

The Progress of EST in Lao PDR

Lao Delegation

Ministry of Public Works and Transport, Lao PDR

4th EST Forum, Seoul, Republic of Korea

24 Feb 2009

***Completed the 2nd DRAFT
EST Strategy and Action Plan***

Main Components:

1. Ambient Air Quality Monitoring and Management
2. Vehicle Emission Control
3. Inspection and Maintenance of Vehicle
4. Regulation of Fuel Quality and Standard
5. Transport Planning and Travel Demand Management
6. Standard and Weight Control
7. Environmentally and People Friendly Urban Transport
8. Infrastructure Development
9. Traffic Noise Monitoring
10. Information and Public Awareness
11. Gender and Transportation



MASTER PLAN ON COMPREHENSIVE URBAN TRANSPORT IN VIENTIANE

(17 Months 04/2007-09/2008)

Contents

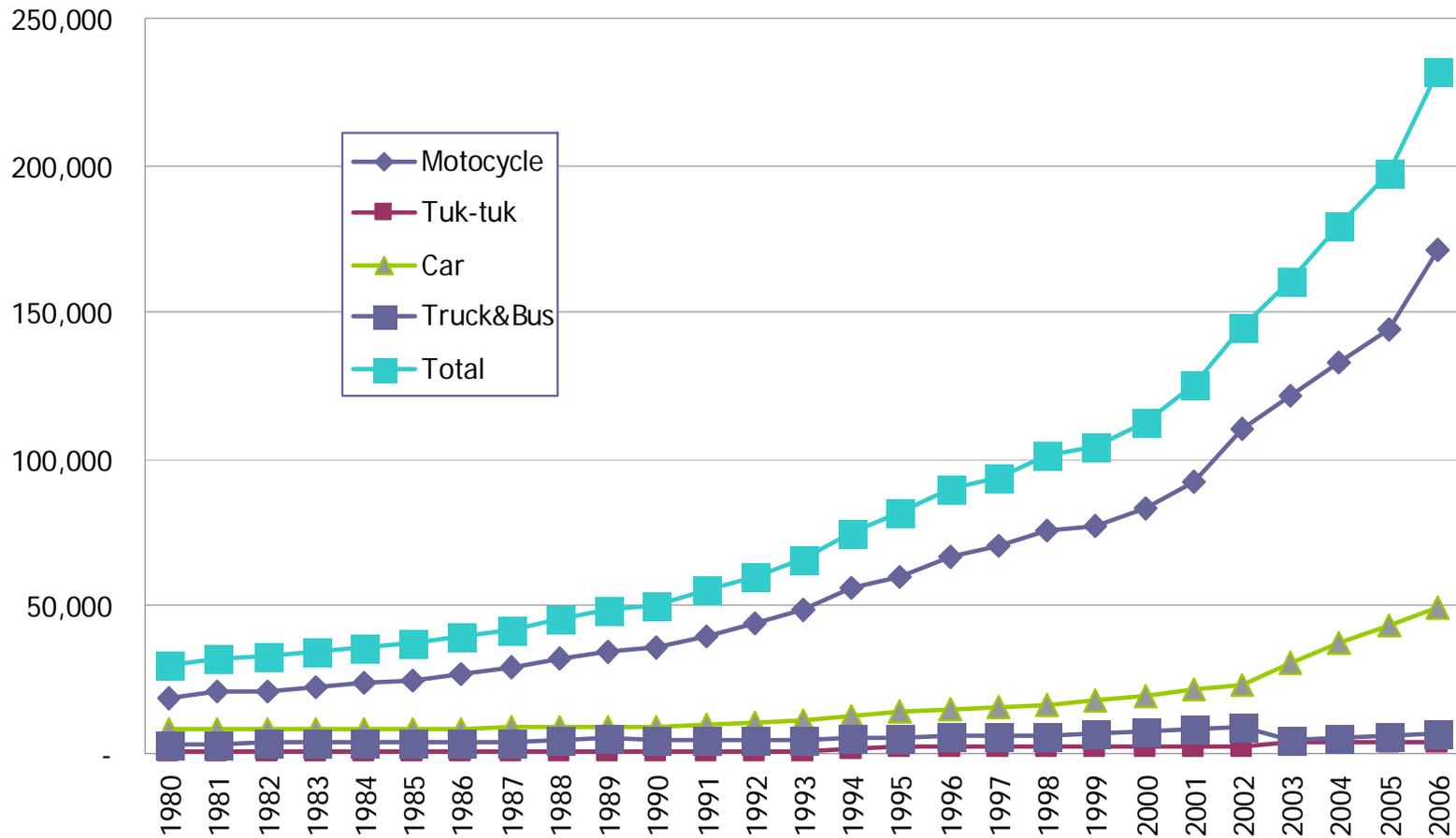
1. Background
2. Objectives
3. Strategy of the Master Plan
4. Major Components of the Master Plan

1. Background

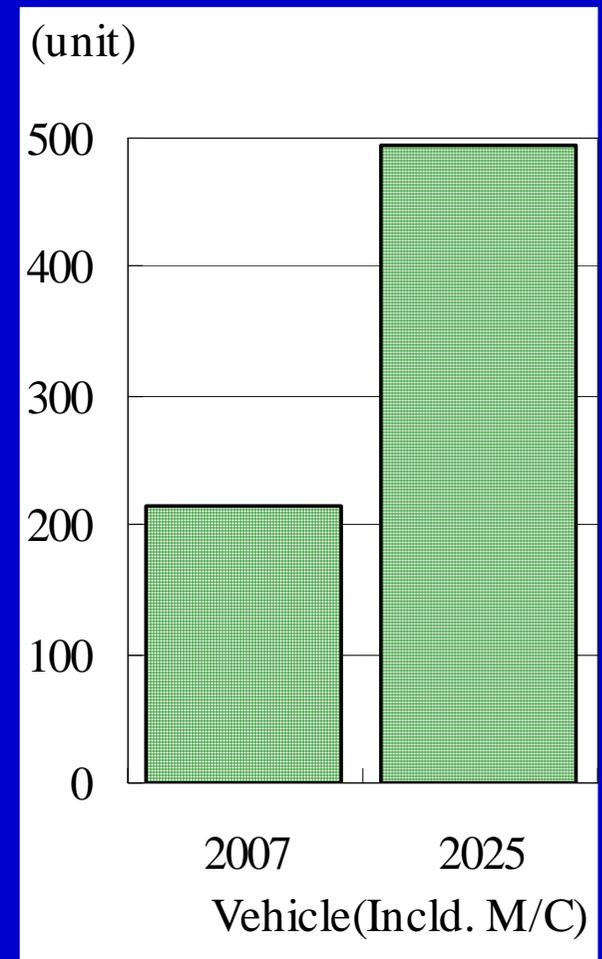
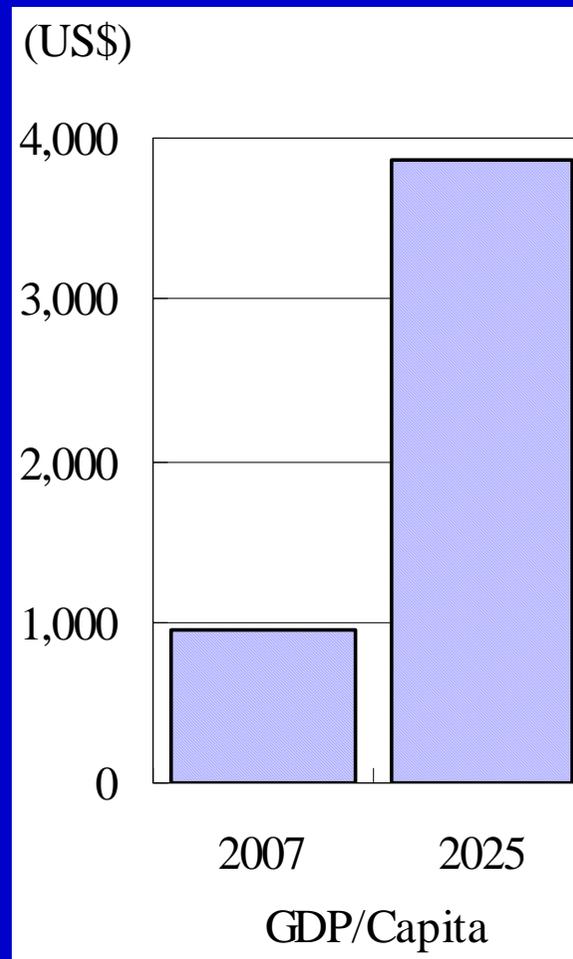
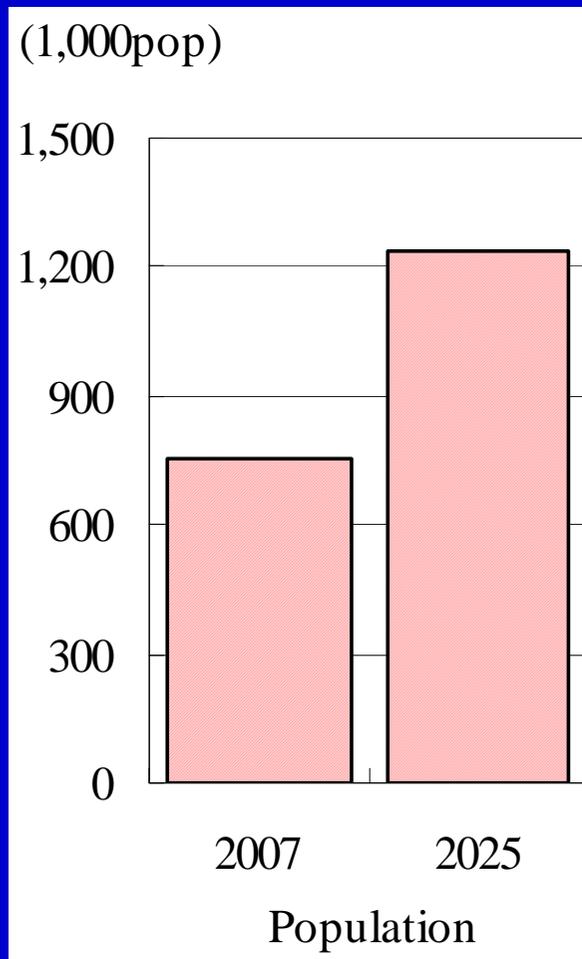
- The present traffic condition in Vientiane is not very bad compared with other capital cities of Asian countries.
- However, the traffic volume is rapidly increasing and severe traffic congestion is anticipated in the future.
- Therefore, '**Preventive Measures**' should be planned and started before traffic condition will become very bad.
- 25th SEA Games Dec 2009
- 450th Anniversary of Vientiane in 2010

Increase of Registered Vehicle

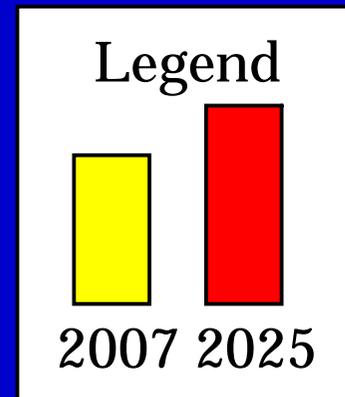
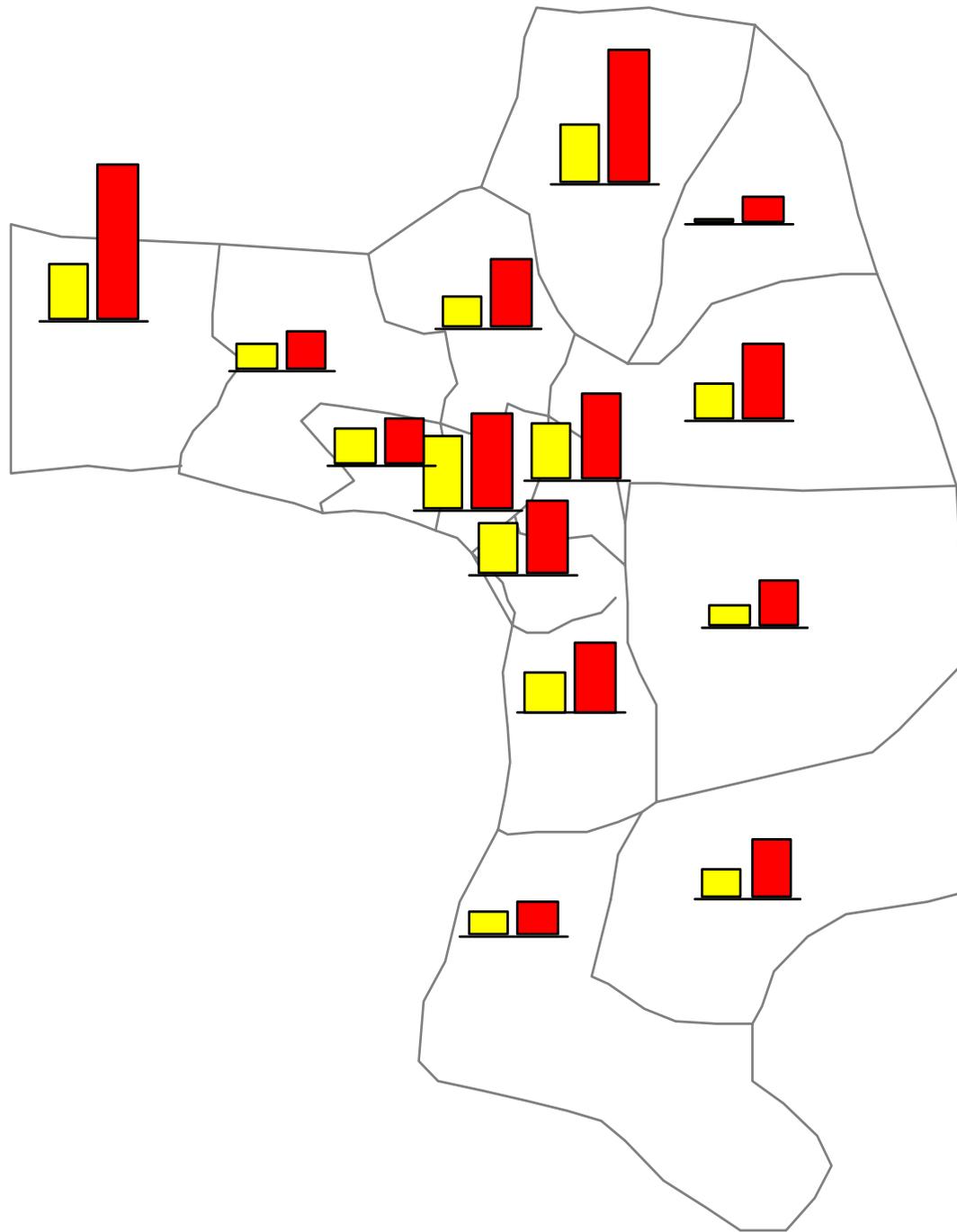
No. of Vehicles



Future Socio-Economic Frame of Vientiane

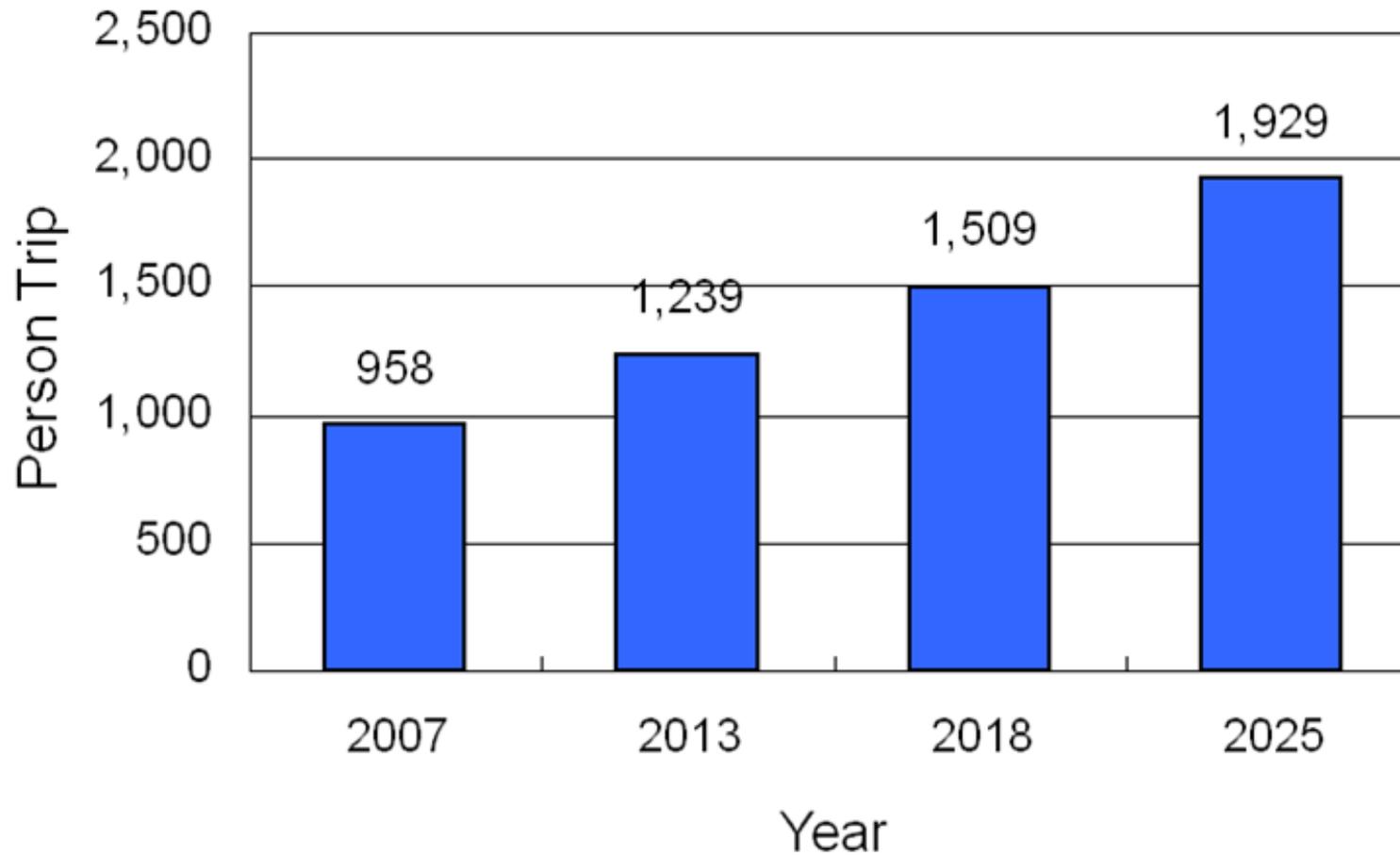


Future Population Distribution



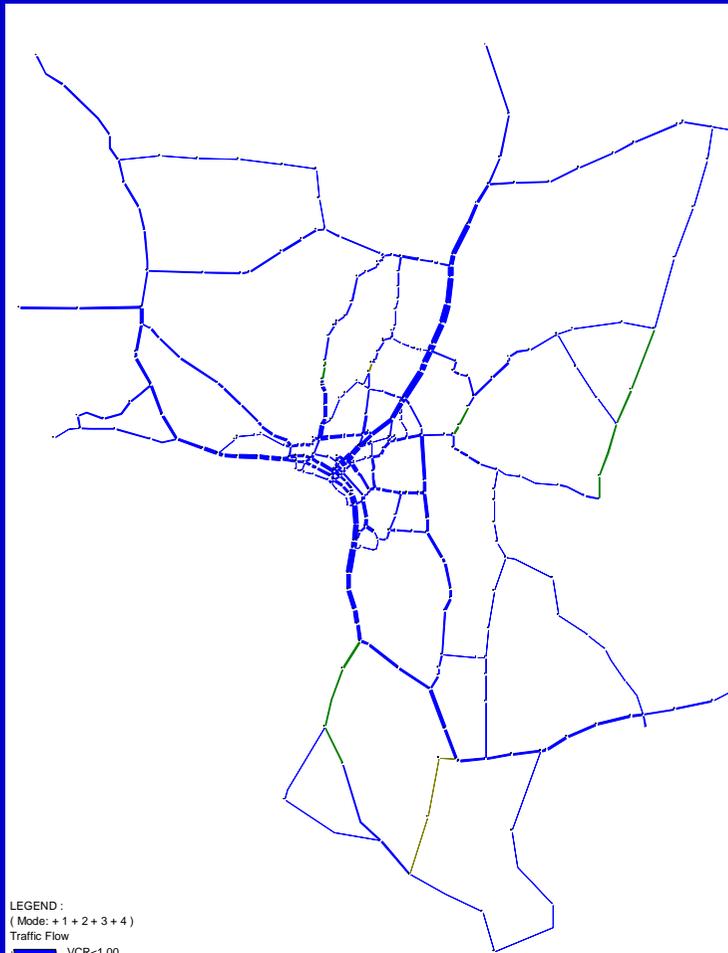
Future Movement of People

(1,000 person trip per day)

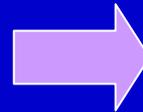


Traffic Condition

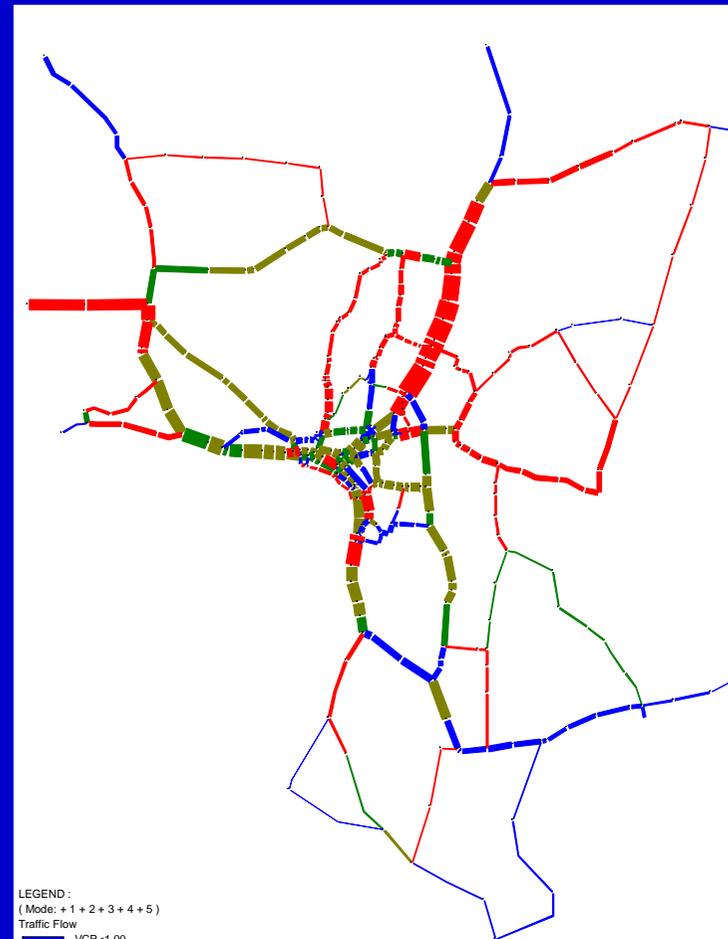
2007



LEGEND :
(Mode: +1 +2 +3 +4)
Traffic Flow
■ VCR<1.00
■ VCR<1.20
■ VCR<1.50
■ 1.50<VCR
scale: 1mm =20000(pcu)



2025



LEGEND :
(Mode: +1 +2 +3 +4 +5)
Traffic Flow
■ VCR<1.00
■ VCR<1.20
■ VCR<1.50
■ 1.50<VCR
scale: 1mm =20000(pcu)

2. Objectives of Urban Transport Master Plan

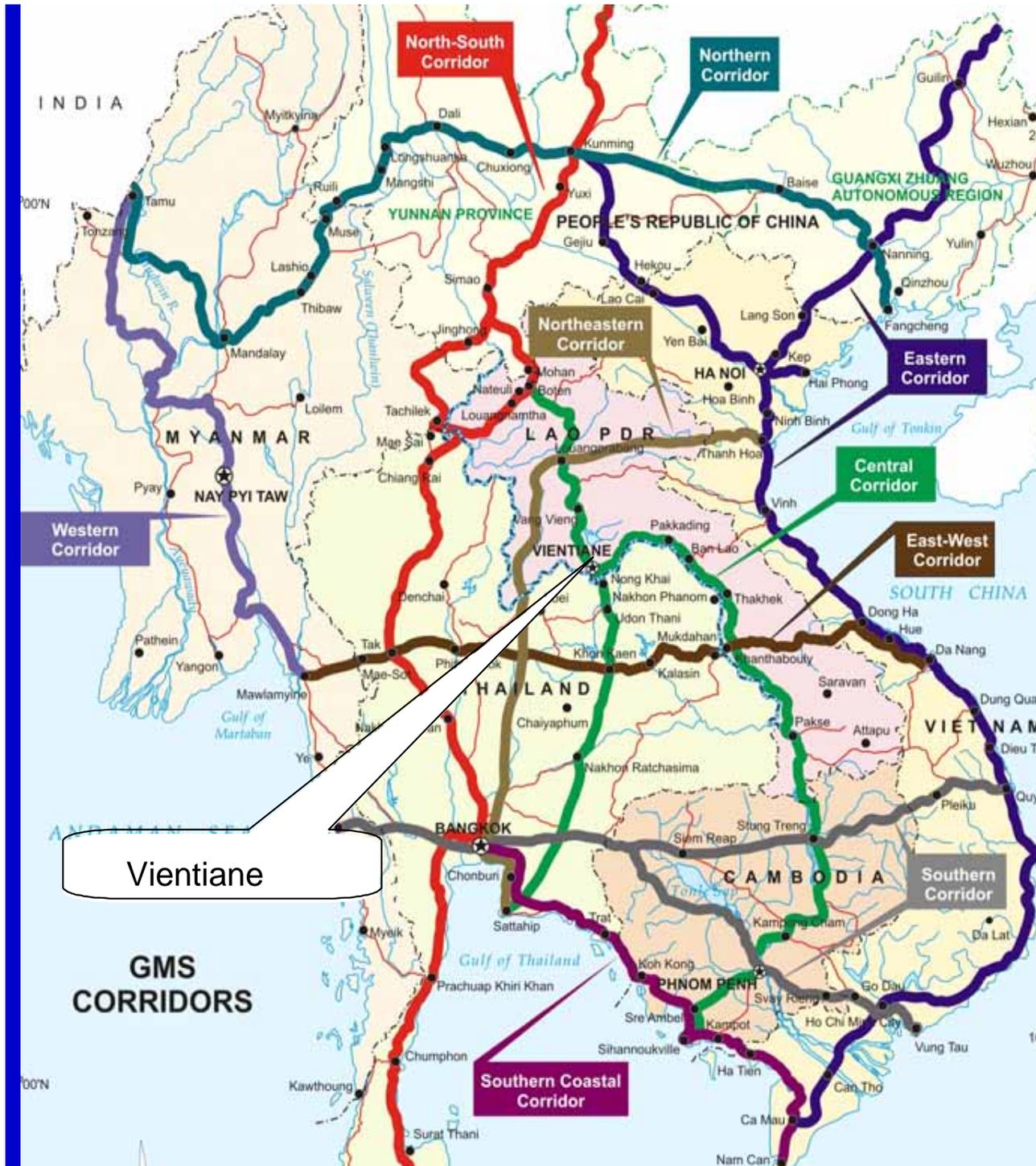
- Provision of safe, smooth, reliable and comfortable and affordable transport to all citizens
- Support sound urban development of Vientiane
- Maintain good living and natural environment, and historical asset.

3. Policy & Strategy of Master Plan

Future Vision of Vientiane

- Clean and Safe City with Functions as;
 - Modern Capital of Lao PDR (Center of Economic, Social and Cultural Activities), and
 - Transport Hub of the Greater Mekong Sub-region

Vientiane as Transport Hub of Greater Mekong Sub- Region



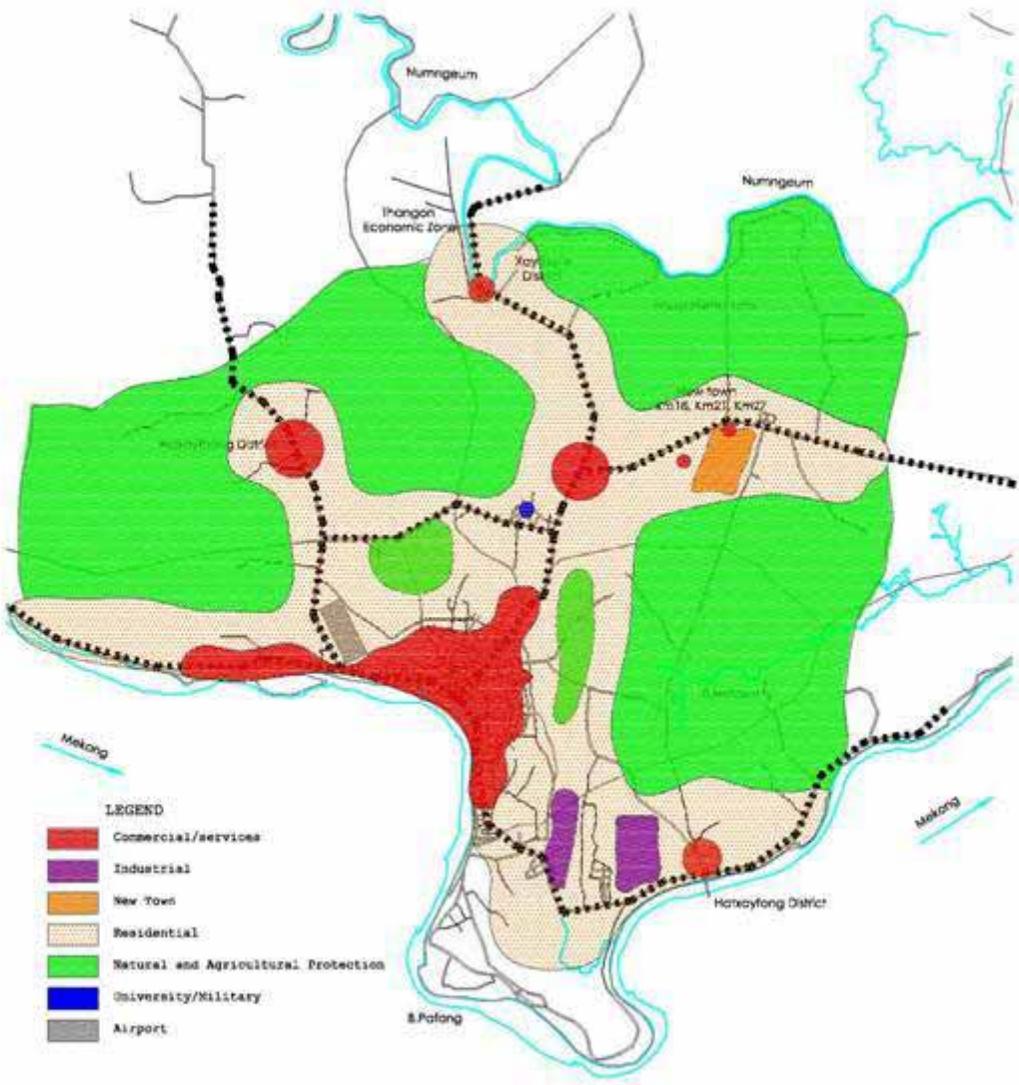
3. Major Components of Urban Transport Master Plan

- 1) Road Network Development
- 2) Public Transport Development
- 3) Traffic Management & Traffic Safety

(1) Road Network Development

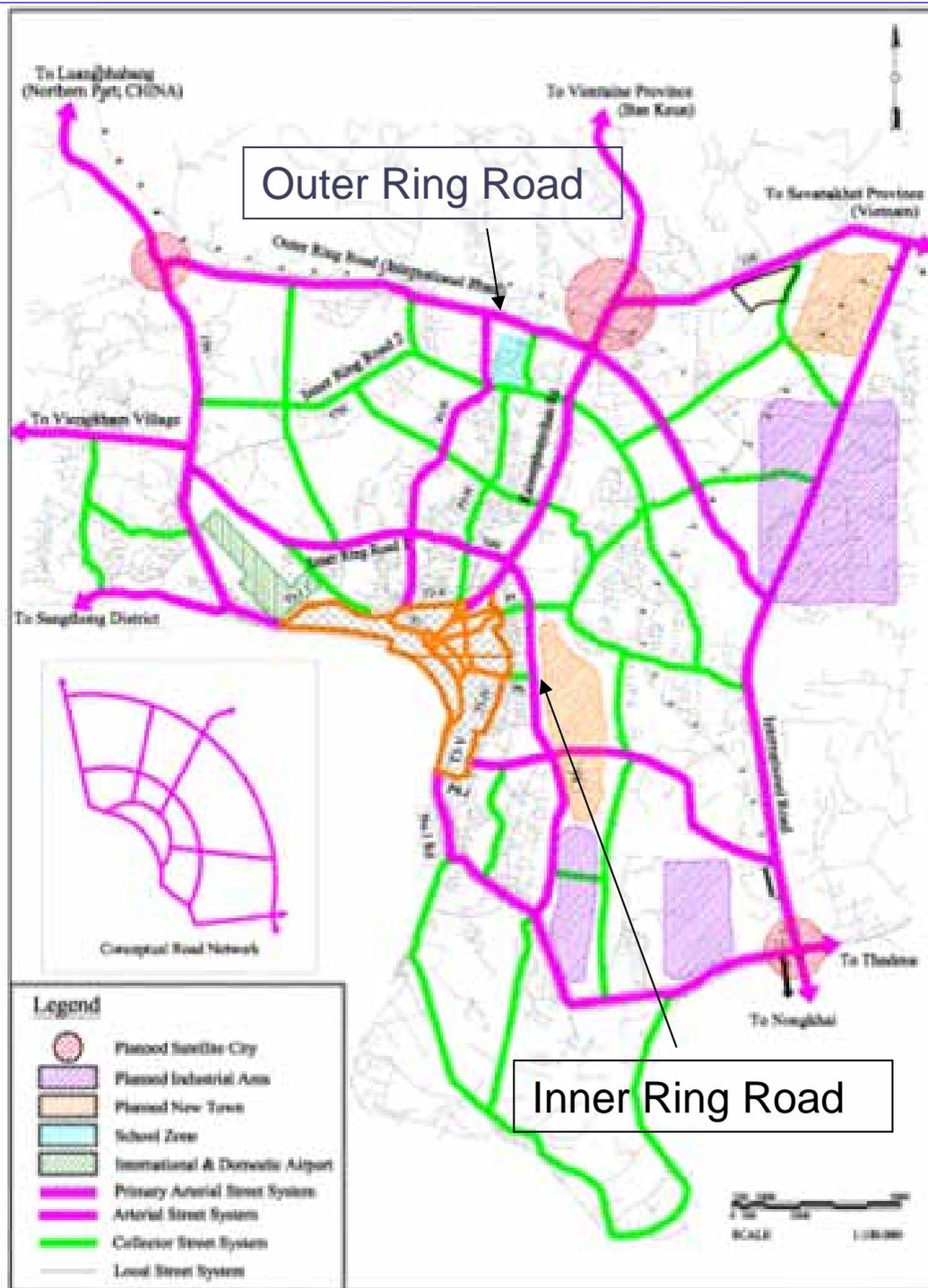
Strategy for Road Network Development

- Support Sound Urban Development
- Establish Functionally Balanced Road Network
- Construction of Missing Links
- Secure Space for Public Transport
- Secure Future ROW and Widen as Traffic Volume Increases

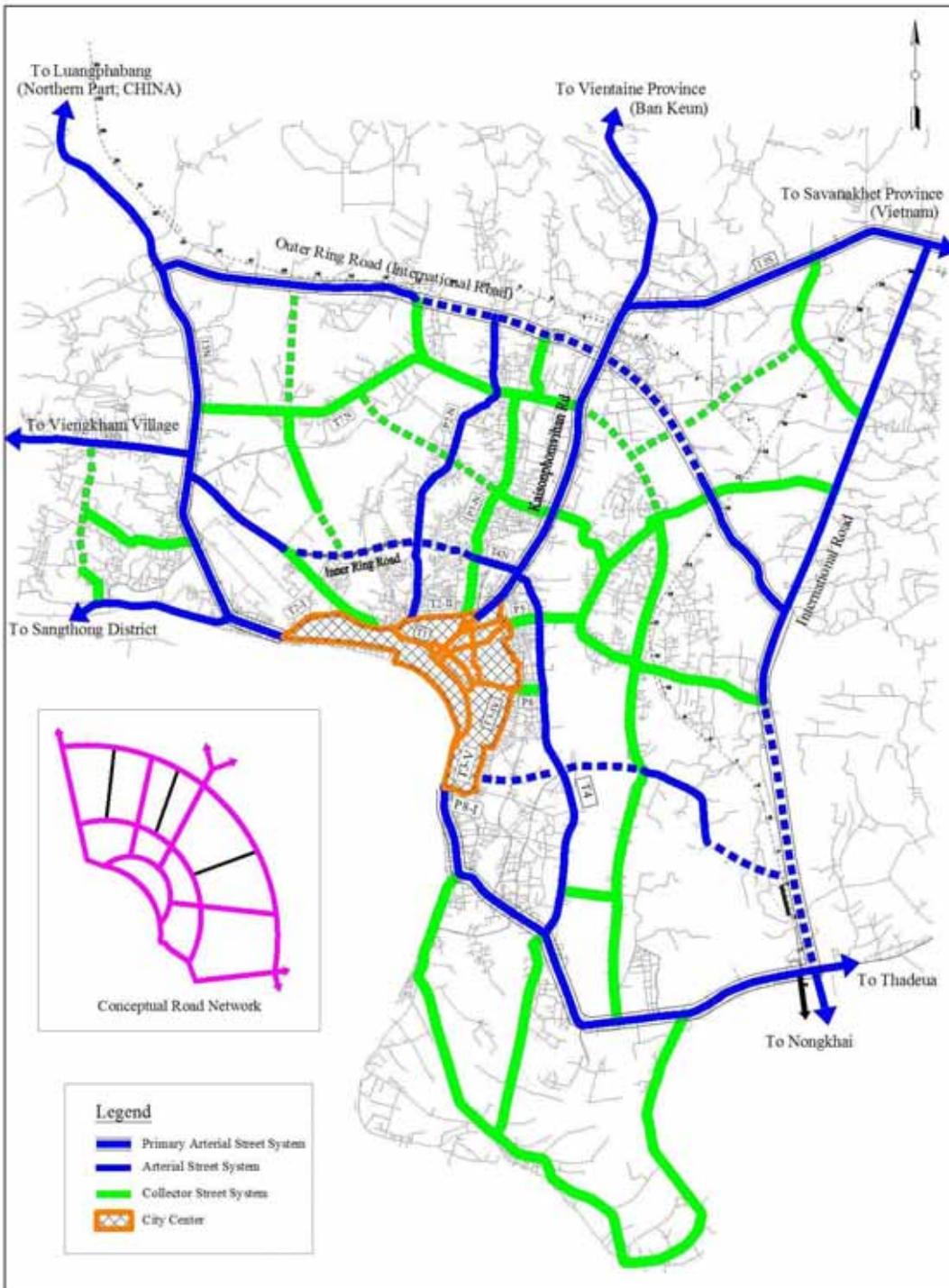


CONTROLLED FINGER PATTERN

Future Urban Development



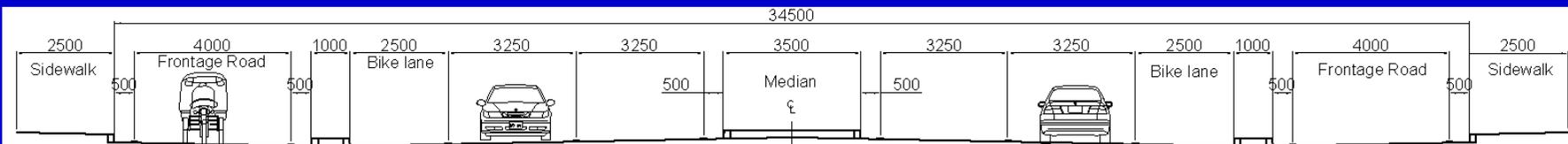
Road Network to Support Planned Development



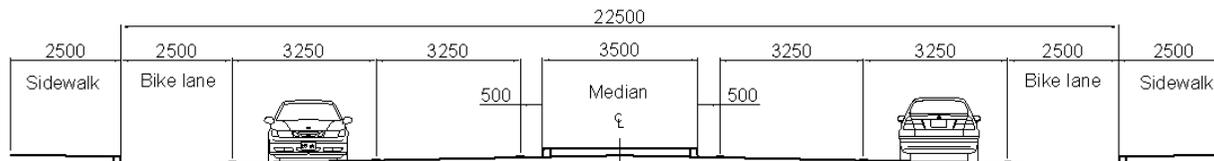
Future Road Network & Missing Links

Cross Section and ROW (Primary Arterial Road)

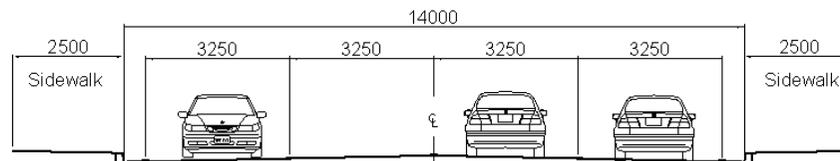
40 m or More



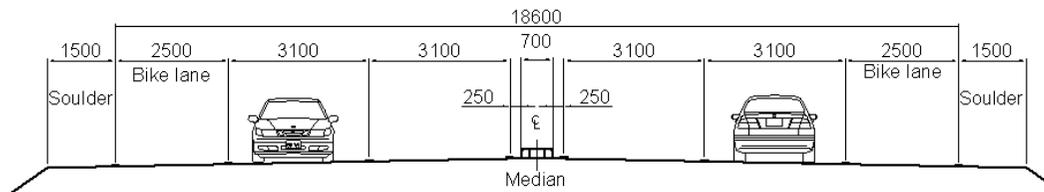
Primary Arterial Street (Desirable)



Primary Arterial Street (Stage Construction)



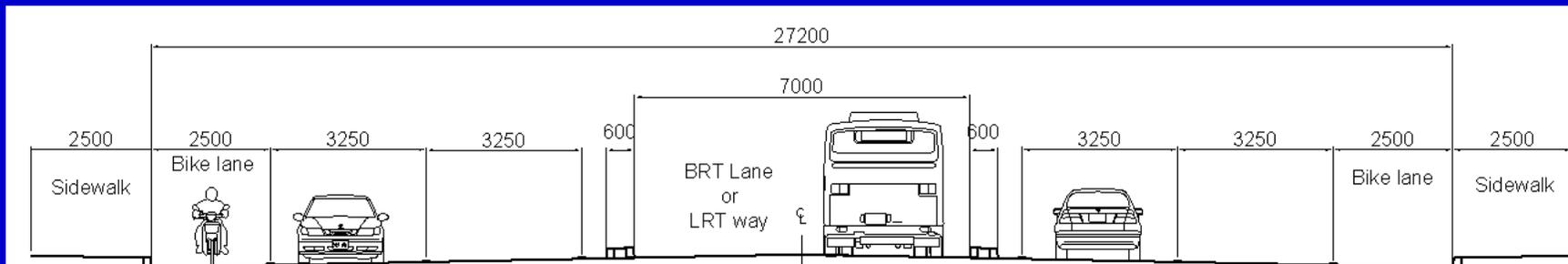
Primary Arterial Street (Stage Construction)



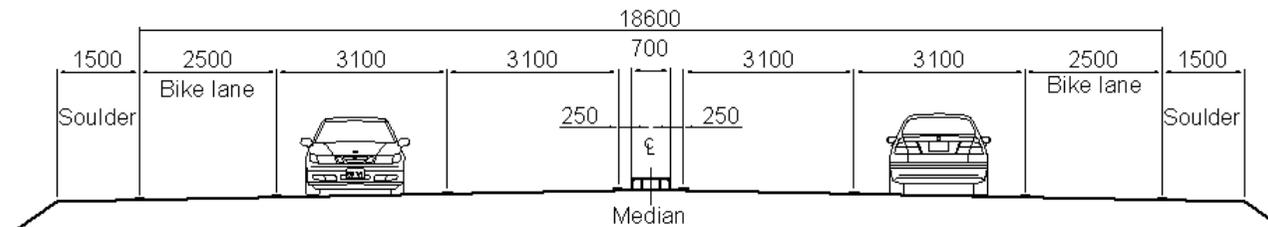
Kaysonephomvihane Rd.

Road Width with Space for Public Transport

40 m or More

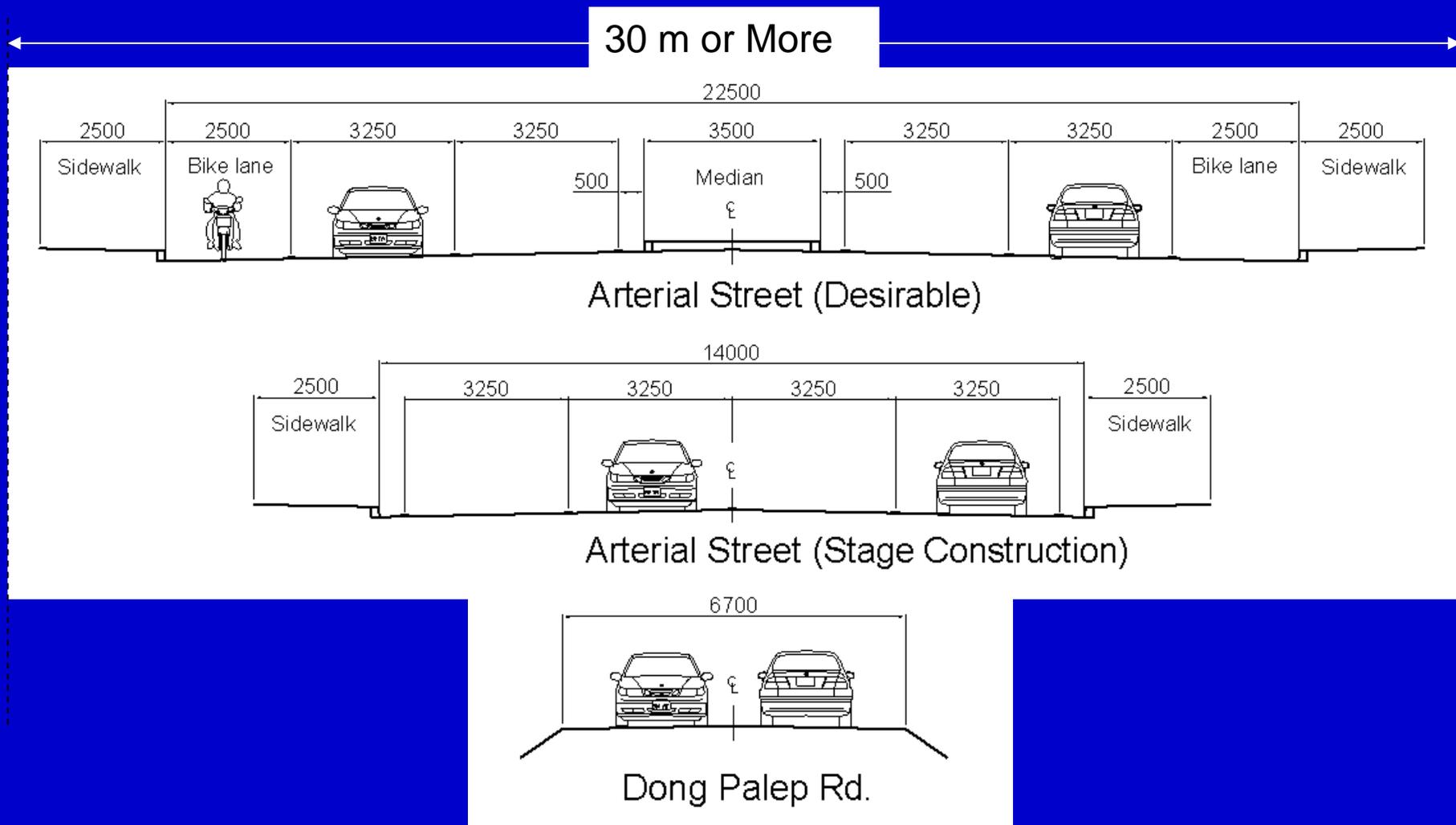


Primary Arterial Street (with Mass Transit)



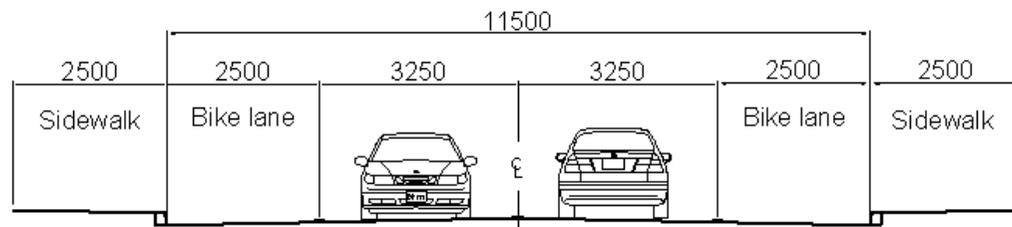
Kaysonephomvihane Rd.

Cross Section & ROW Arterial Street

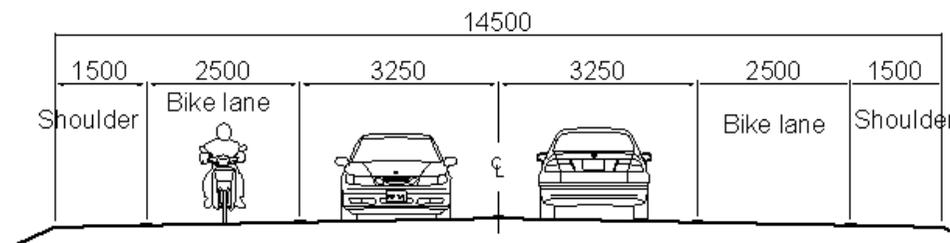


Cross Section & ROW for Collector Street

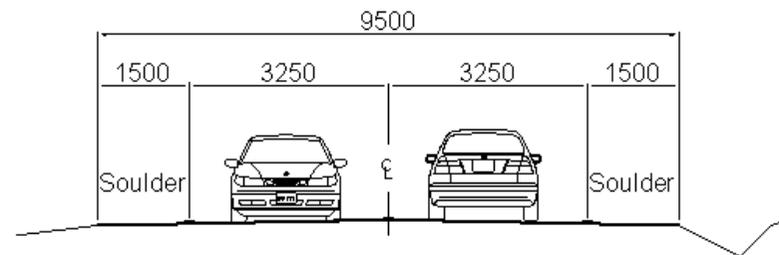
20 m or More



Collector Street (Desirable) (Urbanized Area)

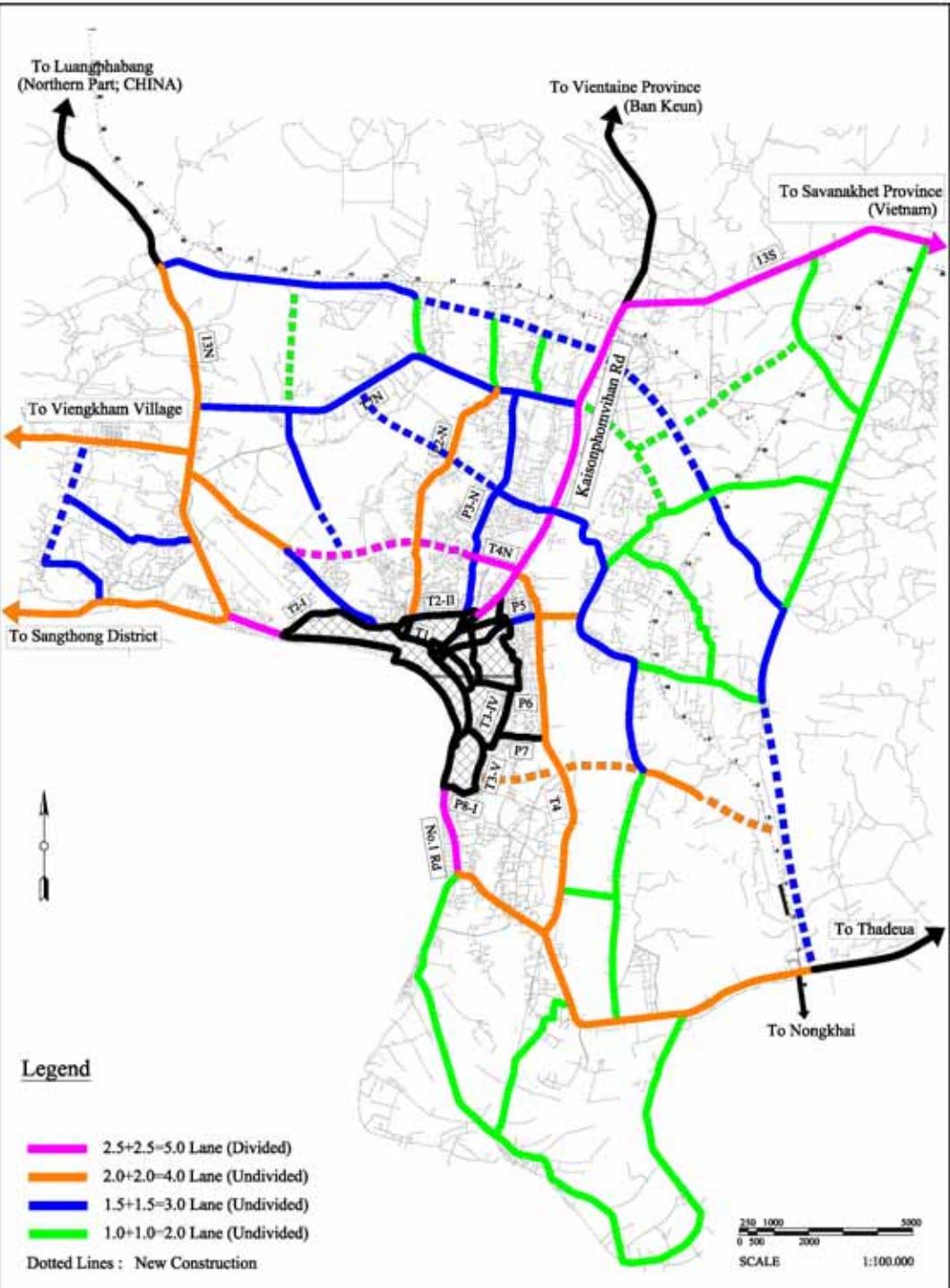


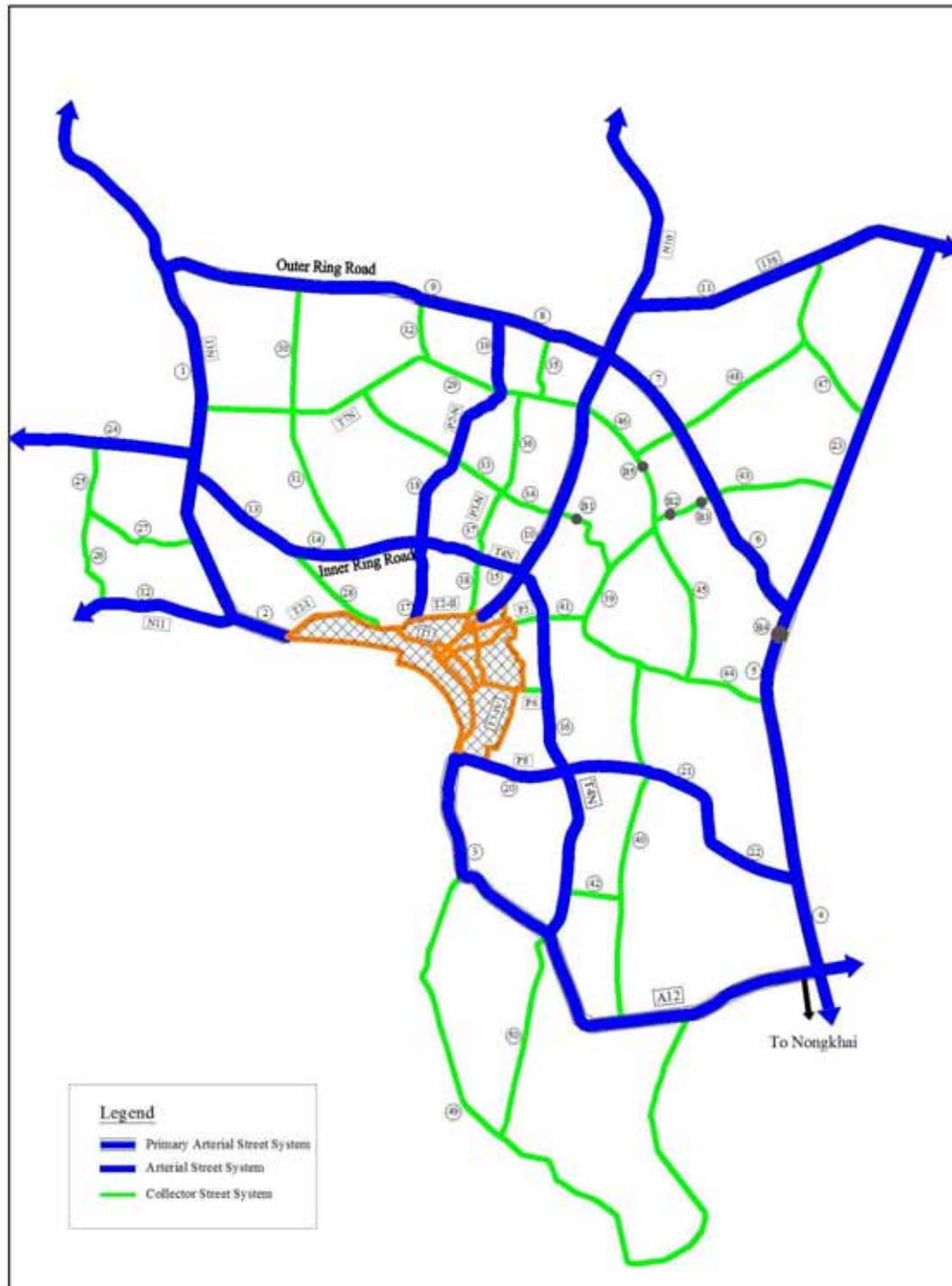
Collector Street (Desirable) (Suburban Area)



Collector Street (Stage Construction)

Road Width in 2025

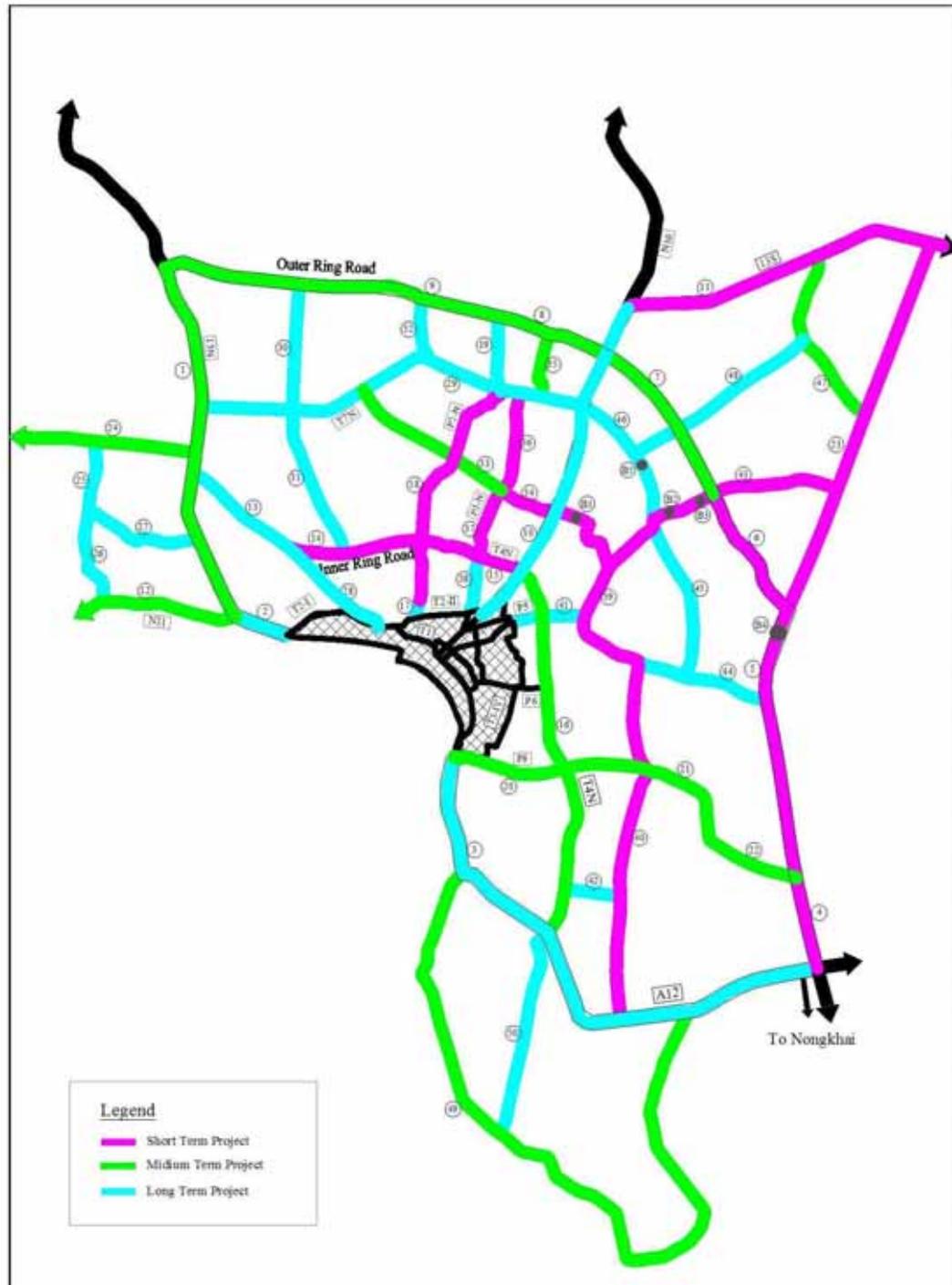




Road Network Development Projects (50 Projects)

Prioritization Criteria for Road Projects

- Planning Factor: Relation to Development Plans, Impact on Socio-Economic Activities etc
- Technical Factor: Urgency, Importance in Road Network & Technical Difficultness
- Environmental Factor: Negative Social & Natural Impact, Degree of Social Acceptance
- Benefit Factor: Economic Benefit, Project Cost

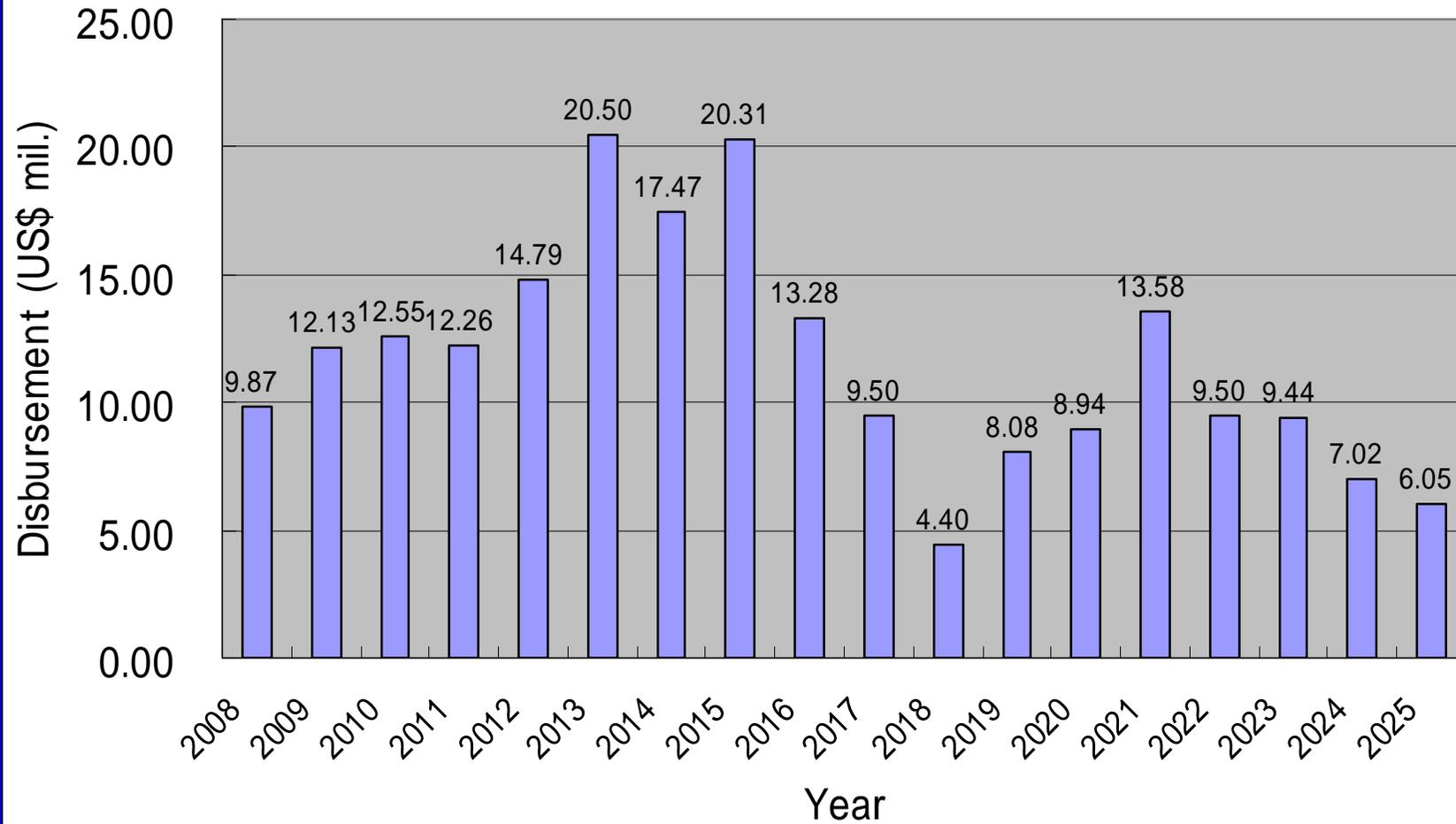


Classification of Project into 3 Terms

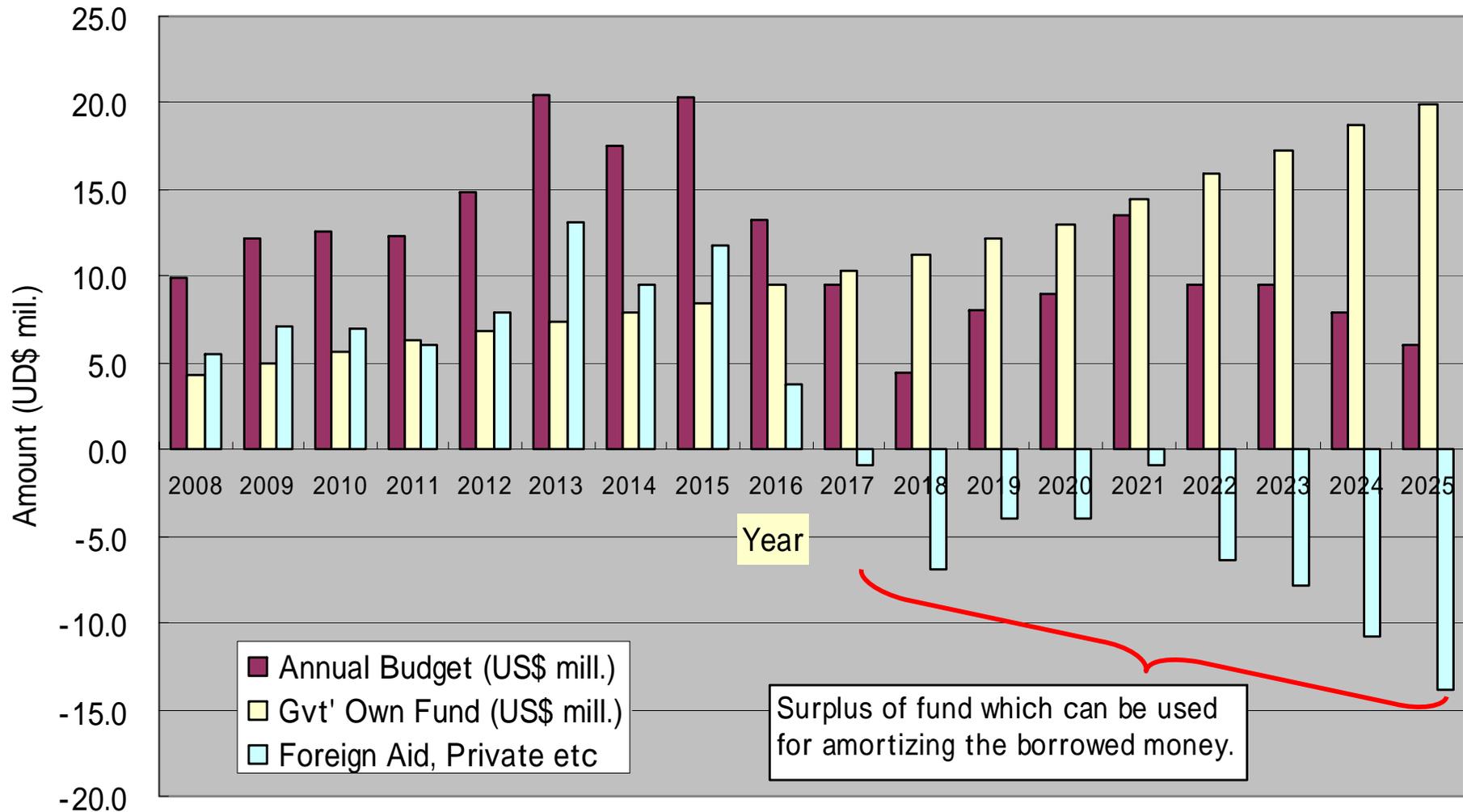
Cost Estimate

	Short Term 2009-2013	Medium Term 2014-2018	Long Term 2019-2025
Cost (US\$ mil.)	84.4	80.6	67.4

Fund Requirement



Financing Plan



Evaluation of Proposed Road Network (1)

Economic Evaluation

	Travel Cost (US\$1,000)	EIRR (%)	B/C	NPV (US\$1,000)
Do-Nothing	516,172	-	-	-
Proposed Network	414,736	18.1	1.54	87,237

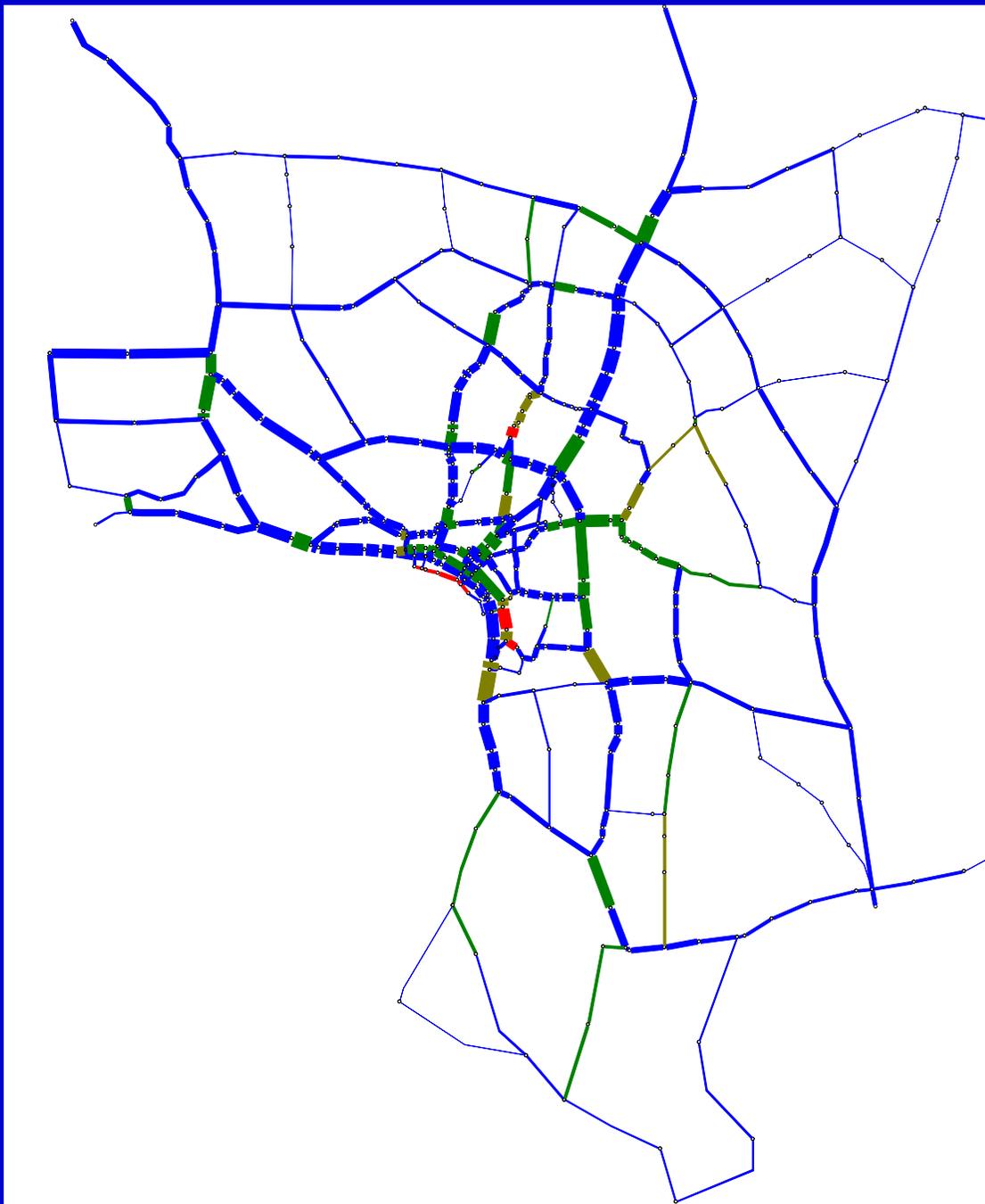
Evaluation of Proposed Road Network (2) Environmental Indicators

Difference of Vehicle Emission (ton/year)

	HC	CO	NOx
Do-Nothing	10,684	27,278	1,892
Proposed Network	10,277	26,242	1,790
Difference	-407 (3.8 %)	-1,036 (3.8)	-102 (5.4%)

Evaluation of Proposed Road Network (3) Traffic Condition

	Total PCU-Hrs	Total PCU-km	Ave. Speed (km/h)	Ave. V/C Ratio (Urban)	Ave. V/C Ratio (Suburb)	Ave. V/C Ratio (Whole)
Do- Nothing	364,006	7,467,732	20.5	1.20	1.45	1.38
Master Plan	173,273	7,128,592	41.1	0.89	0.67	0,71



Forecasted
Traffic
Condition in
2025

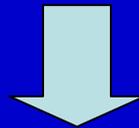
(2) Public Transport

Why Public Transport?

- Minimize use of private vehicles (motorcycles and private cars)
- Reduce air pollution (reduction of CO₂)
- Provide safe and comfortable transport for disadvantaged group (students, physically handicapped, aged, pregnant etc)
- Reduce traffic accidents
- Provide basic function of modern city

Scenarios of Public Transport Development

- Scenario 1: Para-Transit Oriented Scenario
- Scenario 2: Bus Favored Scenario
- Scenario 3: Bus + LRT Favored Scenario



- Scenario 2 is chosen as the Optimum Scenario
- and Scenario 3 is considered as possible scenario in the future

Problems of Present Public Transport in Vientiane

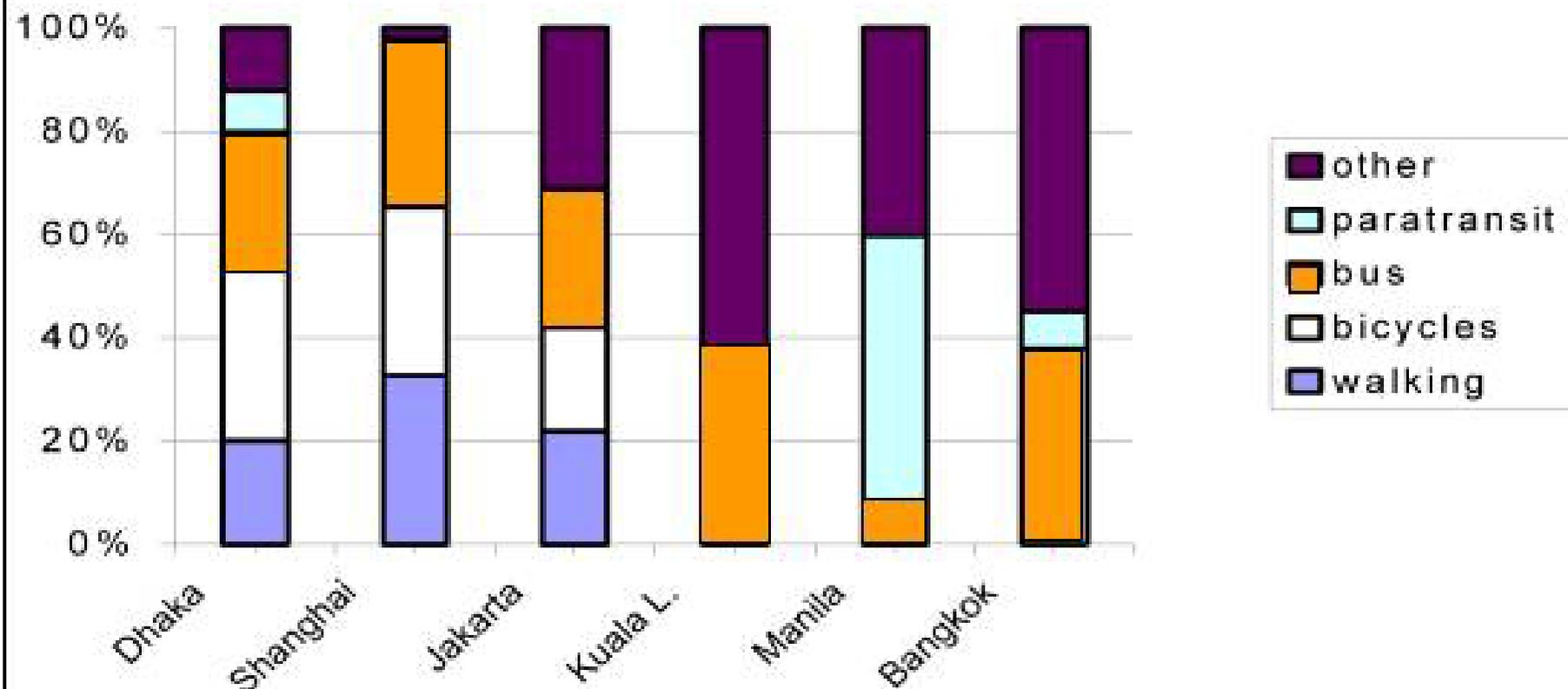
- Insufficient Bus Services: route distribution, frequency/waiting time, reliability, comfortableness
- Para-Transit (Tuk Tuk and Jumbo) Not Suitable for Modern Transport: air pollution, risk of accident, slow speed, not suitable for long trip

Strategy for Public Transport Development

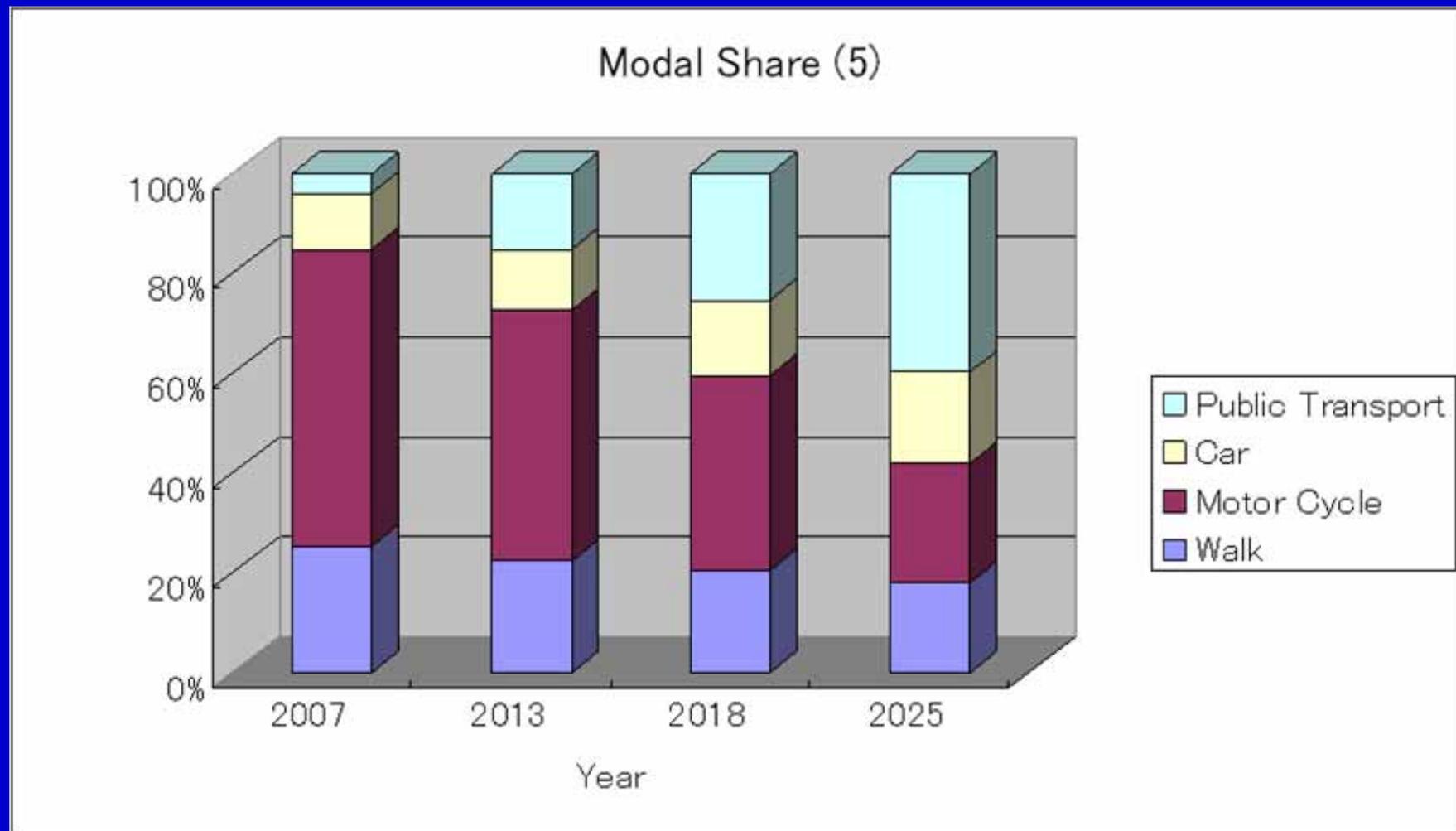
- Upgrade both quantity and quality of bus service system
- Incorporate existing para-transit into urban transport system
- Connect to railroad stations and other transport modes
- Consider future introduction of Light Rail Transit (LRT)

Strategy for Public Transport Development: Target of Modal Share

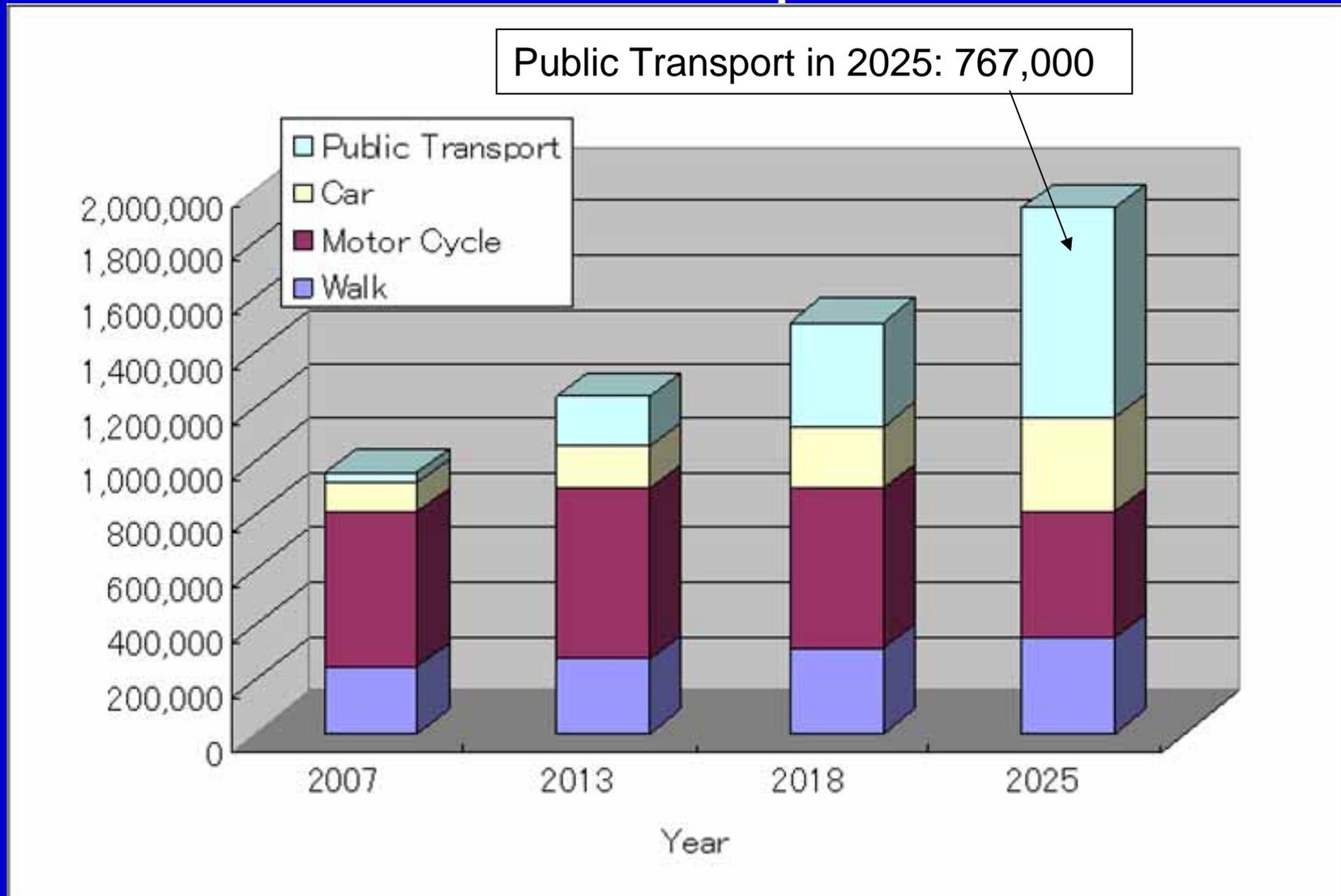
Percentage of travel modes for six Asian cities



Target of Share of Public Transport



Target of Share of Public Transport No. of Trips



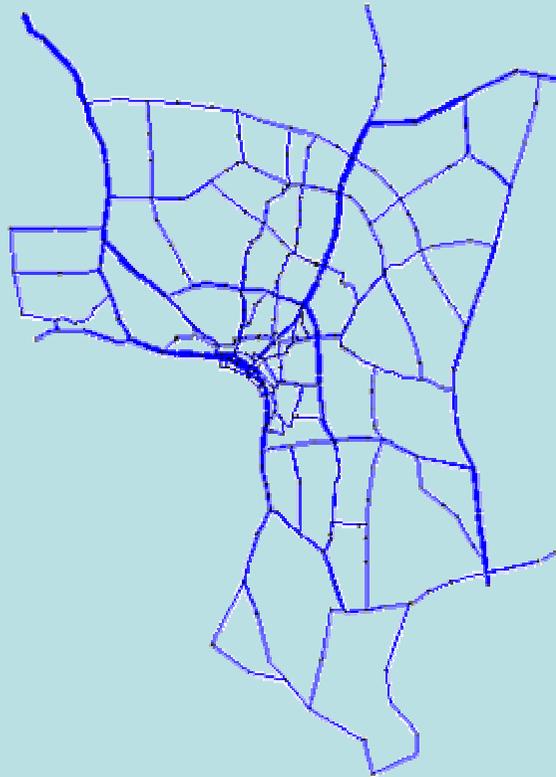
Strategy for Encouraging Bus Use: Market-Based Approach (Voluntary Market Force)

- Provision of convenient, reliable and comfortable bus services with reasonable fare
- Provision of monetary benefits to commuters
- Issuance of commuter pass and student pass with discount fare
- Strict enforcement of parking regulation and parking charge

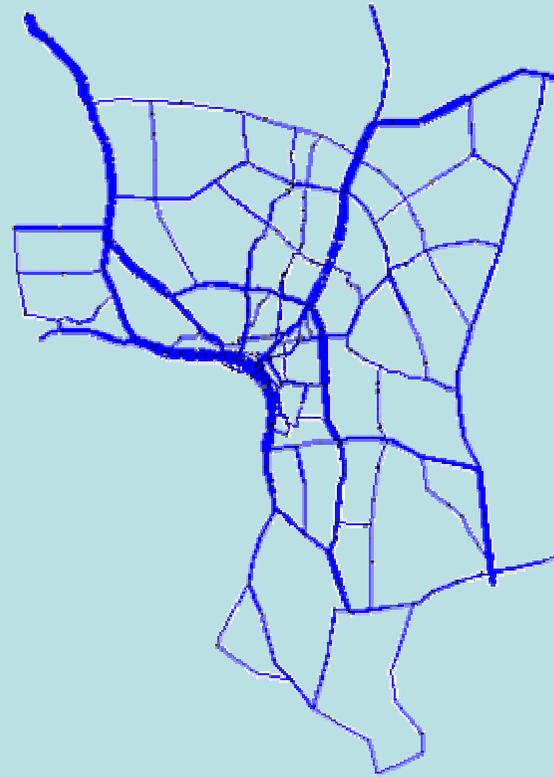
Strategy for Encouraging Bus Use: Regulatory Approach (Compulsory)

- Prohibit students' commuting by private vehicles including motorcycles
- Regulate certain kinds of vehicle (such as odd and even number of license plate) to enter city center
- Allow only high-occupancy vehicle to enter city center
- Introduce road pricing

Route of Demand



Year 2013



Year 2018



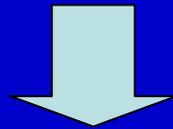
Year 2025

Required No. of Buses

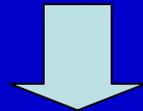
- 264 units by year 2013 (End of Short Term)
- 310 units by year 2018 (End of Medium Term)
- 352 units by year 2025 (Target year or end of Long Term)

Facilities for Smooth Bus Operation

- Bus Priority Lane → Exclusive Bus Lane
- Bus Stop & Bus Terminal
- Traffic Signal Control
- Improvement of Roads & Intersections



Bus Rapid Transit (BRT)



Light Rail Transit (LRT)

Exclusive Bus Lane in Seoul, Korea



BRT in Jakarta, Indonesia





Bus Rapid Transit with Single Bus



Exclusive Bus Lane with Articulated Bus

Assumption for Estimating Fund Requirement for Procurement of Buses

- 100 units out of 264 units for Short Term are procured in 2010 as the 1st batch.
- Remaining 164 units are evenly procured every year over the period of 2011 – 2013: 55 units/yr.
- 310 units of Medium Term and 352 units of Long Term are procured evenly every year: 62 unit/yr. for Medium Term and 50 units/yr. for Long Term.

Evaluation of Public Transport Plan (1)

Economic Evaluation

- $EIRR = 39.6 \%$
- $B/C = 4.17$
- $NPV = \text{US\$ } 551,257,000$

Evaluation of Public Transport Plan (2)

Environmental Evaluation

Unit: Ton/Year

	HC	CO	NOx	CO2
Do-Nothing	2,562	7,784	2,054	1,909
Proposed Plan	1,338	3,583	1,495	1,266
Reduction	1,224 (48%)	4,201 (54%)	560 (27%)	643 (34%)

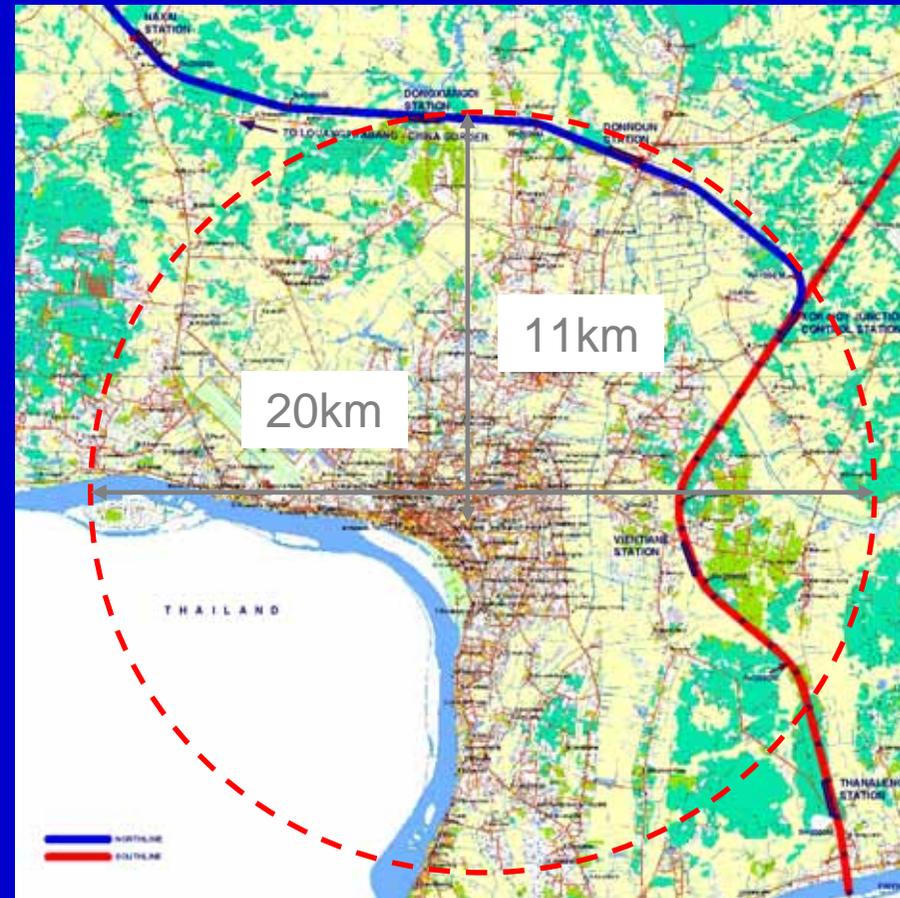
Incorporation of Para-Transit

- Coordination with bus transit as feeder transport (Example: between bus stop and home).
- In future, change to mini-bus and operate in less densely populated areas.
- Possibility to serve as on-demand bus in the future.

Light Rail Transit Development Plan: Possible Area



Yamanote Line in Tokyo



Vientiane

(3) Traffic Management

Common Measures of Traffic Management/Safety

- Parking regulation & other traffic enforcement
- Traffic Safety Education (Drivers and Pedestrians)
- Traffic Accident Data Accumulation & Analysis
- Traffic signals
- Traffic signs & pavement markings
- Traffic safety devices (guard rail etc)
- Road section and intersection improvement
- Traffic Demand Management (TDM)

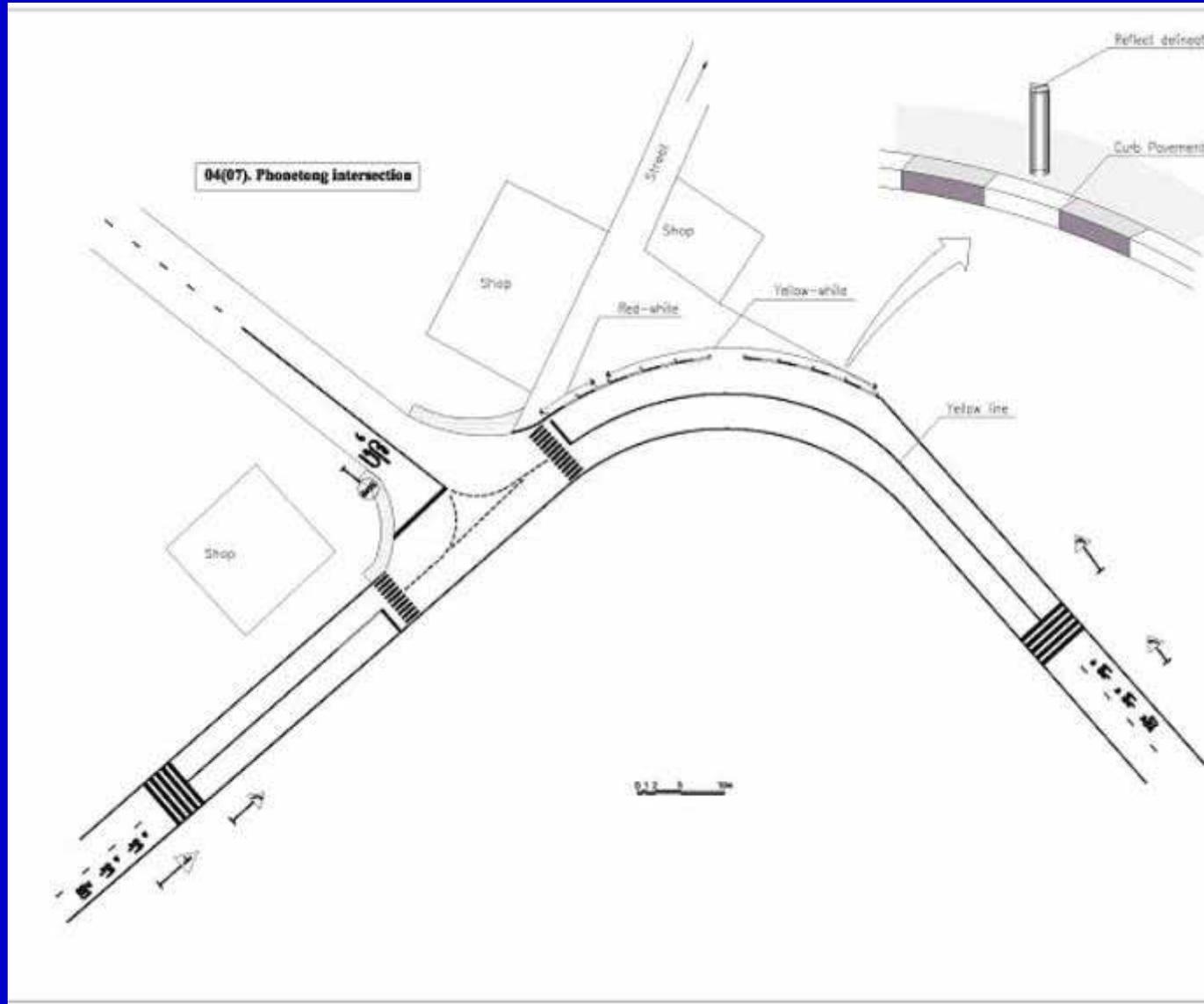
Basic Features of Traffic Management Measures

- Can be implemented in relatively short term and with relatively low cost, compared with other measures such as road network development.
- Effective where road improvement/ widening cannot be implemented.
- Effective for short period.

Position of Traffic Management in this Master Plan

- There are many other studies and projects on traffic management/safety in Vientiane.
- Master Plan Study mainly discusses long-term measures.
- Thus, recommendations are made on traffic accident data base, uniform traffic signs and pavement markings, and 7 examples of improvement of intersections.

Example of Intersection Improvement: Phonetong Intersection



Existing Problems (1)

- Traffic Engineering (1)
 - Disorderly traffic flow due to mixed traffic
 - Inadequate pavement markings and traffic signs
 - Inadequate traffic processing at intersections (Being improved)
 - Inadequate vehicle channelization at intersection

Existing Problems (2)

- Traffic Engineering (2)
 - Insufficient pedestrian islands and traffic safety facilities
 - Insufficient pedestrian crossing facilities
 - Inadequate traffic regulation, especially parking regulation
 - Weak traffic accident database (Being improved)

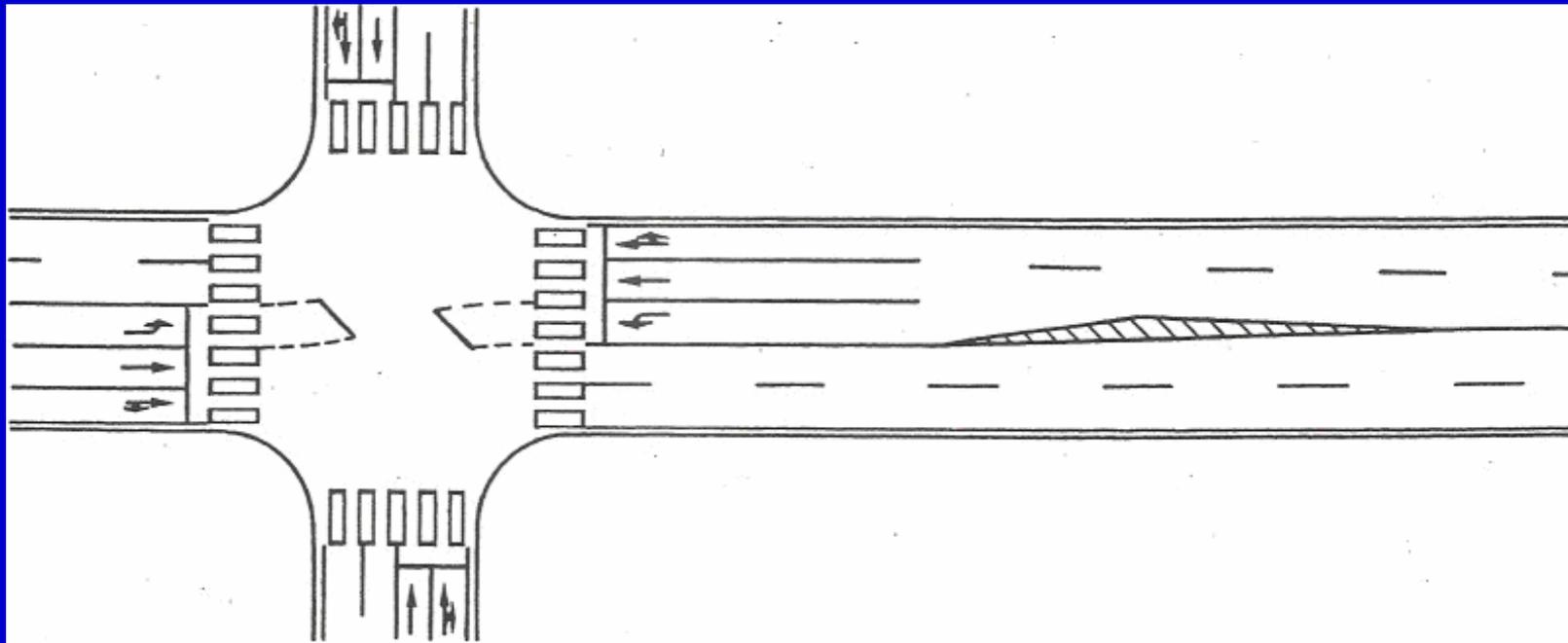
Existing Problems (3)

➤ Traffic Safety

- Insufficient traffic safety education
- Indifference among drivers in obeying regulations
- Necessity for strengthening traffic enforcement

Example of Measures (1)

Exclusive Left-Turn Lane at Intersection

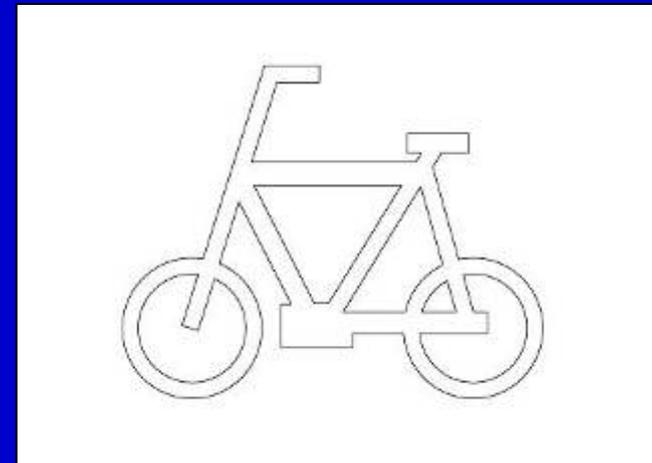
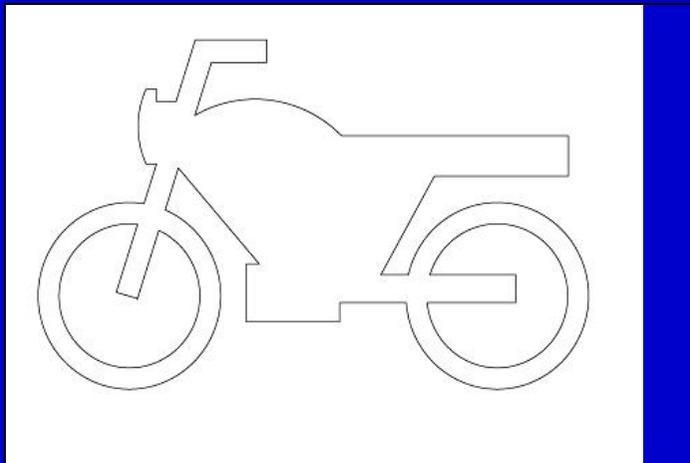


Example of Measures (2) Raised Median



Example of Measures (3)

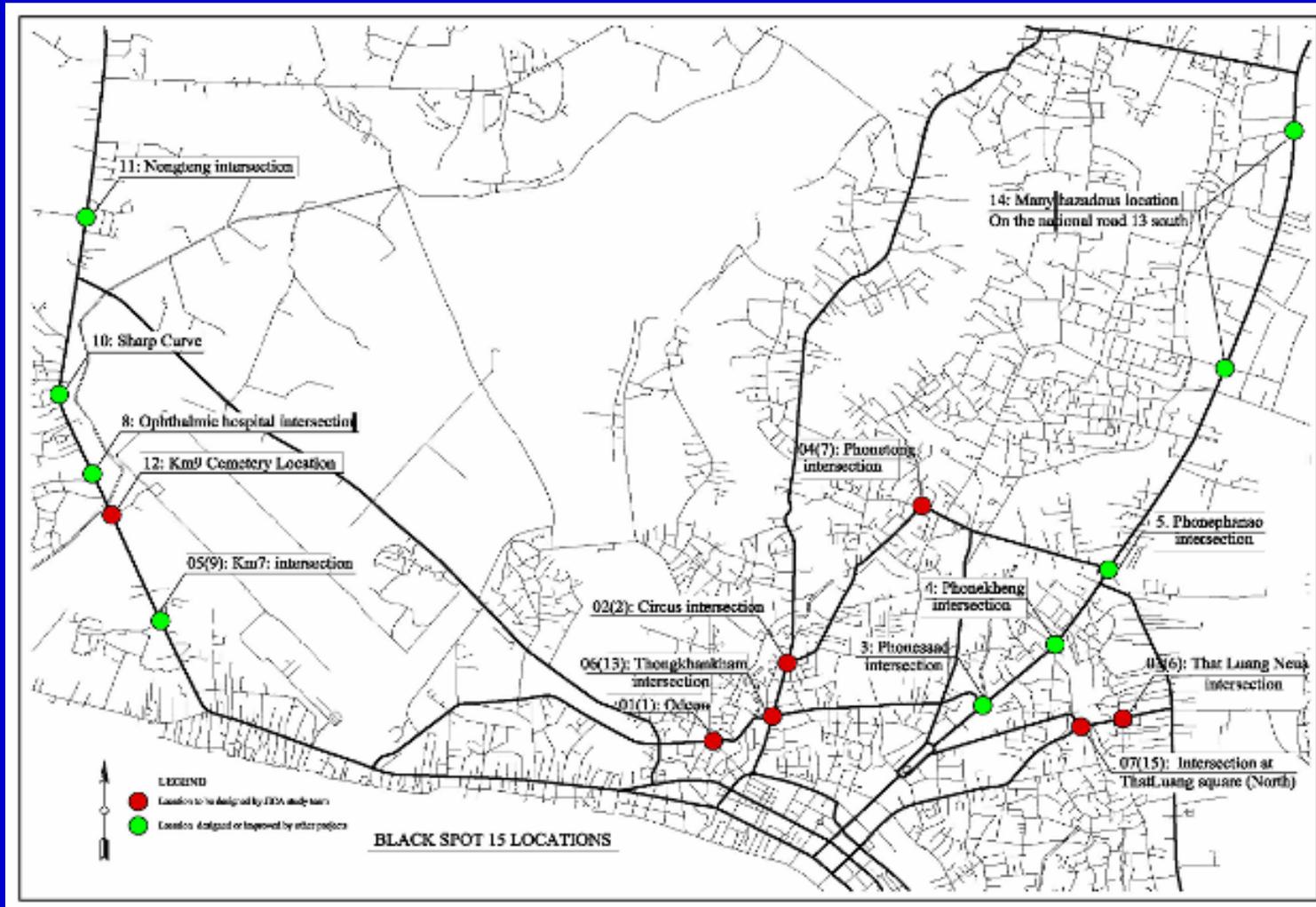
Pavement Marking (Example)



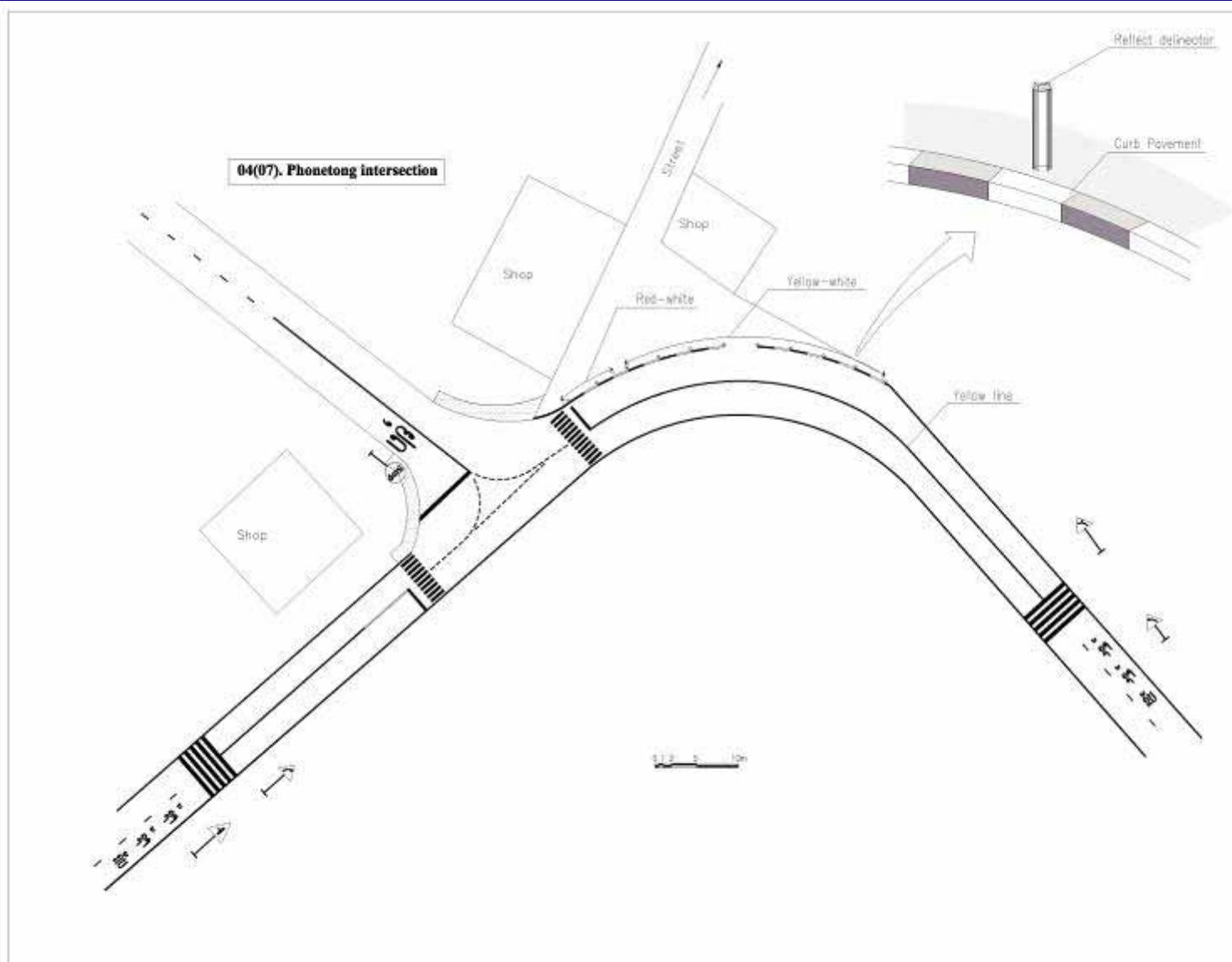
➤ Lane marking and centerline marking are also important

Example of Measures (4-1)

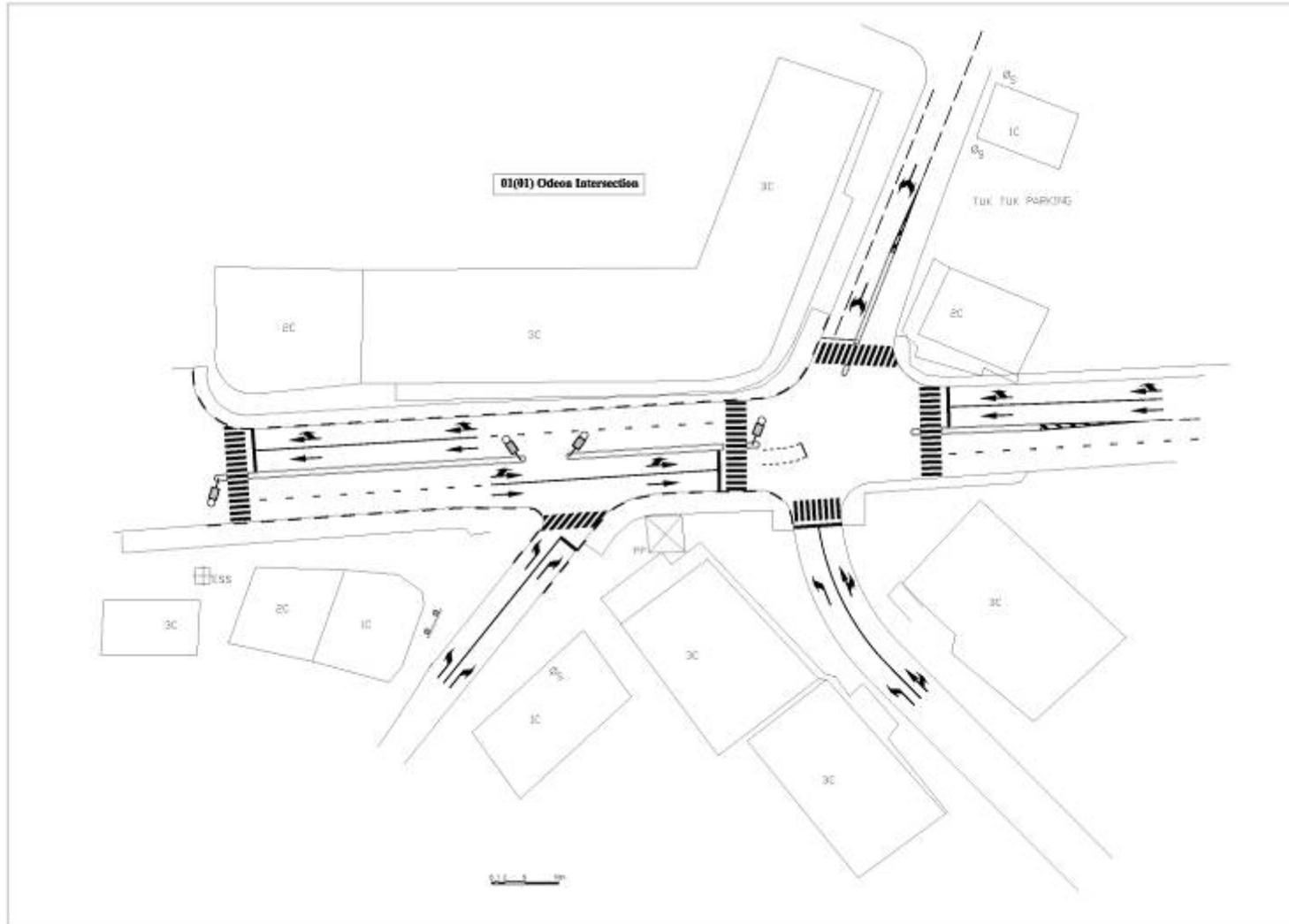
Improvement of Black Spot Intersection



Example of Measures (4-2) Improvement of Black Spot Intersection (1) Phonetong Intersection



Example of Measures (4-3) Improvement of Black Spot Intersection (2) Odeon Intersection



Other Proposed Measures

- Setting up of Traffic Accident Data Management System
- Driver education
- Traffic safety education in school
- Regular traffic safety campaign
- Strengthening of traffic enforcement
- Standardization of pavement markings and traffic signs

Next Steps...

- Submit Final DRAFT EST Strategy to National Environment Committee, **June 2009**
- Government Endorsement, **Late 2009**

Thank you for your attention!