Upper Hill
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The population in CBD/Downtown increases between 4pm to 6pm, as passengers come in to town to catch the bus home. Currently, all matatu/bus start/terminate in the area, and does not allow for standing passengers, as per the law. In the future the transit hub is not needed to be in the CBD/downtown in order to alleviate the congestion in CBD.

Issues

Issues

- 1) Expansion of urban core function to Thika/Westlands, Upper Hill
- 2) NaMATA roles and the challenges
- 3) Little Concern to Matatu Industry, and Ordinary Bus Services
- 4) Factitious CBD influx pattern in evening
- 5) **BRT Traffic control in CBD, Line 1 and Line 3+4 crossing**
- 6) Little Concern of KRC to urban transport
- 7) NE-SW traverse passenger movement in CBD

JICA study identified that 8 grid locked intersections will accommodate more than 2 BRT lines. Further coordination among BRT Lines could improve the entire transport network.



- ★ Over 2 BRT lines run into the Gridlock intersection with level crossing --- 8
- ▲ Single BRT lines run into the Gridlock intersection --- 4

Issues

Issues

- 1) Expansion of urban core function to Thika/Westlands, Upper Hill
- 2) NaMATA roles and the challenges
- 3) Little Concern to Matatu Industry, and Ordinary Bus Services
- 4) Factitious CBD influx pattern in evening
- 5) BRT Traffic control in CBD, Line 1 and Line 3+4 crossing
- 6) **Little Concern of KRC to urban transport**
- 7) NE-SW traverse passenger movement in CBD

Since 1993, KRC railway's renovation was proposed for urban transit network, but is yet to be utilized.

Railway City project is proposed at the central station yard. However, there is no proposal for access improvement of transport service to the large development.



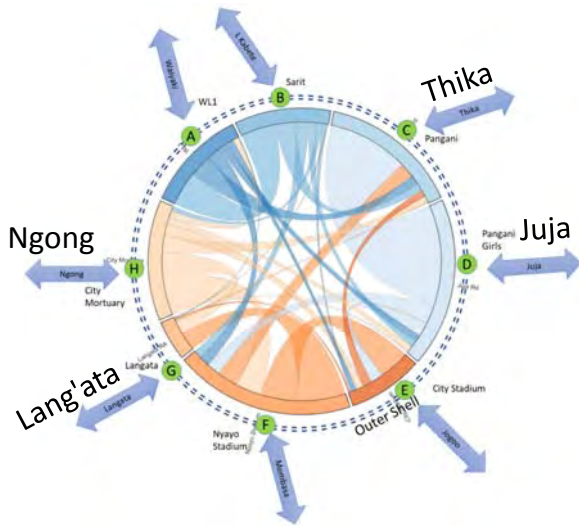
Source: Action Towards a Better Nairobi, the Nairobi City Figure 3.7 Proposed Transit Network by Action



Issues

Issues

- 1) Expansion of urban core function to Thika/Westlands, Upper Hill
- 2) NaMATA roles and the challenges
- 3) Little Concern to Matatu Industry, and Ordinary Bus Services
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The typical traverse movement in urban core was collected using smartphone based survey, and visualized. The study team identified Thika/Juja Road to Ngong/Lang'ata Road corridors as the biggest demand in Nairobi, which accounted for 15-20 thousand persons per day. This traverse traffic should be bypassed by the installation of a Metro service in the Urban core.



Issue-Policy Proposal

Issues

- Expansion of Urban Core
- NaMATA role
- Little Concern for Matatu/bus
- Factitious CBD influx in evening
- BRT traffic control, crossing
- Little Concern of KRC
- NE=SW traverse movement

Outcomes

The integrated transport policies for mobility improvement

Policy I:
Establishment of Comprehensive Mobility Management

Policy II:
Proposal for Future Re-alignment of BRT

Policy III:
Application of Rail-based Transport System

Assess the policies by Mobility Index (see chap 7)



Feedback from Concerned Authorities

Thank you very much for your helpful comments to the draft Interim Report (Dec.2017).

Issues	Comments (Abstract)	Reply from JST	(Remarks) Policy Proposal
1. Expansion of urban core	➤ "It is anticipated that the urban functions will not work and economic activity will be restricted", Opening paragraph has started on the wrong note.(MoTIHUD)	➤ JST rephrased the opening paragraph to "Traffic condition in Nairobi is getting worse due to unsystematic development and high inflow of population".	➤ Issues 1,2,3 and 4 will be mitigated by "Establishment of Comprehensive Mobility Management" ➤ "Proposal for Future Re-alignment of BRT" will contribute to issue 4 ➤ Also, "Application of Rail-based Transport System" is needed for issue 1.
2. NaMATA roles and the challenges	➤ The close relationship between urban development, land use and transportation illustrates that success can only be achieved if NCCG and NaMATA work closely together (NaMATA)	➤ We respect NaMATA and NCCG's role which work closely together.	
3. Little Concern to Matatu/bus	➤ If BRT is implemented, Matatu should serve as a last mile option for passengers wishing to get to their destinations and not compete with the BRT (KURA)	➤ We understand that consultation with the matatu operators on their new role is needed.	
4. Factitious CBD influx in evening	(No specific comment was returned)	(Pedestrian service in CBD shall be improved.)	

Feedback from Concerned Authorities

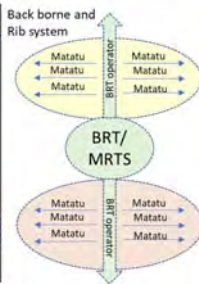
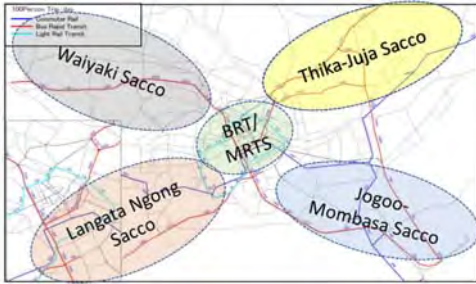
Issues	Comments (Abstract)	Reply from JST	(Remarks) Policy Proposal
5. BRT Traffic control, crossing	➤ Grade separated crossing is proposed at congested junctions (EU) ➤ By proposing that another harmonization be done, this will only use up more time (MoTIHUD) ➤ That would result in new studies and redoing the on-going design of BRT line 1 and 3. a delay of at least 2 years (NaMATA)	➤ We don't want to stop any on-going BRT project but want to enhance the capacity of BRT.	➤ Issue 5 and 6 will be improved by "Proposal for Future Re-alignment of BRT" . ➤ Issue 6 and 7 will be mitigated by "Application on Rail-Based Transport System"
6. KRC to urban transport	➤ The train service being available only once per day is the current situation which will change in the near future (MoTIHUD)	➤ We took the figure from the scope of the commuter rail master plan.	
7. NE-SW traverse passenger movement	➤ The recommendation of metro is biased and not supported by evidence. Further studies should focus on the remaining BRT lines 2, 3 and 5 as soon as practically possible. (NaMATA) ➤ In future Nairobi well deserves a metro (EU) ➤ The proposed viaduct, is it only along Thika Road? (KeNHA)	➤ Since metro project takes long time to implement, we suggest to start a study shortly.	

Proposed Policies

Policy I: Establishment of Comprehensive Mobility Management

1. Improvement of Bus Service
2. Improvement of Road Network
3. Improvement of Pedestrian Service
4. Application of Intermodal Facility
5. Application of Transport Demand Management Measure and Policy

Improvement of Bus Service



Application of Intermodal Facility



Possible locations for Transit



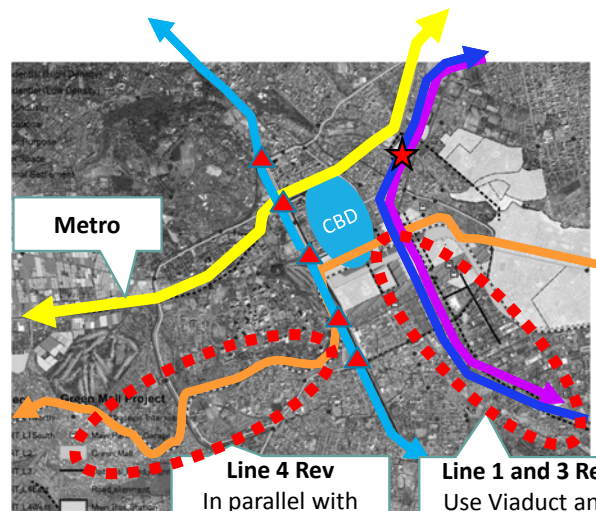
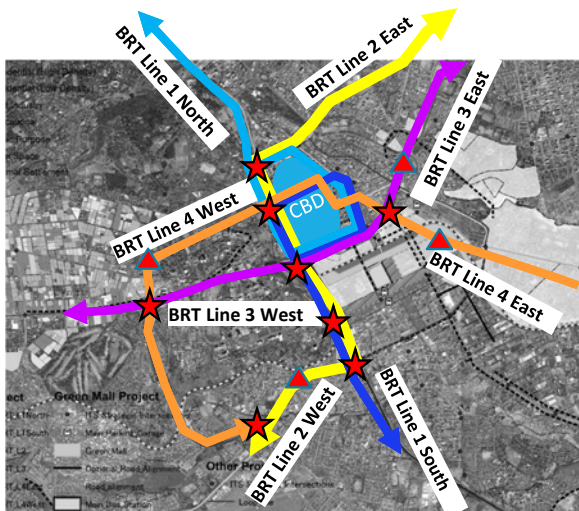
Transit Zone -> Pedestrian oriented, Public transport oriented, Target zones for pricing
 Fringe Zone -> Semi-Pedestrian oriented, Fringe parking promotion

Improvement of Pedestrian Service



Proposed Policies

Policy II: Proposal for Future Re-alignment of BRT



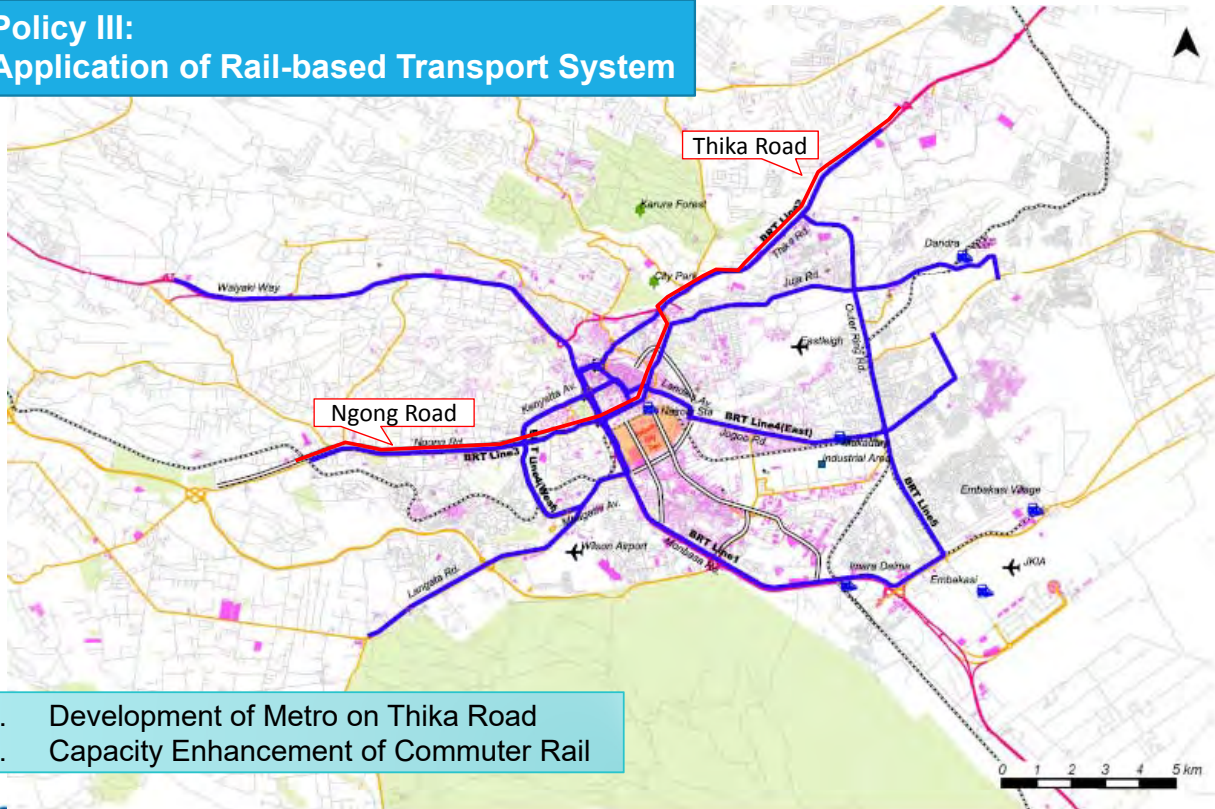
Line 4 Rev
In parallel with KRC

Line 1 and 3 Rev
Use Viaduct and Enterprise Rd.



Proposed Policies

Policy III: Application of Rail-based Transport System



1. Development of Metro on Thika Road
2. Capacity Enhancement of Commuter Rail



Way forward

What should be done in Stage-2?

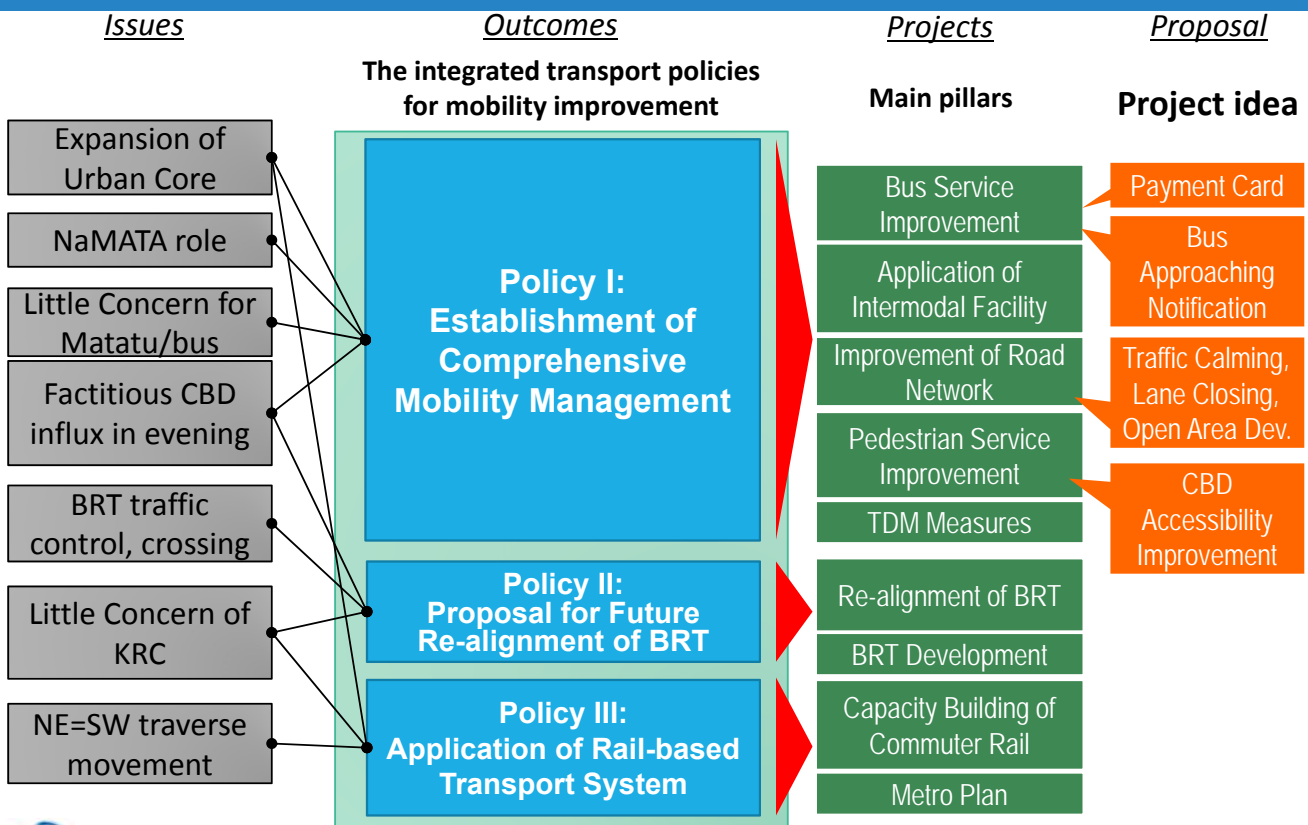
Policy I: Establishment of Comprehensive Mobility Management	<ol style="list-style-type: none"> 1. Improvement of Bus Service 2. Improvement of Road Network 3. Improvement of Pedestrian Service 4. Application of Intermodal Facility 5. Application of Transport Demand Management Measure and Policy 	<p style="text-align: center;">Stage-2 (Additional ToR)</p> <p>Prioritization and select projects evaluated by;</p> <ul style="list-style-type: none"> • Project effectiveness • Realization <p style="text-align: center;">▼</p> <p style="text-align: center;">Project Framework study</p>
Policy II: Proposal for Future Re-alignment of BRT	<ol style="list-style-type: none"> 1. Future Re-alignment of BRT 	
Policy III: Application of Rail-based Transport System	<ol style="list-style-type: none"> 1. Development of Metro on Thika Road 2. Capacity Enhancement of Commuter Rail 	





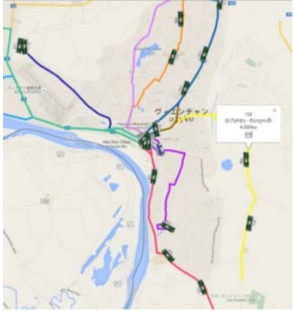
Expected Implementation Schedule

PLANS AND PROJECTS	Immediately	Short-mid (before BRT open in 2022)	Mid-long (before Metro target in 2030)	Remarks
Policy I: Establishment of Comprehensive Mobility Management				
Improvement of Bus Service				
Bus-01 Reorganization of Matatu/Bus routes		✓	✓	Synchronized with BRT installation
Bus-02 New Bus Fleet Standard Development		✓	✓	Can be started, but will take time
Bus-03 : Bus approaching notification for passengers	✓			Improve Bus Service, No Land acquisition & PAPs, Low Cost
Bus-04 Bus standing seat regulation revision		✓		Synchronized with BRT installation
Bus-05 : Commuter Payment Card Installation	✓			Improve Bus Service, No Land acquisition & PAPs, Low Cost
Improvement of Road Network				
Road-01 Missing Link Improvement			✓	Need long-term investment
Road-02 : Traffic Calming, Lane Closing, Open Area Development	✓			Increase Ridership of Public Transportation, No Land acquisition & PAPs, NCC
Improvement of Pedestrian Service				
Ped-01 : CBD Accessibility Improvement	✓			Improve Accessibility, No Land acquisition & PAPs, Low Cost, NCC
Application of Intermodal Facility				
IM-01 Transit Place Development		✓		Synchronized with BRT installation
IM-02 Park & Ride Minimization, Improve the Station Accessibility		✓	✓	Need coordination with Metro/BRT/KRC
Application of TDM Measure and Policy				
TDM-01 Commuting Time Staggering and Operation Hour Extension		✓		TDM enforcement to private car users requires proper development of Metro/BRT network and transit system.
TDM-02 On-Street Parking Restriction, Fringe Parking Development			✓	
TDM-03 Pricing Policy			✓	
TDM-04 Statistics Improvement for Motorization Monitoring		✓		
Policy II: Proposal for Future Re-alignment of BRT				
Re-alignment of of BRT Line			✓	
BRT Development			✓	
Policy III: Application of Rail-based Transport System				
Development of Metro on Thika Road			✓	
Capacity Enhancement of Commuter Rail				F/S is under preparation by other donor

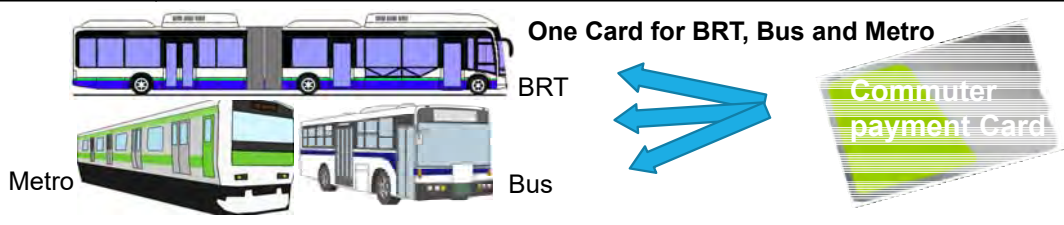
Proposal of effective, realistic and immediate project ideas



Project Idea

Project Title	Bus approaching notification for passengers		
Category	Bus	Schedule	Immediately
Cost	17 million KSh (100 buses)	Source of funds	(Proposed by JST) JICA
Executing Agency	NTSA or NCCG	Benefit	Increased service level of buses, Easy to setup and existing buses can be introduced
Summary	On board GIS devices installed and it notifies passengers the location of buses approaching		
<ul style="list-style-type: none"> - When the BRT and Metro network completed, the real time approaching information of feeder services is required to secure the BRT passenger services. JST proposes to install this service as soon as possible to bus fleets immediately, not waiting for BRT service commencement. - Thanks to GPS, mobile internet services and smartphones, the approaching notification of bus fleets can be realized easily with lower cost. - Platform shows the real-time locations of ordinary buses and BRTs. It comes easy than before due to GPS, smartphones, and internet. 			
 <p>On board smartphone on each bus can report its location in real time to the server.</p>		 <p>Passenger can see the real time bus approach with their own smartphones.</p>	
		 <p>Image of Platform</p>	

Project Idea

Project Title	Commuter Payment Card and Clearing House System (CHS) Installation								
Category	Bus	Schedule	Immediately						
Cost	400 million KSh	Source of funds	(Proposed by JST) JICA						
Executing Agency	NTSA or NCCG	Benefit	Minimization of passenger loading time Discount joint fare system can be adopted						
Summary	This project will develop business model of installation of the CHS.								
 <p>One Card for BRT, Bus and Metro</p> <p>By installing the CHS system which is capable to handle the commuter payment cards of all BRT and bus operators, discount joint fare system can be adopted. Functions of CHS are as follows.</p>									
<table border="1"> <thead> <tr> <th>Apportionment</th> <th>Approval Management</th> <th>Clearing</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Appointment Rule definition • Revenue/Cost/Fee Calculation by operators • Revenue/Cost/Fee apportionment • Apportionment Adjustment </td> <td> <ul style="list-style-type: none"> • Approval workflow • Review and Approve of proposed cost/revenue apportionment </td> <td> <ul style="list-style-type: none"> • Reconciliation of all transactions • Clearing Account Management • Clearing and Settlement Execution </td> </tr> </tbody> </table>		Apportionment	Approval Management	Clearing	<ul style="list-style-type: none"> • Appointment Rule definition • Revenue/Cost/Fee Calculation by operators • Revenue/Cost/Fee apportionment • Apportionment Adjustment 	<ul style="list-style-type: none"> • Approval workflow • Review and Approve of proposed cost/revenue apportionment 	<ul style="list-style-type: none"> • Reconciliation of all transactions • Clearing Account Management • Clearing and Settlement Execution 		
Apportionment	Approval Management	Clearing							
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Project Idea

Project Title	Traffic Calming, Footpath improvement, Open Area Development		
Category	Road	Schedule	Immediately
Cost	2.2 million KSh per km (Pedestrian Footpath)	Source of funds	(Proposed by JST) JICA (Pedestrian Facility Development)
Executing Agency	NCCG	Benefit	Enhancing the walkability, Improving pedestrian accessibility, Making attractive land scape
Summary	Improvement and upgrade of the Footpath, Conquest of the pedestrian space		
<ul style="list-style-type: none"> - The road ratio in the CBD district is more than 23%, which attract the car traffic into the pedestrian oriented districts. In order to enhance the walkability and accessibility, it is necessary to execute lane closing and excluding on-street parking, and improving footpath. This could be implemented in CBD and even in Downtown, which could improve the security of the district. - In addition, it is expected that open area development will be done by using private sector resources. Photos presents implications of lane closing in European cities, which exclude on-street parking and expanding footpath, then install café space, which will enhance the city branding concept of Nairobi. 			

Project Idea

Project Title	CBD Accessibility Improvement		
Category	Pedestrian Service	Schedule	Immediately
Cost	10 million KSh per Pedestrian bridge	Source of funds	(Proposed by JST) JICA
Executing Agency	NTSA or NCCG	Benefit	Enhancing the walkability, Improving pedestrian accessibility, Decreasing the traffic congestion
Summary	Installing the pedestrian bridge/pedestrian deck is convenient for pedestrians.		
<ul style="list-style-type: none"> - There are two major pedestrian corridors in the urban core, i) community, Uhuru park and city hall avenue, and ii) the pedestrian footbridge crossing the railway yards connecting the workshop road. - The former movement cross the Uhuru highway which generates the conflict between pedestrians and vehicles. The NCCG considers possibility of exclusive foot bridge or other grade separated method, however, the bridge should be coordinated with the BRT Line 1 installation and expected road improvement proposed by the NUTRANS. - The latter movement needs improvement of the pedestrian bridge itself. 			
		<p>Existing condition of CBD pedestrian service. Matatu cause traffic congestion.</p>	

Main Contents of Final Report

27

Background, Objectives and Output

□ Background

- Transportation projects are planned by various Executing Agencies and donors but those projects have not been coordinated with each other


□ Objectives on Stage-1

1. To Review the Urban Transport Policies;
E.g., BRT, Road development, Railway improvement project etc.
2. To grasp detailed traffic movement in Urban Core and
3. To Formulate measures for **Mobility Improvement**

□ Output

1. To collect and summarize information on transportation projects in the Urban Core
2. To clarify issues on the transportation projects
3. To prepare mobility index and Transport Policies for urban core

□ Outcome

 The integrated transport policies for mobility improvement in Urban Core

Chapter 2: Present Situation

Social and Economic Situations

- Increased number of cars
 - Grew 5.7% in GDP (2017)
 - Over 2mil. Number of vehicles are registered per year
 - Rapid Economic growth increases number of cars

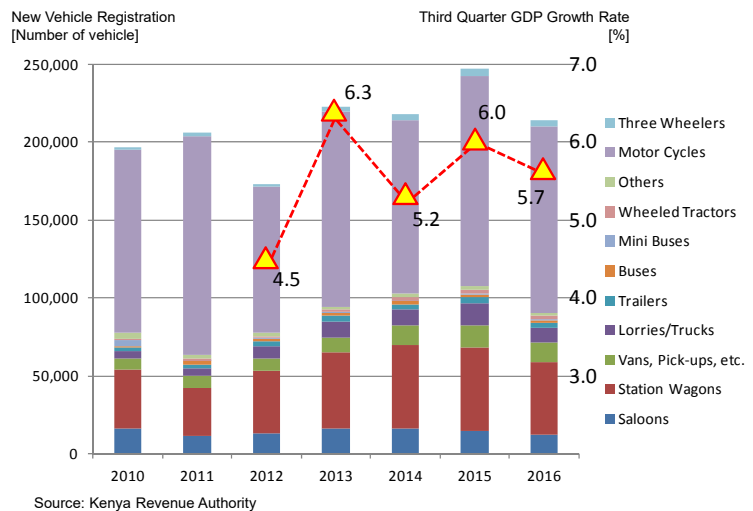


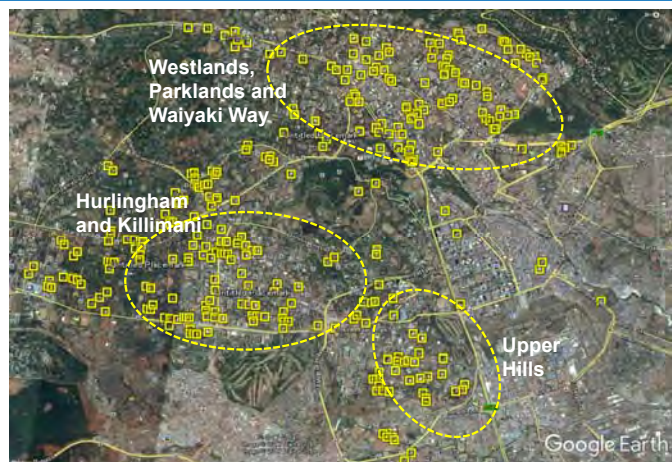
Figure. New Vehicle Registration and Third Quarter GDP growth rates in Kenya



Chapter 2: Present Situation

- Land Use and its change
 - Development activities in around CBD has been growing rapidly
 - Changed: Low density residential -> commercial, high rise office bldg. or apartment

Fig: Urban Development Activities in Past 10 yrs.



Road Network

- Southern Bypass has been constructed and freight traffic detoured after NIUPLAN
- Road network has been prepared as a Backbone of NMA

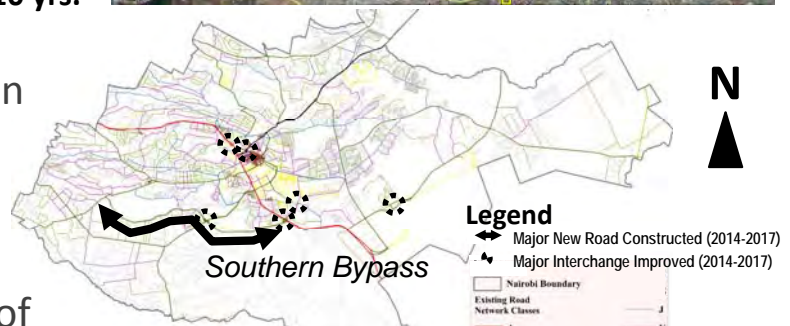


Fig. Road Network change between 2014-2017 in NMA



Chapter 2: Present Situation

Existing Public Transport Services (Matatu and Bus)

Terminals

- 10 terminals are in use
- NCCG manages and usage of terminals and leases parking space

Regulation

- Under regulation of NTSA
- All passengers must be seated
- 119 SACCOs are in operation
- Management companies
 - KBS, Double-M, City Hopper, etc.

Fares

- Cash based fare collection
- Buses are cheaper than Matatus



● Nairobi Sta.



Bus



Matatu

NIPPON KOEI PADECO QCENTRAL

Chapter 2: Present Situation

Existing Public Transport Services (Matatu and Bus)

Having congested bus terminal



2005

Source: NIUTRANS



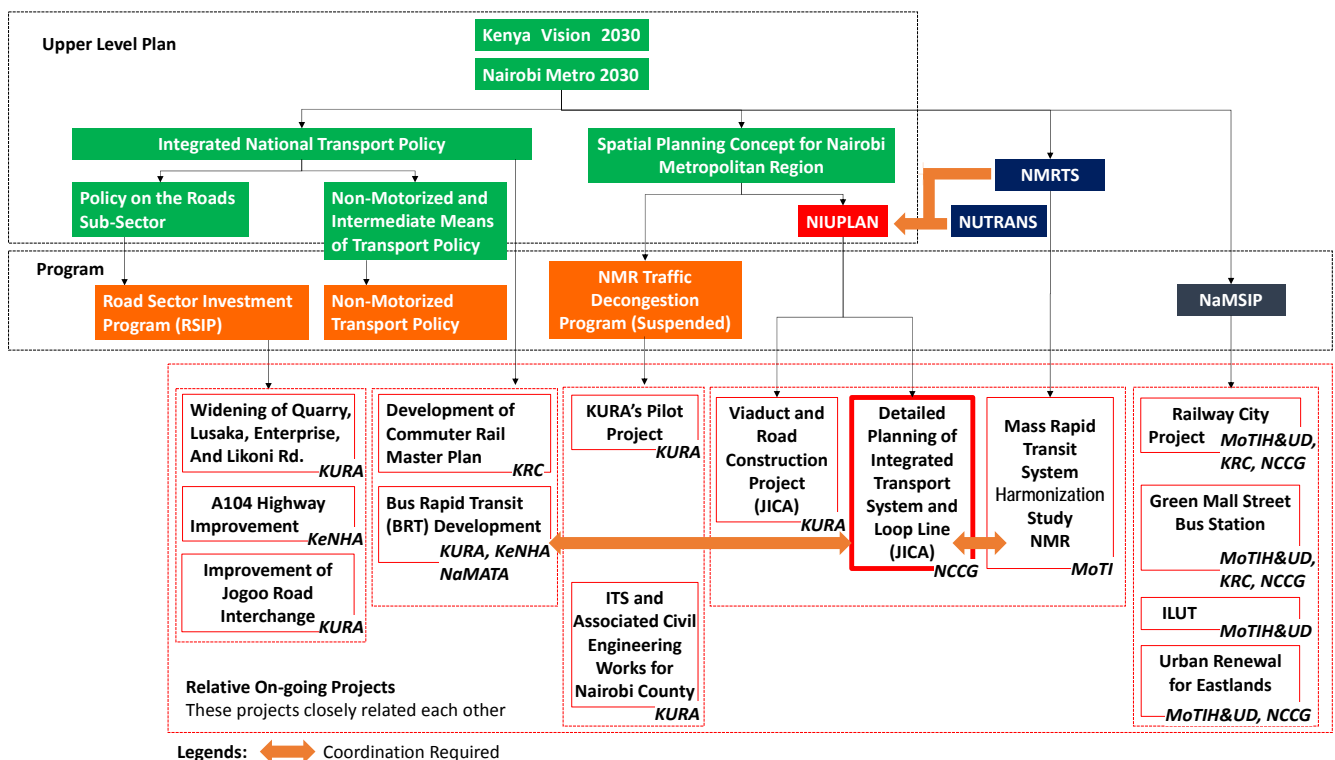
2017

- ✓ 10-12 length buses
- ✓ Blue colored buses (KBS) only

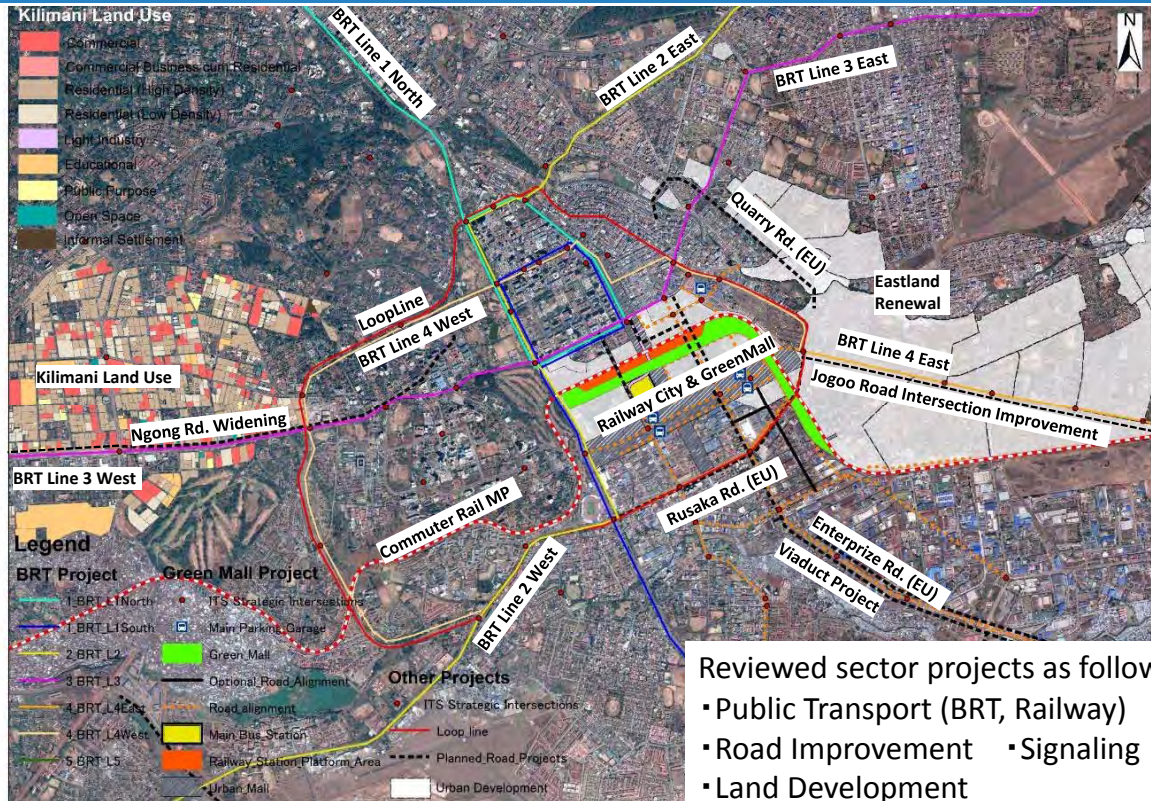
- ✓ 8-10m minibus modified small truck fleets
- ✓ Several brand are competing in the same bus terminal
- ✓ Quantity of services have become full now, seems not well organized
- ✓ Stalls increased and Bus exits are narrowed

Chapter 3: On-going and Planning Projects Review

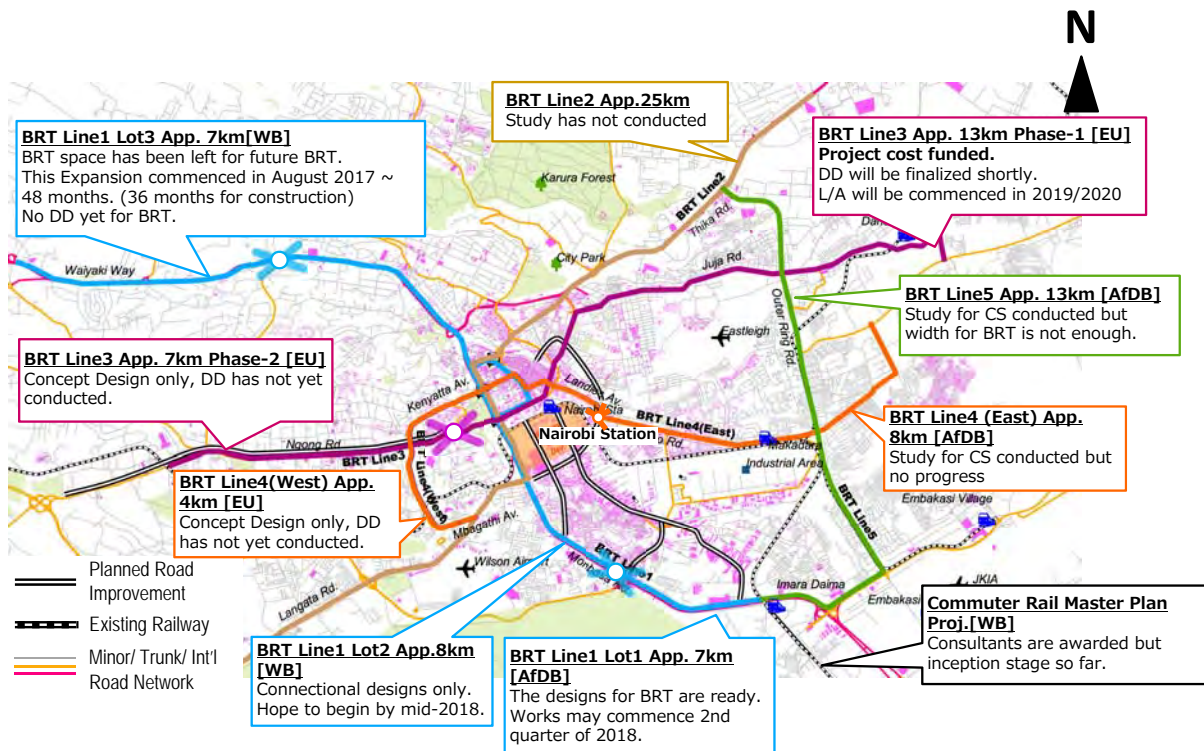
Plan and Project Hierarchy



However, on going projects are;



On-going BRT Network

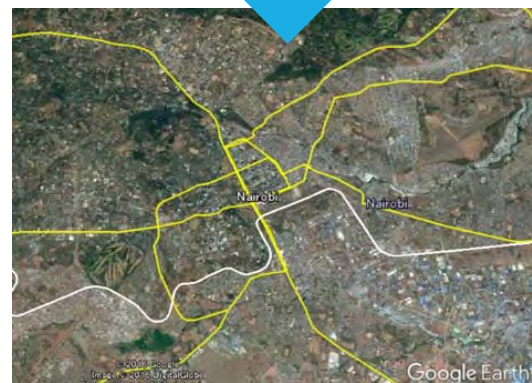


Public Transport (Railways) (1)

Loop Line Project

- Loop Line was proposed by NIUPLAN (2014) to mitigate the concentration of passengers' in CBD on the condition that arterial railway network is constructed in accordance with Metros (2011)
- In accordance with the Harmonization Plan, the arterial railway network planned in Metros has been changed to BRT routes, and the BRT routes are planned along a part of the loop line. The priority of construction of the rail-based loop line became low, due to less projected ridership.

NIUTRANS + NIUPLAN (up to 2030)



Harmonisation Study (up to 2030)

NIPPON KOEI PADECO QCENTRAL

37



Public Transport (Railways) (2)

Commuter Rail Project

- Commuter train service is in operation with only 3 round trips per day between Nairobi Central and Syokimau station and one round trip to the other areas served by the service.
- Because of the Diesel Locomotive haulage, increasing the numbers of train operation is difficult.



Nairobi Commuter Train Route Map



Planned KRC Commuter Rail Network



NIPPON KOEI PADECO QCENTRAL

38

Road Projects (1)

Ngong Road Improvement

- Granted by Japan
- Consists 5.6km Phase-1 and 2
- Under Construction for Phase-1
- BRT Lane is left 9m but the design is out of scope

Viaduct and Road Construction project

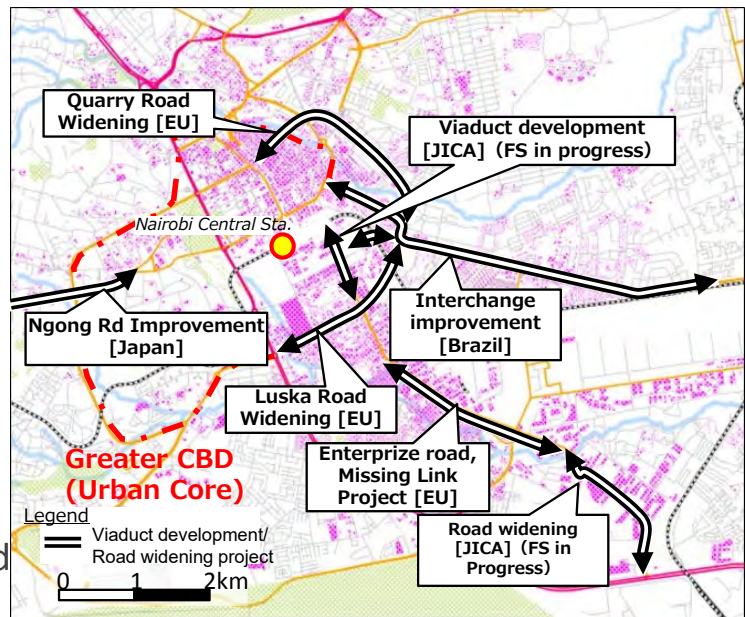
- F/S in progress

Quarry Road/ Enterprise Road Construction

- Funded by EU
- Under Construction

Improvement of Jogoo Road Interchange

- Funded by Brazilian Exim Bank
- Project suspended due to fund shortage

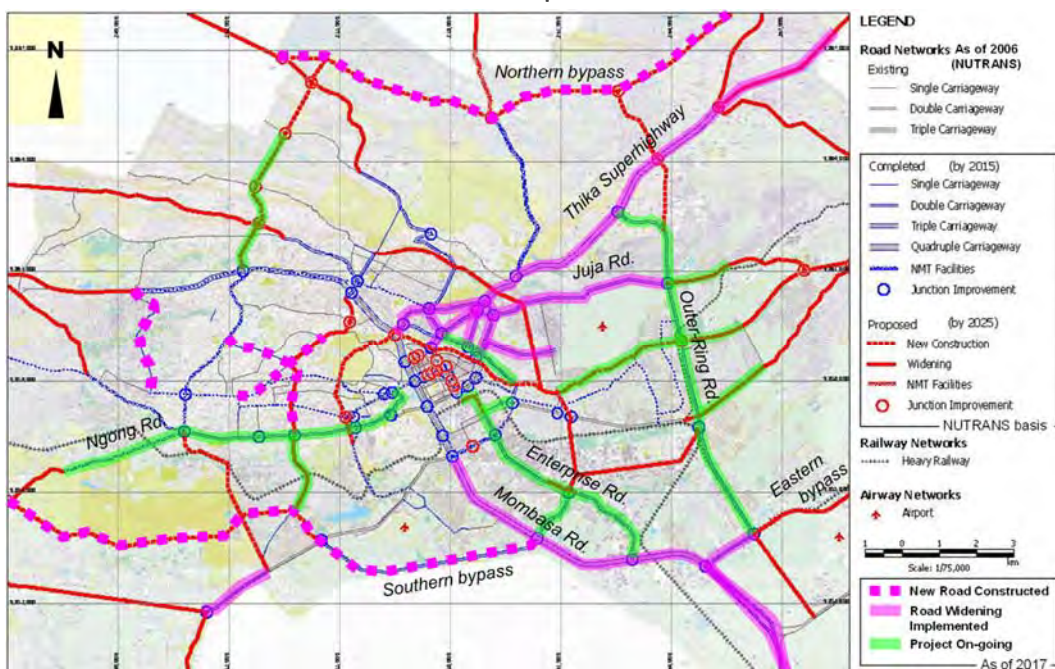


Road Projects Location MAP in Urban Core

Road Projects (2)

Improved Roads in Nairobi Metropolitan Area (NUTRANS)

- Southern Bypass and Northern Bypass and Some missing links in western side of Nairobi has developed.



Non Motorized Transport (NMT)

Non Motorized Transport Policy (NMTP)

- Established by NCCG in 2015
- Vision: To be a County where NMT is the mode of choice for short and medium trips*

Implementation Action Plan

Action	Description
Implementation Committee	NCCG should immediately take up the responsibility of setting up a “Steering Committee” to implement the policy.
Funding arrangement	Special NMT Fund should be created
Priority Policy Actions	<ol style="list-style-type: none"> Development of a Nairobi Streets and Roads Design Manual (NSRDM) Data collection to help in identifying problems, designing interventions, prioritizing projects and monitoring progress Development of master plans for pedestrian, cyclists and human-drawn carts Development of the Highway Code and other materials for education and publicity campaigns Passing the necessary by-laws to enable proper planning, effective enforcement, adequate funding, effective land use planning and control.
“Quick Wins” Package	the package should include interventions that address safety of NMT users; security along the routes; and elimination of missing links (detours) and barriers.
Pilot Projects Package	Two NMT route pilot project packages are proposed. In addition, pedestrianization of the CBD should be in the priority package.
Investment Matrix for the STAP*	The time frame for implementation of the STAP is 2 years starting in 2015.

* STAP: Short Term Action Plan



Urban Development Project (1)

Railway City Project

- Consultant is DOHWA and GIBB Africa, the study is on-going until March 2018.
- One of NaMSIP project funded by WB supervised by MoTIH&UD, Kenya Railways and NCCG
- To prepare urban plan and design to complete and expand Nairobi CBD by filling in the missing gaps in development and integrating with CBD spatial structure
- Project Area: 118 ha of KRC Land and 31ha of surrounding private lands, total 149ha.



Location Map of Railway City Project

Green Mall Project

- Consultant is Gauff and the study is on-going.
- Development of selected roads, having 15.8km and the Green Mall street bus station in Nairobi Central Station.
- Includes F/S, detailed design, preparation of tender documents and construction supervision.



Location Map of Green Mall Project



Urban Development Project (2)

Interdisciplinary Land-Use and Transport Metropolitan Analysis within the Nairobi Metropolitan Region (ILUT)

- Consultant is Egis and the study is completed under NaMSIP supervised by MoTIH&UD.
- Proposing integration of intermodal transfer among different modes, land use development plan around the main intermodal nodes and providing detailed engineering design for selected infrastructure around selected commuter rail station.



Location of the commuter rail station

Urban Renewal for Eastlands

- Consultant is RPC and the study is on-going under NaMSIP support.
- Includes development framework for 20years, action area plan, public transport solution, etc. to re-develop old residential area in Eastlands.
- Target area is 11.54km² expecting additional 0.1~0.2 million population.



Area of urban renewal for Eastlands



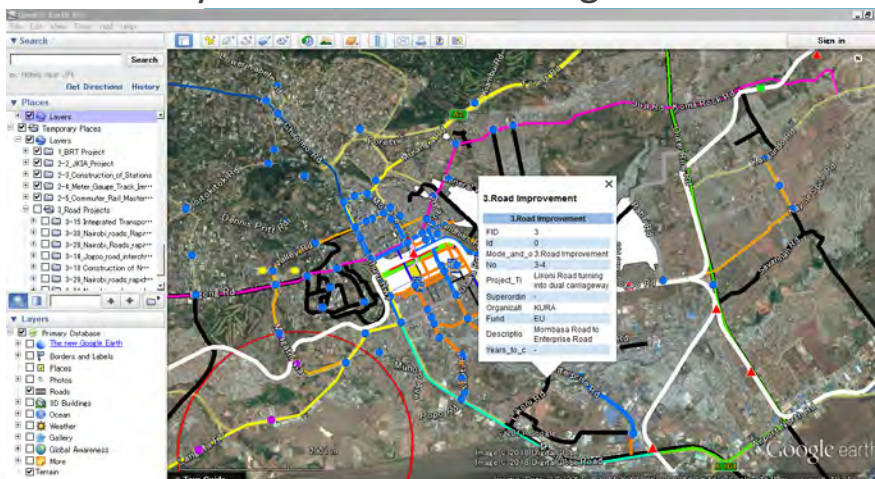
Project Database

Project Database includes project information as follows:

- (1) Project type (2) No. (3) Project Title (4) Superordinate Project (5) Organization (6) Fund (7) Status and Description& Remarks

The database is established by GIS software (Arc GIS) and transferred to NCCG (Workshop was held in 19th Dec. in NCCG)

It is easy to transform to Google Earth format (free software)



Input -Project location
-Project Status

GIS Software

Transform

Google Earth

-Viewing only
(with project status)



Chapter 4 and 5:
Urban Core Mobility
Improvement
-Data Driven
Planning and
Comprehensive
Approaches-

45

Collected data and Analysis

□ AMP Collector

- CBD traverse flow, ODs
 - Which direction of traffic flows to be Metro? Prioritization?
- 24/7 flow dynamism in CBD
 - Identify the influx in the evening peak.
- Micro flow pattern of passenger in CBD/DT
 - Mobility improvement in the city

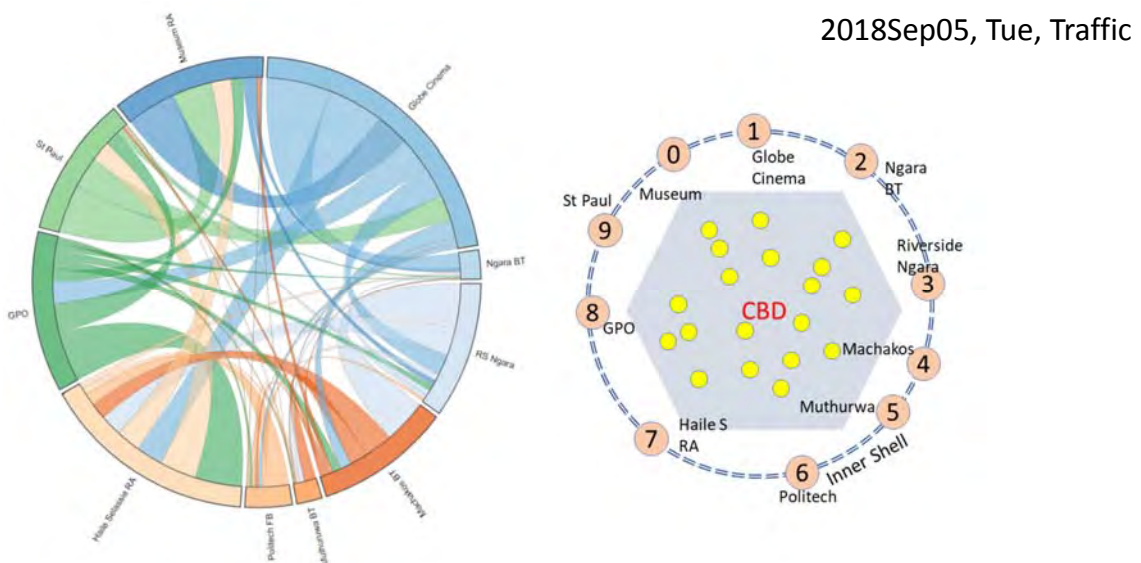
□ STRADA Update

- Peak hour OD for 2030
 - Evaluation of corridor based mobility
- Urban Core evaluation mechanism
 - Evaluation of urban core mobility

Interviews, Reviews

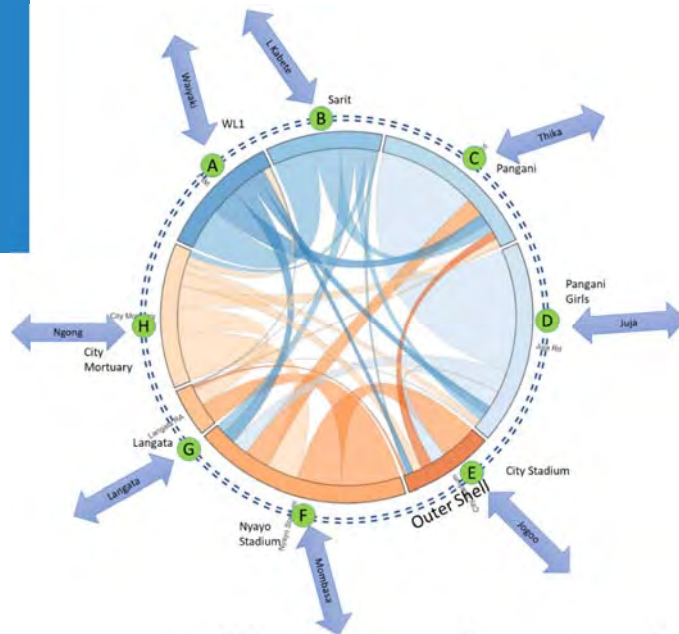
- Review on existing studies on transport
 - NIUPLAN, Traffic surveys by BRT studies
- Observation on Street
 - Visited and observed the passenger movements and local behaviors in CBD, Downtown, Ring road surrounding frequently for AMP setting
 - Ride experience for KRC, Matatus, Uber services
 - Observation of KRC corridors, including Kibera relocation sites and P&R in Syokimau and Imara Daima
- Stakeholder interviews
 - Matatu drivers associations representative, KBSM CEO
 - Kenya Transport Researchers Network

Traverse Traffic in CBD



- The Chord Diagram shows the travers traffic in CBD,
 - Northeast to Southwest, and Northeast to west are major, each has 15-20K traffic per day.
 - This behavior are common among the weekdays.

Traverse Traffic in Outershell

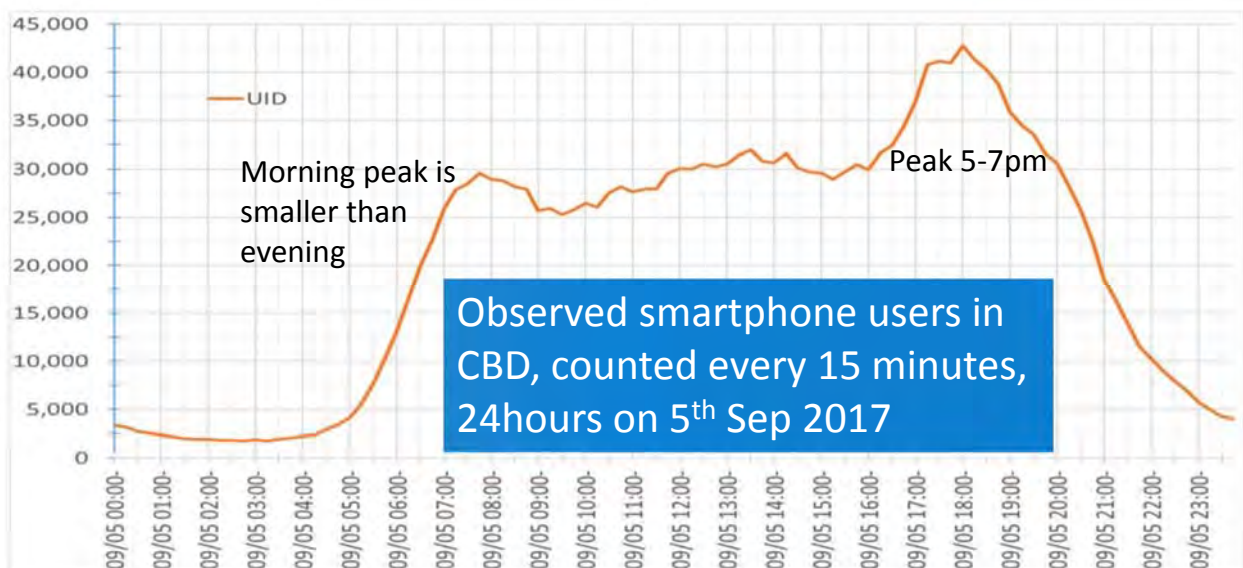


□ The major traverse traffic pattern in outershell are similar to innershell

- The daily traffic between Northeast-southwest is 10-12 K per day
- Traffic among southern part is large.
 - Due to well connectivity of Lusaka=Langata=Mbagathi Roads,
 - The movement from Mombasa road will be distributed by those road, but traverse movement is heading to the Thika direction



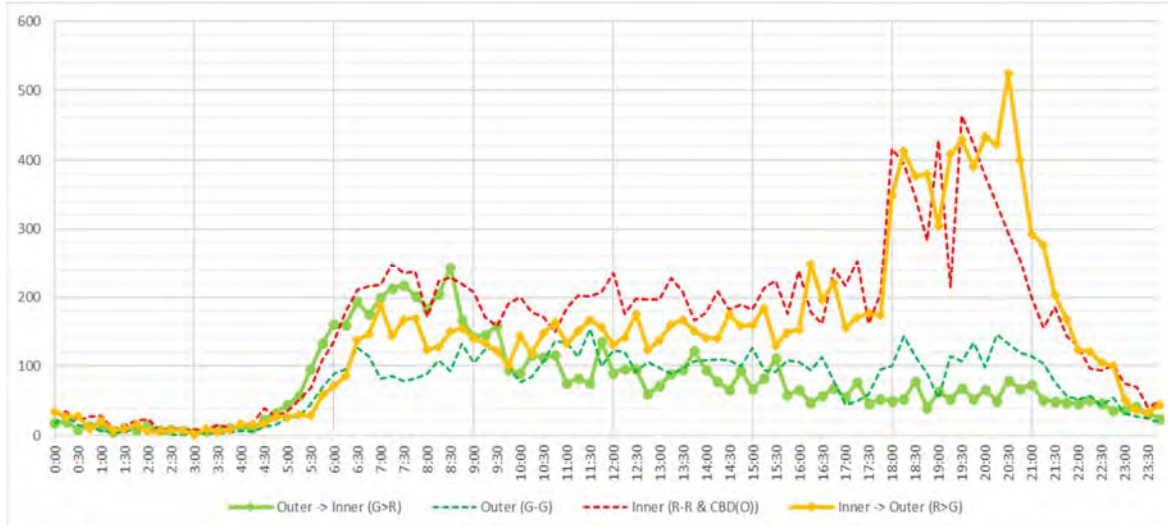
When people move into CBD



□ People come into CBD to catch their bus from surrounding, as all bus routes concentrate at CBD and no passengers are allowed to stand.

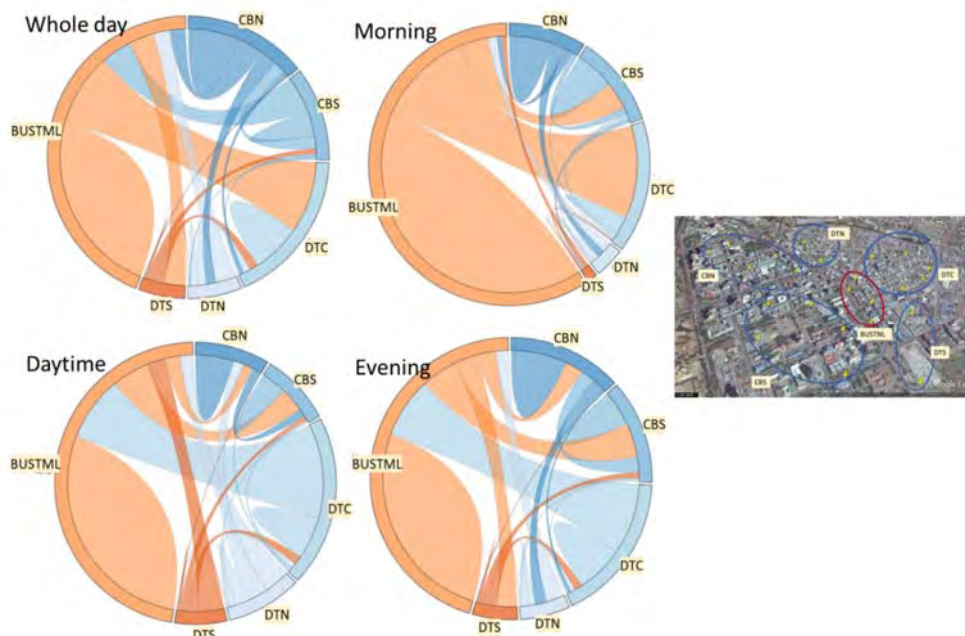


When people move out from CBD



Directional movement summary in daily timeline

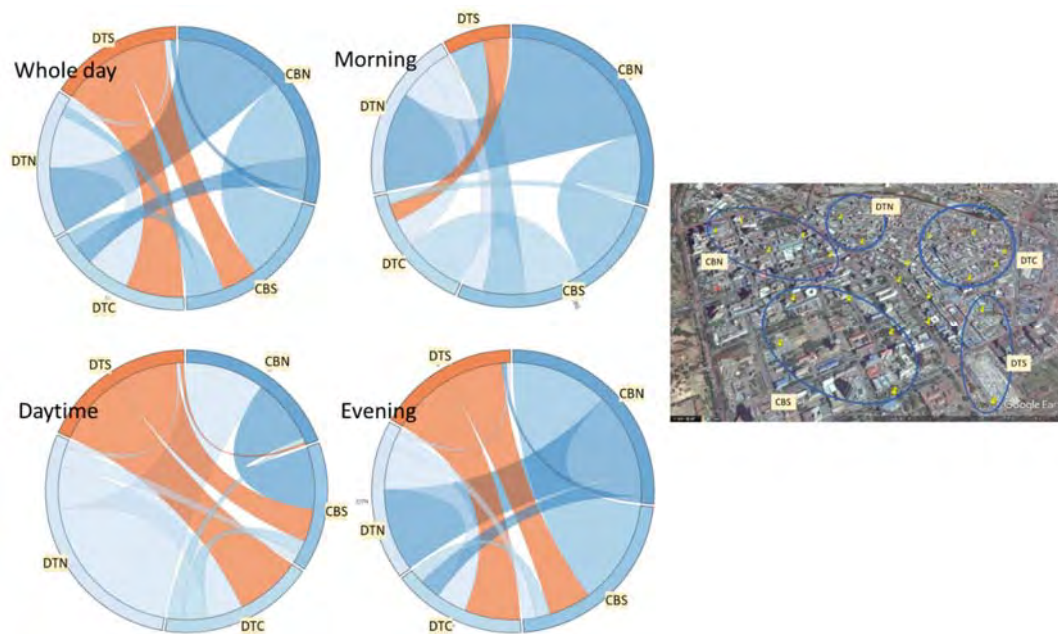
- Outbound movements: Red; center -> CBD surrounding, Yellow; CBD surrounding to outershell
- The above shows the outbound passenger traffic boosts after 6pm, continues until 9m
- Instead, the influx movement in the morning (green) is much less than amount of outbound



Passenger movement in CBD, high concentration to bus terminal

- This drawing shows the 900 K passengers movement in CBD.
- Of the 900k, passengers counted in the bus terminal shares 40%, 360-380 K.
- Passengers moved only in bus terminal area shares 25%, 200-210 K
- The movement from bus terminal to downtown is biggest, which can be accounted 150 thousand concentrated in the evening





- Passenger movement between districts in CBD
 - The movement in North-South direction is possible,
 - The East-west movement can be major in northern CBD
 → which can suggest pedestrian strategy

Strategy driven from Data and observation (1)

- High passenger concentration in Evening peak
 - Off-peak measures are required? No.
 - The business structure of Matatu/bus in Nairobi does not allow for standing passengers.
 - Bus terminal in future can be located out of the CBD. BRT can run out of the CBD.
 - This will reduce the number of passengers accessing to CBD, and the conflict between passenger and cars can be reduced, and the mobility of vehicles will be improved
 - Matatu/Bus cannot be removed easily from CBD
 - Co-habitation policy of Matatu including Capacity building, IT application (GPS, e-money), standing passengers are proposed
 - Improve the matatu industry, not Matatu drivers
 - matatu vehicle qualification standard improvement, with Matatu manufacturers profit in Nairobi
 - JICA can work together with Japanese car manufacturer
 - Security and regulation
 - bus operation hours can be extended until late night
 - land use and urban development policy (entertainment business development)

Strategy driven from Data and Observation (2)

- The major traverse movement in CBD was in east-west direction,
 - the middle class habitation spread along the east-west belt in Nairobi suburb, building a new urban axis
 - proposed a high capacity Metro service along the axis
- TDM is required for passenger car congestion
 - Assessed as “Mobility in Urban core” framework
 - TDM policy is effective with METRO, better than with BRT, as Metro has higher capacity.
- What is Mobility assessment framework requirement
 - Assess the volume/capacity ratio in the Urban Core area
 - Assess the influence of reduction of number of lanes due to BRT installation. This does not cover the negative influence of the level crossing. Assessed the shift from passenger cars to Metros.
 - NIUPLAN requires the multicore strategy. Does the urban core mobility assessment not fit to the NIUPLAN policy?
 - Added the corridor assessment framework. Assessed the peak and directional volume/capacity ratio of the major corridors connecting the CBD and subcenters, and suggested adequate capacity for future demand.

Issues and Policies

Issues

- 1) Expansion of urban core function to Thika/Westlands, Upper Hills
- 2) NaMATA roles and the challenges
- 3) Little Concern for Matatu Industry, and Ordinary Bus Services
- 4) Factitious CBD influx pattern in evening
- 5) BRT Traffic control in CBD, Line 1 and Line 3+4 crossing
- 6) Little Concern of KRC to urban transport
- 7) NE-SW traverse passenger movement in CBD

Policy I: Establishment of Comprehensive Mobility Management

1. Improvement of Bus Service
2. Improvement of Road Network
3. Improvement of Pedestrian Service
4. Application of Intermodal Facility
5. Application of Transport Demand Management Measure and Policy

Policy II: Proposal for Future Re-alignment of BRT

1. Future Re-alignment of BRT

Policy III: Application of Rail- based Transport System

1. Development of Metro on Thika Road
2. Capacity Enhancement of Commuter Rail

Chapter 6: Metro Plan Preliminary

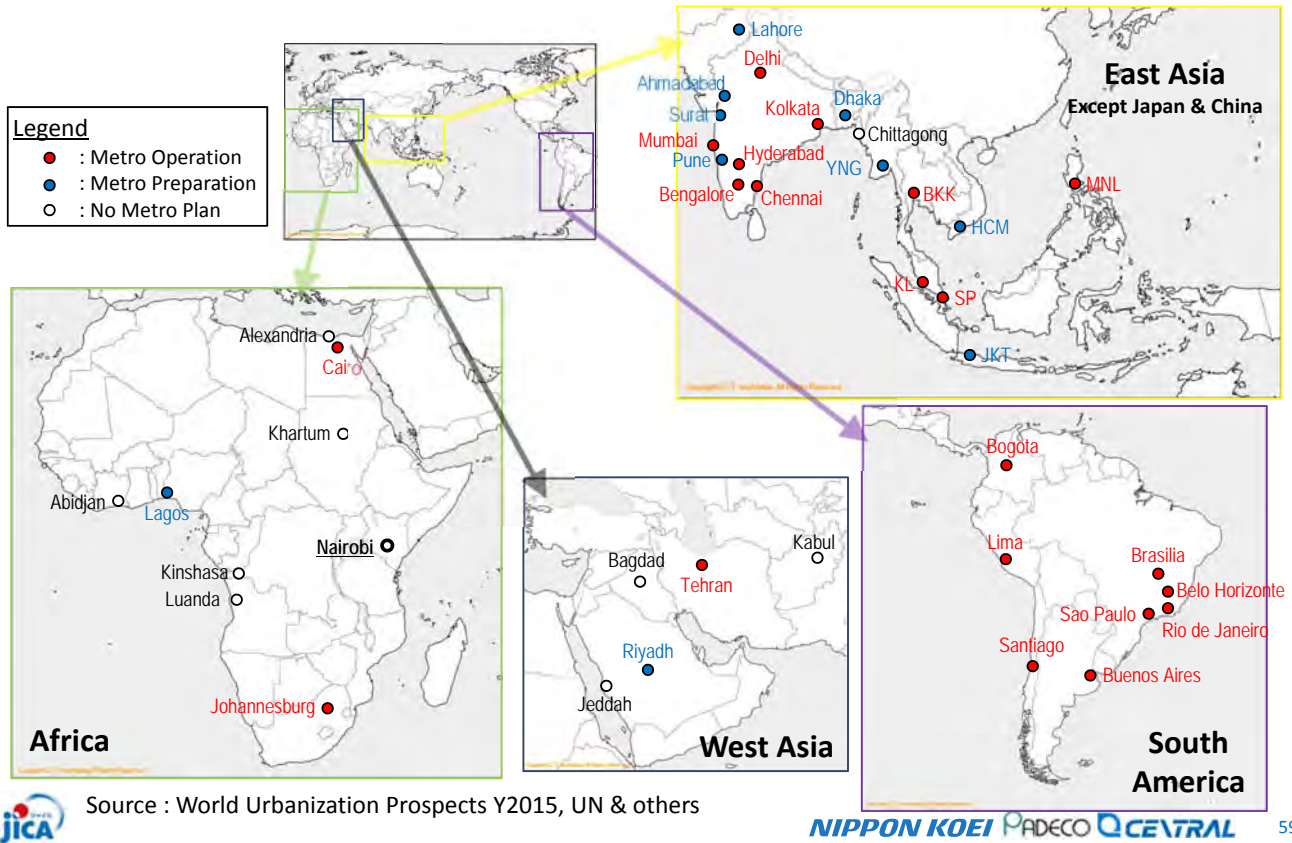
Policy III:

Application of Rail-
based Transport System

Existing Commuter Rail and BRT Plans



Over 4M Population Cities & Metro



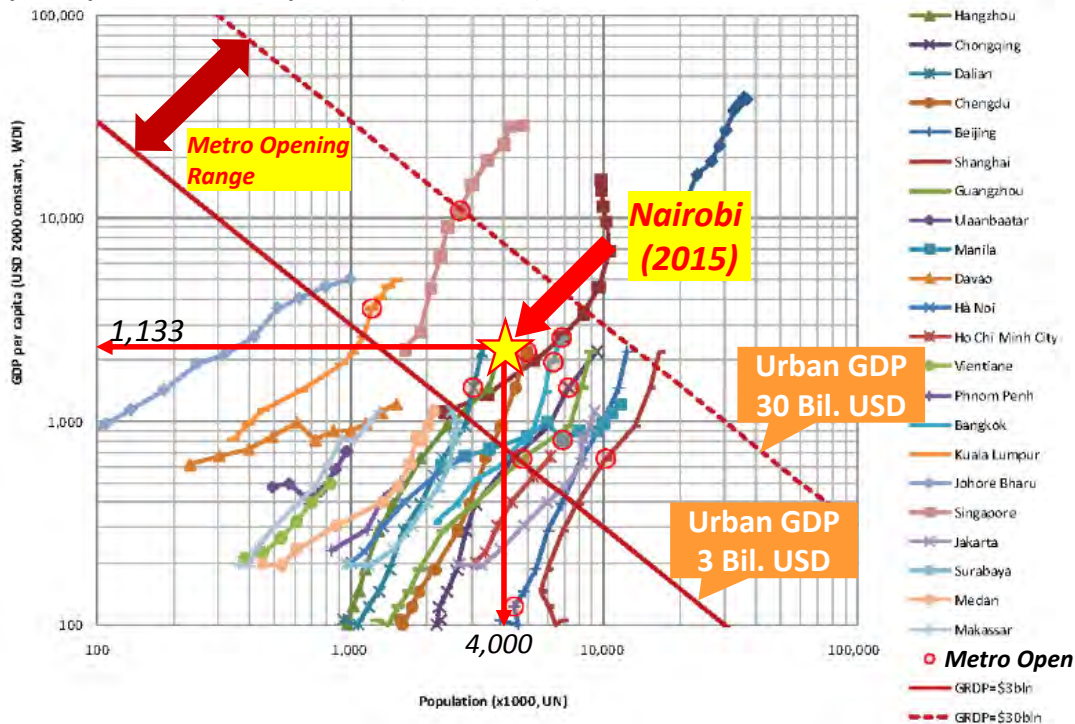
Prediction of Timing of Metro Opening

Area	Cities having Metro already (as of 2017)	Metro Opening (as of 2017)		
		Cities reached time to have Metro	Cities reaching time to have Metro by 2025	Cities not reaching time to have Metro by 2025
South East Asia	<ul style="list-style-type: none"> ● Bangkok (Thailand) ● Manila (Philippine) ● Kuala Lumpur (Malaysia) ● Singapore (Singapore) 	<ul style="list-style-type: none"> ● Ho Chi Minh (U/C) ● Jakarta (U/C) ● Johor Bharu 	<ul style="list-style-type: none"> ● Davao ● Hanoi (U/C) ● Surabaya, Medan ● Yangon 	<ul style="list-style-type: none"> ● Ulaanbaatar ● Vientiane ● Phnom Penh ● Makassar
Central and South Asia	<ul style="list-style-type: none"> ● Kolkata, Delhi, Mumbai, Hyderabad, Chennai, Lucknow, Kochi, Jaipur, Bangalore (India) ● Almaty (Kazakhstan) ● Tashkent (Uzbekistan) ● Almaty (Kazakhstan) 	<ul style="list-style-type: none"> ● Dhaka (U/C) ● Pune ● Lahore ● Ahmadabad(U/C) ● Karachi 	-	<ul style="list-style-type: none"> ● Kathmandu
Middle East	<ul style="list-style-type: none"> ● Tehran (Iran) ● Cairo (Egypt) ● Dubai (UAE) ● Ankara, Istanbul (Turkey) 	<ul style="list-style-type: none"> ● Baghdad ● Damascus 	-	-
Middle & South America	<ul style="list-style-type: none"> ● Mexico City (Mexico) ● Caracas, Valencia, Maracaibo (Venezuela) ● Lima (Peru) ● Santiago, Valparaiso (Chile) ● Sao Paulo, Rio de Janeiro, Brasilia (Brazil) ● Buenos Aires (Argentina) ● Panama City (Panama) 	<ul style="list-style-type: none"> ● Guadalajara ● Barranquilla ● Bogota ● Guayaquil ● Belem ● Curitiba 	<ul style="list-style-type: none"> ● Cartagena ● Asuncion 	<ul style="list-style-type: none"> ● Guatemala City ● Managua
Africa	<ul style="list-style-type: none"> ● Johannesburg, Cape Town, Durban, Port Elizabeth (South Africa) ● Algiers (Algeria) 	<ul style="list-style-type: none"> ● Lagos 	<ul style="list-style-type: none"> ● Nairobi (2020) ● Dar es Salaam (2025) 	<ul style="list-style-type: none"> ● Kampala ● Lusaka ● Lilongwe

Note; 1. (U/C) means Under Construction as of 2017.
 2. City name shown in Red means already operated as of 2017.

Timing of Metro Opening in the World

GDP per Capita to Urban Population (1960-2010) -East Asia, Southeast Asia-



Source: The Research on Practical Approach for Urban Transport Planning, JICA 2011



Formation of Rail-based Transportation Network

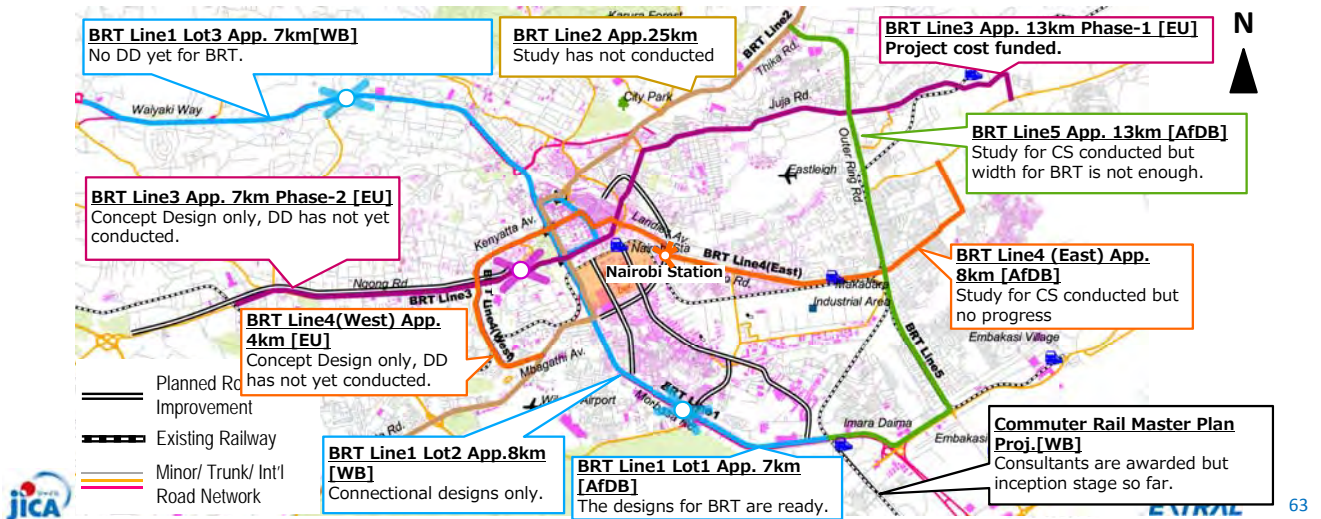
- KRC has started Commuter Rail Master Plan Study.
- Currently, Thika Road has the highest traffic demand. However, no BRT is been planned because there is no space for the BRT system. Therefore, it is recommended to introduce a metro system which will not require large scale land acquisition.
- Infrastructure of BRT lines which will be replaced by rail based transportation system in future shall be constructed in a form considering easy replacement.



Public Transportation Networking Plan

	2016-20	2021-25	2026-30	2031-35	2036-40	20XX	
BRT Line 1 (Monbasa-Waiyaki)	←→	←→	←→	←→	←→	←→	←→
BRT Line 2 (CBD-Ngong)	←→	←→	←→	←→	←→	←→	←→
Metro Line 1 (Thika-CBD)	←→	←→	←→	←→	←→	←→	←→
BRT Line 3 (Juja-Enterprise, as Line 1+)	←→	←→	←→	←→	←→	←→	←→
BRT Line 4 (Jogoo-Langata, Ngong direction by KRC/Southern Bypass)	←→	←→	←→	←→	←→	←→	←→
BRT Line 5 (Thika)	←→	←→	←→	←→	←→	←→	←→

←→ Planning, Financial Arrangement
 ←→ Design & Construction
 ←→ BRT Operation
 ←→ Metro Operation
 ←→ Replace BRT for Metro based on future demand



63

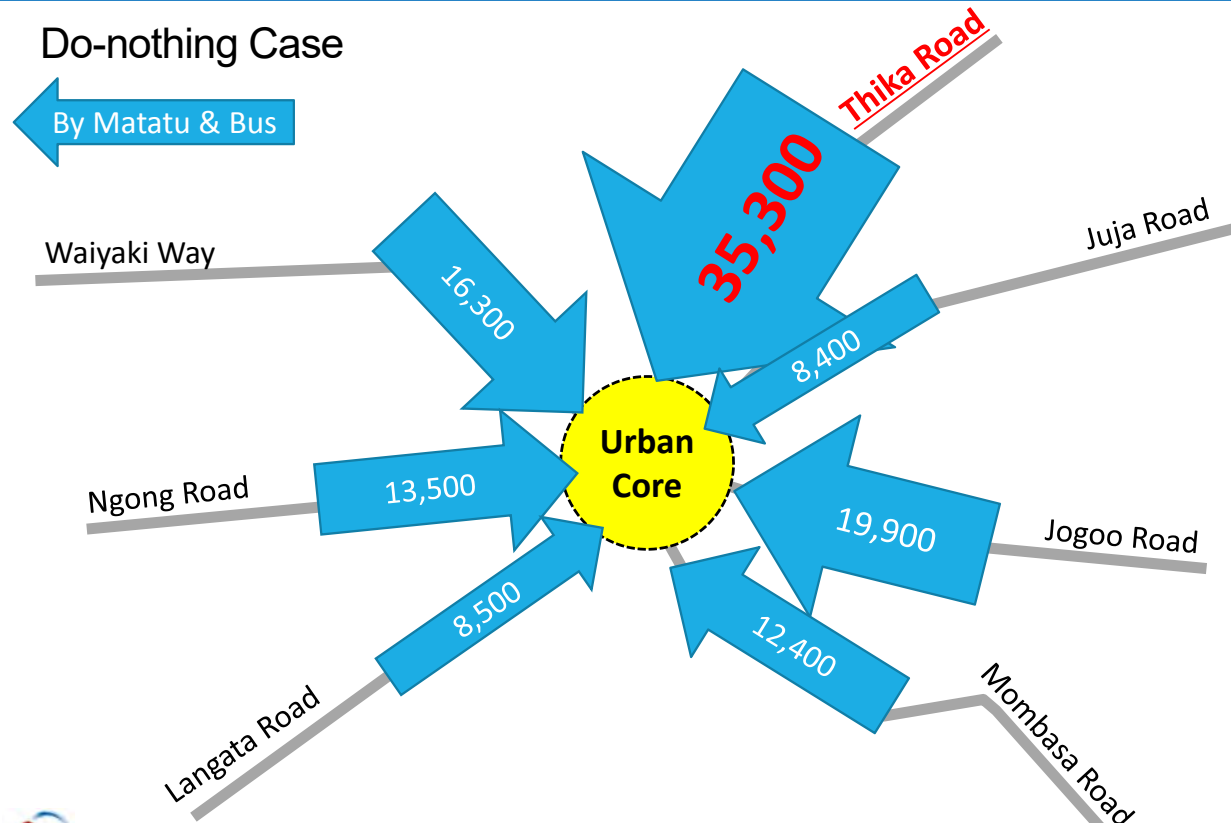
Concept Plan of Nairobi Metro

- ❑ First metro system in recommended connecting CBD and Kasarani through Thika road.
- ❑ In order not to disturb transportation at ground surface, the metro line shall go underground within CBD.
- ❑ Minimized land acquisition required at elevated section utilizing cycle lane.
- ❑ Fast access to CBD from suburb areas
- ❑ Property Development at underground station area (underground shopping mall, direct access to adjacent buildings).
- ❑ Common ticket system with BRT Lines and Commuter Rail.
- ❑ New organization for the Metro Operation to be considered.

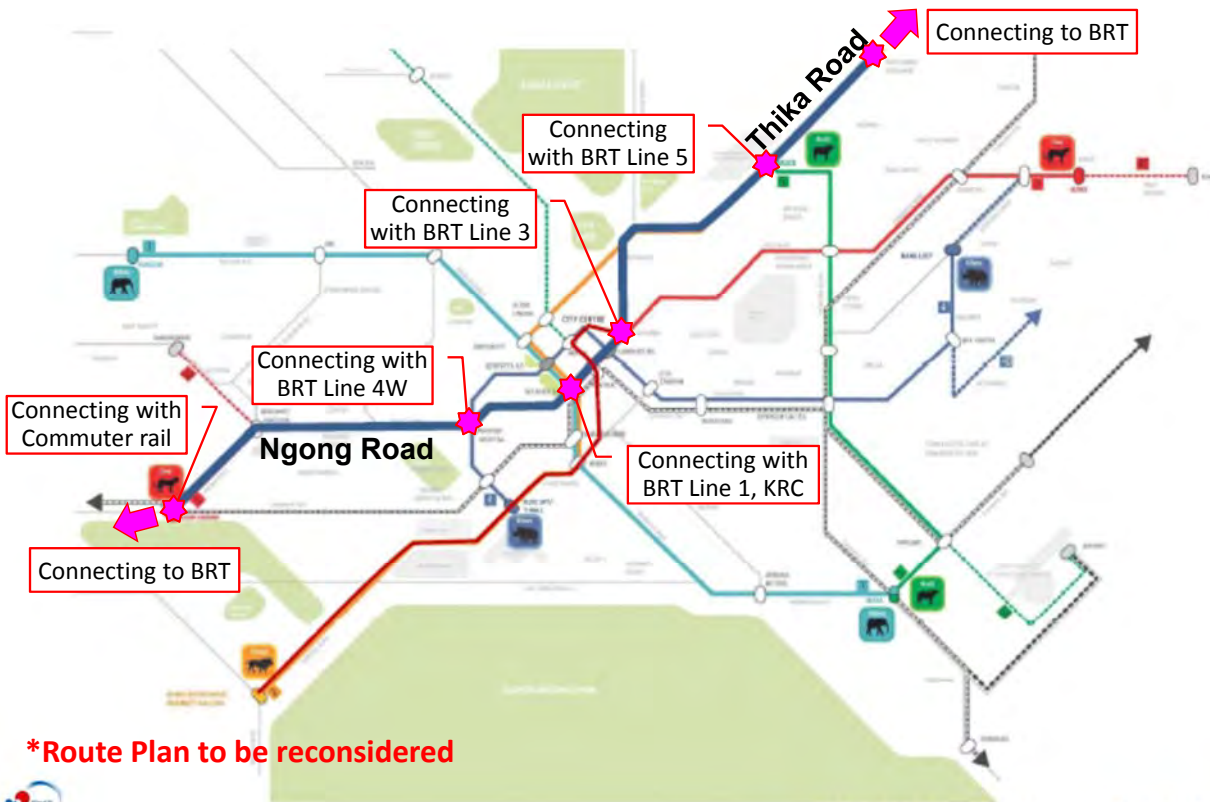
Inbound person trips in peak 1 hour on 2030

Do-nothing Case

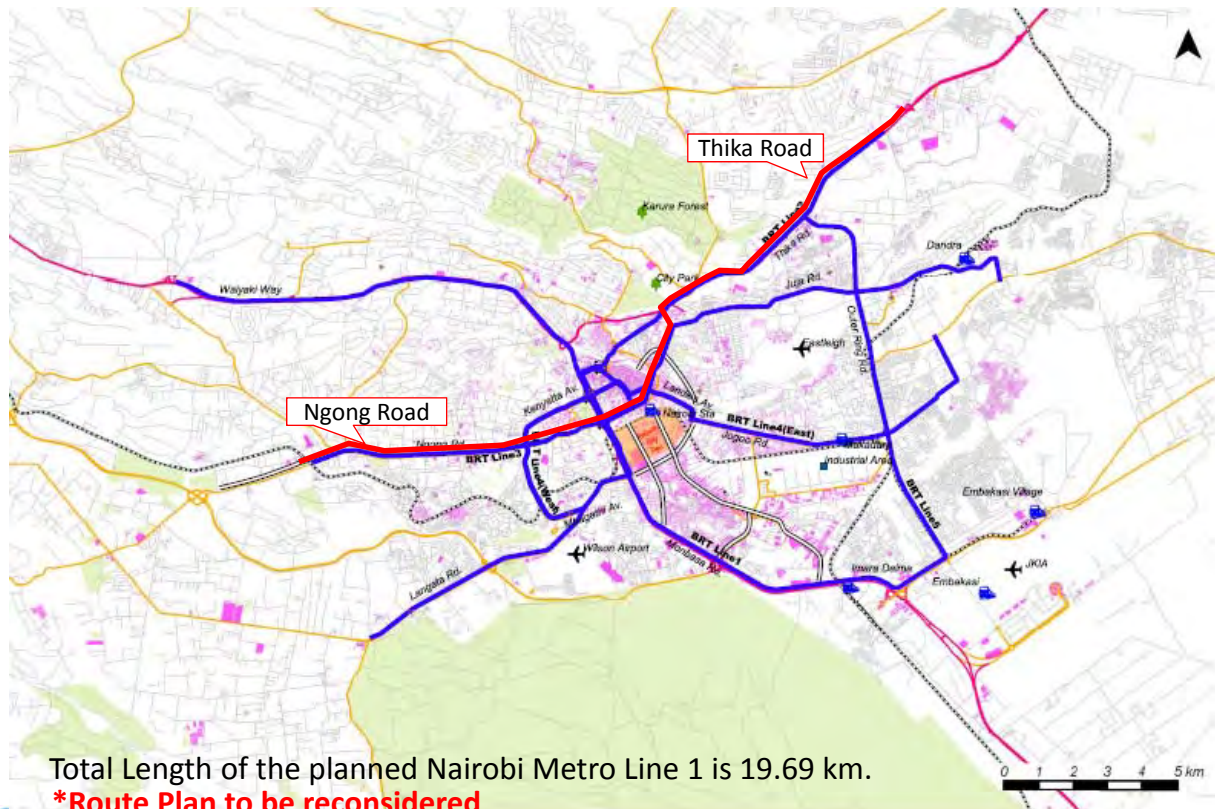
By Matatu & Bus



Planned Route of 1st Metro (Preliminary Draft)



Planned Route of 1st Metro (Preliminary Draft)

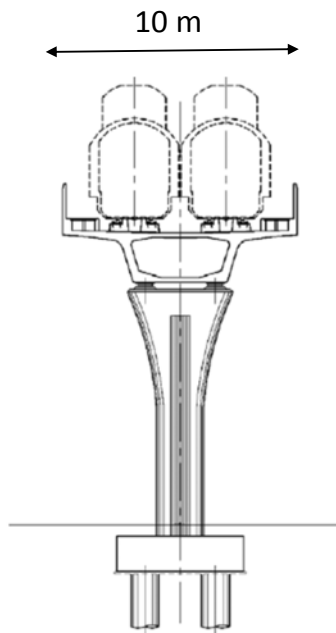


Design Concept of Nairobi Metro

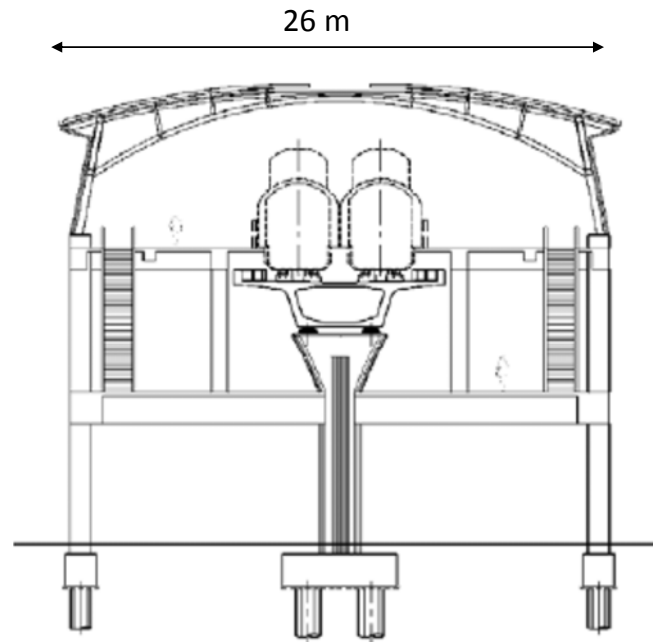
- It is planned to construct elevated structures at East section of Nairobi Metro. On the other hand, the central section is planned to go underground.
- Construction cost of elevated structure is 30% approx. of that of the underground structure. Therefore, in order to save the construction cost of Metro, longer elevated section is preferable.
- Construction of an elevated structure for Metro will not require big space, and thus, land acquisition can be minimized.
- Although the construction cost is higher than that of the elevated structure, alignment of underground section can be set freely.
- Intermodal integration Facility shall be provided at each station to improve connectivity between trunk and feeder.

Typical Structures of Elevated Section

Box Girder Type Elevated Structure



Typical Elevated Station Structure



***Structure Plan to be reconsidered in Stage 2.**

Typical Structures of Underground Section

Shield Tunnel (Single Track type)



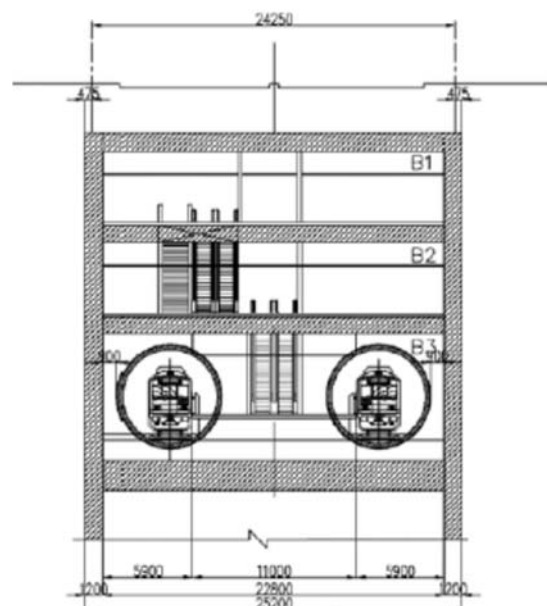
Shield tunnel will be selected where geological condition is poor.

NATM Type Tunnel



NATM type will be selected where geological condition is good.

Typical Underground Station



***Structure Plan to be reconsidered in Stage 2.**

Intermodal integration Facility



Source: Yasu city Shiga pref., Uenohara city, Yamanashi pref., Japan

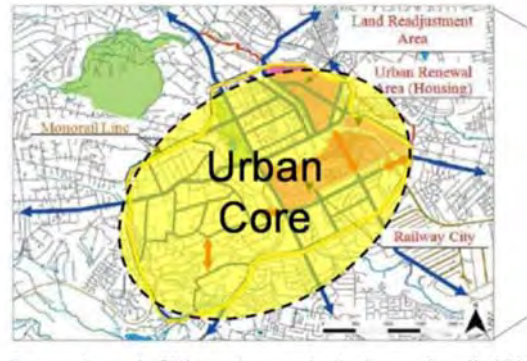
Station square can facilitate intermodal integration between backbone (Metro) and rib (Matatu and ordinary bus) without disturbing road traffic.



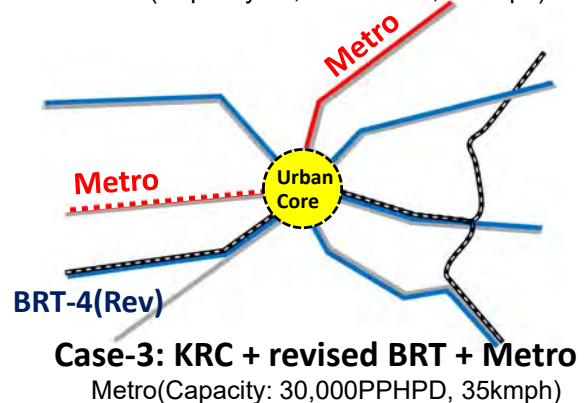
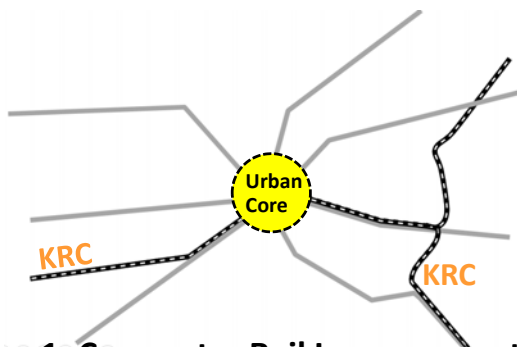
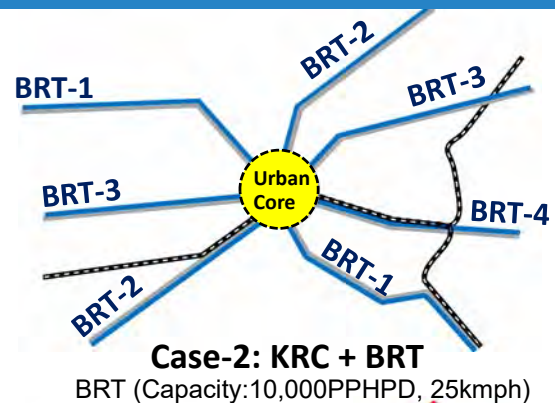
Chapter 7: Mobility Assessment

Mobility Assessment Framework

- Four scenario for 2030
 - Do nothing (Case-0)
 - Only commuter rail (Case-1)
 - KRC + BRT (Case-2)
 - KRC + Revised BRT + Metro (Case-3)
- Two Criteria
 - Urban Core Mobility
 - Corridor Based Mobility
- Characteristics
 - Peak period, 1hour only



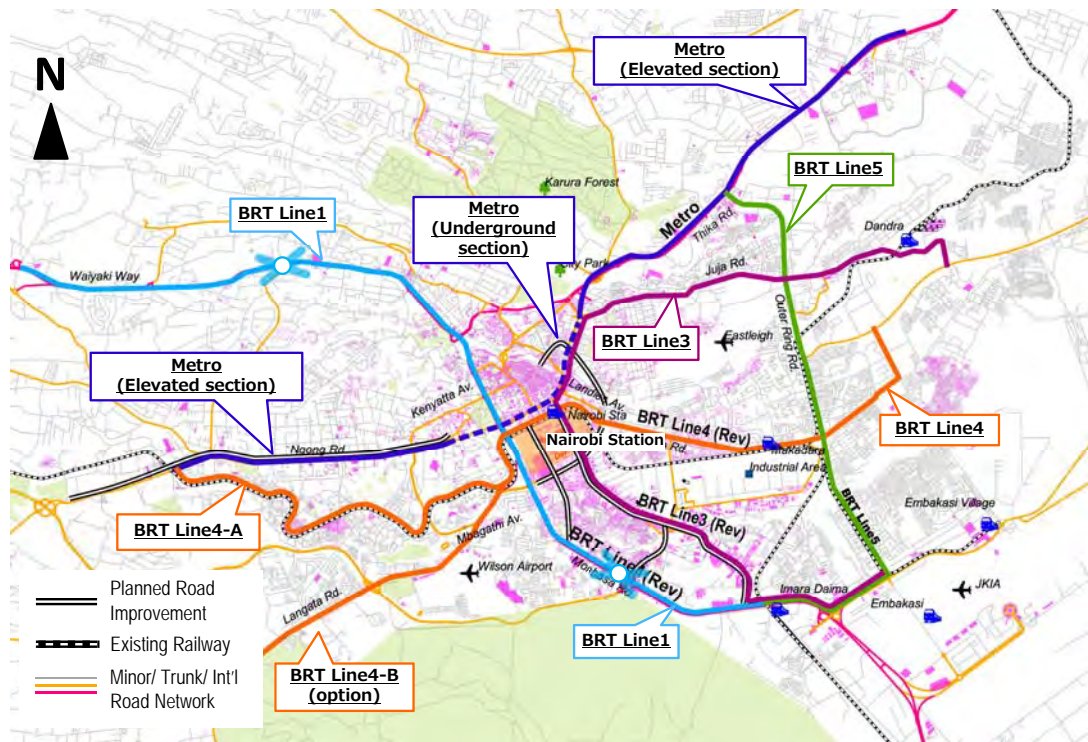
Four Scenarios for 2030



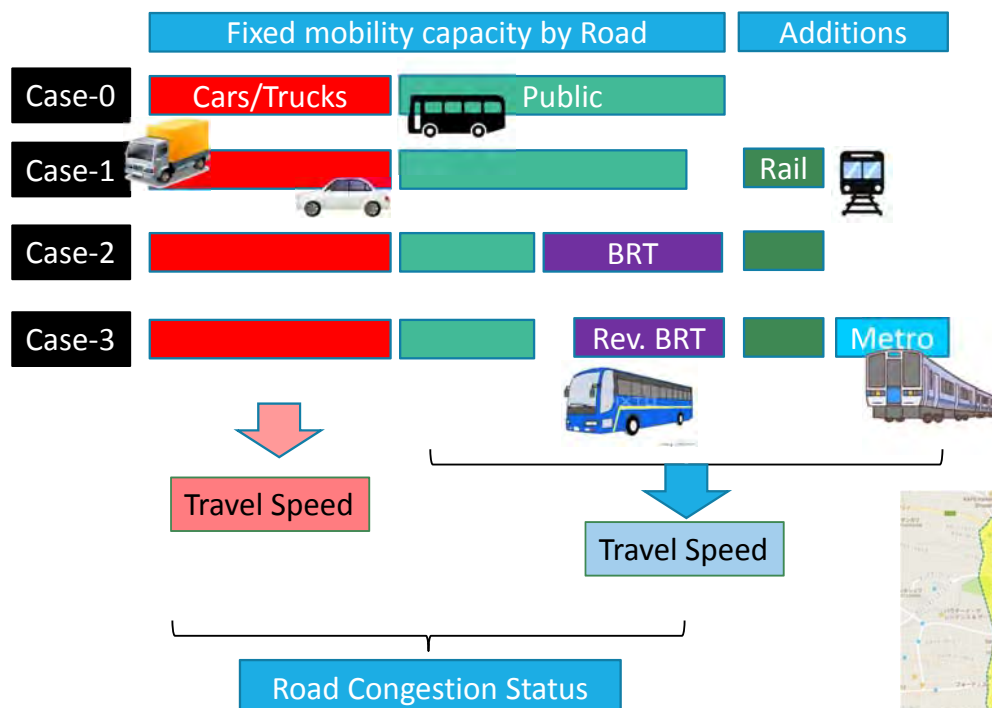
Commuter Railway (Capacity: 5,000 PPHPD, 25kmph)

***Case-3 is the case that Metro line is on Thika Road as a preliminary plan**

Proposed Metro + BRT Network (Case-3)



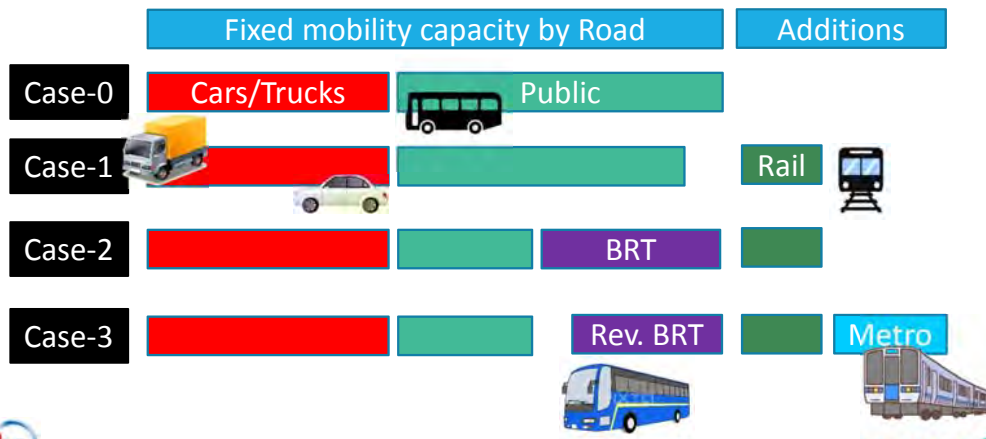
Urban Core Mobility Assessment



*Case-3 is the case that Metro line is on Ngong Road as a preliminary plan

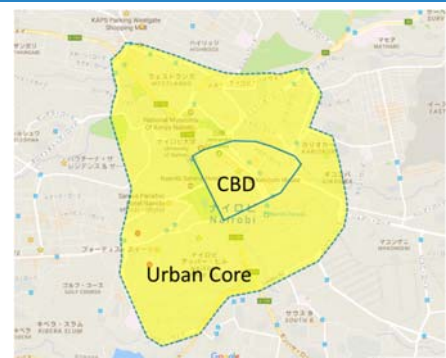
Urban Core Mobility Assessment

- ❑ Road space is fixed and has to be shared by public transport services and private vehicle.
- ❑ Private car use will increase, and we need to assess how the road space to be shared among private car, matatu, bus and BRT.
- ❑ On assessment, future private car demand is fixed. The matatu/bus user will shift to rail, BRT and Metro.



Urban Core Mobility Assessment

- ❑ The travel speed, congestion rate (road traffic / road capacity) are simulated among the road network in the Urban Core
- ❑ Case-0, matatu, ordinary bus and passenger car will share the road space.
- ❑ Case-1, KRC commuter rail improvement will can reduce the matatu/bus service and may alleviate the congestion.
- ❑ Case-2, BRT will reduce the bus and matatu traffic, and may alleviate the congestion but it will occupy two lanes in Urban Core, and increase congestion.
- ❑ Case-3, Revised BRT network will minimize two lanes occupation in urban core, and may alleviate congestion, Metro will not occupy the road surface.



Travel Speed Assessment

	Public Transport Ave. Speed	Vs Case-0
Case-1	14.5	108%
Case-2	19.1	143%
Case-3	20.9 km/h	156%

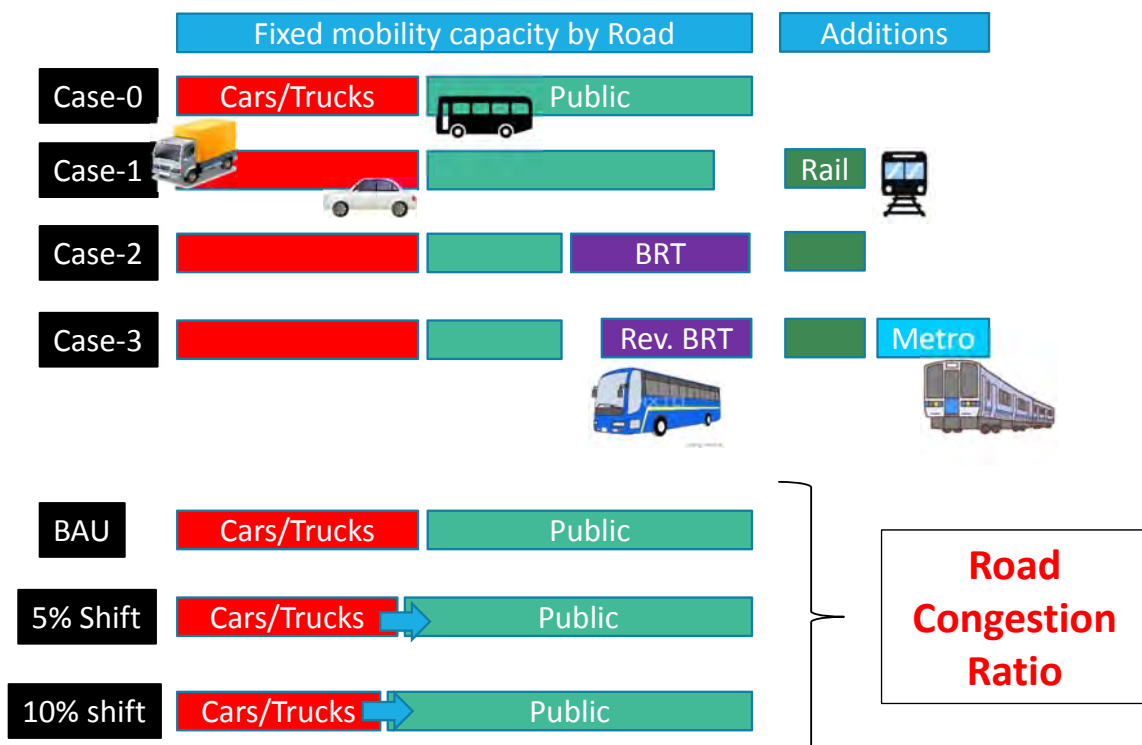
Case-1: Commuter rail improvement has limited influence to mobility.

Case-2: BRT can improve the Public transport service, but it will damage the traffic flow.

	Private V Ave. Speed	Vs Case-0
Case-1	27.4	103%
Case-2	23.6	88%
Case-3	25.1 km/h	94%

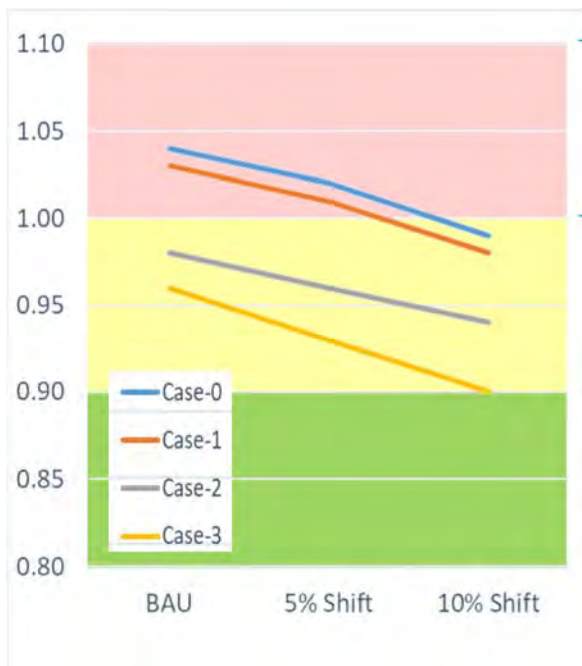
Case-3: Revised BRT + Metro can improve the public transport, and minimize the impact to traffic flow in urban core.

Road congestion ratio



Sensitivity of Mobility Improvement

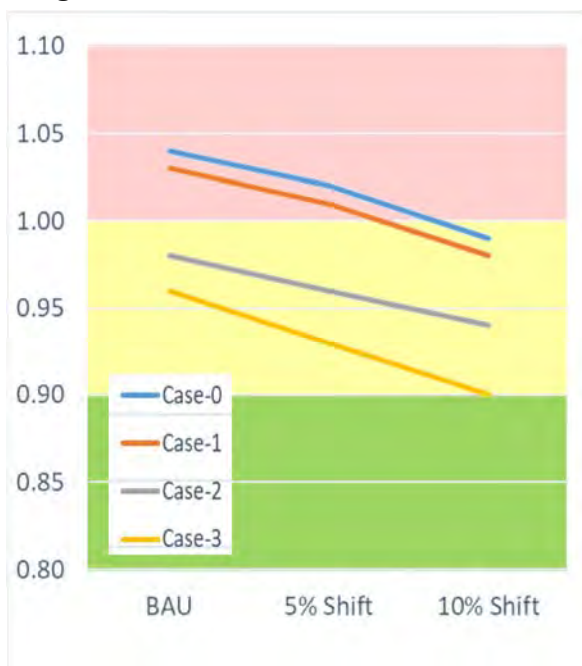
Congestion Ratio



Congestion ratio over 1.0 means the vehicle demand exceeds road capacity in everywhere in Urban Core, in both directions in the peak one hour. The photo above shows the situation of ratio 1.0 - 1.1, as paralyzed in one direction, and no flow in other direction due to paralyzed intersection.

Sensitivity of Mobility Improvement

Congestion Ratio



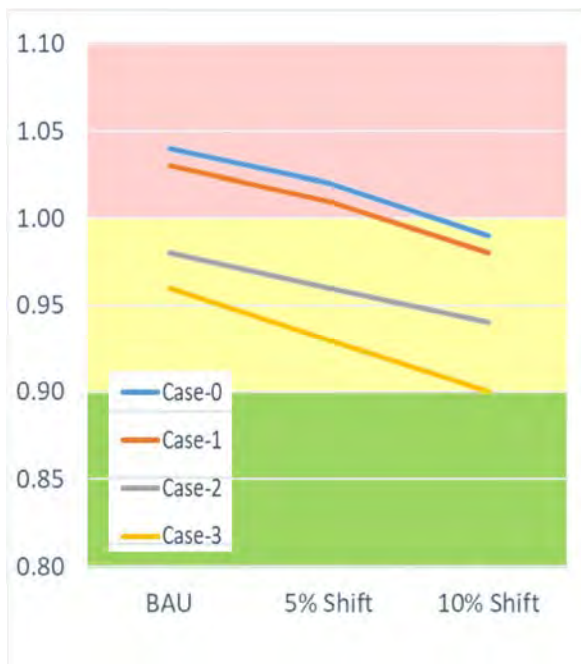
- Travel demand management (TDM) policies
- Area pricing, road pricing
 - Parking control
 - Staggering commuting hour
 - Incentives for public transport use

To assess influence of the TDM measures, assuming 5% shift and 10% shift from passenger car demand to public transport demand, and estimate the congestion ratio.

Basically, shift from passenger car to public transport is quite difficult for people who once captured by the private car utility.

Sensitivity of Mobility Improvement

Congestion Ratio



Case-0&1: The ratio exceeds 1 for BAU case and 5% shift.

Case-2&3: BRT installation can keep the ratio less than 1. The sensitivity of TDM measures is strong in Case-3 than in Case-2, as Case-3 has Metro with large capacity which can absorb the shifted demand.

Case-2 (BRT) can make the congestion ratio less than 1, but its synergy with TDM measures is not strong compared with Case-3 (rev BRT + Metro).

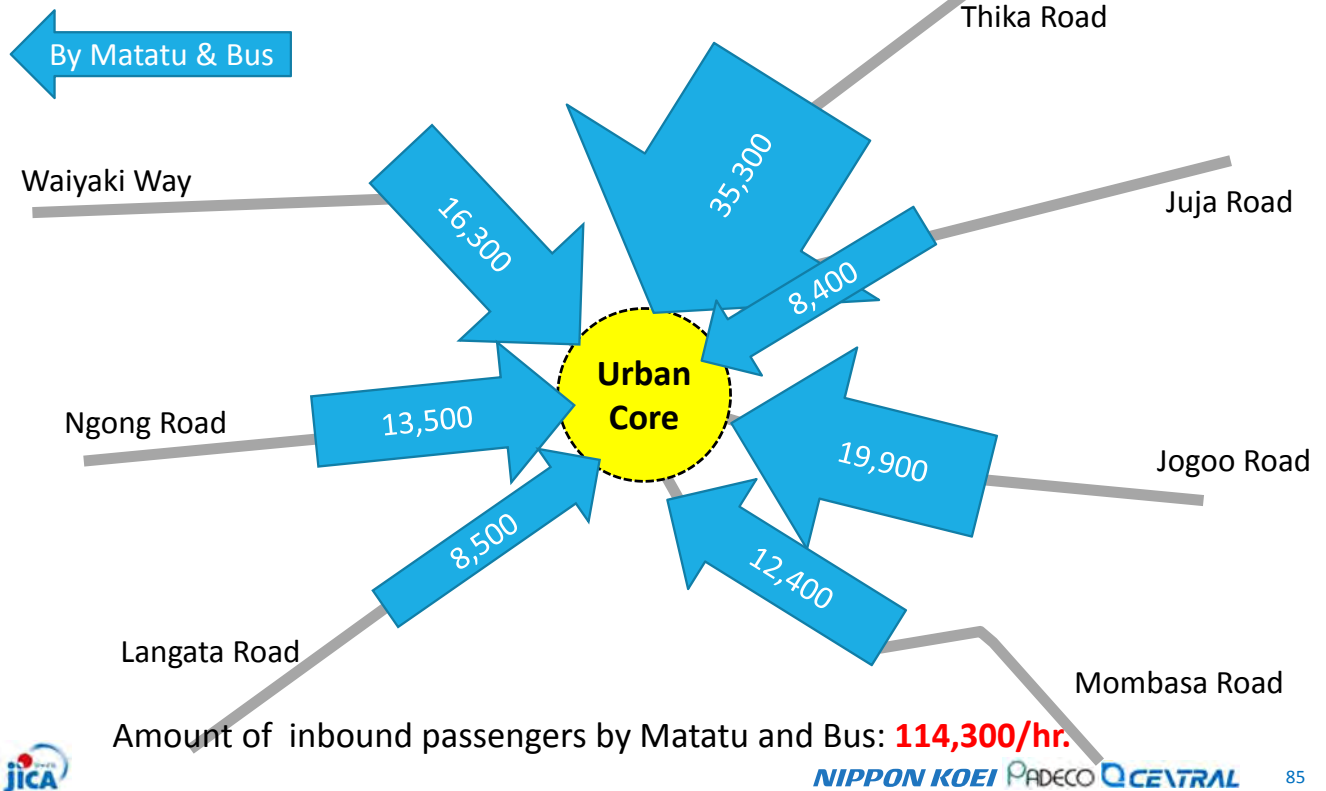
The minimum 0.90 for Case-3 + 10% shift is not preferable condition, but it is flowing.

Corridor Based Mobility Assessment

- Corridor Mobility represents accessibility to Urban Core, and connectivity between Urban Core and subcenters
- Targeted the inbound direction and peak one hour demand.
- Best combination of services should be sought, among Commuter Rail, BRT, Metro and ordinary matatu/bus.
 - Matatu/bus runs on highway, influence to general road traffic.
 - Commuter rail has limited capacity
 - BRT can improve, but occupy two lanes.
 - Metro provide biggest capacity, but expensive

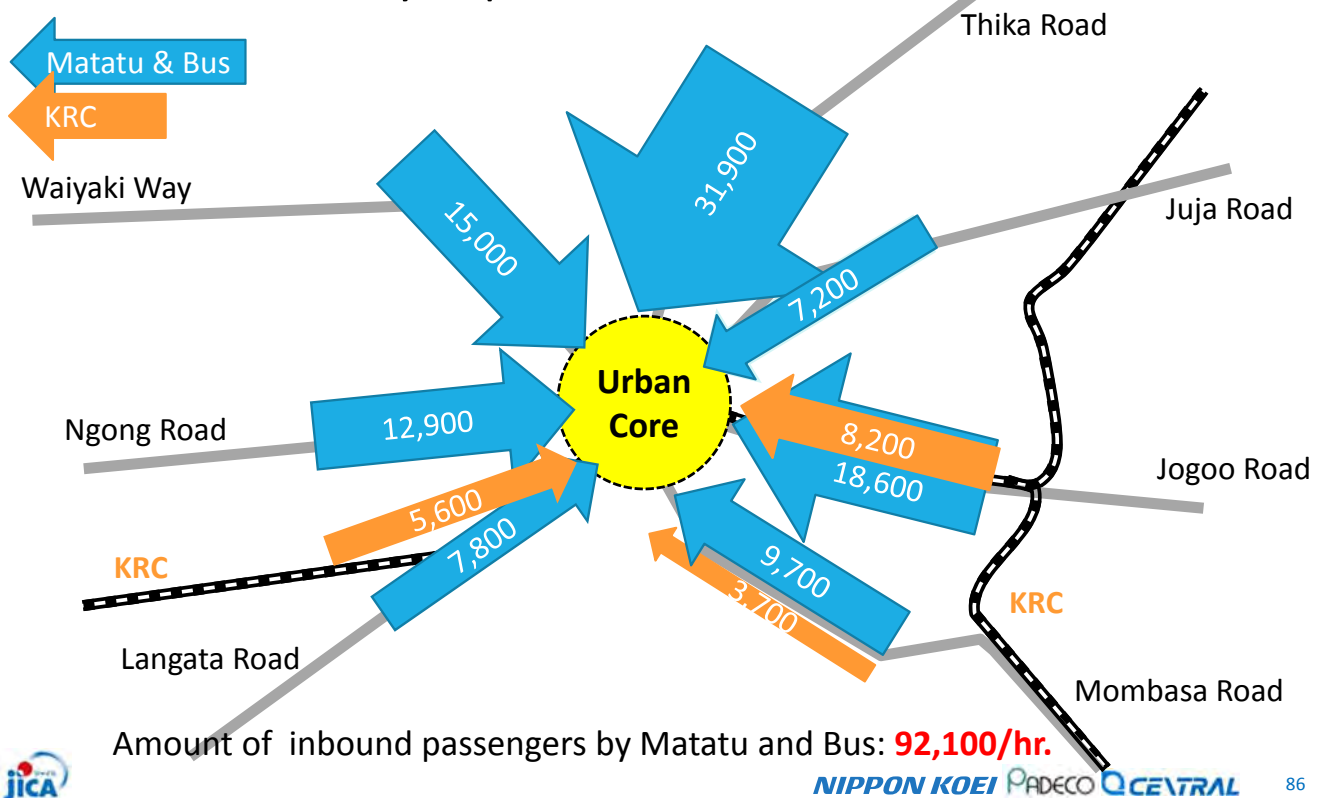
Case-0: Inbound person trips in peak 1 hour on 2030

Do-nothing



Case-1: Inbound person trips in peak 1 hour on 2030

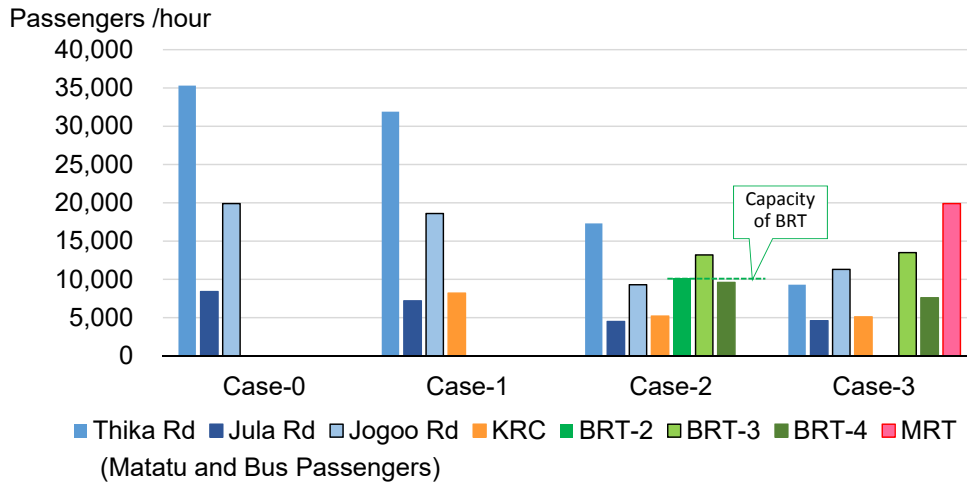
Commuter Railway improvement



Inbound passengers per hour on 2030 (unit : pax/hr.)

North-East and South-East

- Case-0 Do-nothing
- Case-1 Commuter Railway (Capacity: 5,000 PPHPD, 25kmph)
- Case-2 Commuter Railway + BRTs (10,000PPHPD, 25kmph)
- Case-3 Commuter Railway +BRTs + Metro (30,000PPHPD, 35kmph)



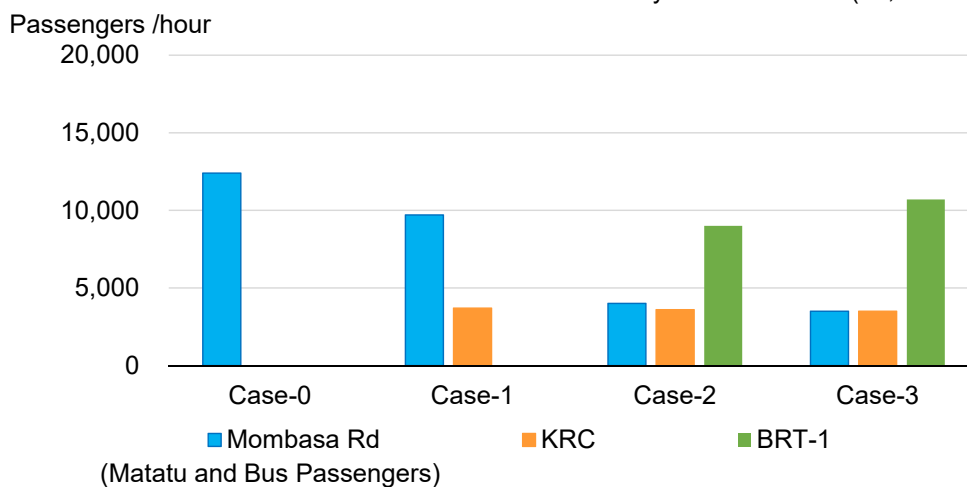
- ✓ KRC contributes to reduce the matatu passengers on Thika Road in case-1.
- ✓ BRTs can significantly reduce the matatu passengers in case-2. However, the demand of BRT will reach to its transport capacity of 10,000 PPHPD on 2030, and BRT-2 plan is not practically progressing so far.



Inbound passengers per hour on 2030 (unit : pax/hr.)

South

- Case-0 Do-nothing
- Case-1 Commuter Railway (Capacity: 5,000 PPHPD, 25kmph)
- Case-2 Commuter Railway + BRTs (10,000PPHPD, 25kmph)
- Case-3 Commuter Railway +BRTs + Metro (30,000PPHPD, 35kmph)



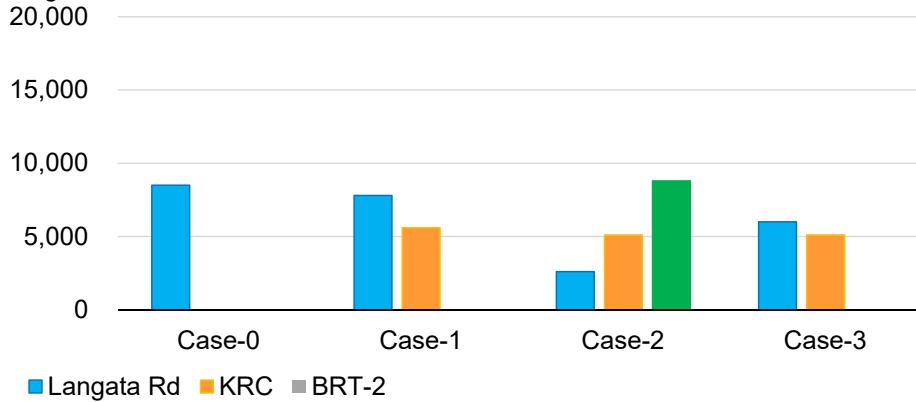
- ✓ KRC gathers the passengers around 4,000PPHPD. Even if BRT-1 is introduced, passenger of KRC is not reduced.



Inbound passengers per hour on 2030 (unit : pax/hr.)

South-West

Passengers /hour



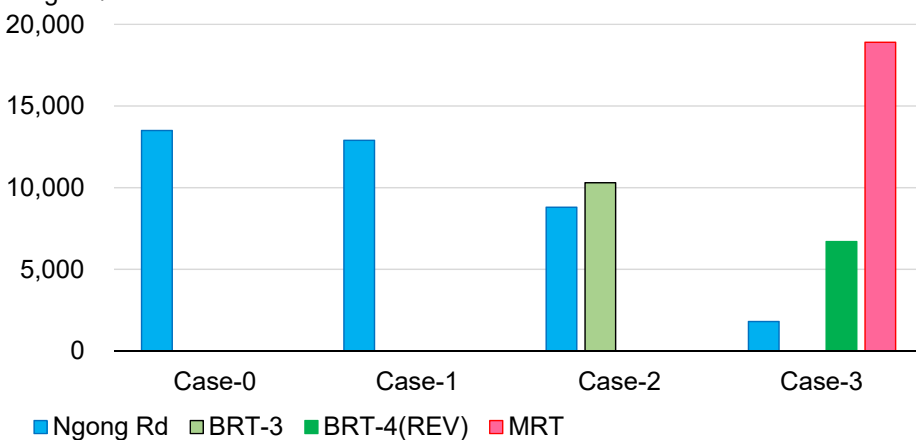
Case-0 Do-nothing
 Case-1 Commuter Railway (Capacity: 5,000 PPHPD, 25kmph)
 Case-2 Commuter Railway + BRTs (10,000PPHPD, 25kmph)
 Case-3 Commuter Railway +BRTs + Metro (30,000PPHPD, 35kmph)

- ✓ In Case-3, BRT-4' is installed near Ngong Rd instead of BRT-2.
- ✓ BRT-2 is more effective to reduce Matatu passengers on Langata Rd. than BRT-4'.

Inbound passengers per hour on 2030 (unit : pax/hr.)

West

Passengers /hour



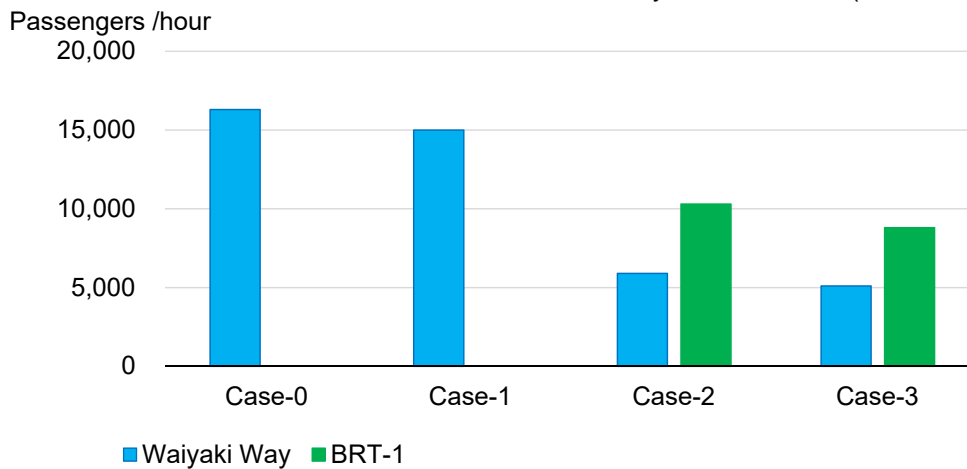
Case-0 Do-nothing
 Case-1 Commuter Railway (Capacity: 5,000 PPHPD, 25kmph)
 Case-2 Commuter Railway + BRTs (10,000PPHPD, 25kmph)
 Case-3 Commuter Railway +BRTs + Metro (30,000PPHPD, 35kmph)

- ✓ BRT-4(REV) is the revised BRT route proposed by Study Team.
- ✓ Metro gathers the passengers from Matatus which are operating not only on Ngong road but also Waiyaki way..

Inbound passengers per hour on 2030 (unit : pax/hr.)

- Case-0 Do-nothing
- Case-1 Commuter Railway (Capacity: 5,000 PPHPD, 25kmph)
- Case-2 Commuter Railway + BRTs (10,000PPHPD, 25kmph)
- Case-3 Commuter Railway +BRTs + Metro (30,000PPHPD, 35kmph)

North-East and South-East



- ✓ BRT-1 can significantly reduce Matatu passenger on Waiyaki Way. However, the demand of BRT-1 reaches its capacity in 2030 in Case-2.
- ✓ Metro can mitigate the passenger demand of BRT-1 as shown in Case-3.



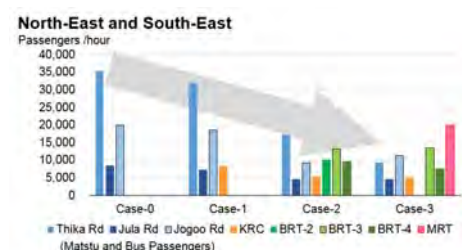
Summary of Mobility Assessment

Urban Mobility

- Reorganization BRT line minimizing road lane elimination (Case-3) can maintain the road traffic flow. It also shows higher synergy with TDM measures.

Corridor Mobility

- Suggested optimized combination of transport interventions for major corridors to satisfy the PPHPD demand in peak hours in 2030.
- Identified the Thika corridor requires metro services, and others can be managed by BRT.



Chapter 8: SEA

95

Strategic Environmental Assessment (7)

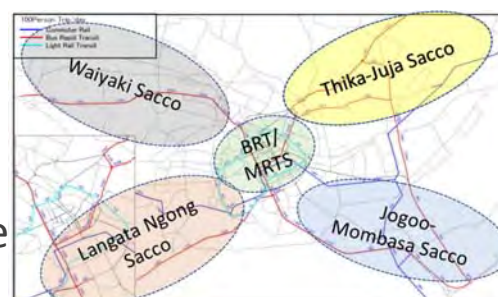
(Provisional Study (not in the ITR))

Expected Impacts of Proposed Integrated Transport System in NUC

Policy I: Comprehensive mobility management

(Related Issue)

- 1) Consideration of related transport service
- 2) Concentration of vehicles and difficulty of terminal operation of the public transport system
- 3) No coordination between relevant transport and areal development projects



Strategic Environmental Assessment (8)

Expected Impact (+/-)

Policy I: Comprehensive mobility management

(Pollution)

- ✓ Dramatic improvement of air quality in CBD is expected by using **EV unit BRT or ordinary bus**.
- ✓ Deterioration of air quality would be mitigated by application of **off-peak measures as well as road pricing policy**.
- ✓ Elimination of airborne dust could be maintained by the combination of **decrease of vehicles, increase of urban greenery** as well as establishment **pedestrian city** in CBD.

(Natural Environment)

- ✓ Urban ecosystem would be assured by increase of **urban greenery** development in CBD.

Strategic Environmental Assessment (9)

Expected Impact (+/-)

Policy I: Comprehensive mobility management

(Social Environment)

- ✓ Business confusion for other bus operation service such as Matatu would be occurred after **demarcation of bus operation** in Nairobi.
- ✓ Transport safety for bus transport will be assured by the **new bus standard**, such as bigger fleet and wider entrance.
- ✓ Business and livelihood environment for bus users will be improved by effective time management provided by **new bus service systems** such as bus approaching system and commuter payment card system.
- ✓ Business revitalization and establishment of safe pedestrian city in CBD is expected by **improvement of pedestrian space** in CBD.
- ✓ **Increase of solid waste** at proposed intermodal facilities could be occurred due to high density of people.

Strategic Environmental Assessment (1)

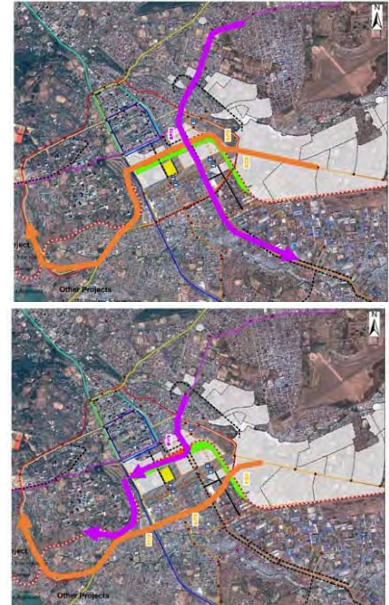
(Provisional Study (not in the ITR))

Expected Impacts of Proposed Integrated Transport System in NUC

Policy II: Proposal for Future e-alignment of BRT

(Related Issue)

- 1) No coordination between relevant transport and regional development projects
- 2) Concentration of vehicles and difficulty of terminal operation of BRT in CDB
- 3) Difficulty of level crossing operation of BRT in CBD
- 4) Difficulty of lands acquisition for the BRT



Strategic Environmental Assessment (2)

Expected Impact (+/-)

Policy II: Proposal for Future Re-alignment of BRT

(Pollution)

- ✓ Deterioration of air quality would be mitigated by **smooth multi-level crossing** and increase of BRT users.
- ✓ Deterioration of air quality would be concerned triggered by increase of traffic volume on the **narrowed private vehicle lane**, especially on Uhuru highway.
- ✓ Increase of noise and vibration nuisance would be mitigated by decrease of private vehicles and **increase of well-maintained BRT** in NUC.

(Natural Environment)

- ✓ Disturbance of urban ecosystem would be occurred if **cutting a large volume of valuable street trees** is implemented.

Strategic Environmental Assessment (3)

Expected Impact (+/-)

Policy II: Proposal for Future Re-alignment of BRT

(Social Environment)

- ✓ Volume of land acquisition will be controlled by **utilizing part of ROW of commuter rail**, thus other area will be critical concern.
- ✓ Economic burden for BRT users would be worse if **the fare is very high**.
- ✓ Increase of traffic accidents at intersections would be controlled by **utilizing the existing viaduct of commuter rail**, thus other intersection will be critical concern.
- ✓ **Public benefit** from the **relevant transport projects** would be provided efficiently by the proposed integrated transport.
- ✓ Working condition in CBD would be improved by **predictable commute time**.
- ✓ District separation and deterioration of road safety for crossing pedestrians would be occurred by **possible short headway of BRT** and **congestion of the private vehicle lanes**.

Strategic Environmental Assessment (4)

(Provisional Study (not in the ITR))

Expected Impacts of Proposed Integrated Transport System in NUC

Policy III: Application of Metro on Thika road

(Related Issue)

- 1) Difficulty of level crossing operation of the public transport system
- 2) Concentration of vehicles and difficulty of terminal operation of the public transport system
- 3) Appropriate estimation of passenger carrying capacity
- 4) Difficulty of lands acquisition for the public transport system
- 5) Necessity of transport demand oriented plan



Strategic Environmental Assessment (5)

Expected Impact (+/-)

Policy III: Application of Metro on Thika Road

(Pollution)

- ✓ Deterioration of air quality in NUC would be mitigated by **increase of Metro users** and decrease of traffic congestion.
- ✓ Increase of noise and vibration nuisance would be mitigated by decrease of private vehicles and **increase of Metro users** in NUC.

(Natural Environment)

- ✓ As a secondary impact, future **uncontrolled regional development** along the Metro line would be escalated, which could disturb ecological resource in Nairobi County.

Strategic Environmental Assessment (6)

Expected Impact (+/-)

Policy III: Application of Metro on Thika Road

(Social Environment)

- ✓ Involuntary resettlement and land acquisition will be minimized by **subway development and elevated Metro** in NUC.
- ✓ Possibility of economic burden for Metro users would be concerned if the **fare is very high**.
- ✓ Business revitalization and establishment of safe pedestrian city in CBD is expected by Metro with **underground property development**.
- ✓ Working time management for the workers in CBD would be improved by **predictable commute time** for Metro users.
- ✓ Possible **future uncontrolled regional development** would be concerned along the Metro line.

APPENDIX

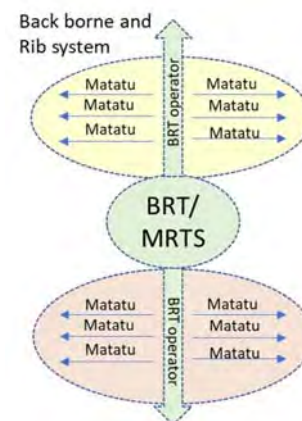
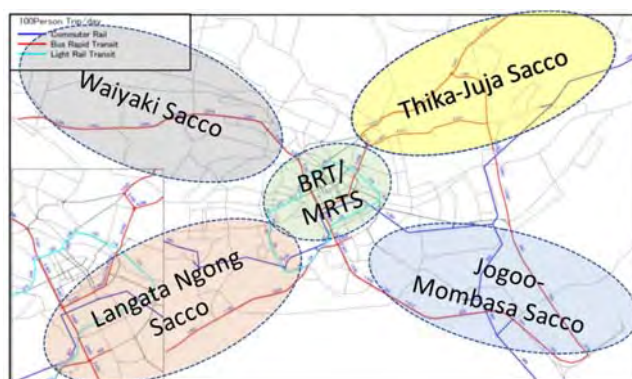
Supplemental Remarks for Policy I and II

Policy I: Comprehensive Mobility Management

Improvement of Bus Service

(i) Re-organization of Matatu and other ordinary bus service route

- Replace Matatu and ordinary bus service to feeder transport service to avoid concentration of traffic volume in the CBD.



Policy I: Comprehensive Mobility Management

Improvement of Bus Service

(ii) Application of new bus fleet standard

- Applying bigger fleet, wider entrance door, relatively low floor, low emission power unit, (and electric power unit, if available).



Policy I: Comprehensive Mobility Management

Improvement of Bus Service

(iii) Renovation of bus service system



Proposed a platform to show the real-time locations of ordinary buses and BRTs (e.g, Vien Tiang). It comes easy than before due to GPS, smartphones, and internet.



Passenger can see the **real time bus approach** with their own smartphones.



On board smartphone on each bus can report its location in real time to the server.

Policy I: Comprehensive Mobility Management

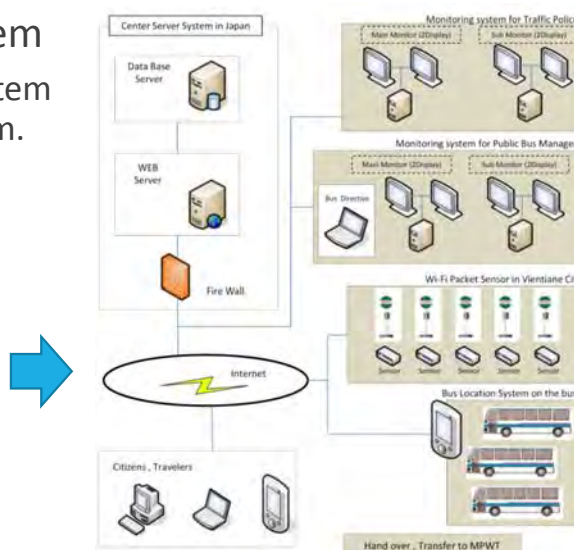
Improvement of Bus Service

(iii) Renovation of bus service system

- Applying approaching notification system integrated with other transport system.

System Diagram

- A) Bus Location System
 - Smart Phone for the Bus (60)
 - PC and Big Monitor (2 sets)
- B) Wi-Fi Packet Sensor System
 - Packet Sensor (25sets)
 - PC and Big Monitor (2sets)
- C) Center Server System
 - Database Server
 - Web Server
 - Firewall



(iv) Revision of regulation for bus service

- Revision of standing seat regulation can resolve having limitation of carrying volume of passengers.

Policy I: Comprehensive Mobility Management

Improvement of Bus Service

(iv) Revision of regulation for bus service

- Revision of standing seat regulation can resolve having limitation of carrying volume of passengers.

The high capacity bus is fitted with fans and handles for standing passengers and has the capacity to ferry 100 passengers – 60 seated and 40 standing.



<https://citizentv.co.ke/news/photos-long-commuter-bus-baffles-nairobi-residents-137709/>

Policy I: Comprehensive Mobility Management

Improvement of Road Network

(i) Missing link improvement

- Establishment of grid road network structure in Nairobi Urban Core as well as Westlands and Eastleigh.

(ii) Promotion of road space management

- Open space development by utilizing part of road space.



Improvement of Pedestrian Service

- Improvement of pedestrian accessibility in CBD by facilitating signs and clearing access route to nodal point of other transport system.

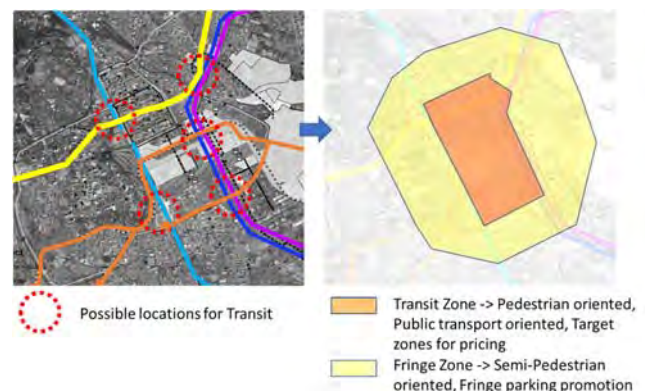


Policy I: Comprehensive Mobility Management

Application of Intermodal Facility

(i) Transit Place Development

- Between BRT lines each other and other modes
- To shift concentrated transit stations outside



(ii) Park & Ride (P&R) Minimization, Improvement of the Station Accessibility

- P&R policies are applied in several stations and it requires a large parking space
- The space shall be developed with access road for pedestrian for accessibility improvement



Fig. State of Practice, P&R facility in Imara Daima Sta.

Policy I: Comprehensive Mobility Management

□ Application of TMD Measure and Policy

(i) Promotion of off-peak measure

- Off-peak measure can control part of traffic volume by avoiding vehicle in peak time.

(ii) Reinforcement of parking policy

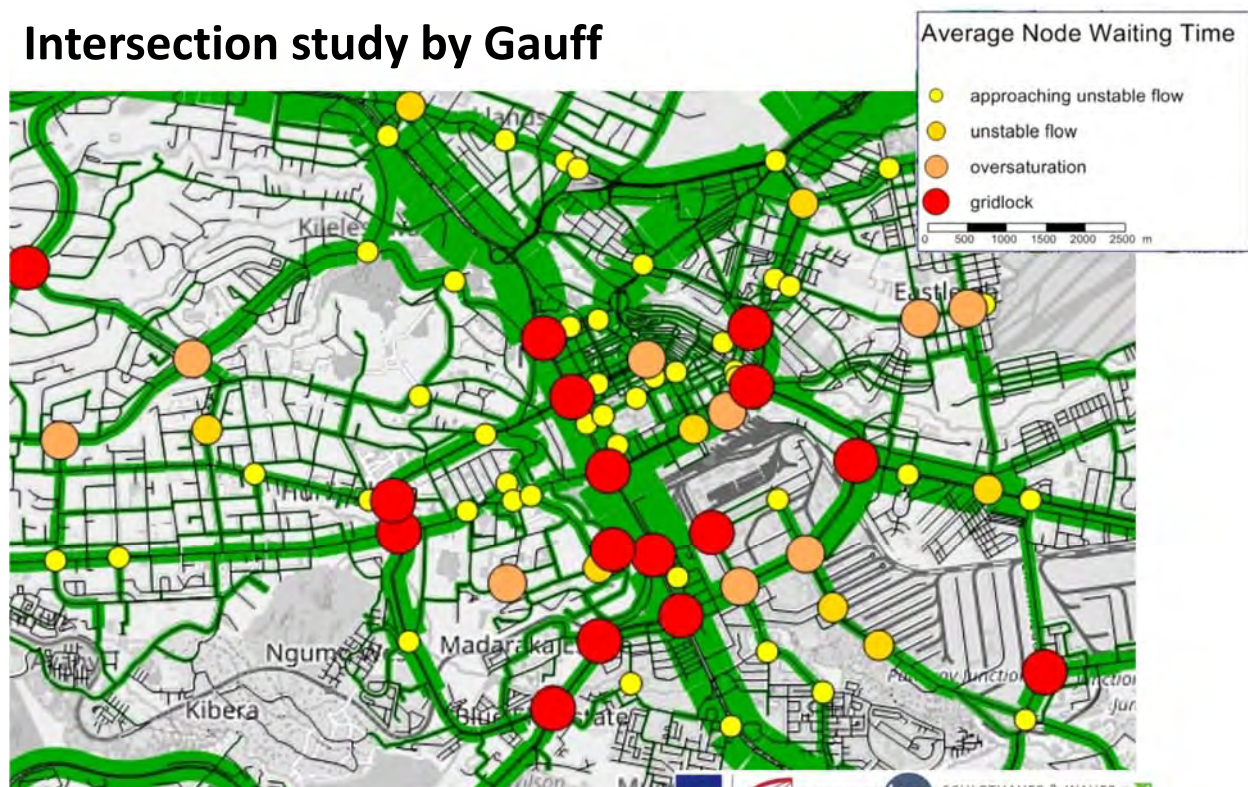
- Minimization of on-street parking in CBD. Development of off-street parking lot in the fringe or out skirt of Nairobi Urban Core.

(iii) Establishment of pricing policy

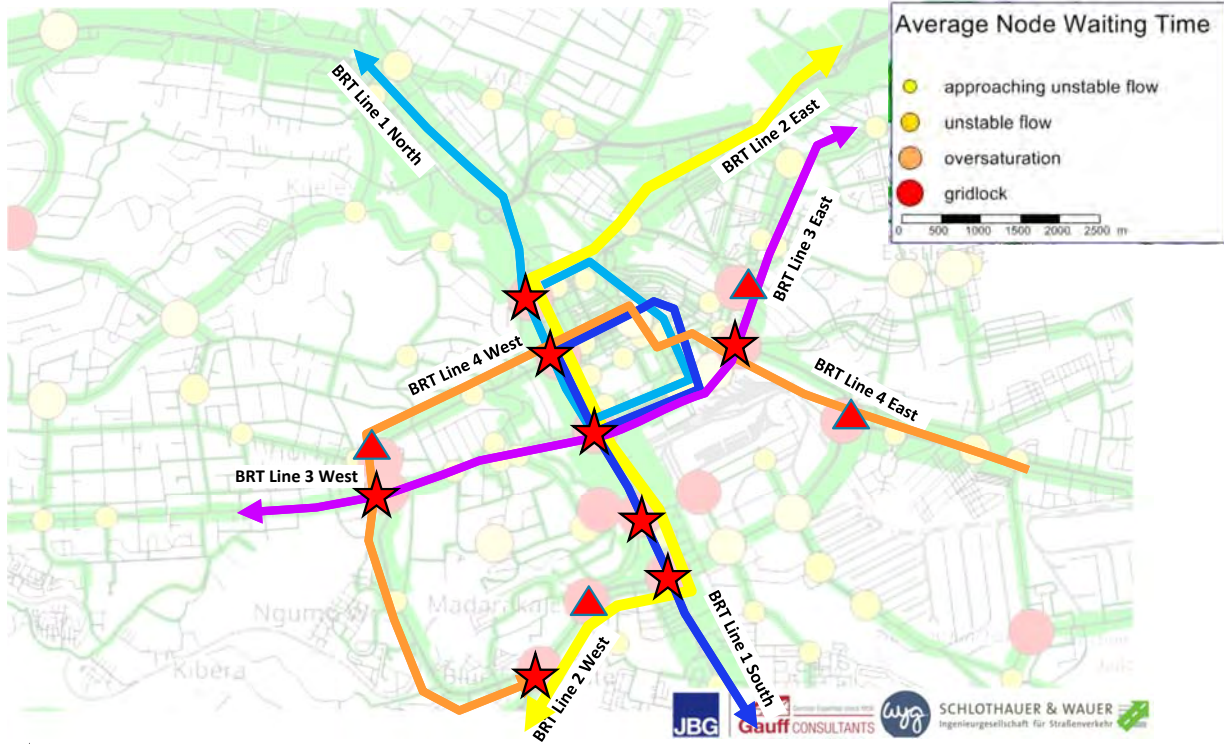
- Charging road price for private vehicle in designated district in Nairobi Urban Core.

Policy II: Proposal for Future Re-alignment of BRT

Intersection study by Gauff



How HS BRT lines go into the congested area

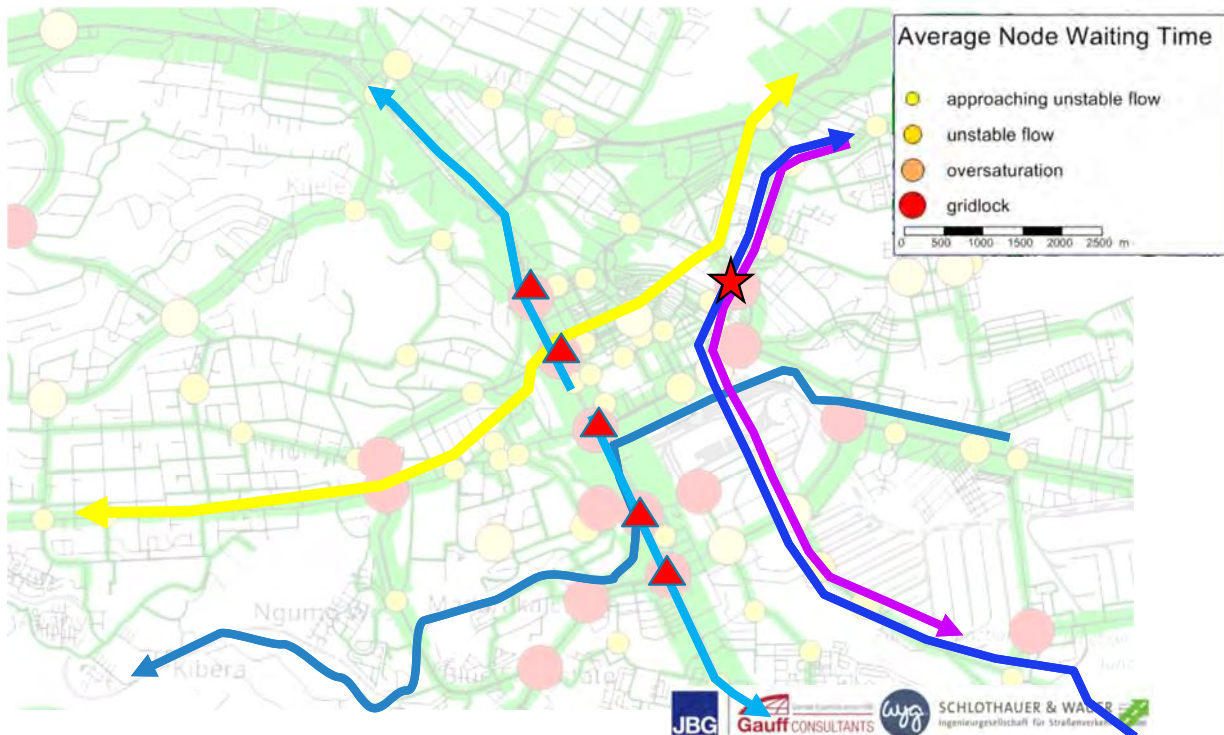


★ Over 2 BRT lines run into the Gridlock intersection with level crossing --- 8



▲ Single BRT lines run into the Gridlock intersection --- 4

HS based BRT with ITS evaluation



★ Over 2 BRT lines run into the Gridlock intersection with level crossing --- 1



▲ Single BRT lines run into the Gridlock intersection --- 5

Appendix-2

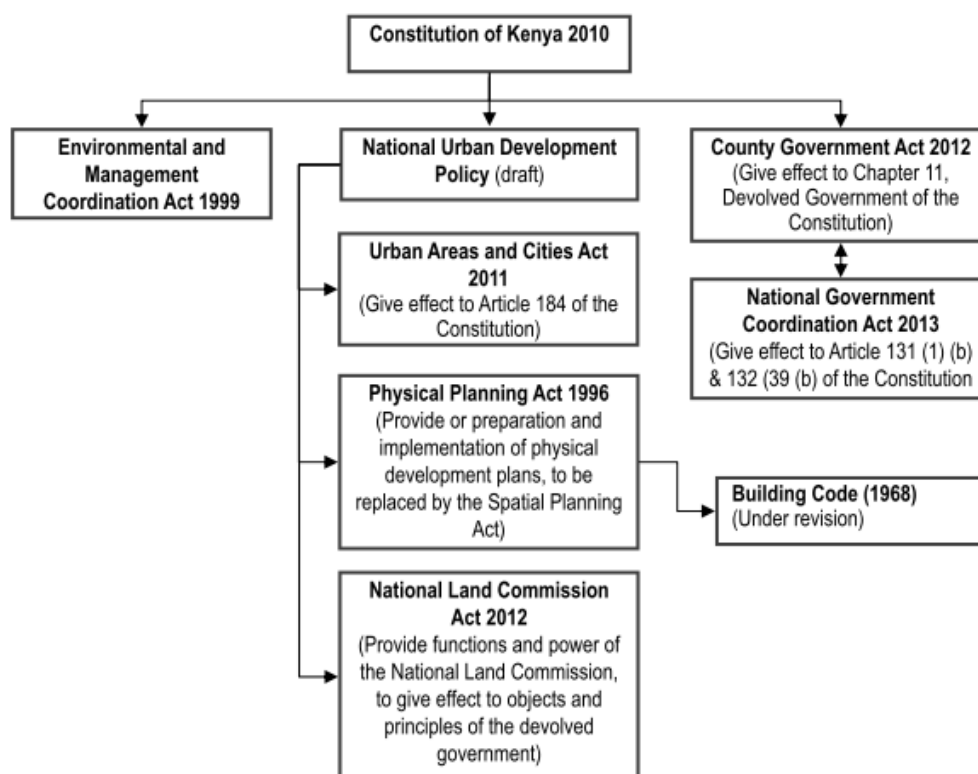
Relevant Laws

Appendix 2 Relevant Laws

A2.1 Urban Development

After the issuance of the 2010 Constitution of Kenya, laws and regulations have been revised to adjust to the new constitution. Laws related to urban development can be classified into: (i) laws concerning government management, (ii) laws concerning urban and physical development, and (iii) laws concerning environment.

The following figure shows the relation of related laws.



Source: NIUPLAN

Figure A 2.1 Structure of Concerned Laws and Plans

The following table shows the laws and regulations related to urban development management and their characteristics.

Table A 2.1 Laws related Management of Urban Development

Policy, Act	Coverage	Relation with Urban Planning
County Government Act 2012	County	<ul style="list-style-type: none"> Part XI County Planning Governance
National Government Coordination Act 2013	National government and county government responsibilities	<ul style="list-style-type: none"> To establish an administrative and institutional framework for the coordination of national government functions at the national and county level of governance. Chapter IV: Collaboration and dispute resolution between the national and county governments on issues of apparent concurrent mandate.
National Urban Development Policy	Urban area management	<ul style="list-style-type: none"> Chapter 5: County urban planning Governance

Urban Areas and Cities Act 2011	Urban areas and cities management	<u>Planning</u> • Part IV Physical development plans <u>Controlling</u> • Integrated development plan will be a basis for development control (36, (1), (g))
Physical Planning Act 1996	Physical development for the selected area and selected purpose for the concerned administrative unit	<u>Planning</u> • Part IV Physical development plans <u>Controlling</u> • Part V Control of development: physical development: building construction control, development control (change of users, extension of user, subdivision)
Land Acquisition Act 1986	Acquisition system of land for public benefit	
National Land Commission Act 2012	Land management mechanism	• Land management by the National Land Commission and devolved government in land management and administration
Building Code 1968	Building construction control	• Supplement the control of development stated in the Physical Planning Act 1996
Environmental Management and Coordination Act 1999	Environmental management	• Describes the legal and institutional framework of environmental management.

Source: NIUPLAN

A2.2 Transportation

In NIUPLAN, laws regarding infrastructure were reviewed and the modified laws shall be reviewed in the study. In addition to that, some laws regarding transportation, which are not mentioned in NIUPLAN; are also reviewed. The status of the laws reviewed in NIUPLAN and additional laws reviewed in the study are summarized in the Table below.

Table A 2.2 Relevant Laws Condition reviewed in NIUPLAN

Name of Act	Last Modified in	Note
(1) Kenya Roads Act No. 2 of 2007	Modified as The Kenya Roads Bill, 2015	Establishment of Kenya National Highways Authority and Kenya National Secondary Roads Authority are regulated.
(2) Public Roads and Roads of Access Act Cap 399	Date of commencement: 10th August, 1920 and last updated as L.N. 35/1970	Covered in NIUPLAN, No modification so far
(3) Energy Act No. 12 of 2006	Date of commencement: 7th July, 2007, and last amendment in 2012	Covered in NIUPLAN, No modification so far
(4) The National Land Commission Act No. 5 of 2012	Date of commencement: 2nd May, 2012.	Covered in NIUPLAN, No modification so far
(5) Survey Act Cap 299	Date of commencement: 31st December, 1961 and amended as Act No. 9 of 2000	Covered in NIUPLAN, No modification so far
(6) Urban Areas and Cities Act Number 3 of 2011	-	Covered in NIUPLAN, No modification so far
(7) Companies Act Cap 486	Date of commencement 15th June, 2016	Modified in 2015 and 2016. Act No. 17 of 2015, L.N. 233/2015, L.N. 109/2016, Act No 38 of 2016.
(8) Kenya Railways Corporation Act Cap 397	Date of commencement: 20th January, 1978.	Covered in NIUPLAN, No modification so far
(9) Intergovernmental Relations Act	Date of assent: 27th February, 2012.	Covered in NIUPLAN, No modification so far

Source: JICA Study Team

In this study, following acts have not reviewed in NIUPLAN, regarding the project.

- National Transport and Safety Authority Act
- NaMATA Order
- Transport Licencing Act
- Kenya Roads Bill

2.2.1.1 NATIONAL TRANSPORT AND SAFETY AUTHORITY Act

National Transport and Safety Authority Act, 2012 is to establish the National Transport and Safety Authority (NTSA) having following functions to;

- (a) advise and make recommendations to the Cabinet Secretary on matters relating to road transport and safety;
- (b) implement policies relating to road transport and safety;
- (c) plan, manage and regulate the road transport system in accordance with the provisions of this Act;
- (d) ensure the provision of safe, reliable and efficient road transport services; and
- (e) administer the Act of Parliament set out in the First Schedule and any other written law.

In particular, NTSA is on duty regarding motor vehicles (including public service) under the law;

- (1) inspection and certification on registration
- (2) regulation
- (3) advisory on national policy with regard to road transport system and
- (4) researching and coordination for road safety including development and implementation of road safety strategies

The board of NTSA consists on the following members, 12 in total;

- (a) a chairperson appointed by the President;
- (b) the Principal Secretary in the Ministry responsible for matters relating to transport;
- (c) the Principal Secretary in the Ministry responsible for matters relating to finance;
- (d) the Attorney-General;
- (e) the Inspector-General of the National Police Service;
- (f) four persons appointed by the Cabinet Secretary;
- (g) two persons appointed by the Cabinet Secretary to represent groups with special interests in the transportation industry; and
- (h) a Director-General

The public motor vehicle registration, and inspection of the road safety regarding pedestrian are administrated by NTSA thus the project shall be coordinated with NTSA.

2.2.1.2 The State Corporations Act (NaMATA Order)

It is an Act of Parliament to consolidate and reform the laws related to the incorporation, registration, operation, management and regulation of companies; to provide for the appointment and functions of auditors; to make other provision relating to companies; and to provide for related matters.

This is the order to establish Nairobi Metropolitan Area Transport Authority (NaMATA), issued in 17th February 2017 as a special issue under the state corporations act (Cap. 446). The authority is established after record of discussion of The project on detailed planning of integrated transport system and loop line in the Nairobi Urban Core signed in 26th December 2016. However, it should be noted that the bill is yet to pass the parliament as of August 2017.

The authority covers five counties i.e., Nairobi City, Kianbu, Machakos, Kajiado and Murang'a as the Metropolitan Area in Nairobi. The board of Directors of the authority consists of twelve (12) members as follows;

The authority covers five counties i.e., Nairobi City, Kianbu, Machakos, Kajiado and Murang'a as the Metropolitan Area in Nairobi. The board of Directors of the authority consists of twelve (12) members as follows;

- The chairperson of the Board, appointed by the President;
- Two Principal Secretaries responsible for transport and finance, respectively;
- The County Executive Committee Member responsible for transport in each of the said five counties of the Metropolitan Area;
- The Director General; and
- Three independent person who shall be appointed by virtue of their knowledge and experienced, transport and economic relevant field.

NaMATA is on duty to develop a sustainable integrated public transport strategy and urban mobility plan then formulate the Integrated Mass Rapid Transit System including BRT and Commuter Rail within the Metropolitan Area. NaMATA also to ensure the connectivity between modes such as air, road, rail and non-motorized transport. The regulation of parking and coordination between roads and public mode is responsible for the authority. Therefore, various functions in public transport sector from strategy planning to project formulation including coordination with other government agencies are given to NaMATA according to the act.

2.2.1.3 Kenya Roads Bill

The bill has revised in 2015 and the establishment of Kenya National Highway Authority and Kenya National Secondly Roads Authority are regulated in the bill.

- **Kenya National Highway Authority**

The Authority shall be responsible for the management, development, rehabilitation and maintenance of primary national trunk roads Classes S, A, B, H, and J. For the purposes of discharging its responsibility, the Authority shall have the following functions and duties

- (a) constructing, upgrading, rehabilitating and maintaining roads under its jurisdiction ;
- (b) controlling primary national trunk roads and road reserves and access to roadside developments;
- (c) implementing road policies in relation to primary national trunk roads;
- (d) ensuring adherence to the rules and guidelines on axle load control as provided under the Traffic Act;
- (e) ensuring that the quality of road works is in accordance with the standards prescribed by the Cabinet Secretary;

- (g) overseeing the management of traffic and road safety on secondary national trunk roads, in collaboration with other agencies;
- (h) collecting and collating all data related to the use of primary national trunk roads as may be necessary for efficient planning under this Act;
- (i) monitoring and evaluating the use of national trunk roads;
- (j) planning the development and maintenance of primary national trunk roads;
- (k) advising the Cabinet Secretary on all relating to primary national trunk roads;
- (l) preparing the investment programme annual road works programmes for all national trunk roads;
- (m) liaising and coordinating with other road agencies in planning and on operations in respect of roads; and
- (n) performing such other functions related to the implementation of this Act as may be directed by the Cabinet Secretary

- **Kenya National Secondary Roads Authority**

The Authority is responsible for the management, development, rehabilitation and maintenance of secondary National Trunk Roads classes C and D. For the purposes of discharging its responsibility, the Authority shall have the following functions and duties,

- (a) constructing, upgrading, rehabilitating and maintaining roads under its jurisdiction;
- (b) controlling secondary national trunk roads and road reserves and access to roadside developments;
- (c) implementing road policies in relation to secondary national trunk roads;
- (d) ensuring adherence to the rules and guidelines on axle load control as prescribed under the Traffic Act and any regulations made under this Act;
- (e) ensuring that the quality of road works is in accordance with such standards as may be prescribed by the Cabinet Secretary;
- (f) overseeing the management of traffic and road safety on secondary national trunk roads, in collaboration with other agencies;
- (g) collecting and collating all such data related to the use of secondary national trunk roads as may be necessary for efficient planning under this Act;
- (h) monitoring and evaluating the use of National Secondary Trunk Roads;
- (i) planning the development and maintenance of national secondary trunk roads;
- (j) advising the Cabinet Secretary on all matters relating to national' secondary trunk roads;
- (k) preparing the sector investment programme road works programmes for all national secondary trunk roads;
- (l) liaising and coordinating with other road agencies in planning and on operations in respect of roads; and
- (m) performing such other functions related to the implementation of this Act as may be directed by the Cabinet Secretary.

Instead of new authorities establishment, *“The Cabinet Secretary shall review and revoke all legal notices establishing the former authorities¹ under the bill. The former authorities*

¹ Kenya Roads Bill, 93

indicates KeNHA, KeRRA and KURA and those agencies shall be transferred to National Highway Authority and Kenya National Secondly Roads Authority with a period of transition. However, former authorities still be responsibility to maintain and construct as of September 2017, past two years after the bill gazetted. The reconstruction of the road related agencies shall be solved.

In addition to that, Under the decentralization request which gives counties empowered in the revised constitution in Kenya, roads shall be maintained and constructed responsibility counties in charge, i.e., “Each county government shall, within its area of jurisdiction, be responsible for the construction and maintenance of the county roads² . The capacity of counties also shall be improved to function properly under the new act.

A2.3 Environment

1) Law and Policy Related to Environmental Consideration

The Environmental Management and Co-ordination Act (EMCA), formulated in 1999, amended in 2015, serves as the environmental law related to environmental and social considerations in Kenya. Pursuant to the Act, the National Environment Council (NEC) as the administrative authority and the National Environment Management Authority (NEMA) as the executive authority were established. Formulation of detailed regulations for EMCA followed, including Environmental Impact Assessment and Audit Regulations, regulations related with prevention of air and water pollution, waste management, and noise control. In addition, the amendment to the Act accompanied regulations for Strategic Environment Assessment (SEA).

Other regulations pertaining to the environment include wildlife conservation, management of forest resources, control of water resources, and safety, health, and welfare of workers. With EMCA being enforced, it demands that EIA prepared according to EMCA be submitted to the relevant agency along with a permit application for resource utilization or development as required for the use of natural resources, implementation of construction, and construction of facility, and SEA be submitted with a master plan for establishing legislations, policies, and programs.

The laws and policies related to environmental considerations are as follows:

Table A 2.3 Law and Policy (Environmental Consideration) in Kenya

Name	Abstract	Responsible Org.
1. Environmental Consideration Related Law		
The Environmental Management and Co-ordination Act, 1999 Amendment Act, 2015	Pollution prevention Environmental conservation	MEWNR NEC NEMA
1.1 EIA/SEA		
The Environmental (Impact, Audit and Strategic Assessment) Regulation 2009	Environmental Impact Assessment, Strategic Environmental Assessment, Procedures for Environmental Audit, Requirement for applying EIA, SEA License	NEMA
County Government Act 2012	It mandates provisions of opportunities for citizen participation to SEA · EIA via ICT, town hall meetings, notice boards, etc.	NCCG
1.2 Pollution Prevention		
The Environmental Management and Coordination	Management of air pollution	NEMA

² Kenya Roads Bill, 94(1)

Name	Abstract	Responsible Org.
(Air Quality) Regulations, 2008, Revised 2012		
The Environmental Management and Coordination, (Water Quality) Regulations 2006, Revised 2012	Quality standards for domestic water Monitoring discharge	NEMA
The Environmental Management and Coordination, (Waste Management) Regulations 2006, Revised 2012	Regulation and management of waste	NEMA
The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009	Noise and vibration control	NEMA
The Environmental Management and Co-Ordination (Controlled Substances) Regulations, 2007	Conservation of Ozone Layer	NEMA
The Environmental Management and Co-Ordination (Conservation of Biological Diversity and Resources, Access to Genetic Resources and Benefit Sharing) Regulations, 2006	Conservation of biological diversity and management of genetic resources	NEMA
The Environmental Management and Co-Ordination (Wetlands, River Banks, Lake Shores and Sea Shore Management) Regulations, 2009	Wetlands, riverbanks, lake shores, and sea shore conservation	NEMA
The Environmental (Prevention of Pollution in Coastal and Other Segments of the Environment) Regulation, 2003	Management of harbour (ship) drainage	NEMA
2. Natural Environment, Cultural Heritage		
The Wildlife (Conservation and Management) Act (Cap 376) (1985) Revised Edition 2009	Conservation and management of wildlife	MEWNR KWS
The Forests Act, 2005, Revised 2012	Management and conservation of forest	MEWNR KFS
The Water Act, 2002, Revised 2012	Conservation of water resources	MEWNR WRMA
The Water Resources Management Rules, 2007	Regulation of water use including groundwater, prevention of water pollution (requirement for water permit)	WRMA
The National Museums and Heritage Act (Cap 216) (2006) Revised Edition 2009	Establishment of national museums and preservation of cultural heritage	MEAC NMK
3. Laws and Regulations related with Environment during Construction		
The Occupational Safety and Health Act, 2007, Revised 2010	Securing safety, health, and welfare of all worker	MLSSS
The Public Health Act (Cap. 242) 1986, Revised 2012	Securing safety and health during the land use (development)	MoH
The Physical Planning Act (Cap. 286) Revised Edition 2010 (1996)	Development permits from local authority	MoLH&UD Central/District Development Committees
The Energy Act, 2006, Revised 2012	Development permit for construction of facility for the energy sector	MOEP
The Wayleaves Act (Cap. 292) Revised Edition 2010 (1989)	Procedures for laying utility lines in private land	The Government of Kenya

Source: JICA Study Team

2) Law and Policy Related to Social Consideration

The basis for the laws and policies related to the Social Consideration in Kenya lies in securing human rights and property rights. As such, the constitutional Bill of Rights enacted in 2010 governs the related laws and policies. The Bill of Rights, Chapter Four of the Constitution of Kenya, recognises the need to address the needs of marginalised communities, which include “traditional communities with unique culture and identity”, “indigenous communities maintaining traditional lifeways and livelihood”, and “pastoralists and their communities”. Through taking legislative and other measures, it also prohibits direct or indirect discrimination against marginalised group of individuals who are suffering or have suffered

from disadvantage on any ground including race, sex, pregnancy, marital status, health status, ethnic or social origin, colour, age, disability, religion, conscience, belief, culture, dress, language or birth. Notably, it states that the State shall take legislative measures to implement the principle that women, persons with disabilities, youth, ethnic groups, and other minority groups shall be represented in the congress. In addition, Chapter Five of the Constitution of Kenya, 2010, recognises a new form of land ownership, namely, community land that is vested in and held by communities. This will be of importance from the perspective of land acquisition.

Law and Policy related to Social Consideration are as follows.

Table A 2.4 Law and Policy (Social Consideration) in Kenya

Name	Abstract	Responsible Org.
1. Constitution		
The Constitution of Kenya, 2010	Chapter 4: recognizes rights to marginalized groups or communities Chapter 5: recognizes community land	All State organs
2. Land		
Land Acquisition Act (Cap. 295) Revised Edition 2010 (1983)	Provides for procedures for acquiring land for public use.	MoLH&UD
Government Lands Act (Cap. 280) Revised Edition 2012 (1984)	Provides for procedures for government land.	MoLH&UD NLC
Trust Land Act (Cap. 288) Revised Edition 2012 (1970)	Provides for procedures for Trust Land owned by local administrative body.	MoLH&UD Council Divisional Land Board
Registration of Titles Act (Cap. 281) Revised Edition 2010 (1982)	Provides for procedures for registering land and transferring title.	MoLH&UD NLC
Registered Land Act (Cap. 300) Revised Edition 2012 (1989)	Provides for record of registered land.	MoLH&UD
National Land Commission Act 2012	Provides for conditions to prepare RAP. Provides for land acquisition for public use.	MoLH&UD NLC
Land (Group Representatives) Act (Cap 287) Revised Edition 2012 (1970)	Provides for procedures to incorporate group representatives as owners of land (procedures to elect legal owners of customary land).	MoLH&UD Council
Land Adjudication Act (Cap 284) Revised Edition 2012 (1977)	Provides for procedures to adjudicate on ownership of trust land.	Council
Land Consolidation Act (Cap 283) Revised Edition 2012 (1977)	Provides for the ascertainment of ownership for the consolidation of trust land (other than land to which the Land Adjudication Act applies).	Council
Land Titles Act (Cap. 282) Revised Edition 2010 (1982)	Provides for establishment of a Land Registration Court and its jurisdiction.	MoLH&UD Recorder of Titles appointed by the President
Land Disputes Tribunals Act (Cap303A) Revised Edition 2010 (1990)	Provides for establishment of a Land Disputes Tribunals and its jurisdiction	MoLH&UD
Landlord and Tenant (Shops, Hotels and Catering Establishments) Act (Cap 301) Revised Edition 2012 (1984)	Provides for the protection of tenants	MoLH&UD
Land Control Act (Cap. 302) Revised edition 2012 (1989)	Provides for controlling transactions in agricultural land	MoLH&UD
Valuers Act (Cap.532) Revised Edition 2012 (1985)	Provides for the registration of valuers and the certification requirements	MoLH&UD
3. Human Rights		
The Kenya National Commission on Human Rights Act, 2002, Revised 2012	Protection and enhancement of human rights	KNCHR
4. Labour Security		
The Employment Act, 2007, Revised 2012	Protection of employee rights, prohibition of child labor	MLSSS
The Labour Relations Act, 2007, Revised 2012	Right to form a trade union	MLSSS
The Work Injury Benefits Act, 2007, Revised 2012	Compensation to employees for work related injuries and diseases	MLSSS

Source: JICA Study Team

Appendix-3

List of Projects in GIS Database

Appendix 3 Projects List in GIS Database

Mode and/or Project Type	No	Project Title	Superordinate Project	Organization	Fund	Status	Description & Remarks	Years to complete
1. Mass Transit System: Public Transport	1-1_	Lot 1 (Mombasa road) Imara Daima - Nyayo Stadium	Harmonization Study	KeNHA	WB	DD completed including operation plan	Financed by WB. Implementation agency is KeNHA.	
	1-2_	Lot 2 (Uhulu highway) Nyayo Stadium - Univ. way RA	Harmonization Study	KeNHA	WB	No activity	No information	
	1-3_	Lot 3 (Waiyaki way) Univ. way RA - Kangami	Harmonization Study	KeNHA	WB	Study re-started by new consultant	Supported by WB.	
	1-4_	Line 2 East (Thika road): CBD - Ruiru	Harmonization Study	KeNHA	-	No activity	Road widening has been completed. However, there is no room for BRT at Thika road.	
	1-5_	Line 2 West (Langata road): Bomas Kenya - CBD	Harmonization Study	KeNHA		No activity	Road widening has been completed between Langata cemetery and Bomas. There is no space for BRT.	
	1-6_	Line 3 East (Juja road): CBD - Njiru	Harmonization Study	KURA	EU	DD has been completed between KNH to Dandra	Supported by EU. Implementing agency is KURA. Consultant is Ingerop.	
	1-7_	Line 3 West (Ngong road): Show ground - CBD	Harmonization Study	KURA	EU	DD is on-going.	Supported by EU. Implementing agency is KURA. Consultant is Ingerop. There will be reserved space for bus lane (9m width) after the road widening project by JICA. However, BRT plan requires demolish of the on-going new road.	
	1-8_	Line 4 West: T Mall - City Stadium	Harmonization Study	KURA	EU	No information.	Supported by EU. Implementation agency is KURA. Consultant is Ingerop.	
	1-9_	Line 4 East: City Stadium - Mama Lucy	Harmonization Study	KURA	AfDB	DD is on-going.	Supported by AfDB. Implementing agency is KURA. Consultant is Gauff.	
	1-10_	BRT Line-5: Balozi - Imara	Harmonization Study	KURA	AfDB	Basic design is on-going.	Supported by AfDB. Implementing agency is KURA. Road expansion project is on-going.	
	1-11_	Loop Line Project	NIUPLAN	NCCG	JICA	Study is on-going	To avoid congestion at CBD, diverting MRT/LRT passengers by the loop line. To provide sub-centres plan around interchange stations.	
2. Mass Transit System: Railway	2-1_	SGR Project	-	KRC	China	Start Operation Between Mombasa - Nairobi South Sta.	Have a possibility to extend upto CBD area	2017

Mode and/or Project Type	No	Project Title	Superordinate Project	Organization	Fund	Status	Description & Remarks	Years to complete
	2-2_	JKIA Project	-	KRC	China	Preliminary design stage	It is planned to connect JKIA from SRT station with electrified standard gauge. It takes 30 months once construction works started.	-
	2-3_	Construction of stations	NaMSIP	KRC	WB	Under Construction	20 stations will be improvement and 10 stations improvement works will be completed by the end of 2017. Syokimau, Imara Daima, Makadara station construction works has already completed.	2017
	2-4_	Meter Gauge Track Improvement	-	KRC	WB	Improvement plan has not established.	-	-
	2-5_	Commuter Railway Master Plan	NUTRIP	KRC	WB	Mobilized since September 2017	-	2018
3. Road Improvement	3-1_	A104 Highway	NUTRIP	KeNHA	WB	Process of procurement for consultancy service	1. Section of B10 & A104 Highways from JOMO KENYATTA INTERNATIONAL AIRPORT to Southern Bypass Junction and Dualling of AIRPORT SOUTH ROAD including BRT Infrastructure; And Access Road from A104 to the Inland Container Depot 2. Section of A104 highway from JAMES GICHURU ROAD Junction to RIRONI	-
	3-2_	Lusaka Road turning into dual carriageway	-	KURA	EU	On-going	Mombasa Road to Enterprise Road	-
	3-3_	Enterprise Road turning into dual carriageway	-	KURA	EU	On-going	Likoni Road to Homa Bay Road	-
	3-4_	Likoni Road turning into dual carriageway	-	KURA	EU	On-going	Mombasa Road to Enterprise Road	-
	3-5_	Muratina street upgrading and extension	-	KURA	EU	On-going	General Waruingi Road to Juja Road, Juja Road to Thika Road	-
	3-6_	Quarry Road turning into dual carriageway and extension Road and Accra road extension	-	KURA	EU	On-going	Quarry Road to Landhies Road, Accra road to Ngara Road	-
	3-7_	Footpath/cycleway alongside Rabai and Mumias South Road	-	KURA	EU	On-going	Rabai and Mumias South Road	-
	3-8_	M-15 Road Constuction	NUTRANS	KURA	EU	On-going	M15, in NUTRANS	-
	3-9_	The Project for Dualling of Ngong Road (Phase-1)	-	KURA	JICA	On-going	from Adams Arcade (Elgeyo Marakawet Road Roundabout) to the Junction of Ngong Road/Kenyatta Avenue (5km)	2017
	3-10_	The Project for Dualling of Ngong Road (Phase-2)	-	KURA	JICA	Planning Stage		-

Mode and/or Project Type	No	Project Title	Superordinate Project	Organization	Fund	Status	Description & Remarks	Years to complete
	3-11_	The Project for Dualling of Ngong Road (Phase-3)	-	KURA	GoK	On-going		2019
	3-12_	Nairobi Viaduct and Road Construction Project	NIUPLAN	KURA	JICA	Under Feasibility Study	Widening of Enterprise Road and Viaduct (1) connecting Enterprise Road (South area) and CBD (North area) Viaduct (2) connecting Railway City and Jogoo Road (east side)	
	3-13_	Selected Roads and a Green Mall Street Bus Station in the Nairobi Railway Station and its Surroundings	NaMSIP	MoLH & UD KRC, NCC	WB	Study is on-going	Road No. 1:- Begins at Haile Selassie Avenue and cuts through railway yard to end up at Workshop road. Road No. 2:- Begins at Haile Selassie Avenue/Race course road roundabout and proceeds southward through Nairobi railway yard and workshops to end up at Enterprise road. Road No. 3- Begins at Haile Selassie Avenue at Wakulimamarket and traverses present-day MuthurwaMarket.	
	3-14_	Jogoo Road Interchanges with a future Implementation of a BRT	-	KURA	Brazil	Under Design Preliminary	a) Haile Selassie Avenue - Landhies Road - Ring Road Ngara Roundabout b) City Stadium Roundabout c) Jogoo Road - First Avenue Eastleigh - Likoni Road Intersections d) Rabai Road - Likoni Road Intersection	
	3-15_	Intelligent Transportation System (ITS) and associated Civil Engineering Works in Nairobi County	NUTRIP	KURA	WB	Study is on-going	Feasibility Study, Engineering Design, Tender Documentation, Implementation Supervision, and Oversight and Monitoring of the installed ITS. The consultant is Gauff.	
	3-16_	Decongestion of CBD in Nairobi	-	NCC	GOK	Under D/D & Feasibility Study	a) Core CBD: Proposal for decongestion program in core CBD b) Expanded CBD: Traffic management at crossing points of codeline and trunk road c) Huful Highway: Removal of existing 6 Rbt. And signalization (civil works will be done under Southern BP project)	
	3-17_	Rehabilitation and Upgrading of Upperhill Roads Phase 1		KURA		Substantially complete(Under Defects Liability Period)		4 Years

Mode and/or Project Type	No	Project Title	Superordinate Project	Organization	Fund	Status	Description & Remarks	Years to complete
	3-18_	Construction of Missing Link roads and Non Motorized Transport (NMT) facilities in Nairobi		KURA		On-going		3 Years
	3-19_	Nairobi Outering Road Improvement Project		KURA		On-going		3 years
	3-20_	Construction to Bitumen Standards of Ngong Road-Kibera-Kungu Karuma-Langata Road (Missing Link no.12)		KURA		On-going		2 Years
	3-21_	Construction to Bitumen Standard of Waiyaki way-Redhill link road		KURA		On-going		2 Years
	3-22_	Upgrading to Bitumen Standards of Githurai-Kimbo Road (phase 2)		KURA		On-going		1 Year
	3-23_	Rehabilitation and Upgrading of Eastleigh Roads phase 2		KURA		On-going		2 Years
	3-24_	Construction of access to Embakasi (infinity) Industrial park		KURA		On-going		1 Year
	3-25_	Construction of Access Road to Ruai Police Station		KURA		On-going		1 Year
	3-26_	Rehabilitation and Upgrading of Upperhill Roads Phase 2		KURA		On-going		2 Years
	3-27_	Upgrading to Bitumen Standards of Lenana - Muchugia-Dagoretti Market Link Road		KURA		On-going		1 Year

Mode and/or Project Type	No	Project Title	Superordinate Project	Organization	Fund	Status	Description & Remarks	Years to complete
	3-28_	Nairobi Roads Rapid Decongestion Programme (LOT 5);improvement of Junctions: Mbagathi Way/Mbagathi Road Mbagathi Way/access to Montezuma Funeral Home Lang'ata Road/Mai Mahiu Road Junction Langata Road/Access to Carnivore Langata Road/Access to Langata estate. Rehabilitation of Nyumba Moja and Muiri Road	Nairobi Roads Rapid Decongestion Programme	KURA		To be Retendered		2 Years
	3-29_	Nairobi Roads Rapid Decongestion Programme (Lot 6); Improvement of junctions: Argwings Kodhek,Ralph Bunche and Woodlands roads)	Nairobi Roads Rapid Decongestion Programme	KURA		On-going		1 Year
	3-30_	Nairobi Roads Rapid Decongestion Programme phase 2-(Lot 7) Improvement of Dagoretti Corner Junction	Nairobi Roads Rapid Decongestion Programme	KURA		On-going		1 Year
	3-31_	Nairobi Roads Rapid Decongestion programme phase 2-(Lot 9)	Nairobi Roads Rapid Decongestion Programme	KURA		On-going		1 Year
	3-32_	Improvement of Kigwa Close		KURA		Complete		3 Months
	3-33_	Improvement of Kanyagia Drive		KURA		Complete		6 Months
	3-34_	Improvement of Forest View (Part)/Farah(Part)/Begonia(Part) and Lower Plains Road		KURA		Complete		8 Months
	3-35_	Improvement of Road C		KURA		On-going		
	3-36_	Improvement of Pepo Lane		KURA		On-going		
	3-37_	Missing Link Project (Ring Road Parklands)		KURA		On-going		

Mode and/or Project Type	No	Project Title	Superordinate Project	Organization	Fund	Status	Description & Remarks	Years to complete
	3-38_	Missing Link Project (Eastleigh First Ave.)		KURA	EU	On-going		
4. Land Development	4-1_	Nairobi Viaduct and Road Construction Project	NIUPLAN	KURA	JICA	Under Feasibility Study	Integration or relocation of existing bus terminals in coordination with Viaduct, BRT and other related plan.	
	4-2_	Redevelopment of the Nairobi Central Railway Station and its Surroundings	NaMSIP	MoLH & UD KRC, NCC	WB	Consultant service started	Project area is 148.9 ha which consists 118.3 ha of KRC Land and 30.6 ha of surrounding private lands. The consultant is DOHWA	
	4-3_	Selected Roads and a Green Mall Street Bus Station in the Nairobi Railway Station and its Surroundings	NaMSIP	MoLH & UD KRC, NCC	WB	Under Feasibility Study	Proposed Green Mall Street Bus Station: It will be a high capacity bus station. Its length is approximately 1.7 Km - This will be part of a multi-use wide-ranging green corridor beginning at Uhuru highway and ending at proposed Road No. 3 and will be situated on Nairobi Railway station marshalling yard.	
	4-4_	Multi-storied car park at the Sunken Car Park land	-	NCC	GOK	Under studying	Development will be a public private partnership (PPP) with the county providing the land.	
	4-5_	Wakulima market relocation to Eastlands	-	NCC	-	Fund finding	Nairobi's largest fresh produce market is set to be relocated to Eastlands as the county government seeks to decongest the Central Business District.	
	4-6_	Eastland Urban Renewal Project	NaMSIP	MoLH&UD, NCC	GoK	Under studying	The study is aimed to achieve; a) Providing a Development Framework for over 20 years b) Delineation a Functional Urban Renewal Area c. Preparation of an Urban Renewal Framework d) Preparation of Urban Development Model and e) Determination of Land Ownership Patterns	2017
	4-7_	Interdisciplinary Land-Use and Transport Metropolitan Analysis within the Nairobi Metropolitan Region (ILUT)	-	MoLH&UD	GoK	Final Report has been submitted	Final Report on Phase I and Phase II had submitted in September 2015. The main objectives of the ILUT study are (i) Analyzing the missing links between the existing diverse transport plans and proposing the integration of intermodal transfers among different modes of transport; (ii) Analyzing the land use development around the main intermodal nodes, and (iii) Providing detailed engineering designs for selected infrastructure around selected commuter rail stations.	

Appendix-4

Database Update Manual

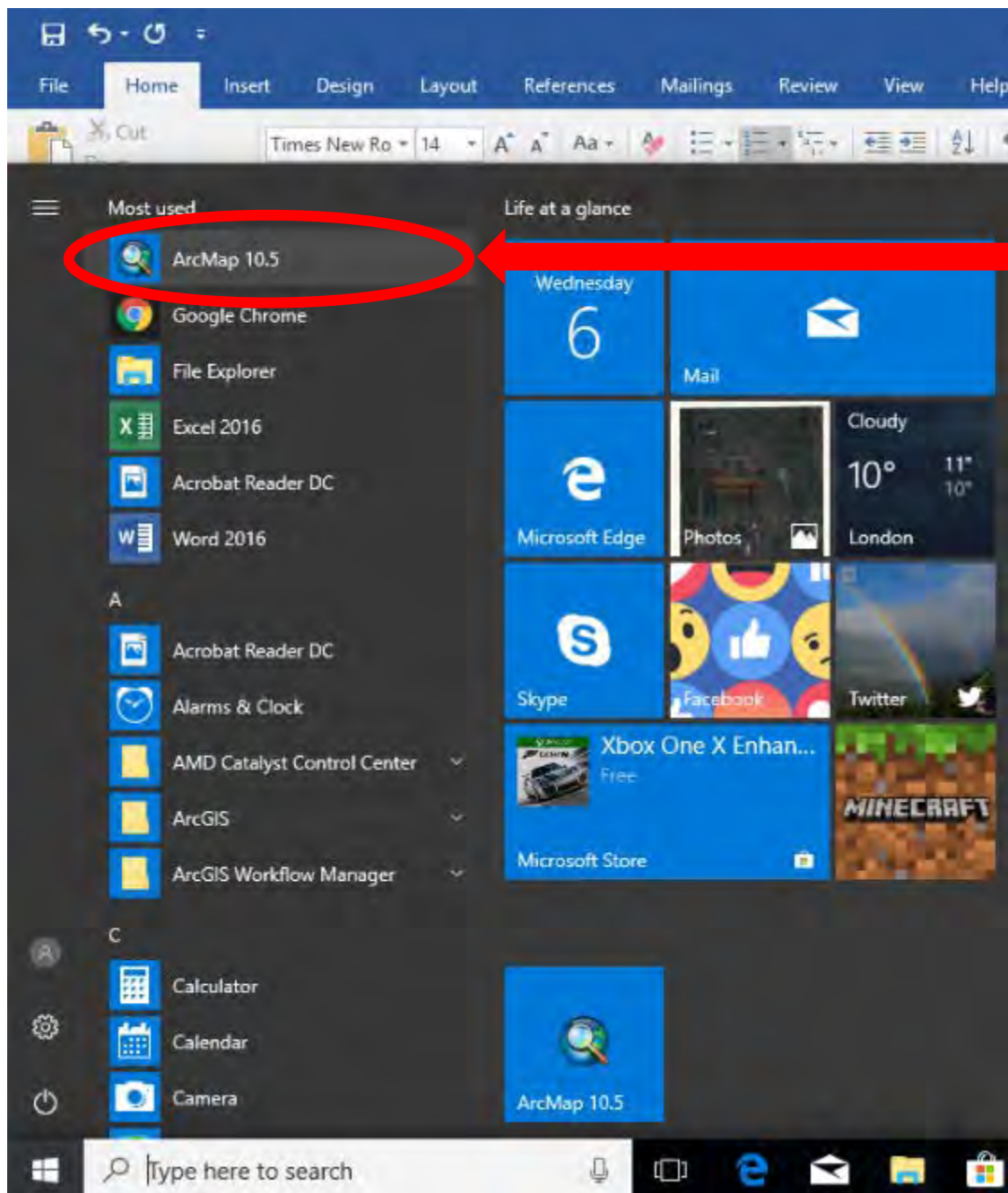
Project Database Update Manual (ver.2)

JICA Study Team

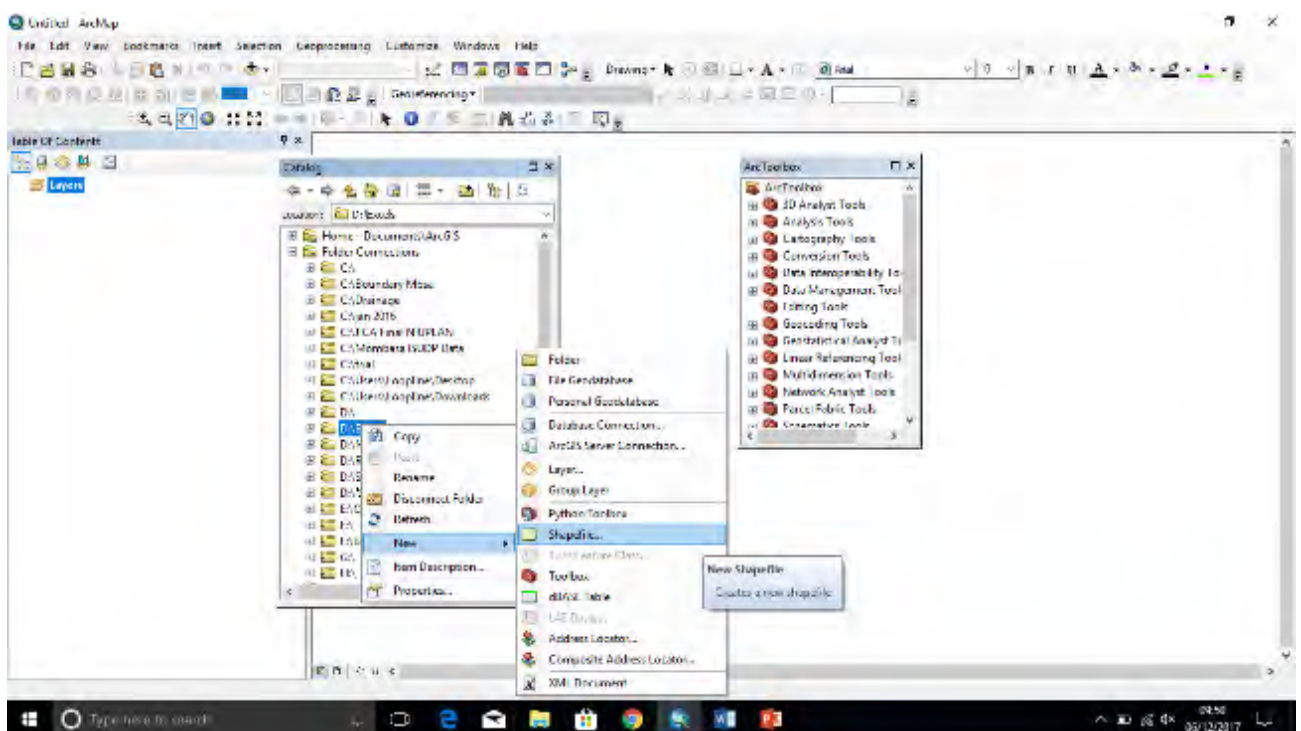
22 Dec. 2017

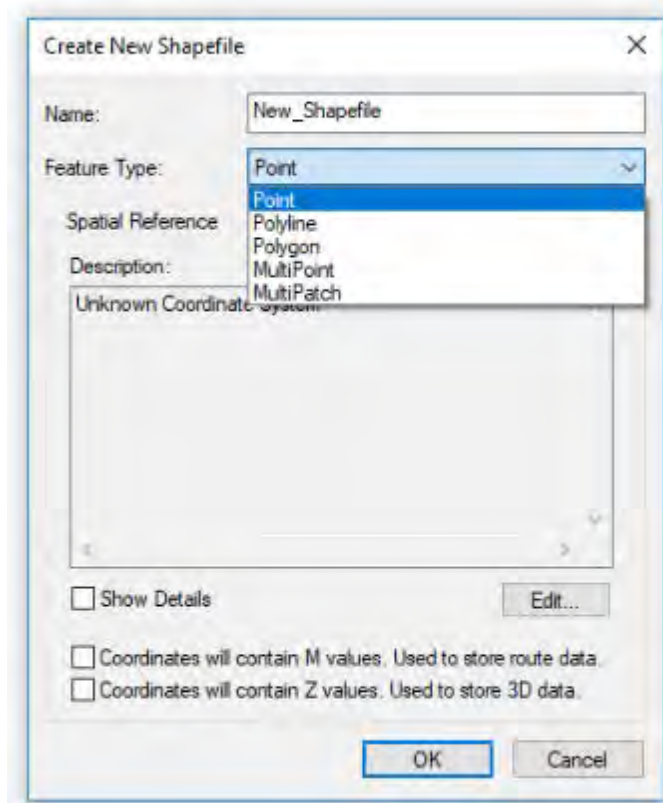
How to Create and Update a Geodatabase in ArcGIS (Version 10.5) in easy steps

- A. Open a new ArcMap document. This can be done by Navigating from Windows tab to ArcMap tab.



- II. Right click on the folder path and proceed with the creation of the shapefile
- III. To create the shapefile, there are five options; Polygon, point, polyline, multi-point and multi-patch features. The decision is based on the type of shapefile to be created eg. For a road use polyline, for a parcel of land use polygon, for location of a bore-hole use point. In case the point feature created should contain several points within one file use multipoint feature. For a shape file with multiple polygons, use Multi patch.
- IV. A point feature is When a feature's geometry consists of only a single vertex and is presented like a dot on the map
- V. A polyline is Where the geometry consists of two or more vertices and the first and last vertices do not have the same coordinates.
- VI. A Polygon is Where three or more vertices are present, the last vertex is and the first vertex have the same coordinates and therefore the feature encloses.






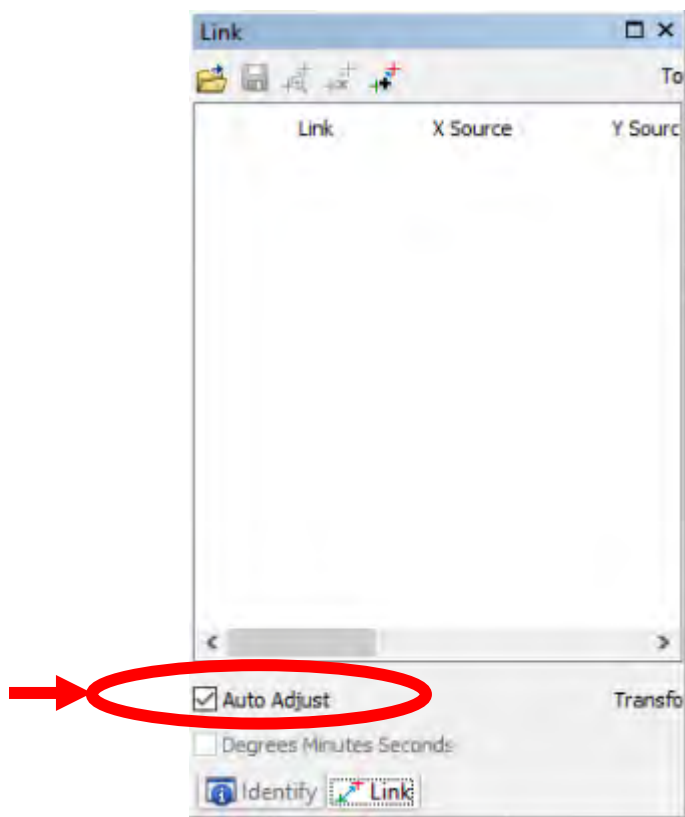
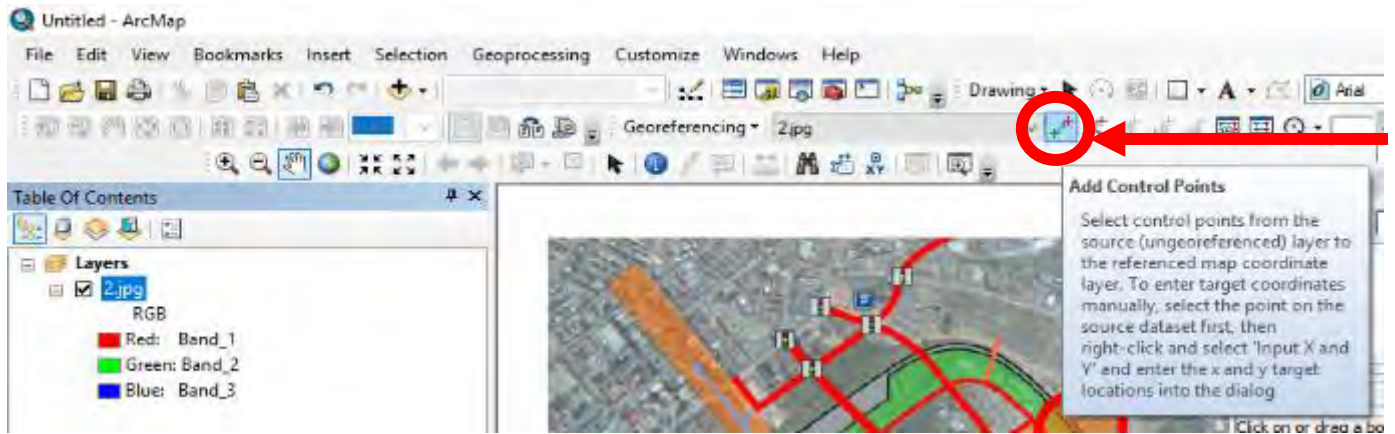
- VII. Under the description tab, click the edit button and specify the coordinate system we use for Nairobi by navigating through the following folders;
 projected coordinate systems → UTM
 → WGS 1984 → Northern Hemisphere → WGS 1984
 UTM Zone 37N. Click OK. The shapefile has been created successfully.
- VIII. To edit the new shapefile; Right click the new shapefile → Editing → Start Editing.
- IX. Proceed to digitise the area of interest. After the required data has been created, remember to save your work by clicking on the save edit button under the editor tool bar.



D. In case you have a Map which you would like to Geo reference, add your

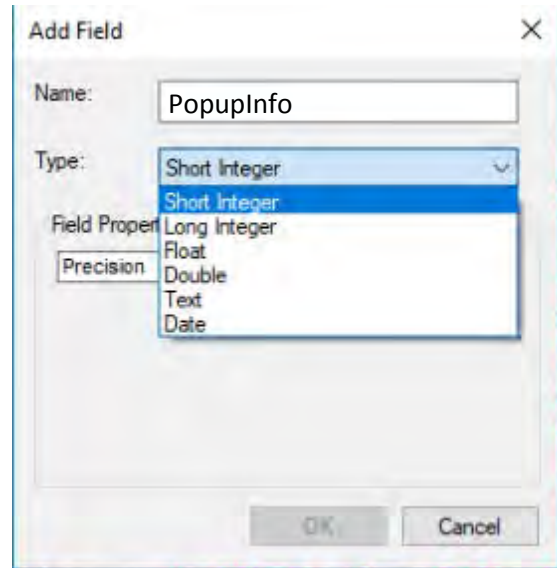
map into GIS by clicking on the  button

Do this for all the 4 points and click on the adjust button which appears at the bottom of the window. Your Map is now Geo referenced to the coordinate system used to describe the 4 control points. Proceed with the creation of your shapefile.



G. Once the required shapefile is on the ArcMap document, you may wish to add additional information on the shapefile. To do this;

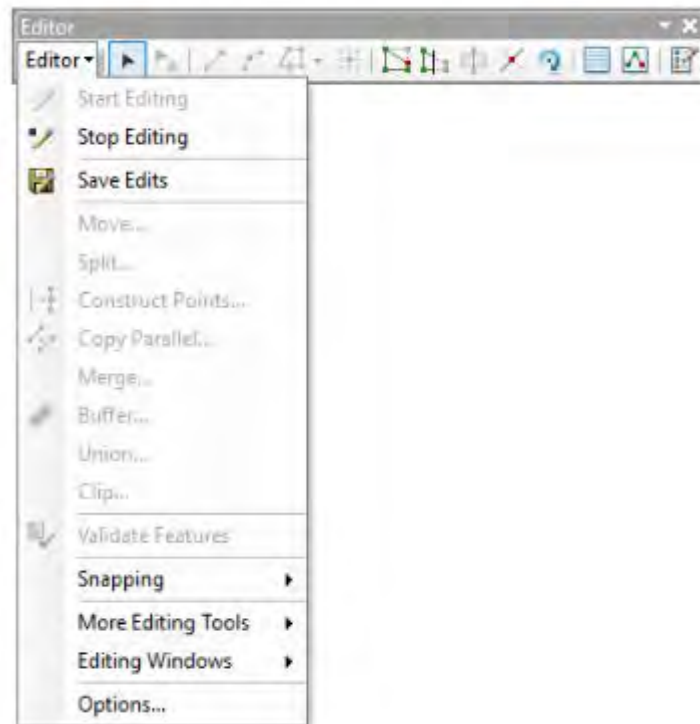
- I. Right click on the shapefile → open attribute table → Add Field.



- II. Under type of field, there are six different options. Choose the type based on the nature of data you would like to include on the attribute table. If you intend to add text in the field created then the type should be text.
- III. The long Integer and Short integer store whole numbers where short integers store short whole numbers while long integers store long whole numbers
- IV. Float and Double data type store numbers with decimal place with Double saving numbers with a longer decimal place than the float
- V. After selecting the type Click Ok

FID	Shape *	OID_	Name	PopupInfo	Shape_Leng	No	
0	Polyline ZM	0	BRT Line 1		0.190756	1-3	
1	Polyline ZM	0	BRT Line 1		0.190756	1-1	
2	Polyline ZM	0	BRT Line 1		0.190756	1-2	
3	Polyline ZM	0			0	1-4	1. Mass T
4	Polyline ZM	0			0	1-5	1. Mass T
5	Polyline ZM	0			0	1-6	1. Mass T
6	Polyline ZM	0			0	1-7	1. Mass T
7	Polyline ZM	0			0	1-9	1. Mass T
8	Polyline ZM	0			0	1-10	
9	Polyline ZM	0			0	1-8	


- VI. In order to insert data on the newly created field on the shape file, right click on the shapefile and click start editing. After the required data has been inserted by typing within the new field, click save edits on the editor toolbar and then click stop editing once you are completely done. The options within the editor toolbar should be active once the start editing button has been clicked. You may also change the shape of the shapefile while you are in the editing session.

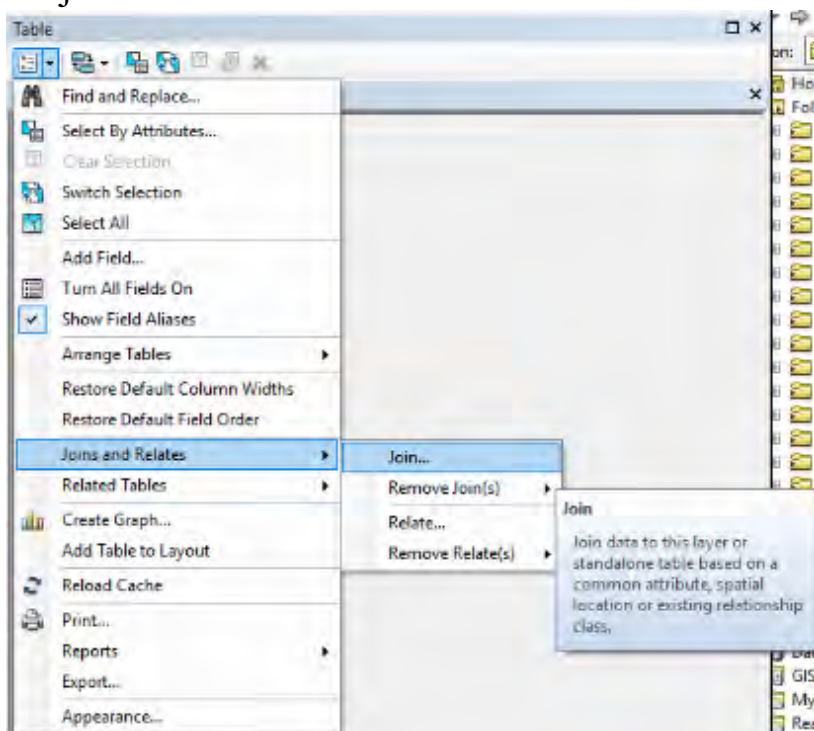


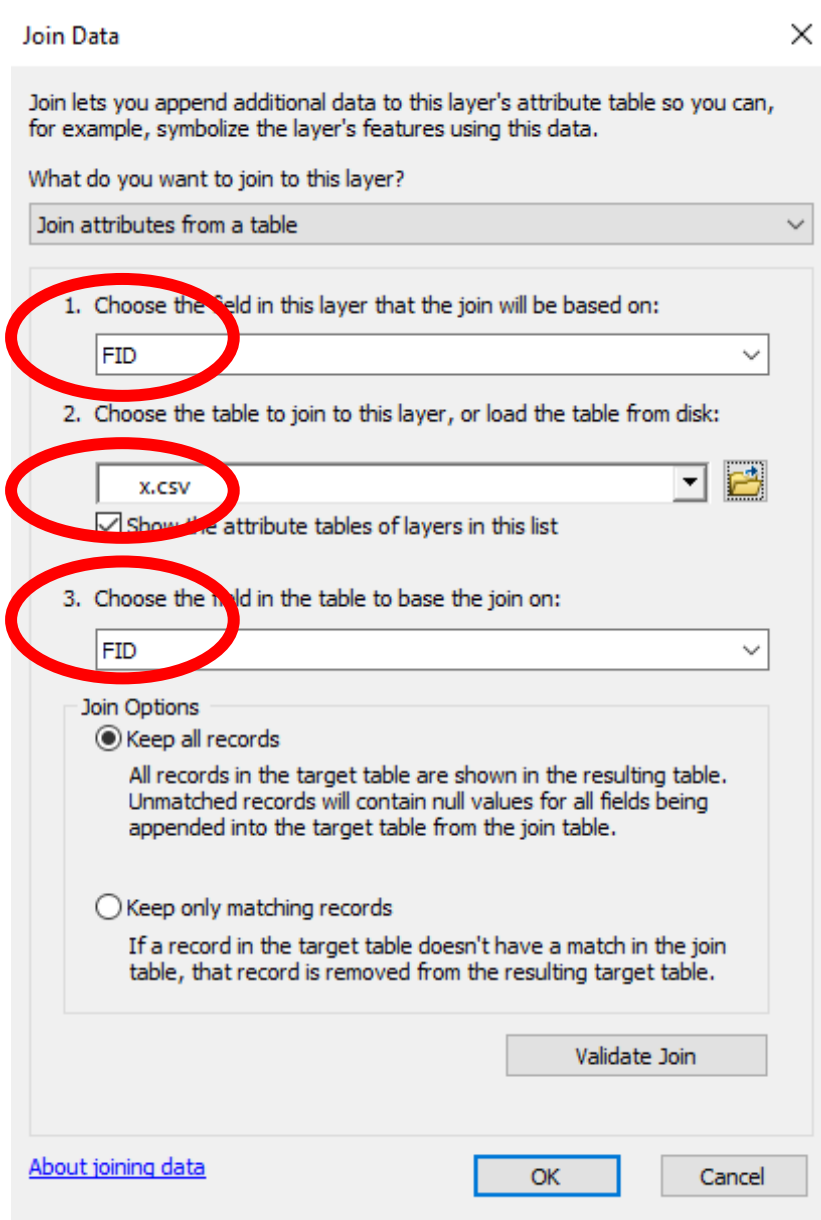
- H. In case you have a table which you wish to add to a shape file, ensure that there is one column on ArcGIS which is similar to another column on excel file Like Below

	A	B	C	D	E	F
1	FID	Mode or Project type	No	Project Title	Superordinate project	organization
2		0 Eastlan renewal project	4-3	Eastlands renewal	NaMSIP	NCC
3						
4						

	FID	Shape *	Id	Area
▶	0	Polygon	0	11.779538

- I. From the 2 tables above, the Column “FID” appears in both. This is the Column we shall use to join the two tables.
- J. To join the two tables in ArcGIS, go to the  button and Navigate to the join button as shown below





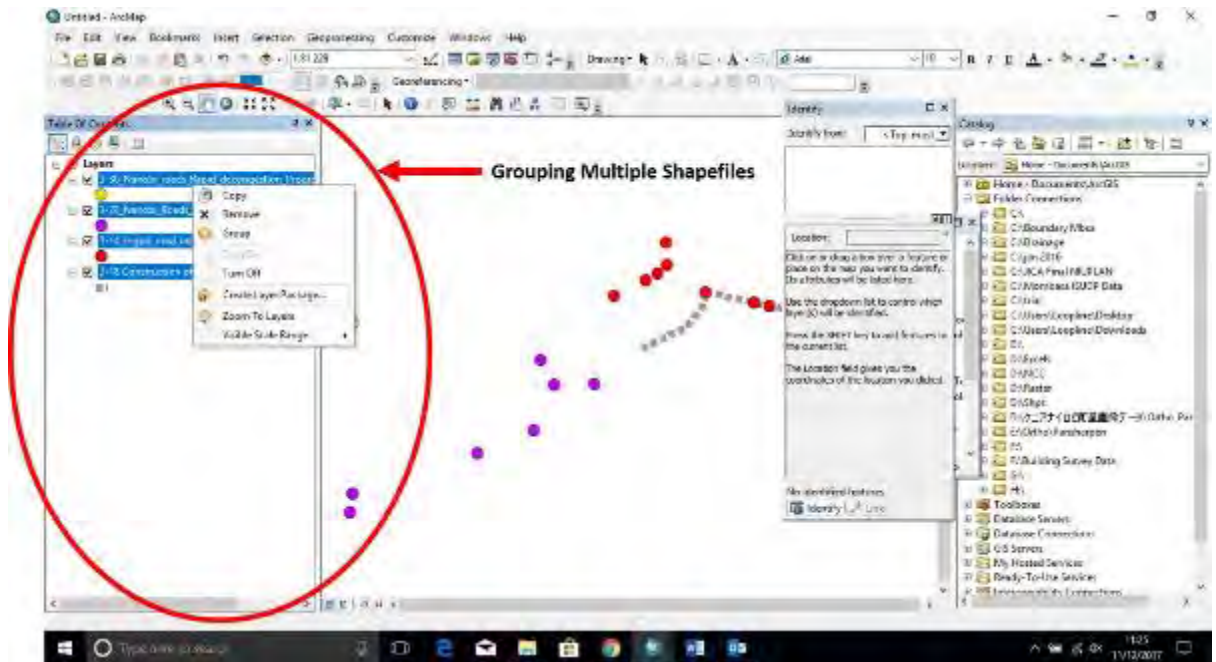
K. It is important to note the area marked in red. Ensure 1 and 3 both have FID selected since this is the field that will be used to perform the Join operation. Number 2 shows the name of the excel file to be used in the join. Ensure that it is saved in a .csv format

L. Finally, click validate join and then OK to complete the operation.

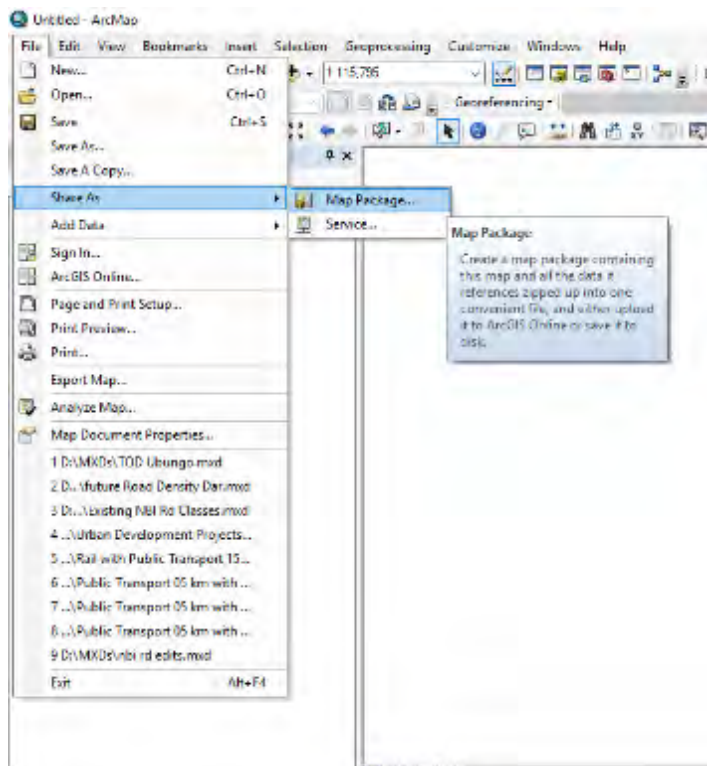
M. In case multiple polygons should be considered as a single entry on the attribute table then use the merge feature within the editor toolbar to merge the polygons.

In case you would like to group together multiple shapefiles that are not of the same type, select all the layers from the table of Content window that you would like to group. After selecting the layers, right click and click group.

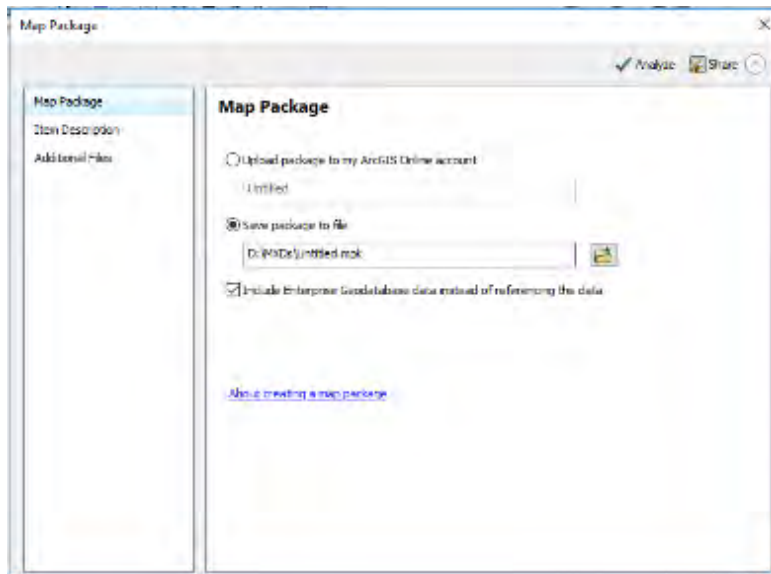
The grouped layers can be collapsed or hidden to reveal or hide the layers associated with a group.



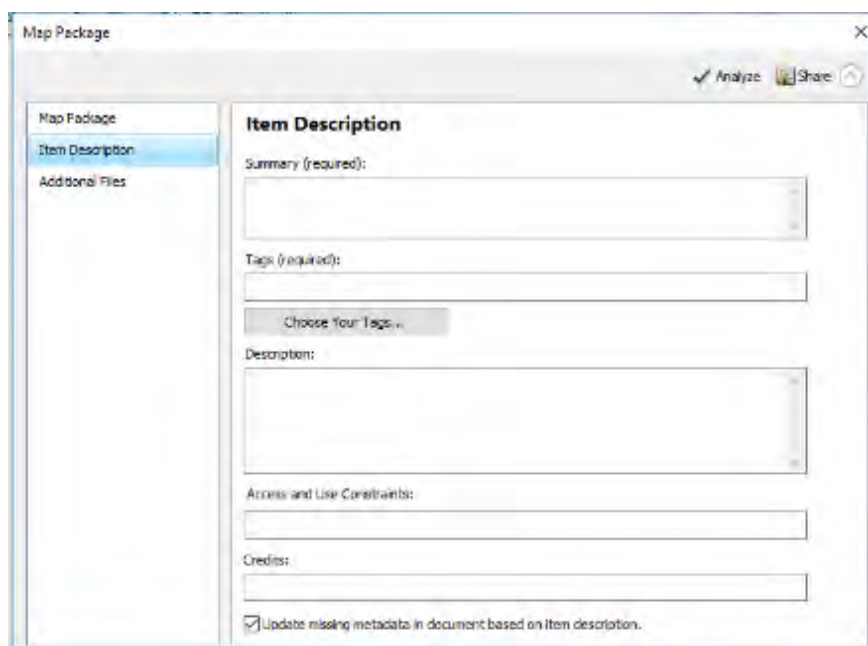
N. Once the editing is completed and all the required GIS data is in the database, save your work as a Map Package (type of format).



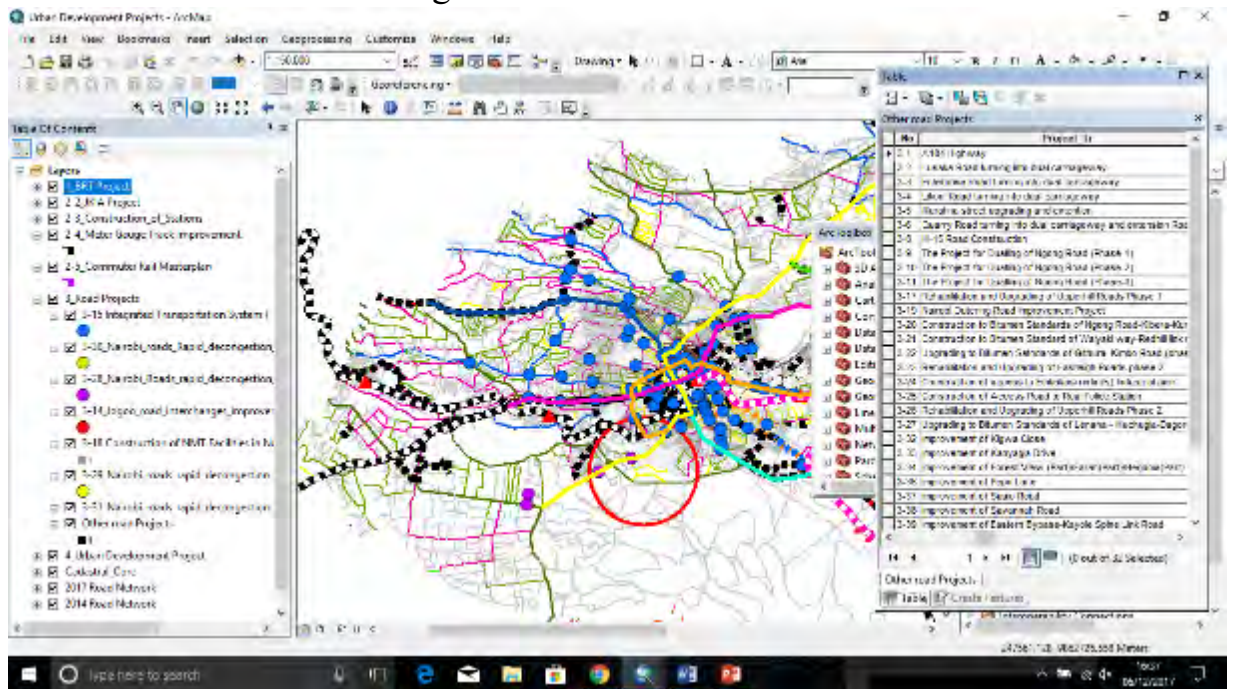
- O. The advantages of saving as a map Package are;
- i. The Symbology on the shapefile is not lost
 - ii. There is no need to save the ArcMap document and the shapefiles separately as they are bundled up together in one file.
- P. After clicking the Map Package button under the Map Package tab, click save package to file and specify the path that you would like to save the data



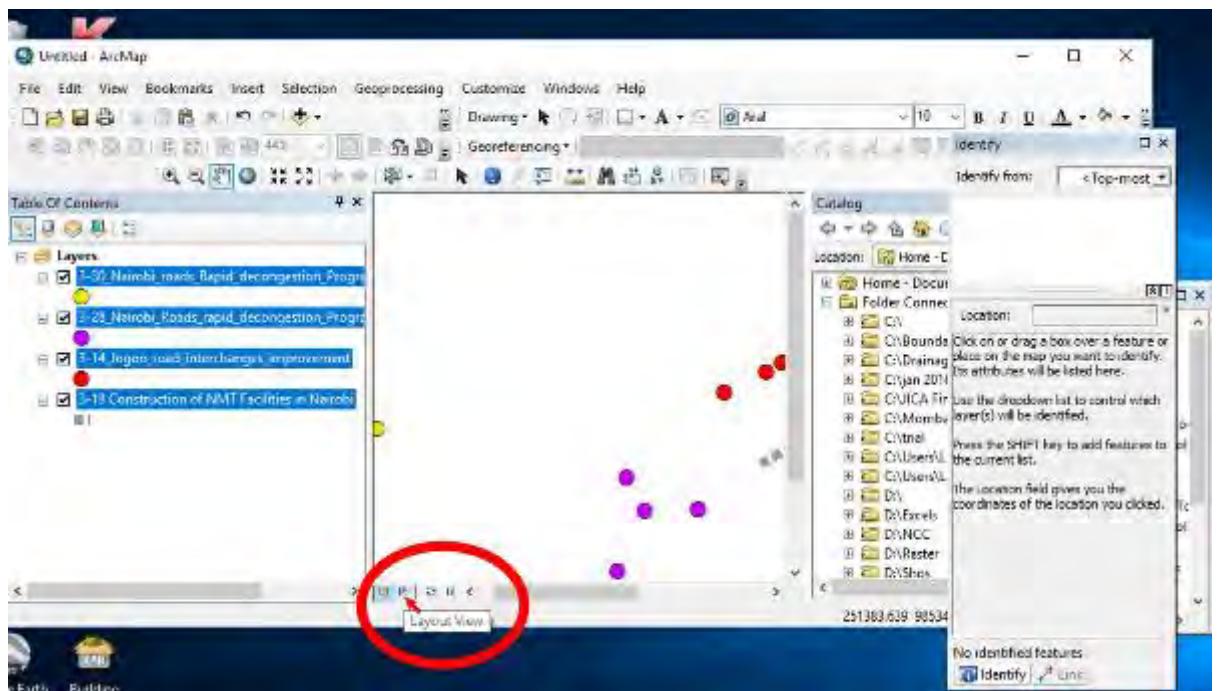
- Q. Under the Item Description tag, fill in the fields labelled “required” or else the Map Package will fail to create. You should write a brief description, summary and tags about the shapefile under this tab.



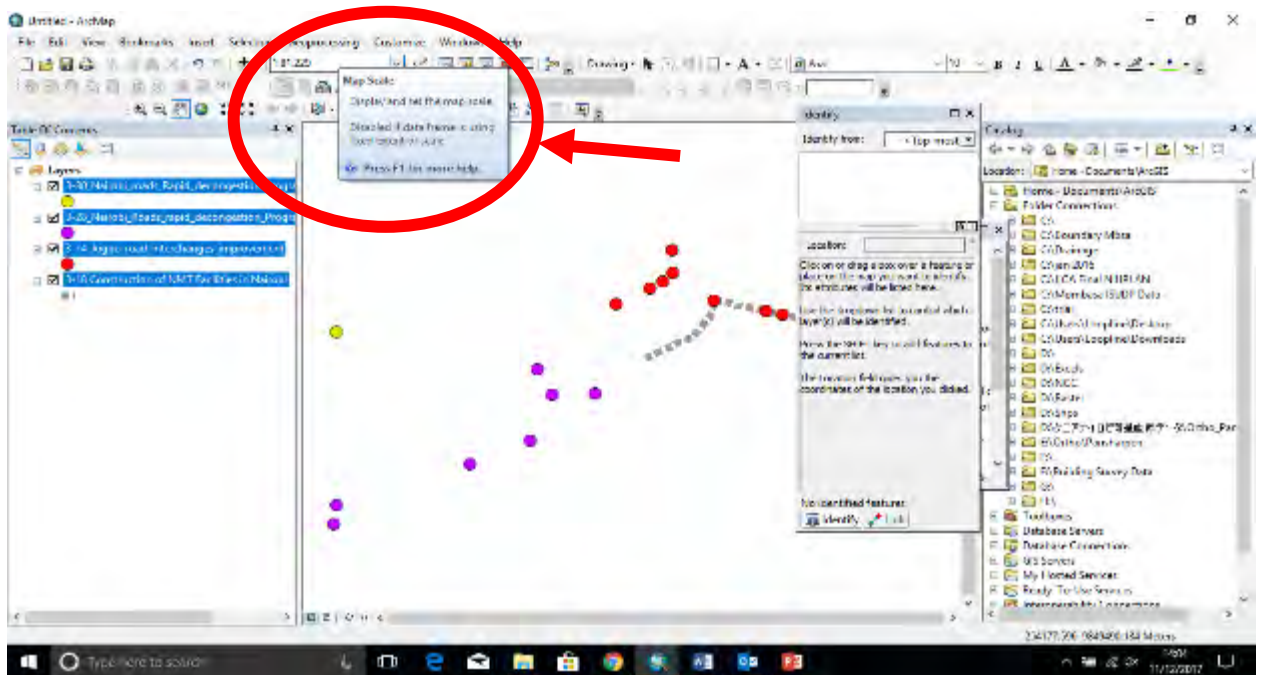
R. The final Output can be as shown below. Please note that a Map Package(.mpk) format can only be opened using ArcGIS software version used to create the file or a higher version.



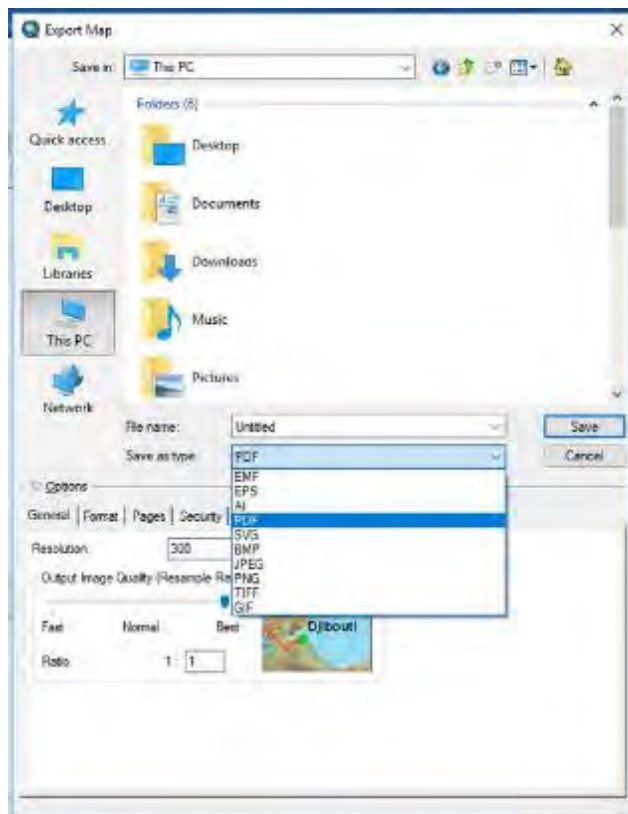
S. If you wish to print a map, ensure that you are on layout view by pressing the layout tab which is at the bottom of the arc Map Document as shown below.



T. Ensure that the drawing is set to the correct scale on the Map Scale tab as shown below

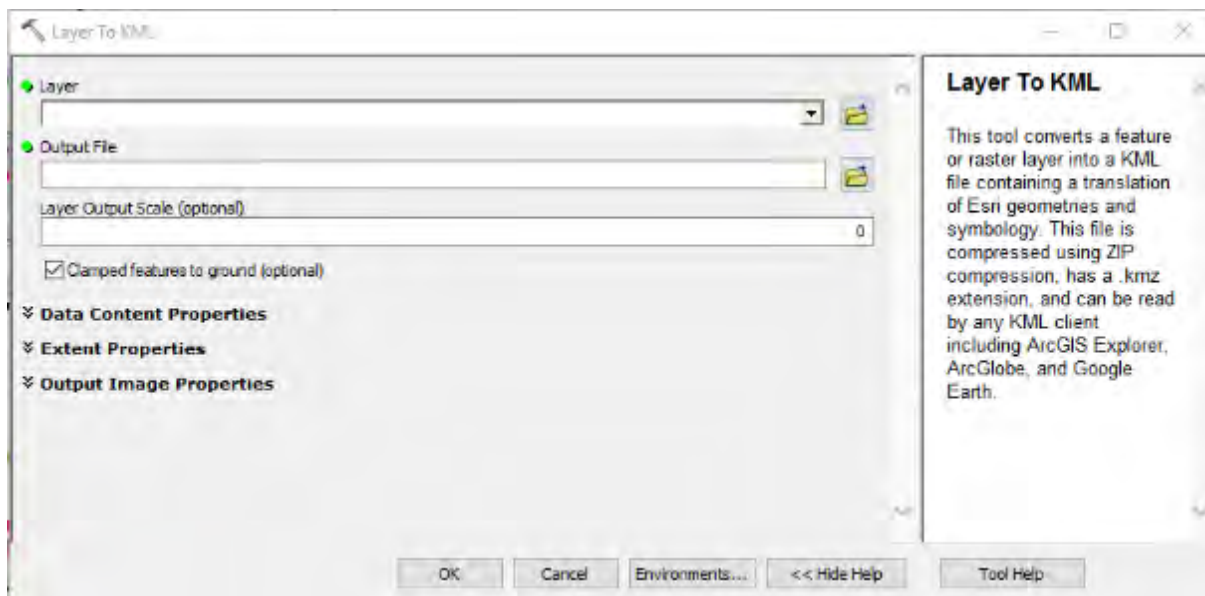
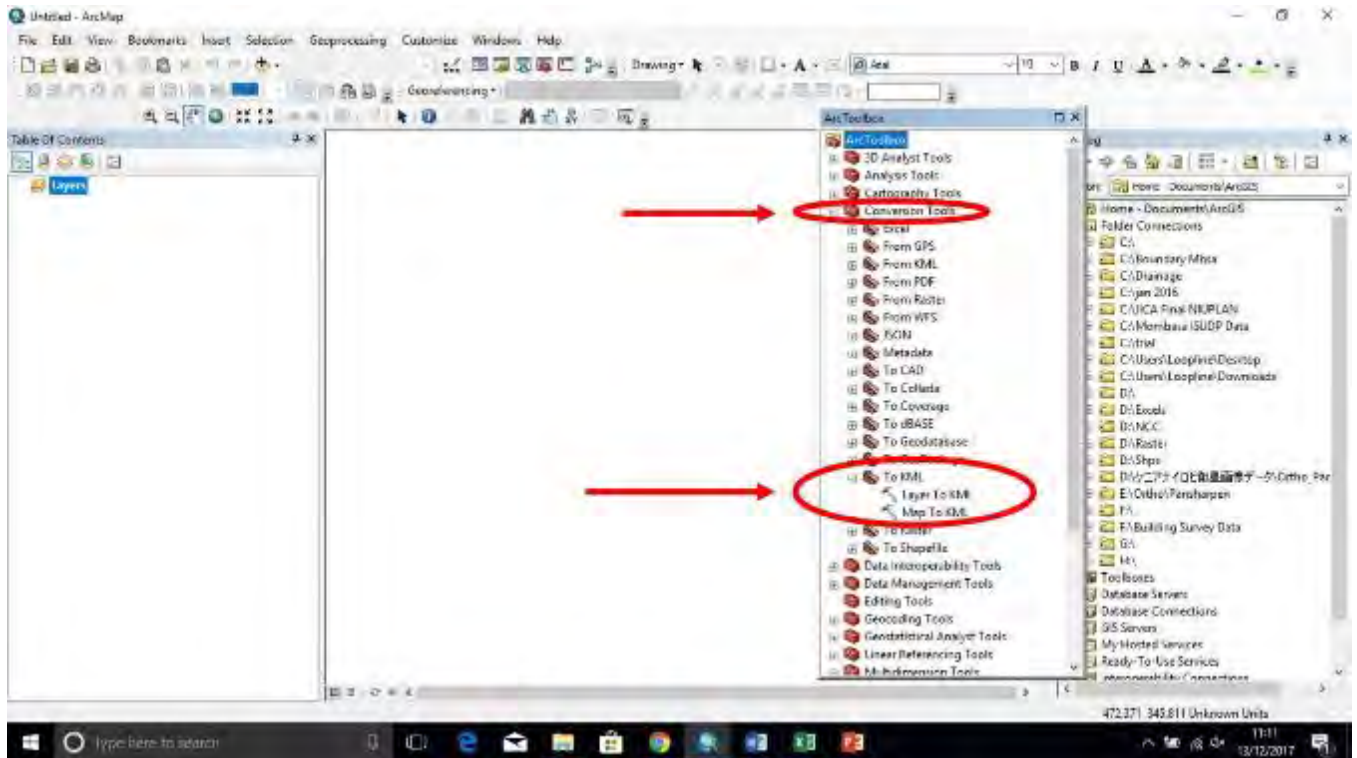


U. Before printing, you can save your file with any of the available formats by going to File → Export Map, navigate to your folder and save with the selected format as shown below




V. In case one wants to view GIS data but does not have any GIS software on their computer, you can convert the shapefiles to .Kml or .Kmx format which can be opened by Google earth. The attribute table which contains additional information about the shapefile is also displayed if you click on the files on google earth.

To Convert the shapefile to .Kml or .Kmx format, go to ArcToolbox → Conversion tools → To KML → Layer to KML



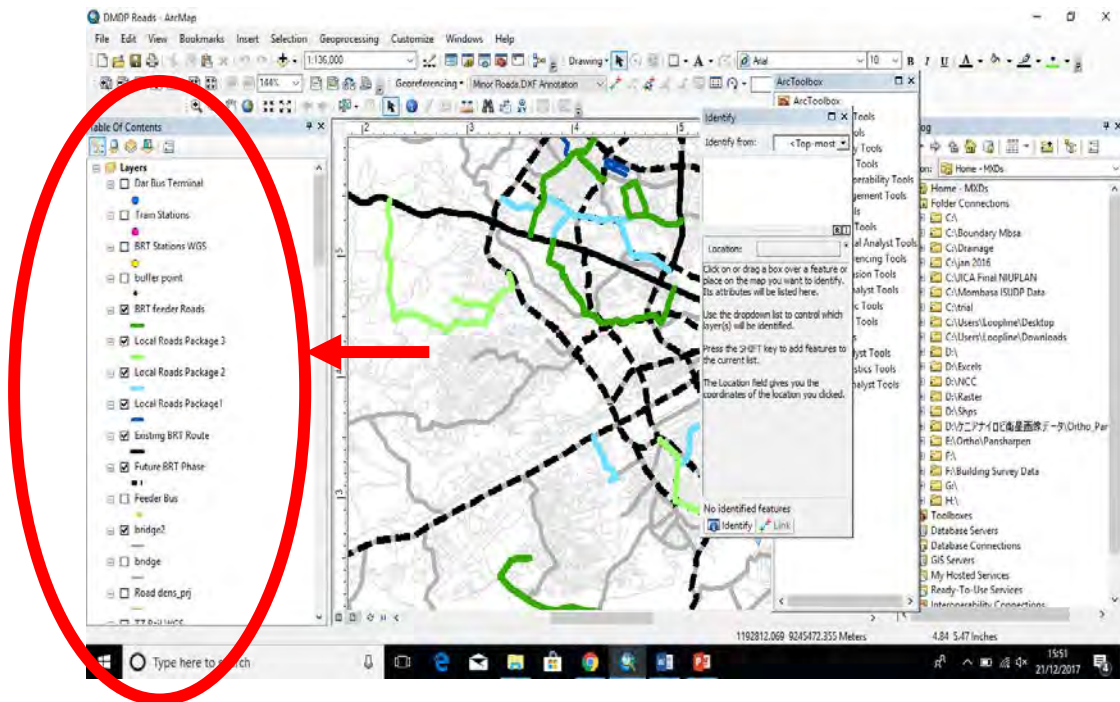
Under the Layer tab, browse to the shapefile that you would like to convert and add it. The Output file tab represents the folder you would like to save the converted shapefile.

Once the file is converted to KML, it will appear on your output file

location with a symbol displayed as . If you have google earth already installed on your computer, double click on the file and google earth will automatically open and display the converted shapefiles.

You can also convert a whole map to KML and view it on google earth.

To create a map, add the required files to the left of the arcmap document under table of contents. After all the required shapefiles have been added, go to File \rightarrow Save as and ensure that the file is saved to the destination of your choice in .mxd format



To convert the .mxd map to KML, go to ArcToolbox \rightarrow Conversion tools \rightarrow To KML \rightarrow Map to KML and follow the same process that was used during the conversion of layer to KML. After Conversion, the resultant KML looks like below. If you click on any feature on the Google earth, a pop-up window appears with the details of the project as also shown below.

