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# TRANSPORT FOR SUSTAINABLE DEVELOPMENT: ANALYSIS OF TRENDS, ISSUES AND POLICY OPTIONS, NEW YORK 27-28 AUGUST 2009

## BEST PRACTICES IN DEVELOPMENT OF URBAN PUBLIC TRANSPORT INFRASTRUCTURE

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**DAR RAPID TRANSIT AGENCY, TANZANIA**

*NEW YORK, 27 AUGUST 2009*

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# TRANSPORTATION CHALLENGES

- Rapid Increase in population
- Rapid increase in private cars
- Low capacity of road networks to meet demand
- Insufficient traffic management measures
- Increase in roadside friction, e.g.. street vendors
- Fragmented land use planning
- Selfish driving behaviour, self prioritising
- No serious Functioning Public Transport
- Ineffective Institutional set up
- Financial limitations

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# Public transport serving in our cities!!!!
# Resulting in failure to satisfy market demand

**Lagos, Nigeria,**
Source: *PPIAF*

**Kigali – Rwanda**,
Source: SUMATRA

**Dar es Salaam- Tanzania,**
Source: DART Reports

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# EMPTY SEATS ON THE ROAD

"Every day there are about 480,000 empty seats on the road" in Dar es Salaam mainly due to unsatisfactory urban public transport.

Source: Air quality and transport – Department of environment, transport and the regions

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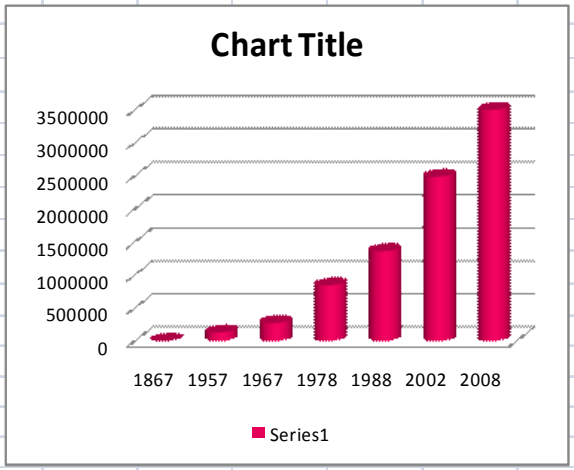
# Dar Transportation Challenges

## Dar Es Salaam Background Information

**Dar es Salaam Population growth trend**

| Year | Population |
|---|---|
| 1867 | 3500 |
| 1957 | 128742 |
| 1967 | 272821 |
| 1978 | 843000 |
| 1988 | 1360850 |
| 2002 | 2487288 |
| 2008 | 3500000 |




- Dar es Salaam means the **Haven of Peace**
- The **commercial city** of Tanzania,
- Generates **80%** of government's domestic revenue
- Has the **largest population**
- City population is estimated to be **3.5** millions, with a yearly growth rate of **4.3%** (2002 Census)
- Has **fastest growth of Vehicle ownership -20% /Year**

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# Dar Transportation Challenges (cont'd)

- Inadequate road network and storm water drainage,
- City centre traffic congestion and accidents,
- Disorganized CBD parking,
- Chaotic public transport,
- Inadequate Non Motorized Transport (NMT) facilities and
- Increasing Air Pollution.

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# Dar Transportation Challenges (cont'd)

## Bus stops are in poor condition and vehicle emissions are increasing air pollution

**Gases Emission is a threat to peoples' health**

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**People enjoy walking, but safety of pedestrians is compromised**

**Street vendors are trying to make their living on walkways**

Reckless driving and parking endangering users especially NMT

Uncomfortable Sitting especially in mini buses.

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# The Need For A Change

The needed CHANGE is; shifting from the present disorganized and unsatisfactory urban transport system, to

Introduction of a more organized mass transit system that will subsequently improve the quality of living of city residents through improved mobility options

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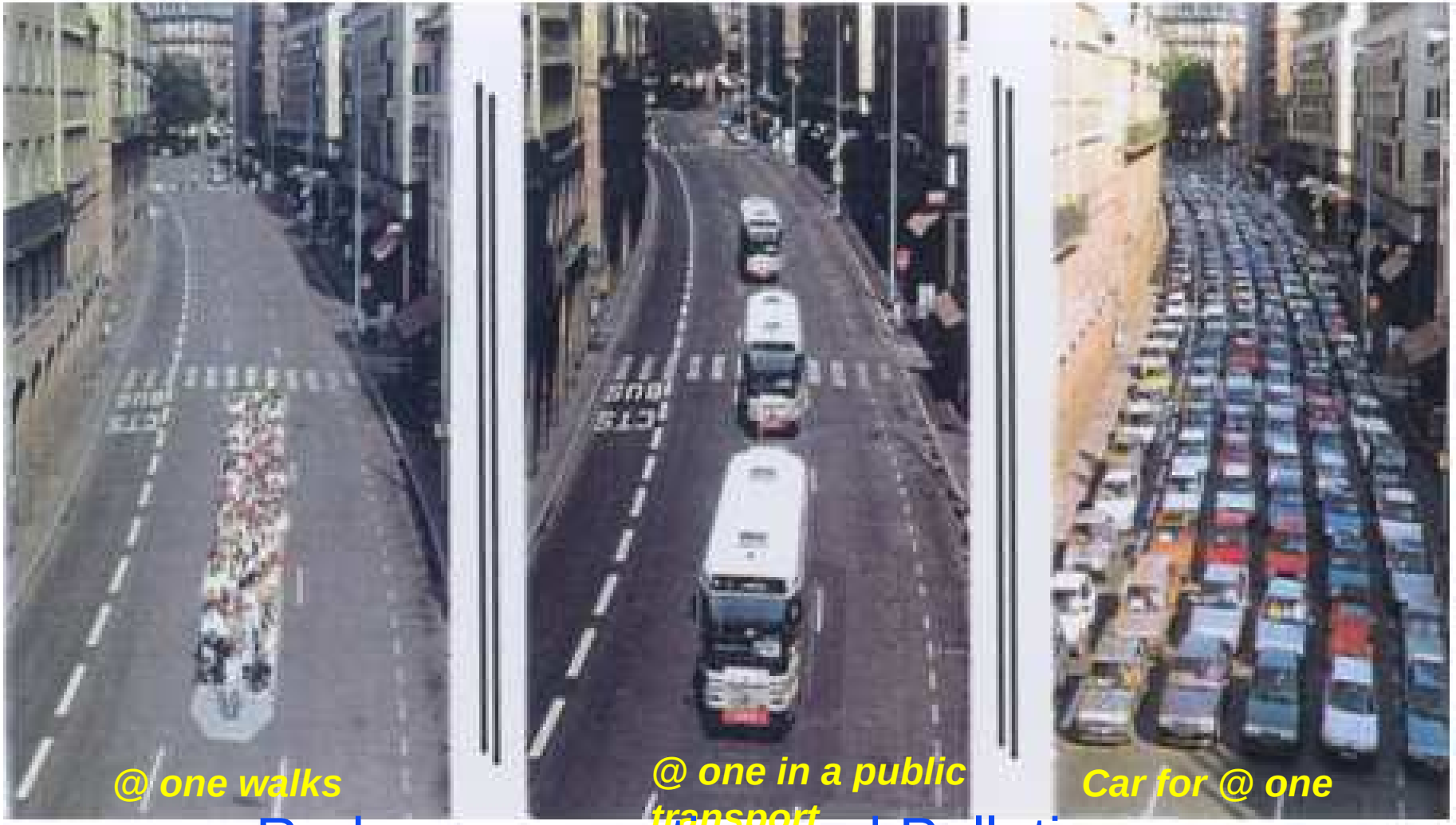
# CONGESTION CAN ONLY BE SOLVED BY GETTING MORE PEOPLE ON PUBLIC TRANSPORT SYSTEM




Reduce congestion and Pollution…

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# Mass Transit Options

## Bus Rapid Transit

## Underground Metro

?

## Light Rail Transit

## Urban Rail

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# The Option for Dar es Salaam

## The Bus Rapid Transit (BRT) System

## Branded:

# Dar Rapid Transit
# ‘DART’

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# Why BRT System

- a high quality public transport system
- a significantly lower investment cost
- a shorter implementation time
- an easier system to operate
- lower operational costs
- It provides capacity for up to 40,000 passengers per hour per direction and relative high average speed (22 km-27 km/h). (Metro system has an average speed of 30 km/h.)
- It is the mass transit system that offers more flexibility to attend to demand and is in most cases sustainable over time with no subsidy on operations.

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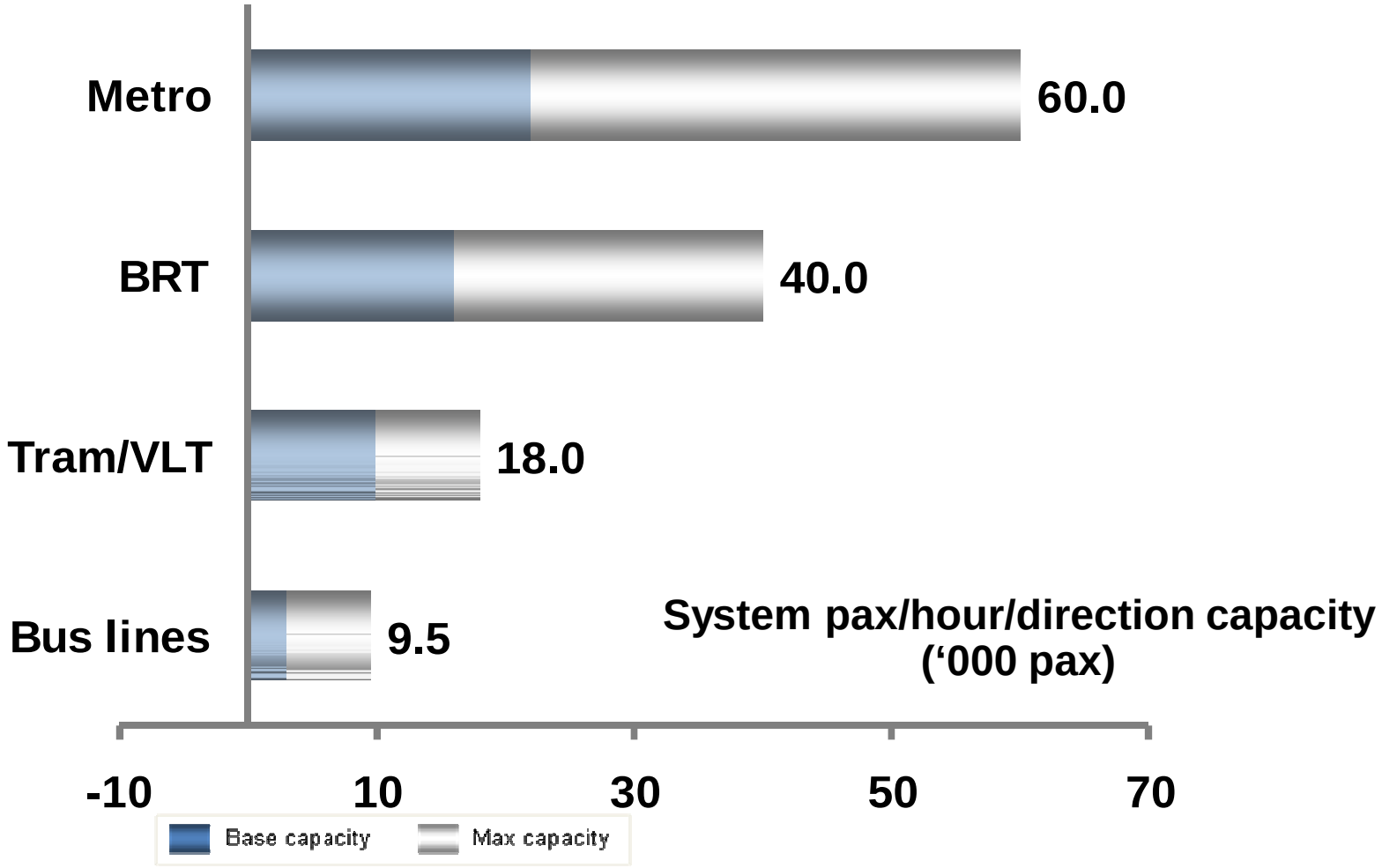
# WHY BRT SURPASSES OTHER MASS TRANSITS

## A) High capacity

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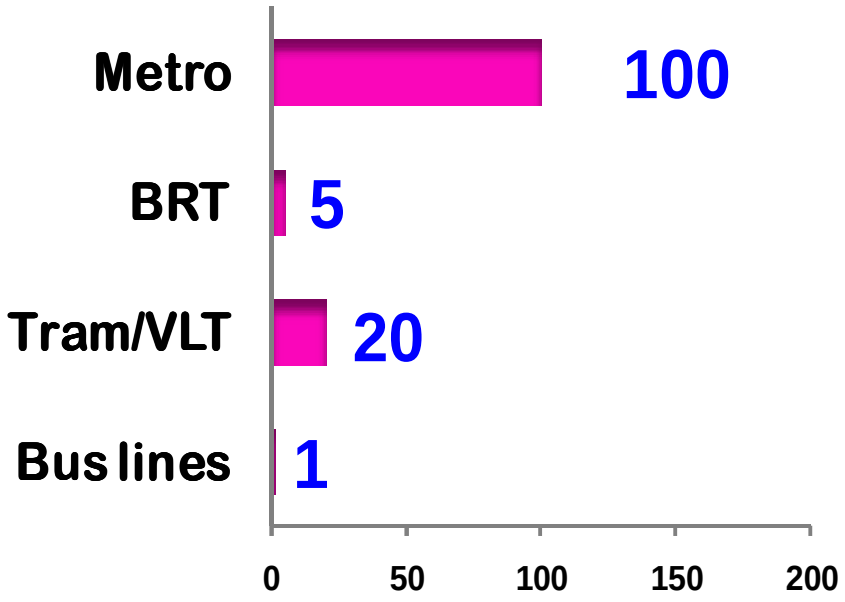
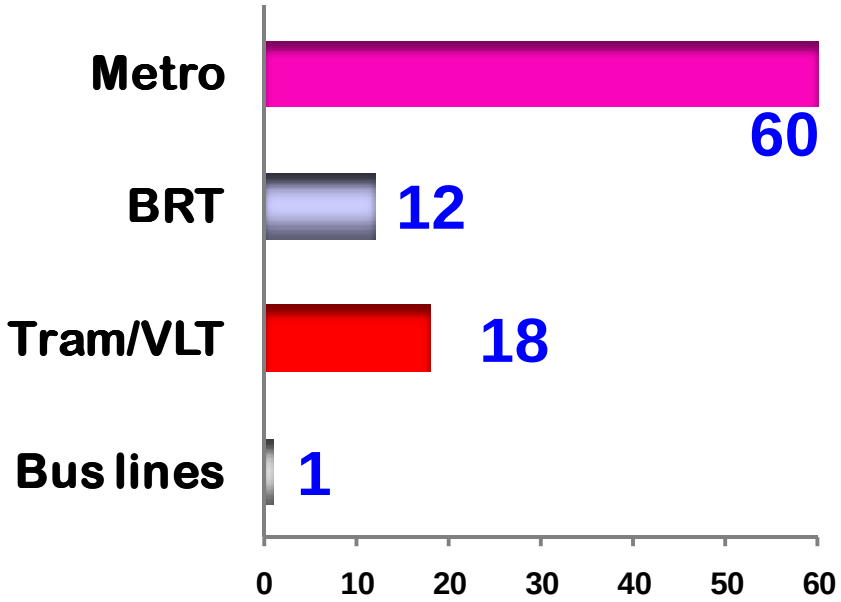
# B) BRT system provides a high pax system with a significantly lower implementation cost and time

**Implementation cost (US$ M/km)**




**Implementation time (Mths)**

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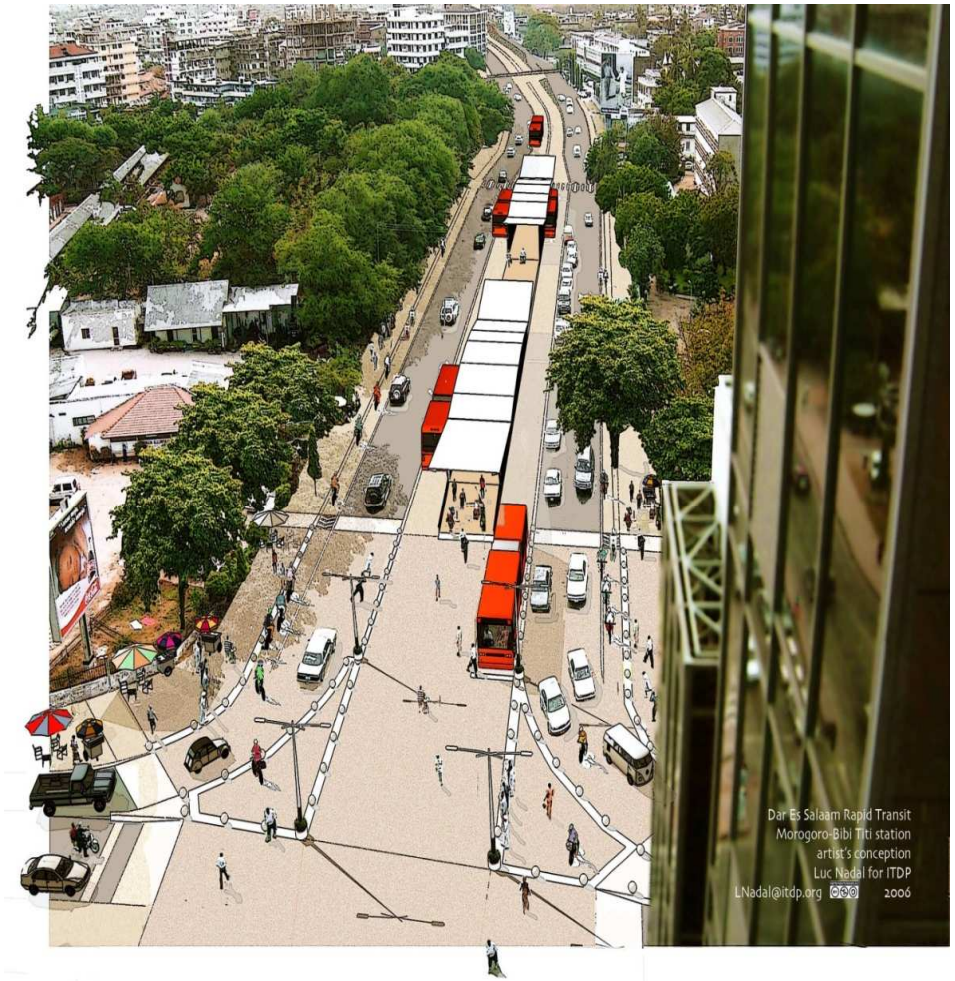
# DART concept is state of the art BRT planning




## DART Characteristics

- Segregated bus lanes
- Modern, articulated buses
- Closed stations
- Comfortable, modern terminals
- Bus depot near the corridor
- Bike lanes on all BRT corridors
- Beautiful sidewalks

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# PLANNING THE DAR RAPID TRANSIT

## Objectives of DART network Design were to;

- Determine and define the long term conceptual design of the system for Dar es Salaam.
- Determine phasing of implementation.

## Stage 1: Long Term Conceptual Design

Comprised the long term conceptual design of the system, based on identified demand pattern

## Stage 2: Detailed Designs and Budget.

Technical designs and budget (capital, maintenance and operations) of all the phase 1 corridors.

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# TRAFFIC SURVEYS

The present conditions of urban mobility were identified by the following surveys:

- Frequency and Visual Occupancy- FVO

How often is a bus route passing through a certain point and estimated pax?

- Classified Counting- CC

What transportation means (car, bus, pedestrians. etc) are used?

- Origin and Destination - OD

Where are the people coming from and going to and trip purpose?

- Velocity, Boarding and Alighting- VBA

Determine bus speed and most important boarding and alighting points.

- Directional Flow- DF

At intersections, determine traffic volumes making the available turns?

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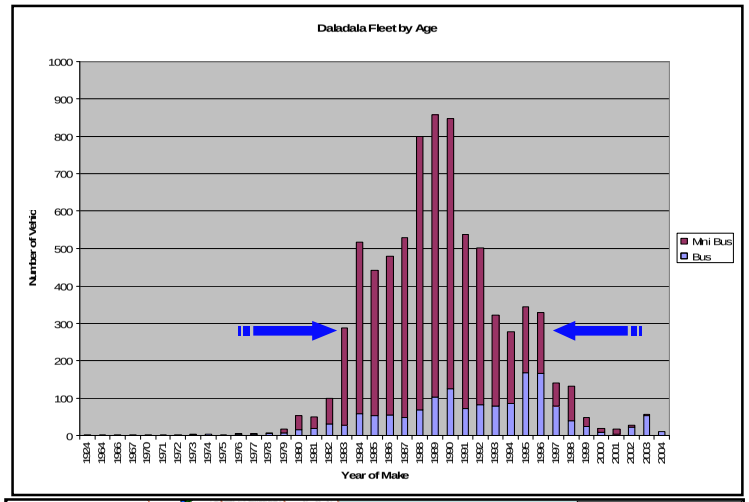
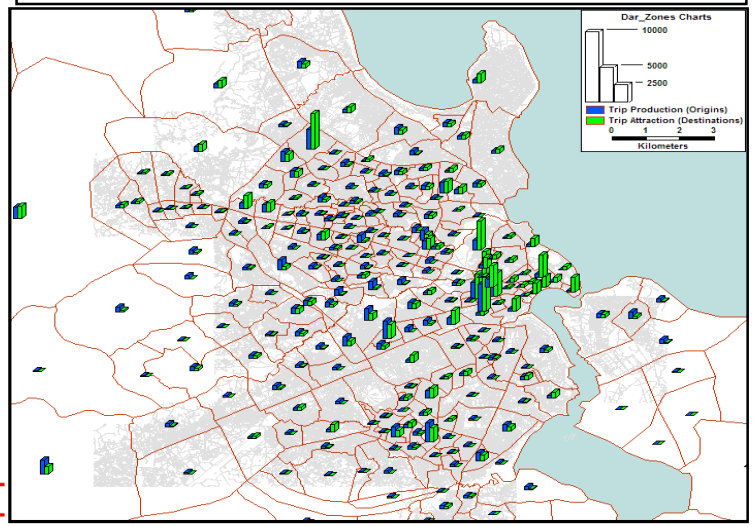
# IMPORTANT FINDINGS

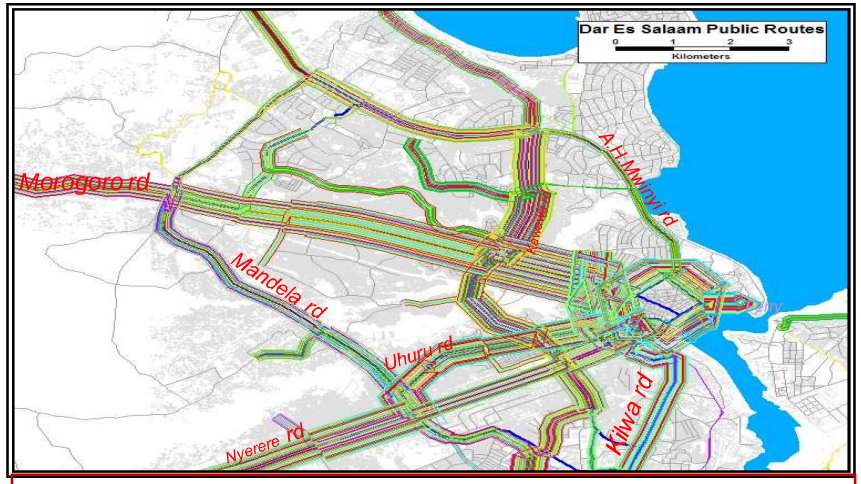
Daladalas >10yrs

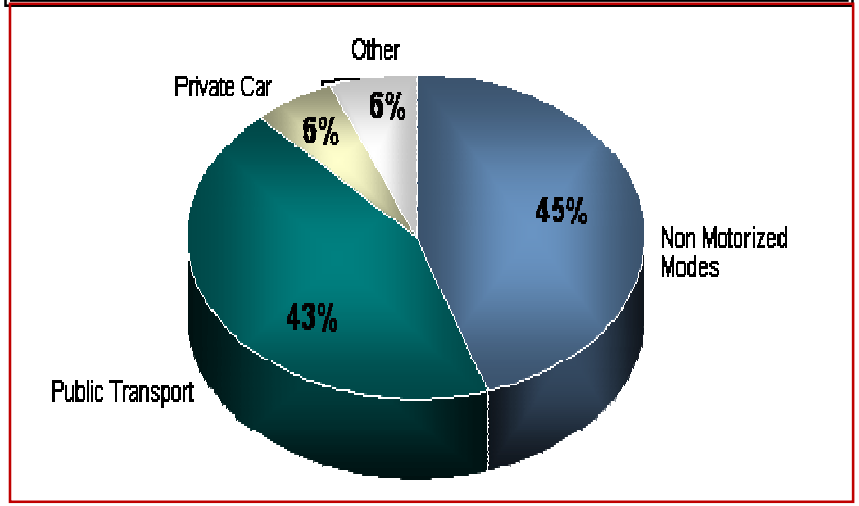



Trip production & Attraction




Routes congested on Trunk rods




Public Transport & NMT are major mobility modes

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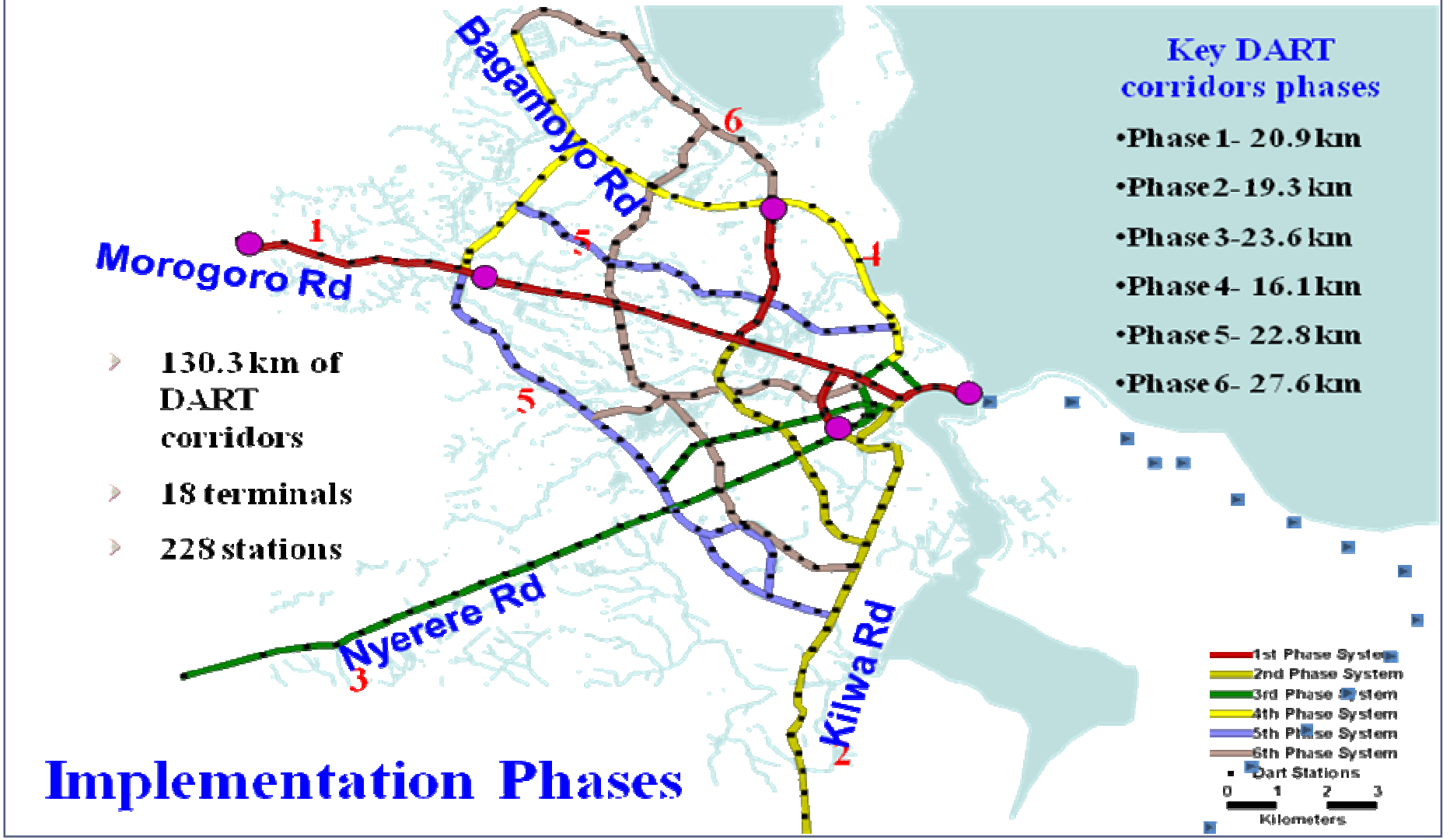
# DART SYSTEM IMPLEMENTATION PHASES

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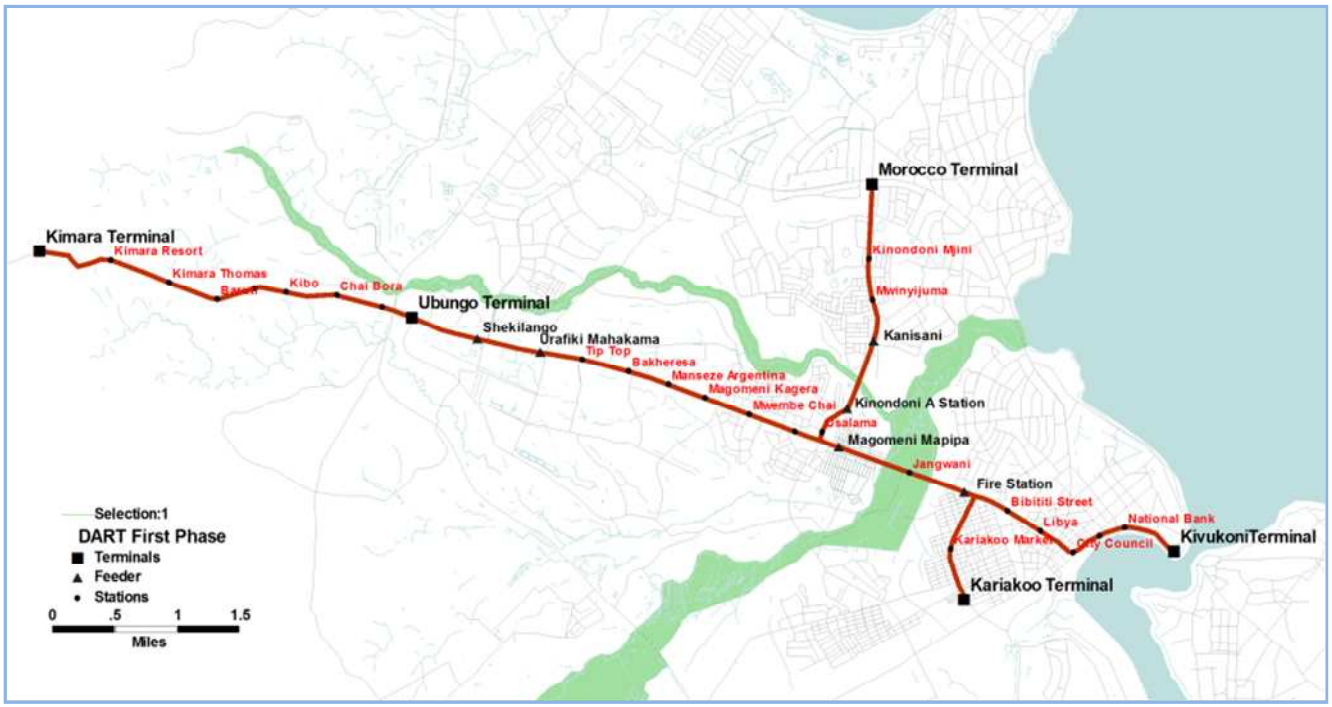
# Phase I Road Corridor – Stations and Terminals




**The DART System Phase 1 will have 20.9 km, 29 stations and 5 terminals, expected to be able to carry about 406,000 passengers per day.**

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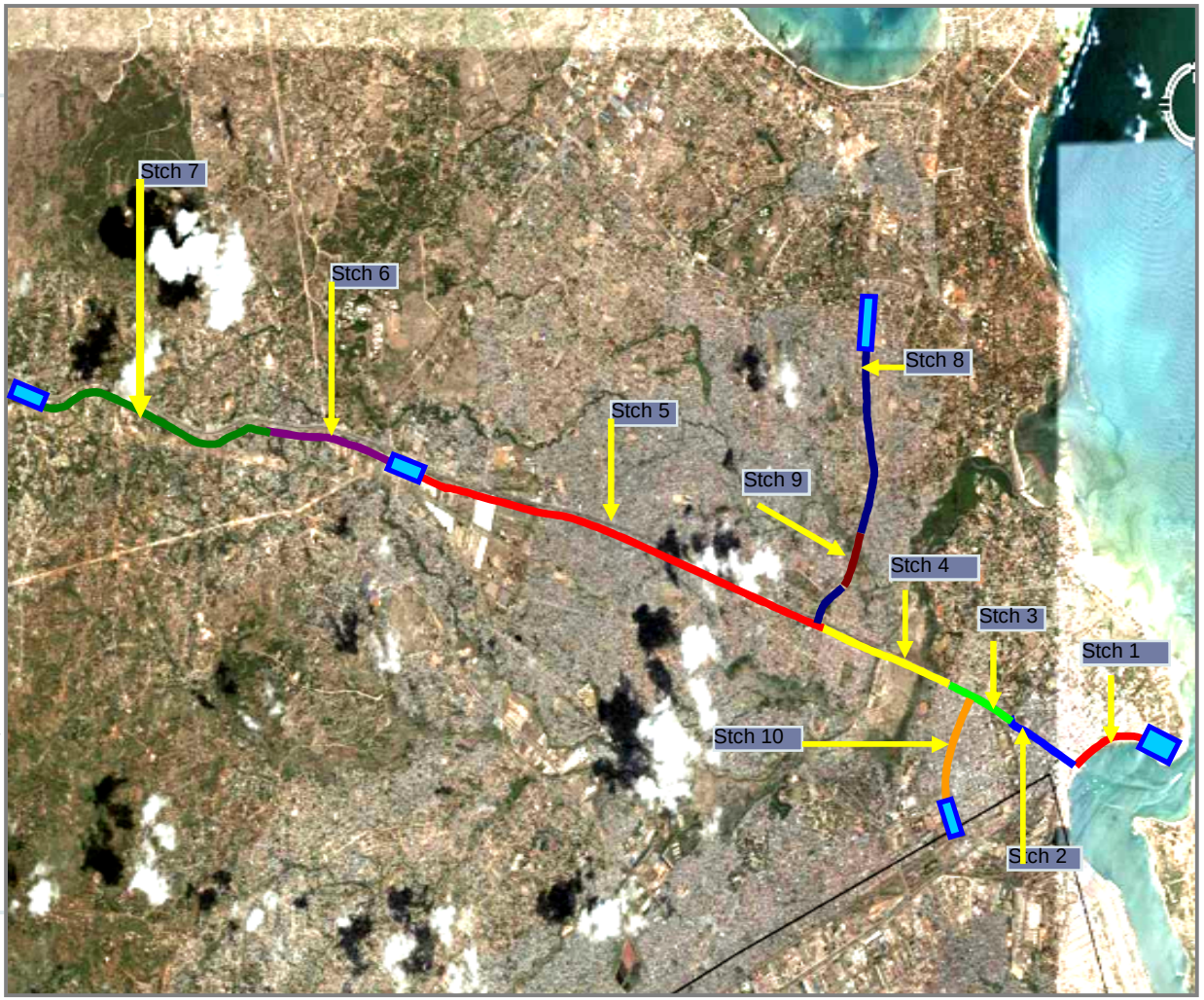
# Based on cross section characteristics, the corridor was divided into 10 different stretches with homogeneous characteristics, to minimise resettlements

DART Phase 1 corridor stretch components

- Stretch 1 –Kivukoni Front up to Morogoro Road
- Stretch 2 – From City Council up to Bibi Titi Road
- Stretch 3 – From Bibi Titi to United Nations junction
- Stretch 4 – From United Nations to Magomeni Mapipa
- Stretch 5 – From Magomeni Mapipa to Ubungo Terminal
- Stretch 6 – From Ubungo terminal to Kibo
- Stretch 7 – From Kibo to Kimara Terminal
- Strech 8 – Kawawa Rd (except by the valley)
- Strech 9 – Kawawa at the valley
- Strech 10 – Msimbazi St

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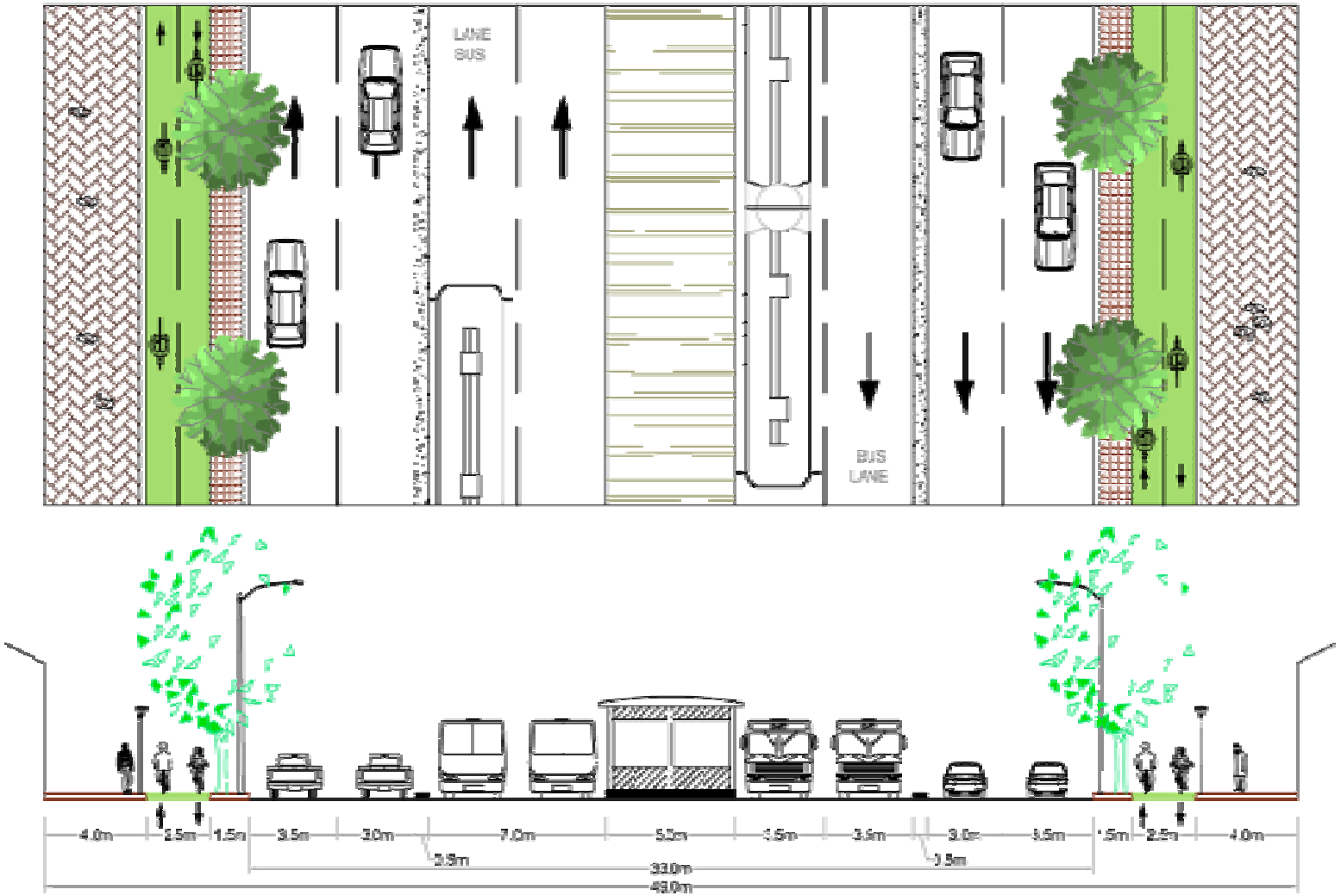
# Typical Cross Section At Stations

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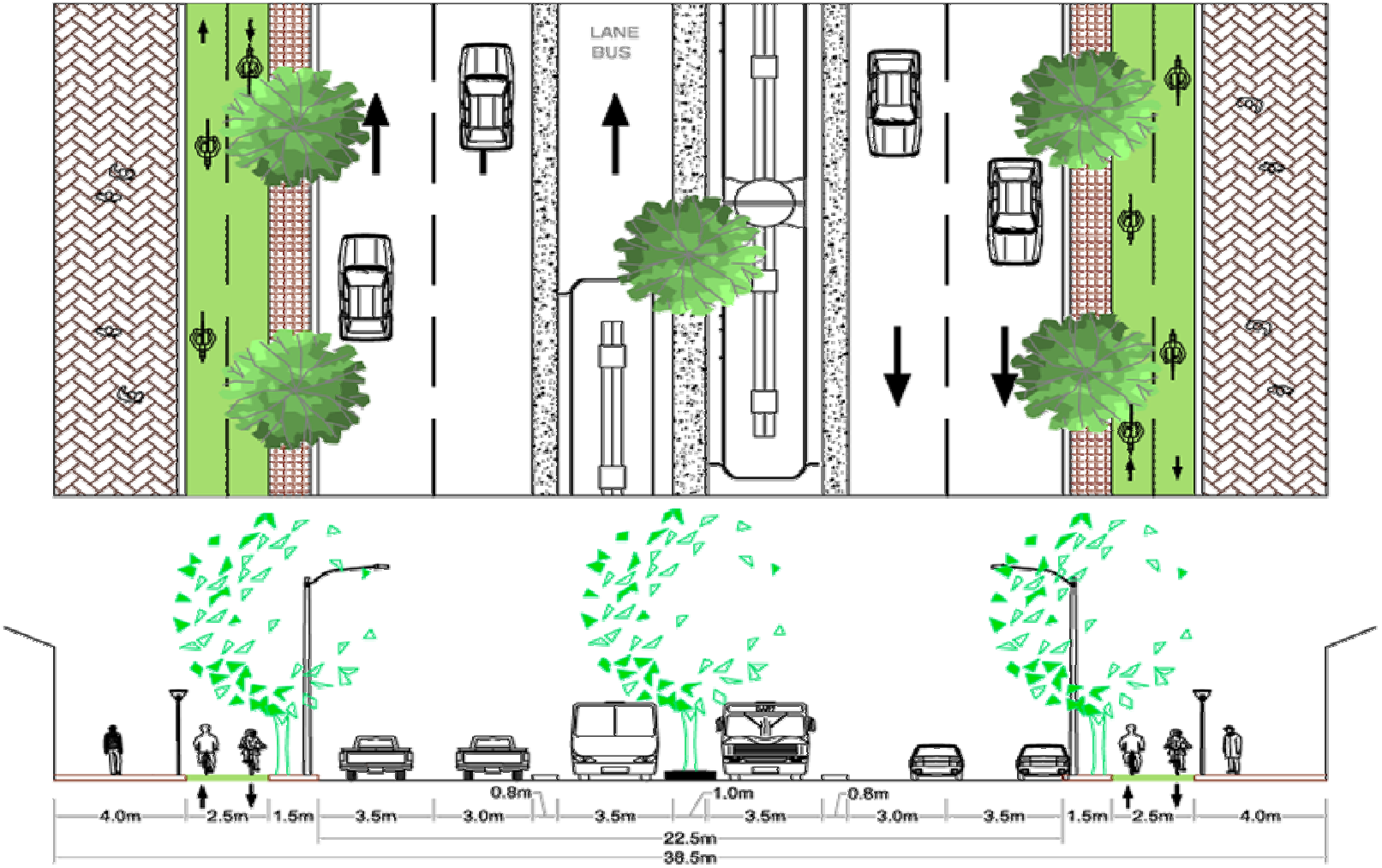
# Typical Cross Section off Stations

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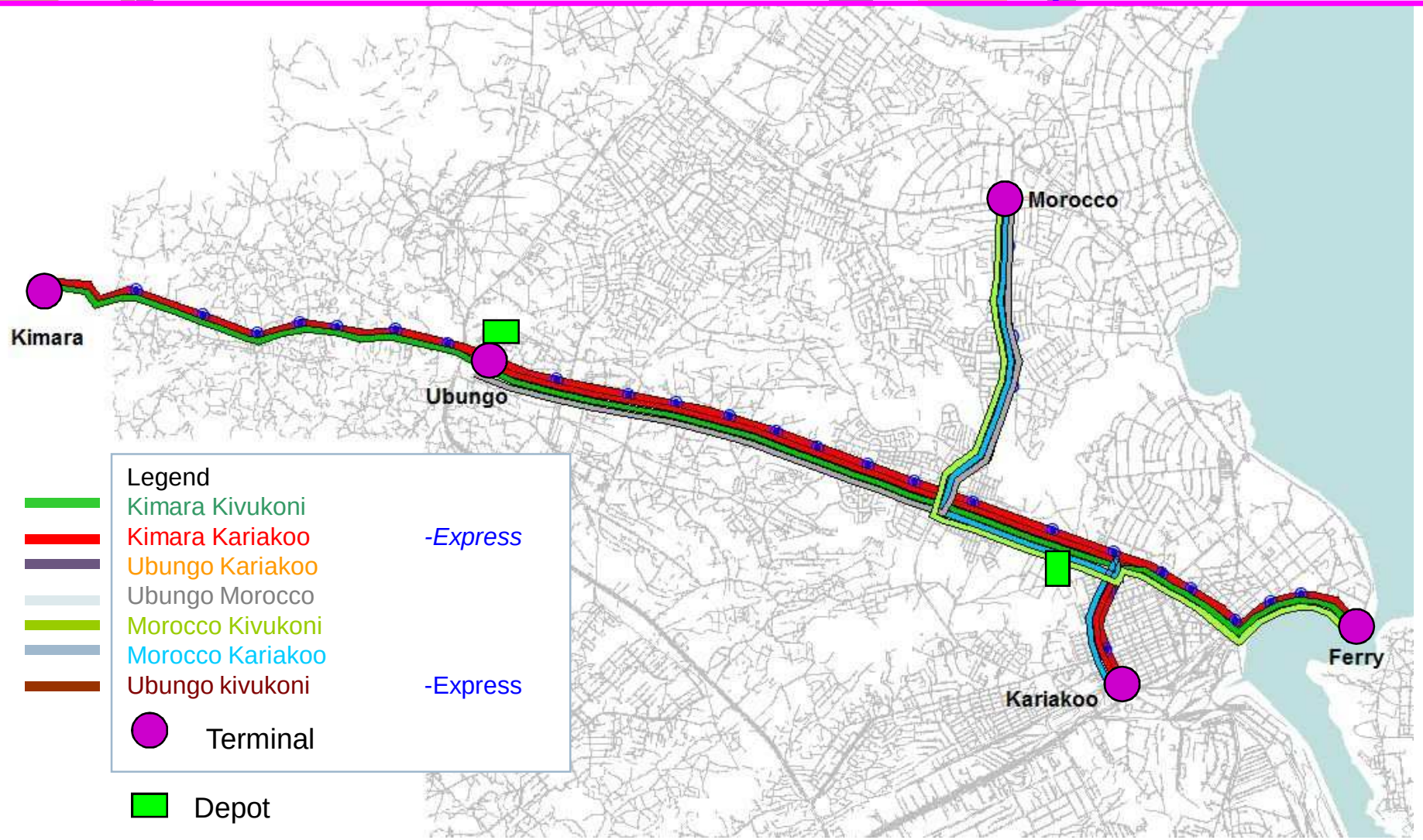
# Phase I-Trunk Services Map

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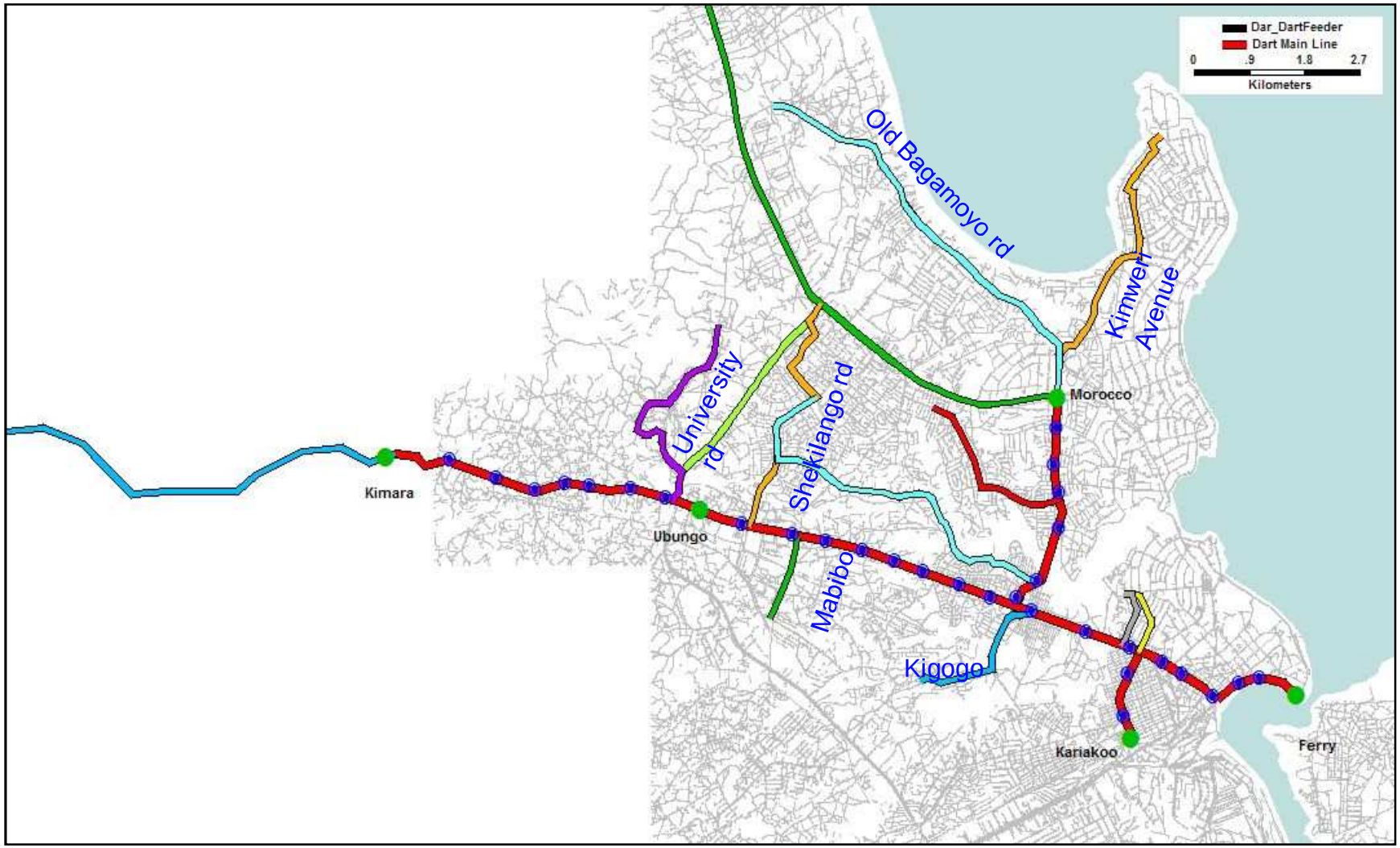
# Phase 1-Trunk and feeder services

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# PROPOSED VIEW ON A TYPICAL DART STATION

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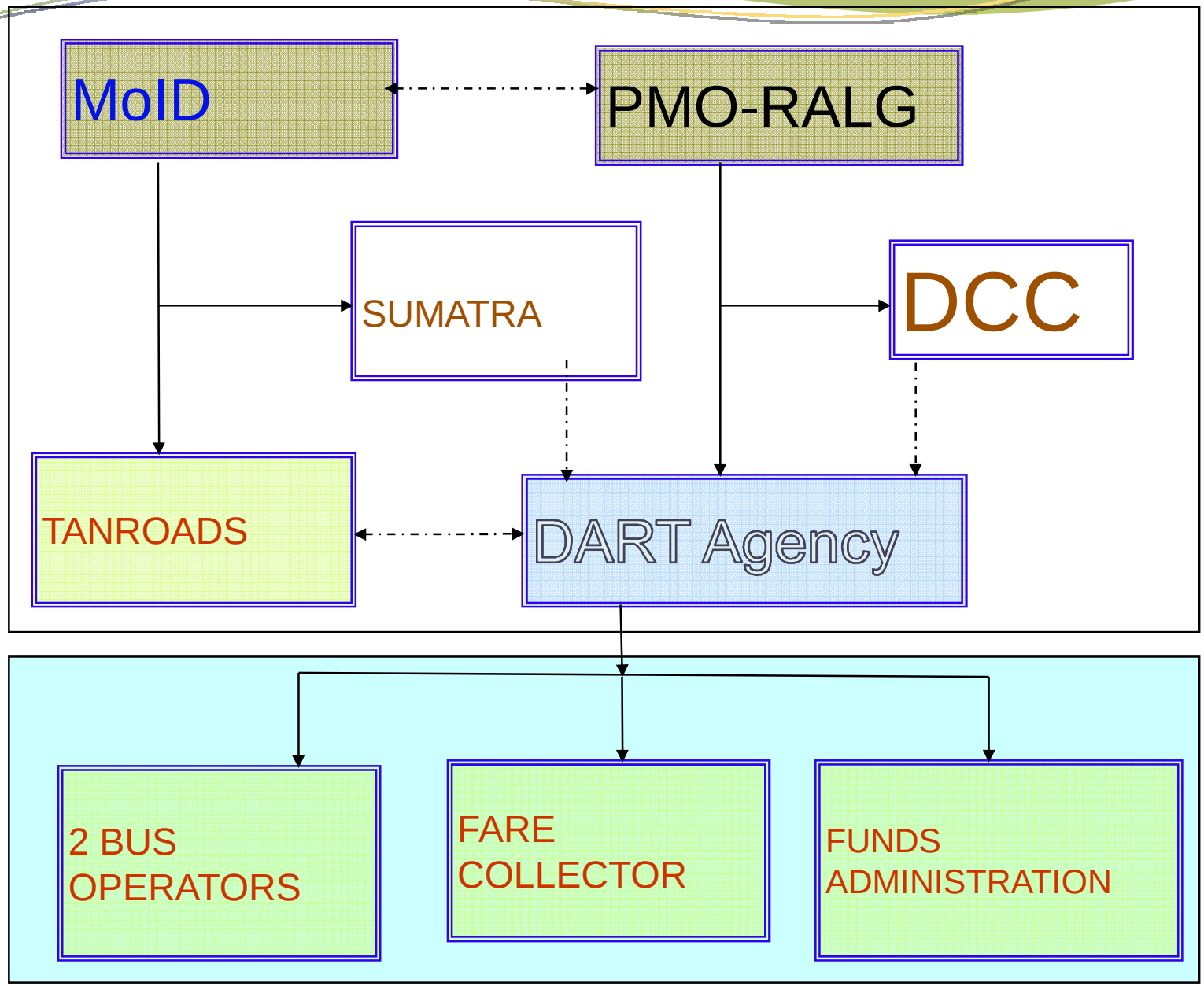
# DART KEY SERVICE ACTORS

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# OPERATIONAL SETUP

DART AGENCY
Planning, Management and Control

Infrastructure (Public)
- Corridors
- Stations
- Garages
- Complementary Infrastructure

Billeting (Private)
- Equipments
- Smart Cards
- Trust Fund

Bus Operation (Private)
- Companies
- Buses
- Employees

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# Bus Operator

- To buy the buses
- To hire and train the drivers
- To operate the buses along given routes
- To maintain the buses and
- To adhere to the bus schedules.



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# Bus Operator (cont'd)

**The DART system will utilize articulated buses with minimum140 pax capacity running on dedicated lanes.**

**Since there is no Sharing of routes with Daladalas, a single DART bus will displace about 10 minibuses along the corridor, together with their usual terribly fuming exhausts.**

**The air quality will definitely improve along DART corridors**



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# VEHICLE CHARACTERISTICS

## Articulated Buses

*High Capacity Bus [ minimum 140 pax]*



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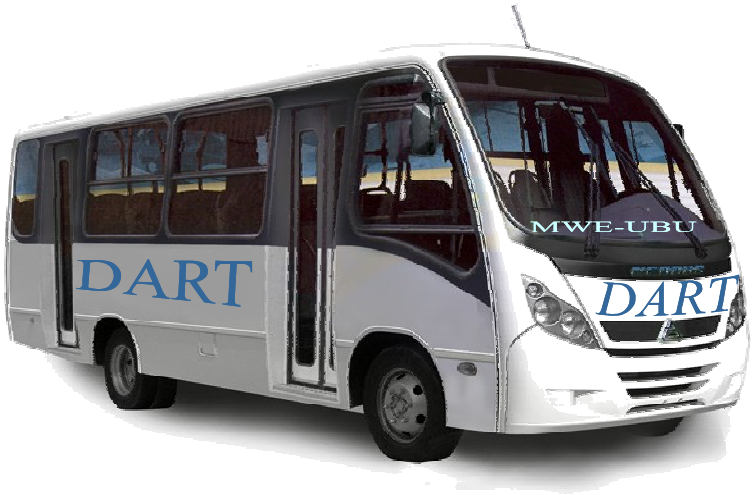
# For the Feeder Routes -the use of Micro-Buses with total capacity of 50 Passengers



# Micro-buses Total Capacity of 50 Passengers



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# FARE COLLECTOR

- To buy, install and maintain the fare collection and communication equipment
- To hire and train cashiers and customer service agents
- To operate the fare collection system smoothly and with transparency
- To maintain the stations and the terminals, specifically cleanliness
- To ensure security of the system for both the passengers and the revenue
- To adhere to the DART system quality goals customer services and experience.



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# FUND MANAGER

- Make payments to the system actors upon advise & authorisation from DART Agency
- Provide cash in transit services
- Prepare regular financial reports



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# DART BENEFITS

| Category | Description |
|---|---|
| Economic | **Cheaper means of mass transportation**<br>❑ Reduce travel times<br>o Less congestion<br>o Segregated bus lanes<br>o Fast boarding and alighting<br>o Centrally controlled system through communications network<br>❑ Increase economic productivity<br>o fair return on investment<br>o Enables Public Private Partnerships<br>o Less cost for customers and Government in general<br>❑ Create employment |
| Social | **Reliable and comfortable**<br>❑ Reduce accidents and air pollution-related illnesses<br>❑ Increase civic pride and sense of community |

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# DART BENEFITS (Cont'd)

| | |
|---|---|
| **Environmental** | **Reliable and comfortable**<br>❑Reduce air pollution-related illnesses<br>❑Less vehicle pollutants emissions<br>❑Reduce noise levels<br>❑It enhances Non Motorized Transport |
| **Political** | **Delivery of mass transit system within one political term**<br>❑Delivery of high-quality resource that will produce positive results for virtually all voting groups |
| **Urban form** | **More sustainable urban form**<br>❑City Beautification |

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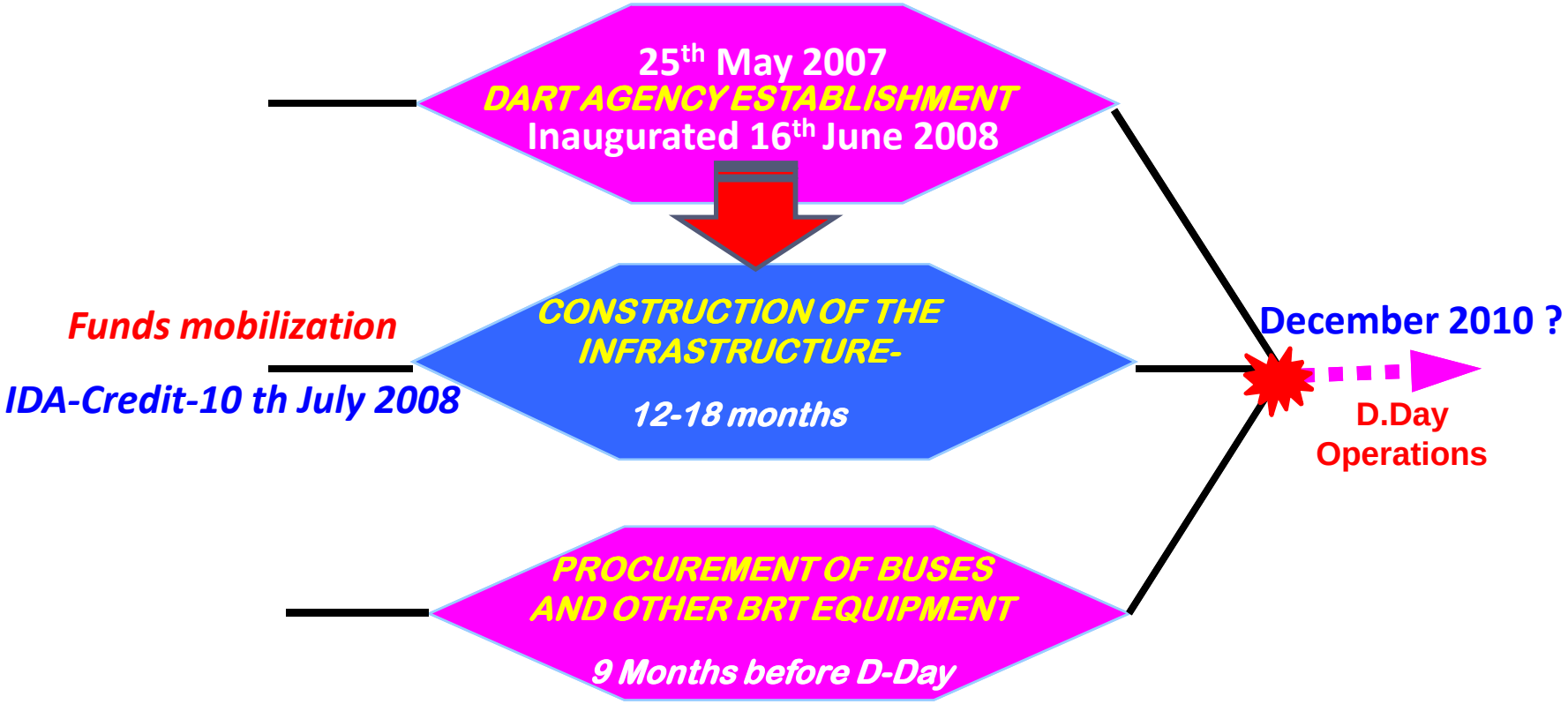
# WHERE ARE WE?

## Three Key Activities to Take Place

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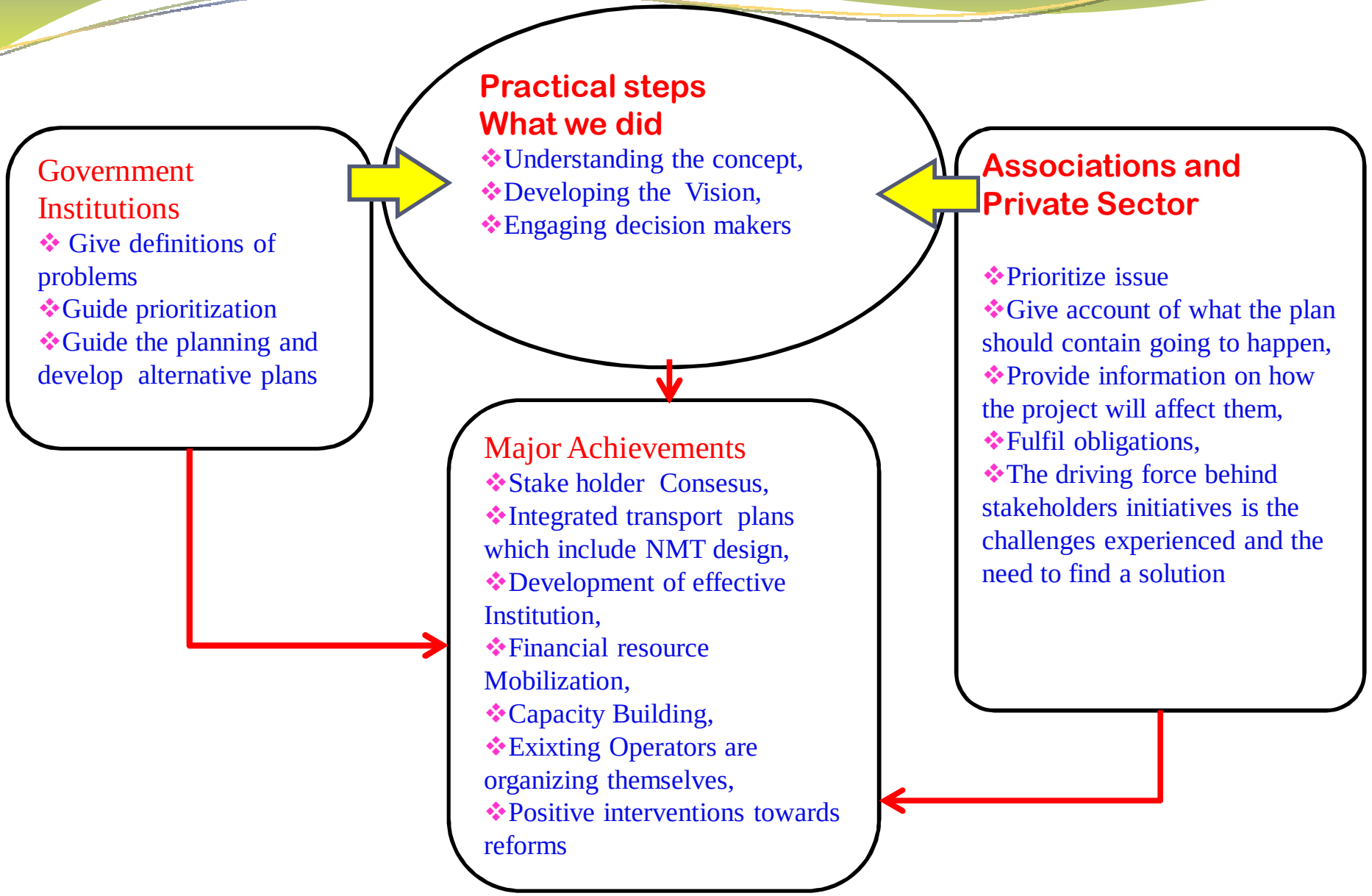
# THE PLANNING PROCESS

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# CONCLUDING REMARKS

- BRT systems will introduce high capacity buses which will gradually eliminate minibuses in the City;
- Reduction of vehicle fleet with introduction of improved vehicles using non polluting energy will have significant reduction of air pollution;
- BRT system is an alternative of the use of private cars thus reducing congestion as well as pollution;
- Development of a good BRT infrastructure include facilities for walking and cycling facilities consequently encourage use of NMT, another cleaner mode of transport.
- Political commitment, stakeholders participation and effective communication are the keys for success.

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SUSTAINABLE PUBLIC TRANSPORTATION SYSTEM REQUIRES RADICAL DECISIONS DRAWN TRHOUGH PARTICIPATORY APPROCH TO CHANGE FROM CHAOTIC TO AN EFFECTIVE MASS TRANSIT SYSTEM, THE BRT.

**Dar es Salaam Today**

**Dar es Salaam, Tomorrow**

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THE FUTURE DAR ES SALAAM WILL *BE LESS POLLUTED* HAVE *SAFER PUBLIC TRANSPORT,* FULLY INTERGRATED MODES OF TRANSPORTATION *[NMT & MT], TOURIST* ATTRACTIVE *SQUARES,* AND MUCH MORE…, *LIVEABLE CITY.*

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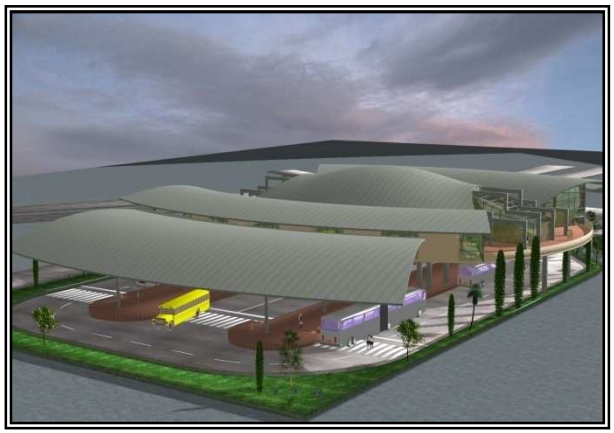

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