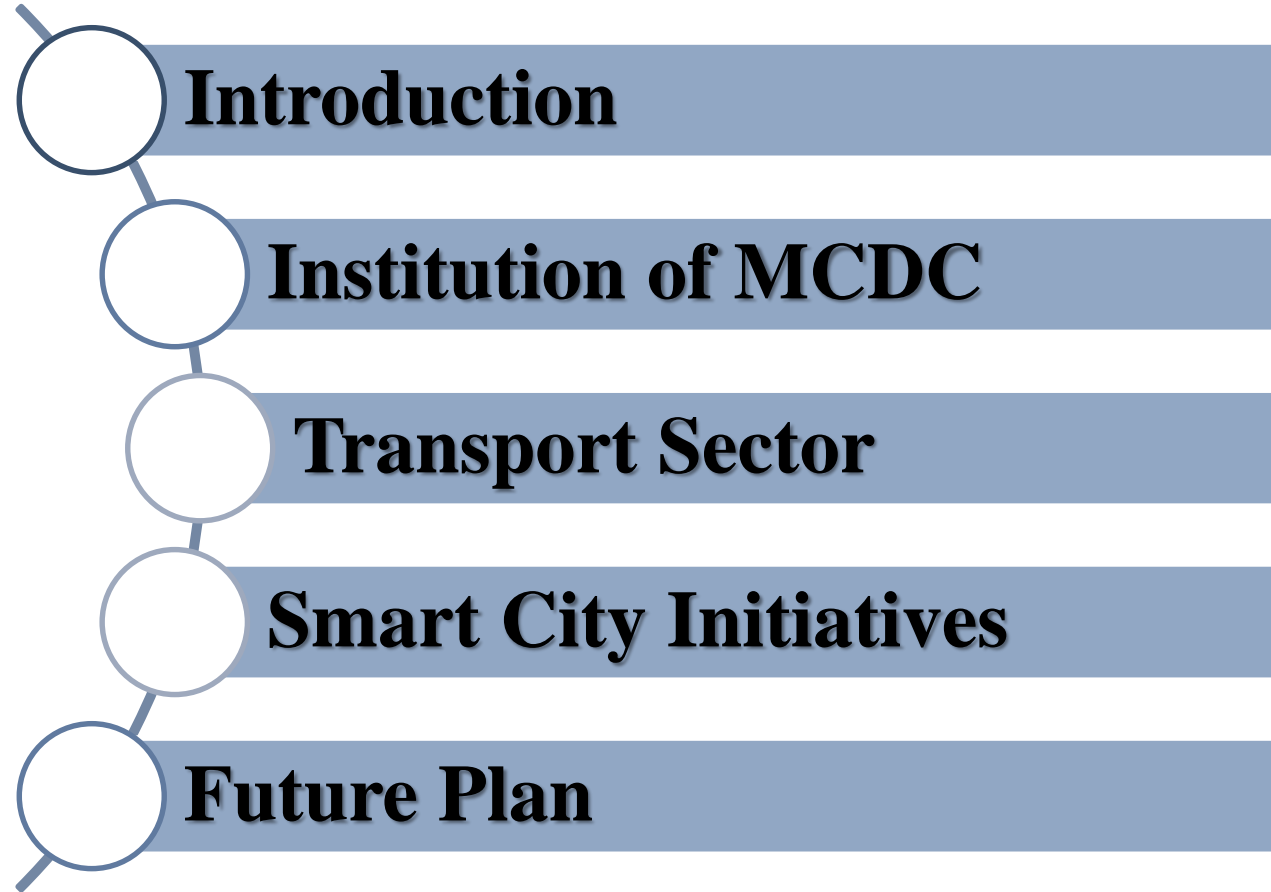




# Transportation in Mandalay

U Kyaw Zay Ya  
Committee Member  
Mandalay City Development Committee

# Overview



# Introduction

## The Republic of the Union of Myanmar

- ❖ Agricultural country
- ❖ Capital - Naypyidaw city since November, 2005
- ❖ Official language – Myanmar
- ❖ Rich in terms of natural resources
- ❖ the second highest exporter of natural gas in the South East Asia region
- ❖ Population - about 51 million (2014)
- ❖ Area - 676,577.2 sq.km
- ❖ Coastline - 2832km
- ❖ Population density – 76 pop./sq. km
- ❖ Urban population – 30%





# Mandalay

- ❖ Second largest city
- ❖ Last Ancient Royal Capital of Myanmar
- ❖ Commercial Hub
- ❖ Member city in 100 Resilient Cities (2013)
- ❖ Smart city (2018)

Townships = **6** nos.

Wards = 96 nos.

Population = about **1.5** million (2014)

Area = about **315** km<sup>2</sup>

Total road length = **1420** km (*Grid Patterns*)

Annual rainfall = 810 mm/year

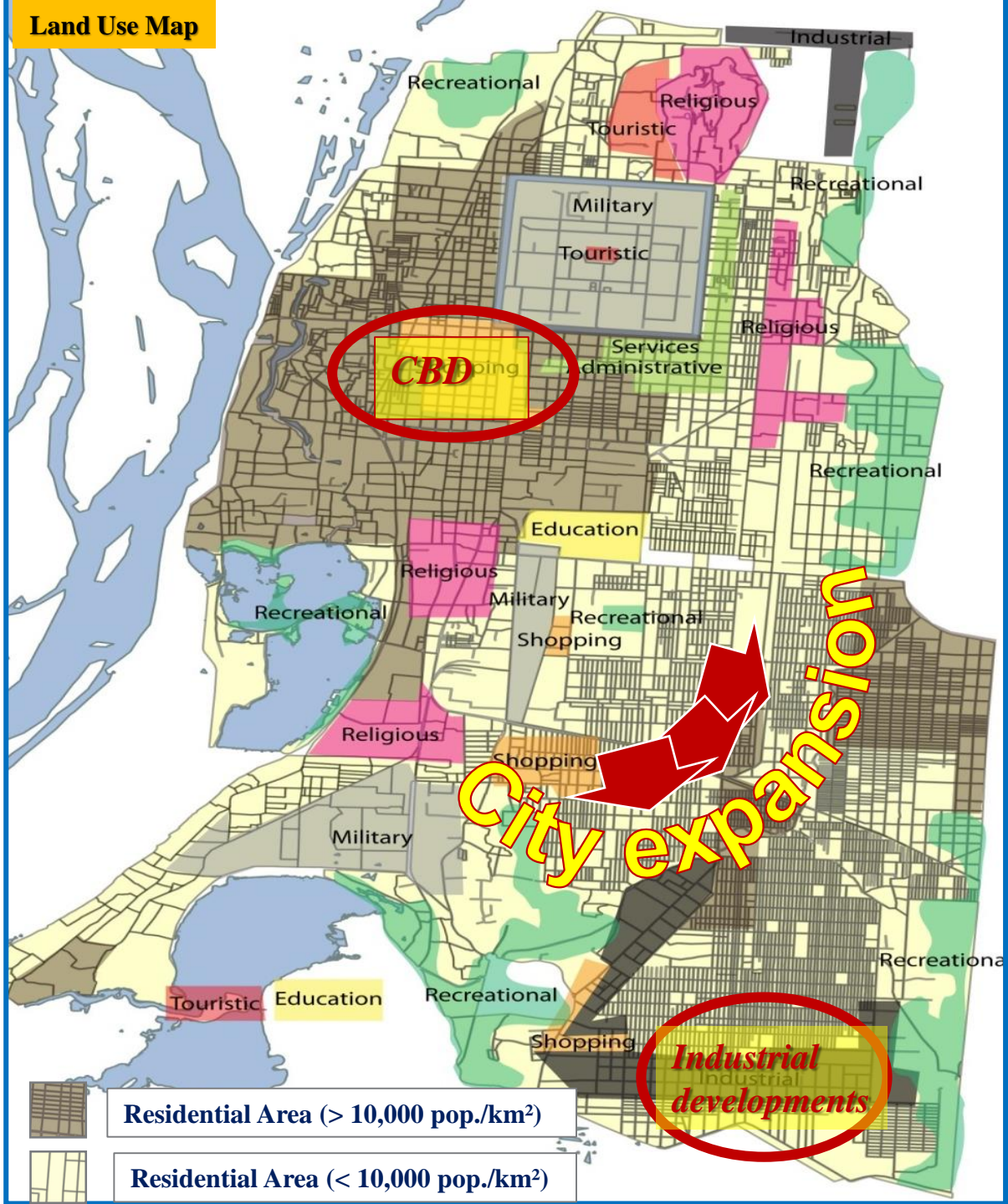
Location : N Lat. 21° 51' 47" & 22° 01' 27"  
E Long. 96° 03' 17" & 96° 03' 47"



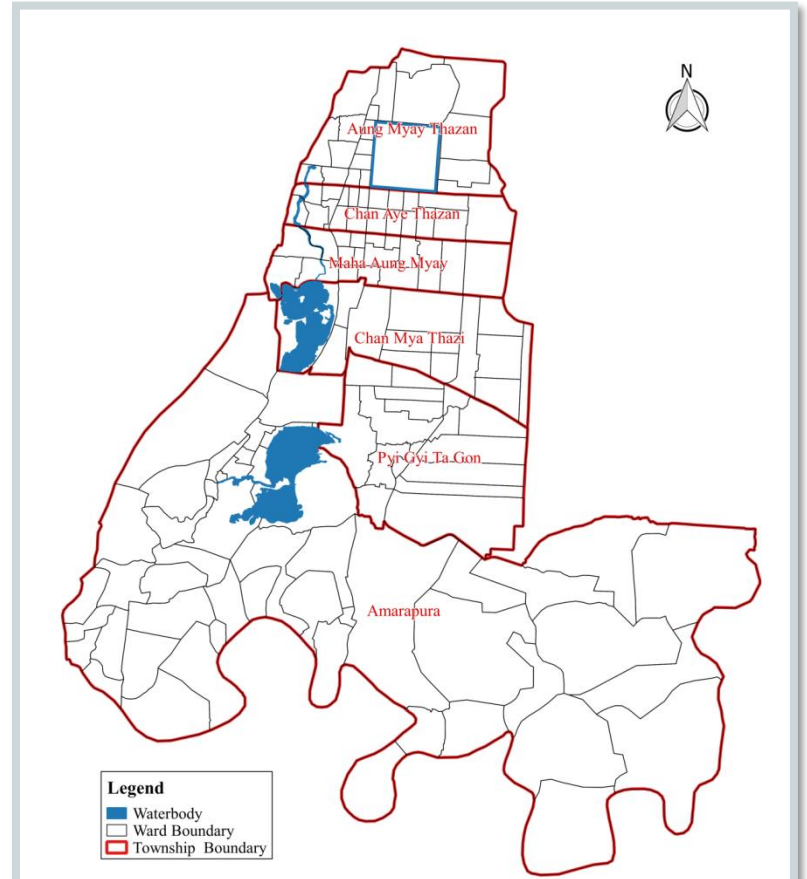
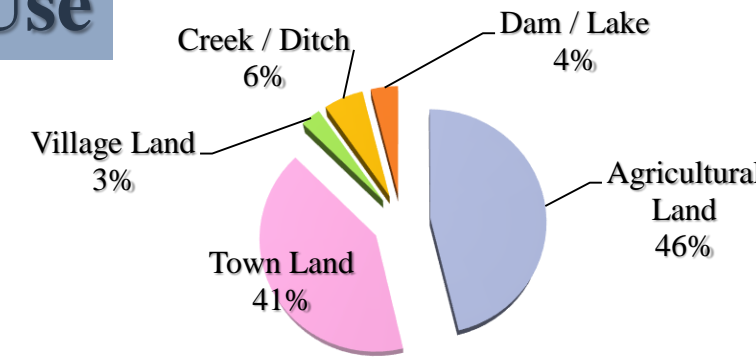
❖ A.D 1857

❖ Royal Palace, Battlemented walls and moat surrounding it

Land Use Map



Land Use



Township and Quarter Map



# Institution of Mandalay City Development Committee (MCDC)



**Minister, Ministry of Development Affairs (Mayor)**

**Vice Mayor**

**Secretary**

**Joint Secretary**

**9 Committee Members**

**Administration  
Department**

**Motor  
Transport and  
Workshop  
Department**

**Market and  
Slaughter  
House  
Department**

**Finance  
Department**

**Revenue  
Department**

**Cleansing  
Department**

**Play Grounds  
and Central  
Garden  
Department**

**Water and  
Sanitation  
Department**

**Urban Planning  
and Land  
Administration  
Department**

**Building and  
Central Store  
Department**

**Roads and  
Bridges  
Department**

**Public  
Relation and  
Information  
Department**

**Agriculture  
and Livestock  
Breeding  
Department**

**Inspection  
Department**

## Mission of MCDC

- ✓ It will be clean city.
- ✓ It will be beautiful city.
- ✓ Citizens must enjoy pleasant lives.

# Transport Sector

## Situation

Bicycle City

Motorcycle City

Bicycle

Motorcycle

Private car/  
public transport



300000 (2014)

**No. of motorcycle**  
1999 – Imported from China  
2004 – Starting to increase  
2002 ~ 2018 – increasing **21.5** times

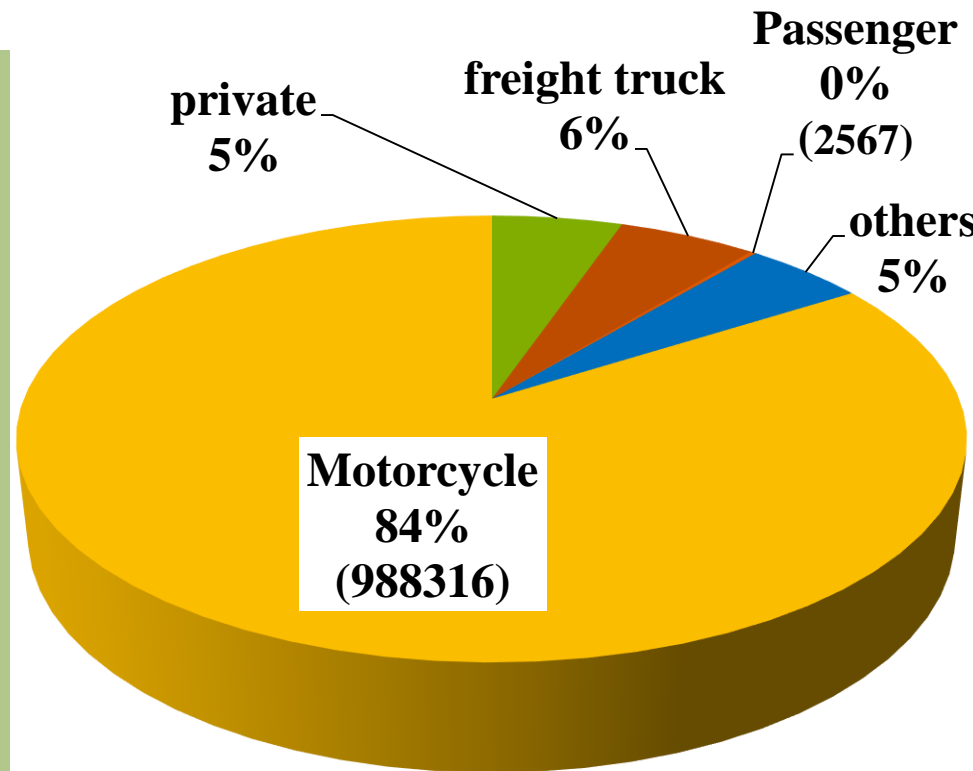
**No. of Private car**  
2002 ~ 2018 – increasing **3.5** times

**Policy change from 2011**

- Keep and destroy old cars
- Import of private cars
- Allow residents to register illegally imported motorcycles

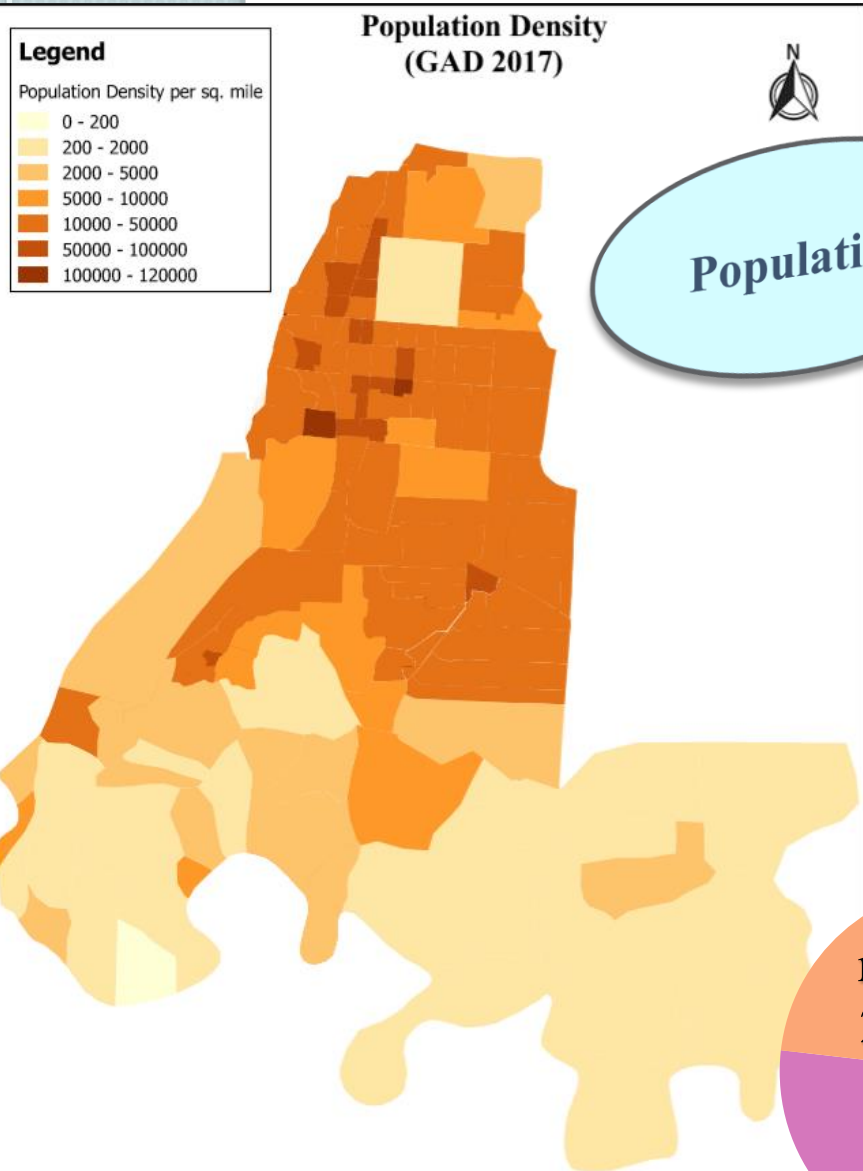
- City having maximum number of motorcycles
- Motorcycles : common mode for commuting

## Modal share in 2016

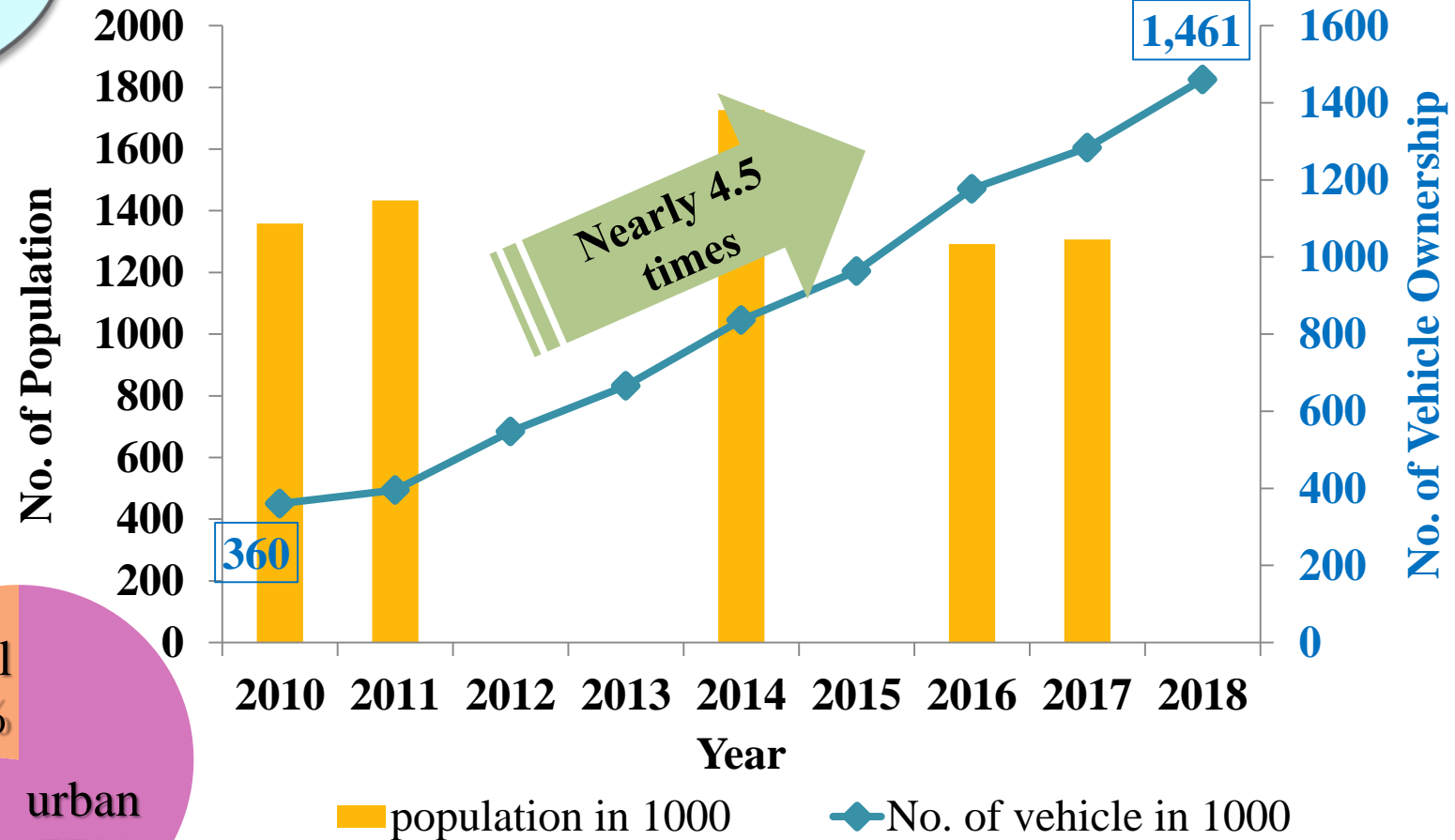


(Source: Traffic Police)

# 1. Vehicle ownerships and population



Population density = 34000/sq.mile  
Populated township = Ma Ha Aung Myay





## 2. Vehicle ownerships and traffic problems

### Motorcycles

#### Reason

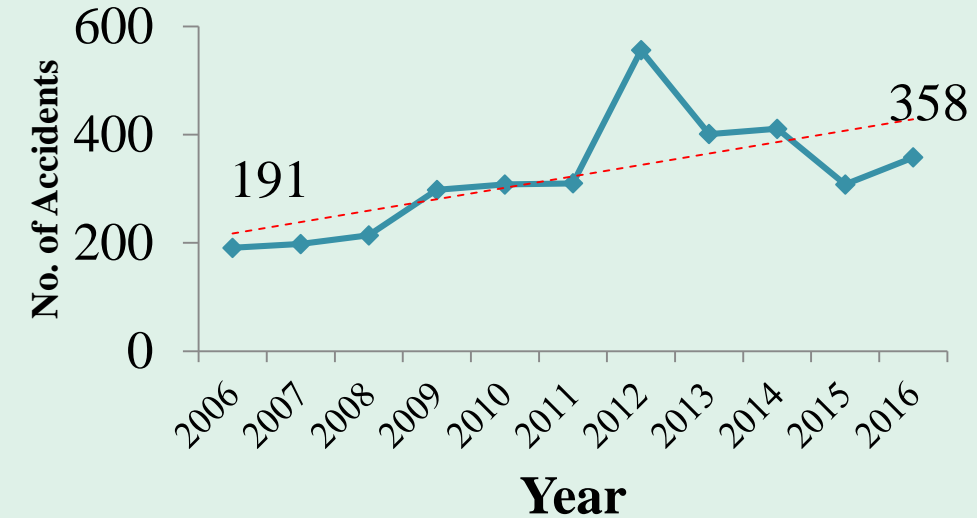
- Convenience
- Time save
- Cheap price



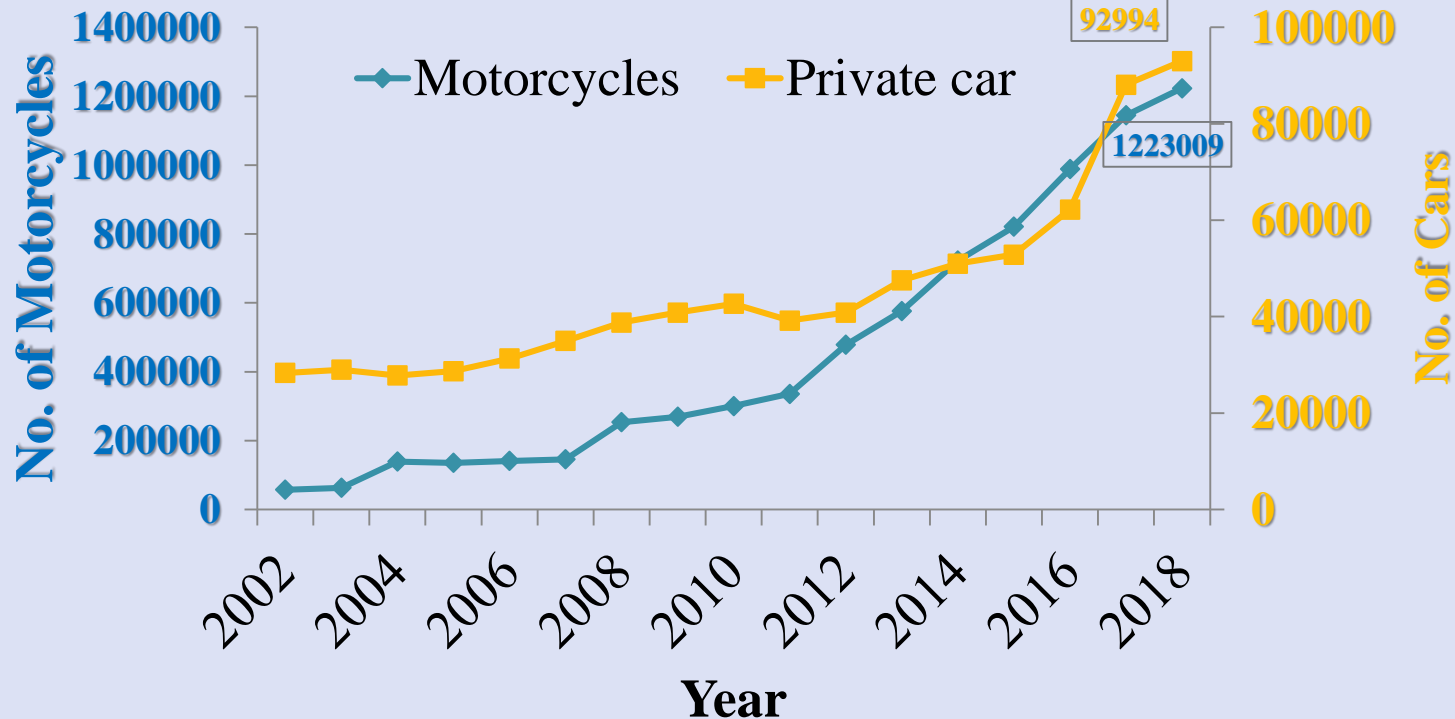
#### Usage

- Private
- Public - taxi

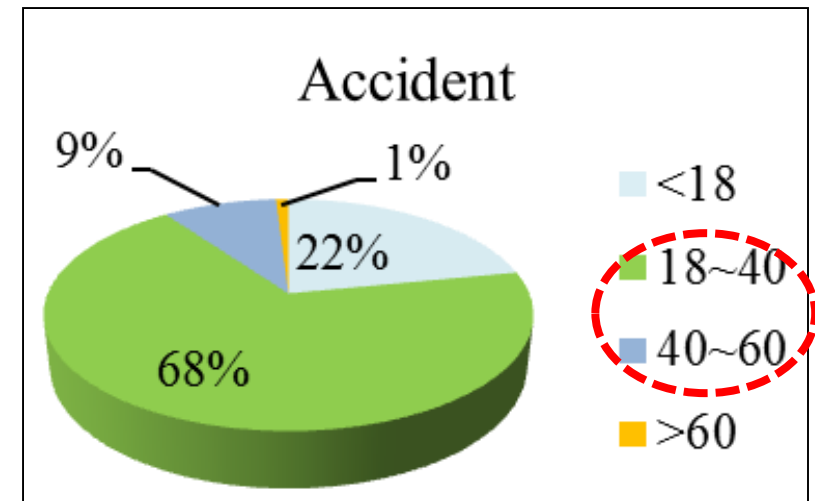
### Traffic accidents



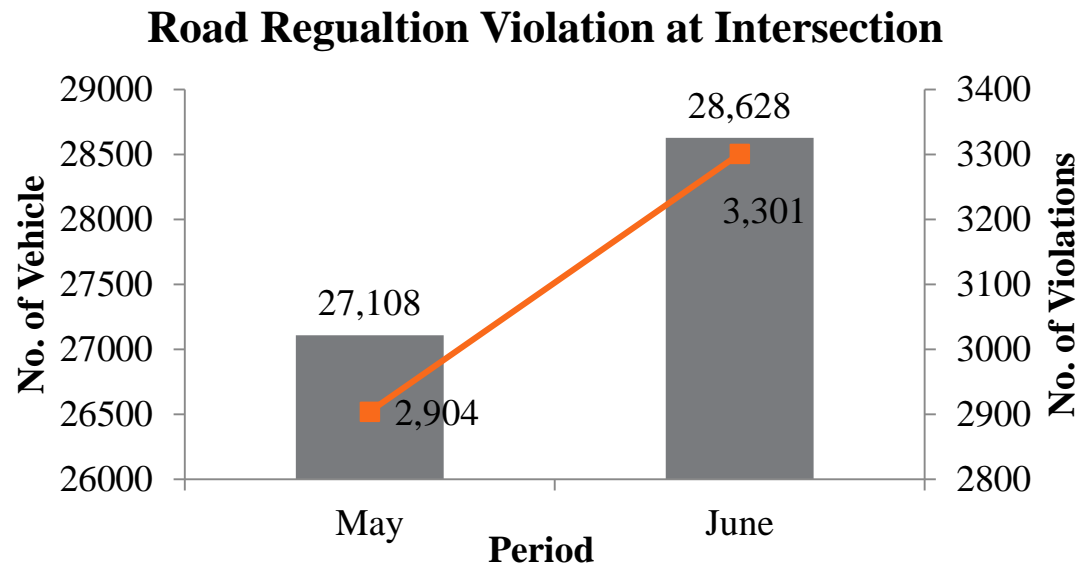
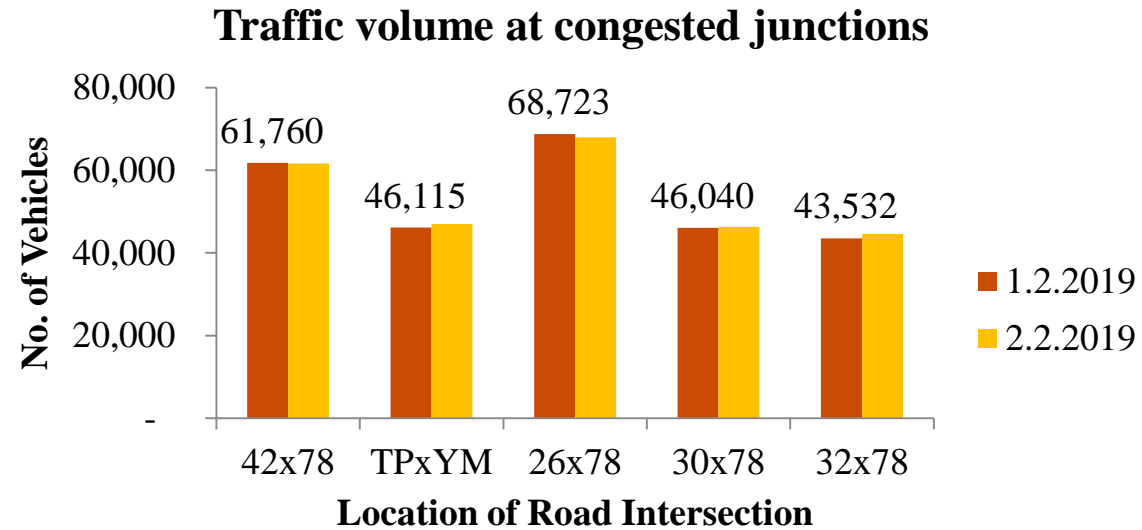
### Vehicle ownerships



### Accident



# 3. Traffic Flow ( Sensor Data)

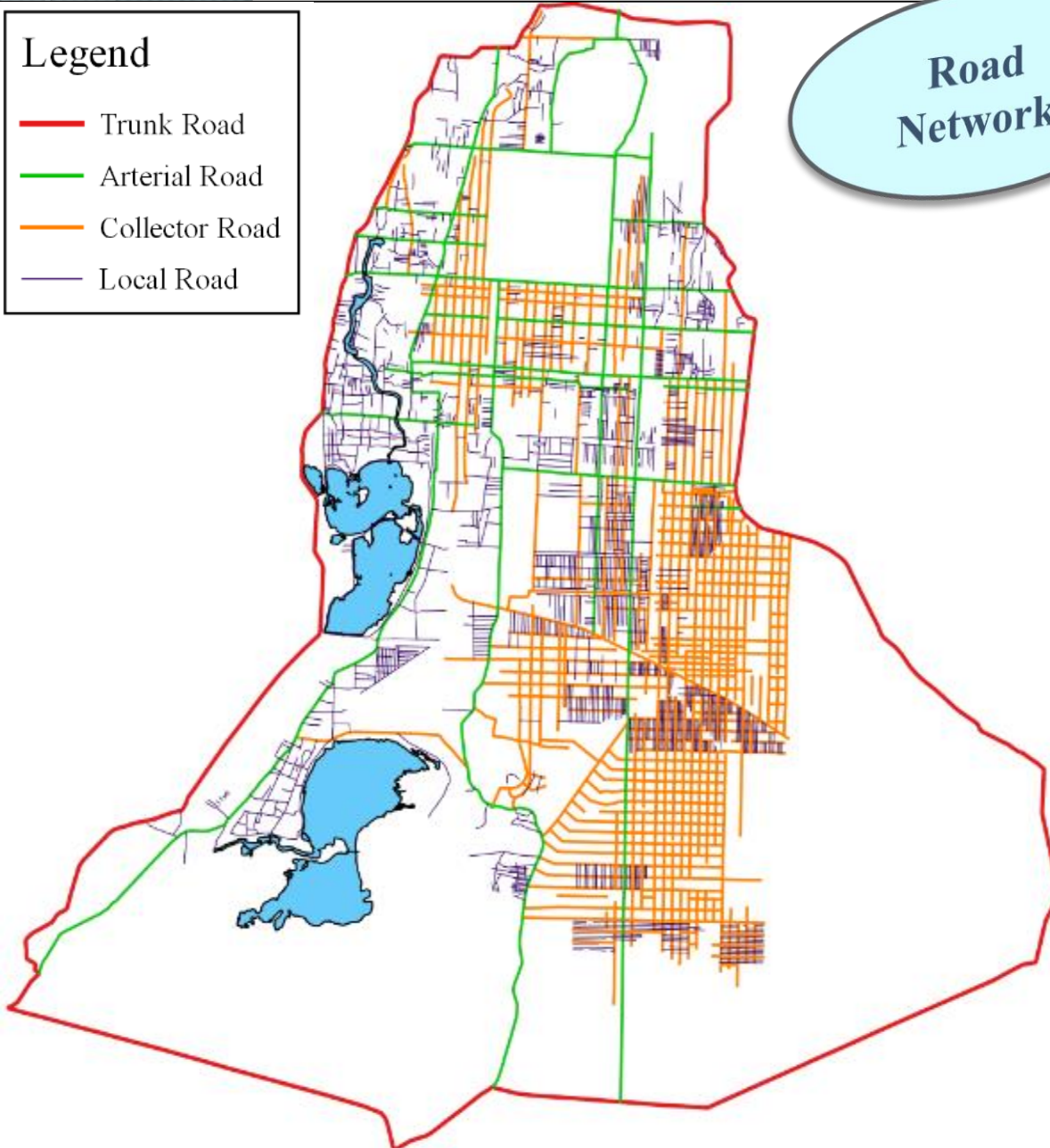


■ Passing Vehicles    — Violations





# 4. Road Condition

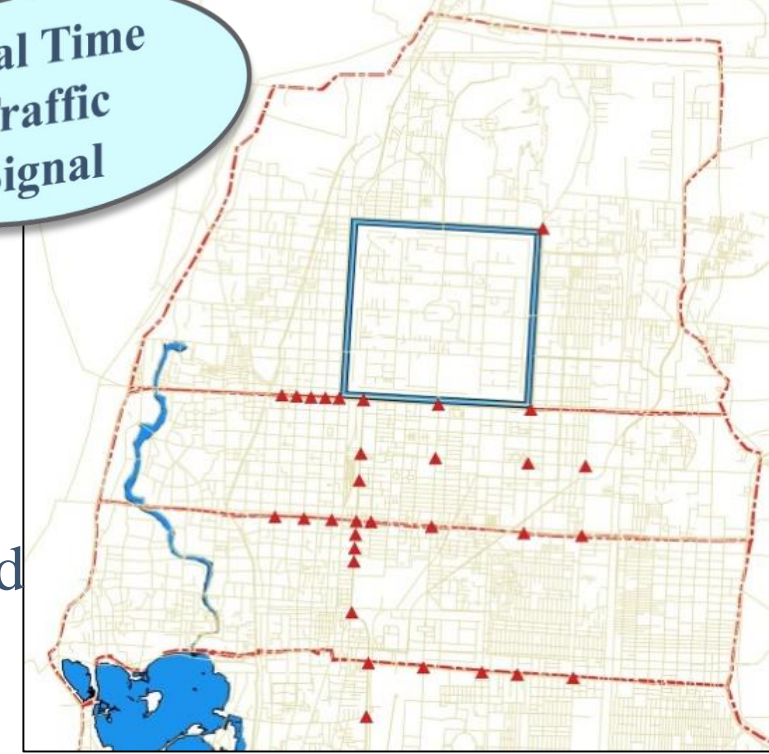


**Road Network**

## Road Types

1. Trunk Road
2. Arterial Road
3. Collector Road
4. Local Street

**Real Time Traffic Signal**

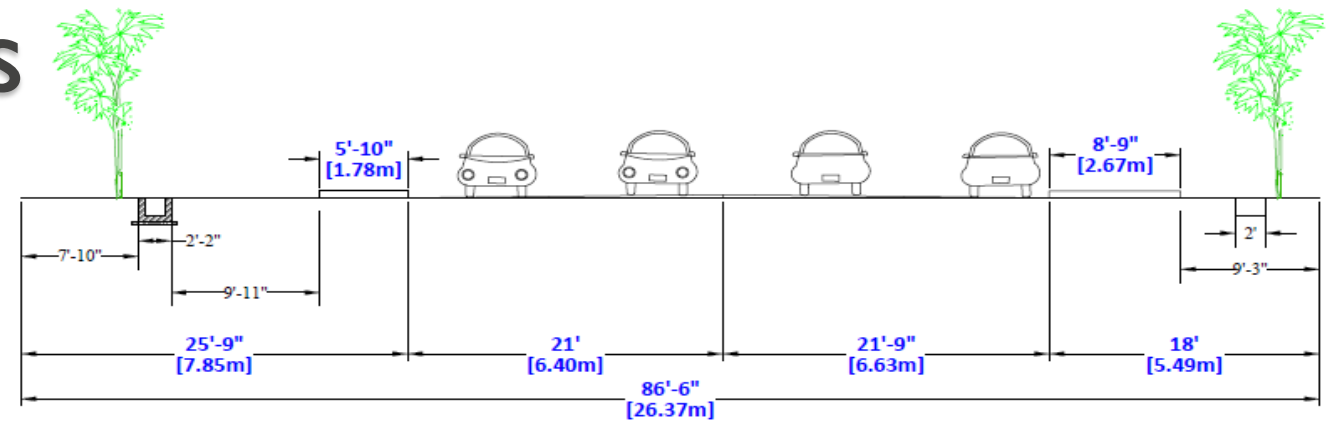
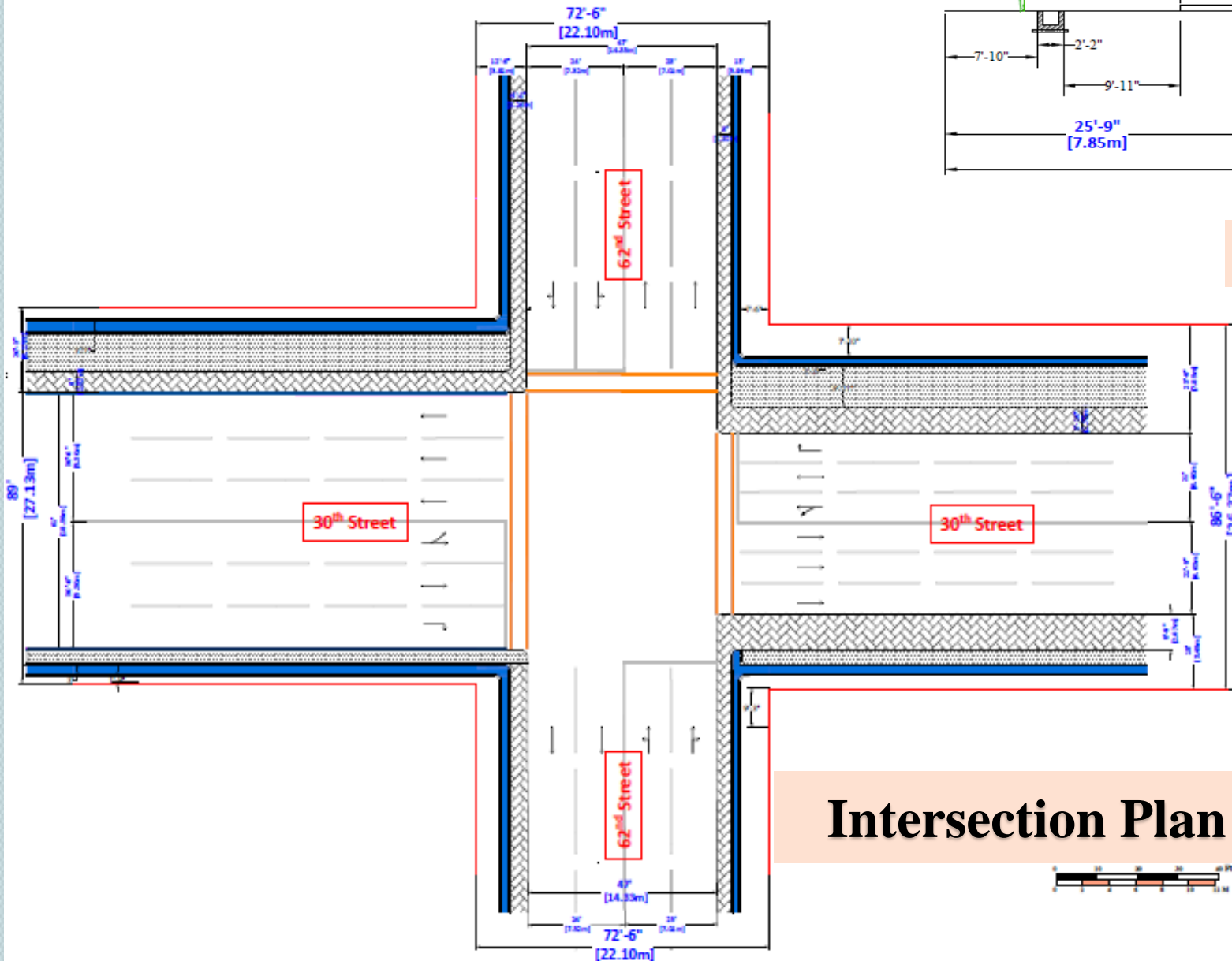


## Traffic control measures (2018)

- ✓ Traffic signals = **95** nos.
- ✓ Real Time Traffic Signal = 32 nos.
- ✓ One-way = 9 locations
- ✓ Motorcycle separated roads = 1
- ✓ Motorcycle forbidden zones = 2 overpasses



# Current Road Designs



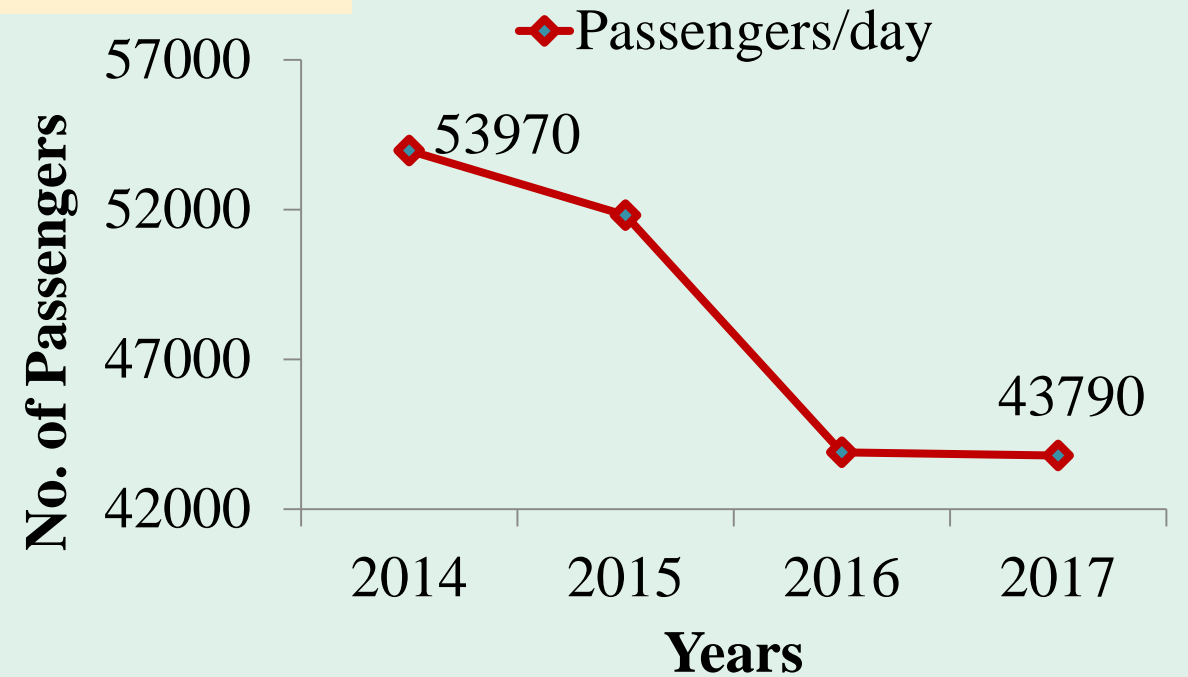
**Road Cross-Section**

## 30<sup>th</sup> and 62<sup>th</sup> Street Junction

**Intersection Plan**

# 5. Bus Services

## Bus Users



✓ population = nearly 1.5 Million

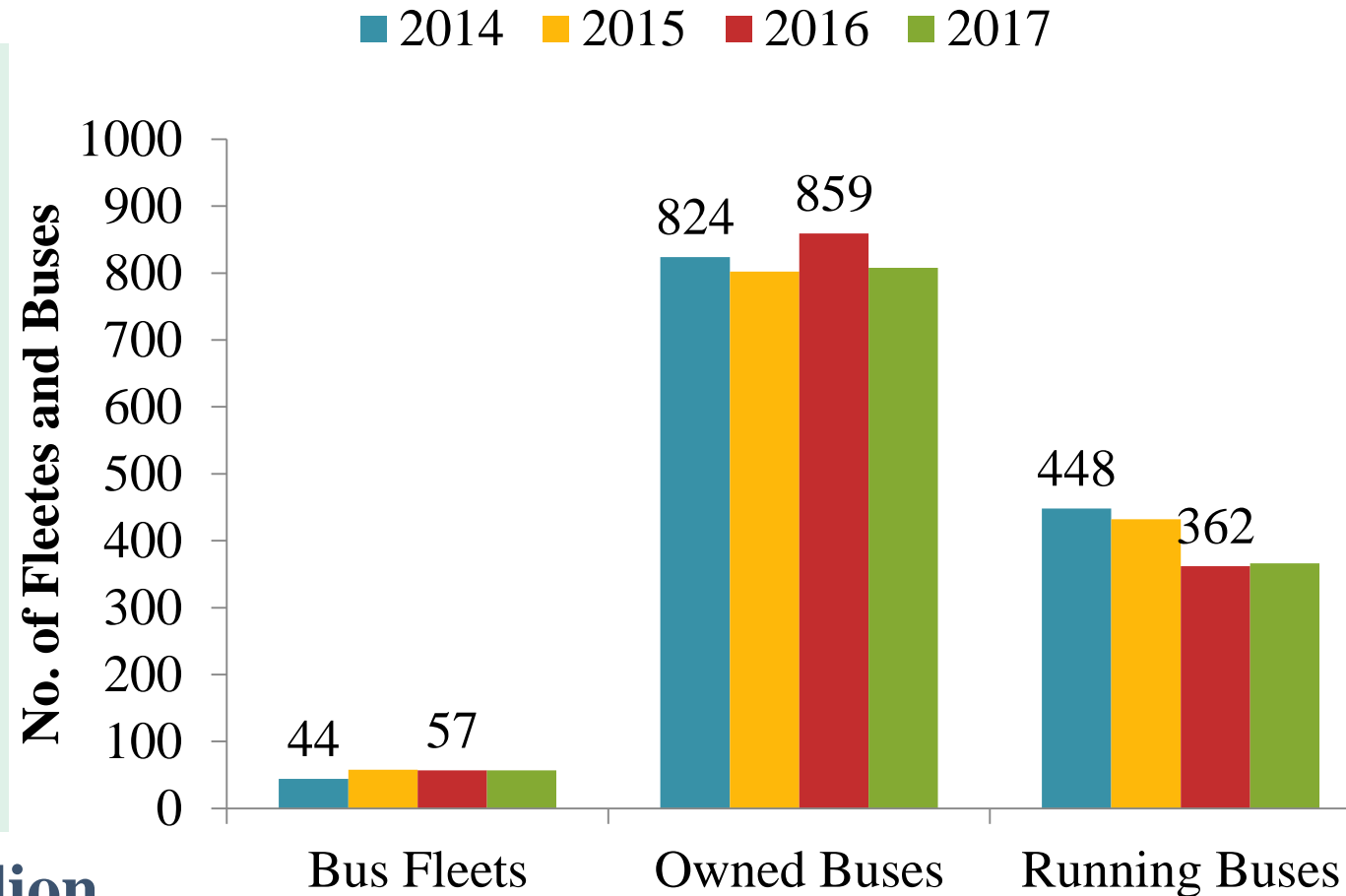
*for daily commuting*

✓ bus users = about 44,000 people (About 3% of total population)

✓ registered motorcycles are nearly 1.3 Million (over 1 Million people)

✓ Total route length = 1012km

## Conditions of Buses



(Source: Ya.Ka.Ka)





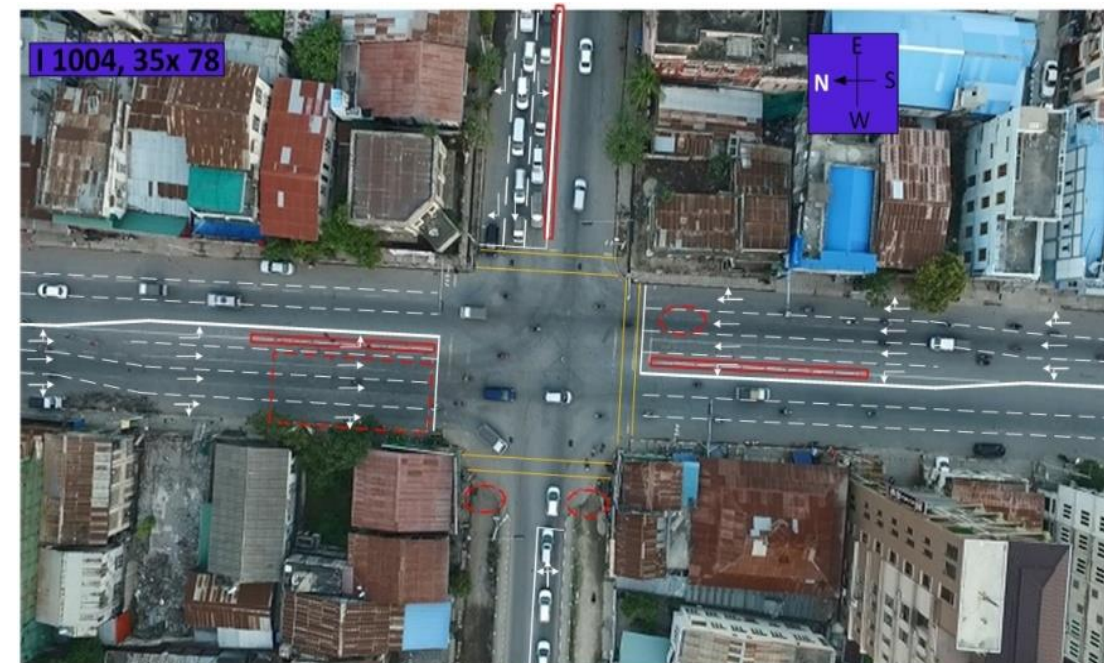
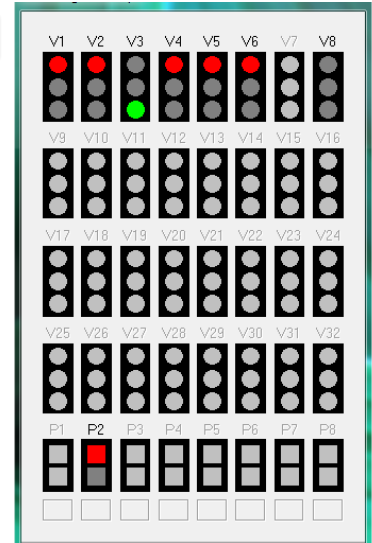
- 14



# 6. Intelligent Traffic Control System

## Using Sydney Coordinated Adaptive Traffic System(SCATS) Traffic Control System

- Monitor traffic route and adapt the timing of traffic signal
- Use intelligence sensor and devices integrating(32)number of traffic light and (266) number of (ANPR)CCTV cameras
- Monitor and records the vehicles and traffic condition between the city areas in 24hr



# Sydney Coordinated Adaptive Traffic System (SCATS) Traffic Control System

## Purpose

- ❖ To control traffic congestion within city area
- ❖ To monitor traffic flow

## Technology

- ❖ Sydney Coordinated Adaptive Traffic System (SCATS)
- ❖ AI based Intelligent Traffic Monitoring System ( HIK iVMS-8600 platform software)
- ❖ Automatic Number Plate Recognition (ANPR) CCTV
- ❖ (3x3) video wall
- ❖ Central control room (24 hrs recording)
- ❖ Alert system for violation of traffic rules and regulations in line with time

## Data

- ❖ Photos and Video
- ❖ Chart | Graph | Report

# SCATS System

File View Edit Login Tools Window Help

Cycle Lock

Trim

Detector Alarm

RAM Update

Short Clearance

Fallback

Manager

Dwell

Notices

Lamp Fault

Long Clearance

High Density

Region

Plan Lock

Incidents

Major Alarm

System Alarm

Messages

Increment Failure

File Update

Central Manager - Mandalay

User 15 - Level 6

11/20/2018 3:20:42 PM

Show Configure Options

Find Monitor Subsystem Strategic Monitor

3573

Alarms DA PK LF SI NF

Split Plan 2

Masterlink

Offset Plan 3

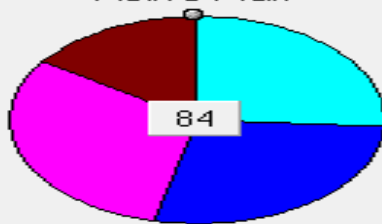
Offset 0, 0 ^A

Special Facilities Z3,6

XSF

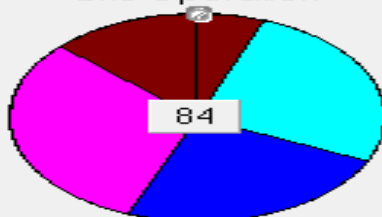
<A>	27%	22
B	27%	23
C	31%	26
D	15%	13

Active Plan



<A>	22	-3
B	20	0
C	26	0
D	11	2

Site Operation



Active Offset 0 ^A

Site Fallback 0

MSS

Masterlink

MANDAL Subsystem 13

Degree of Saturation 78

Subsystem Plan 2

Master Subsystem

Link Plan 3

Link none

Cycle Plan none

Cycle Length 84

SCATS 6

Cycle Generator 0

Active Link none

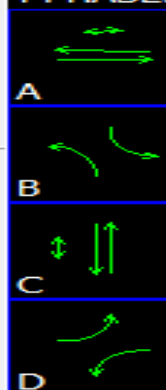
Required Cycle Length 82

TCS 3573

MANDALAY  
MANDAL

SS=13

4 PHASES



YEL

D MX@8 P^A@9

Region - MANDAL - Version 6.9.3.15

User 15 - Level 6

11/20/2018 3:20:42 PM



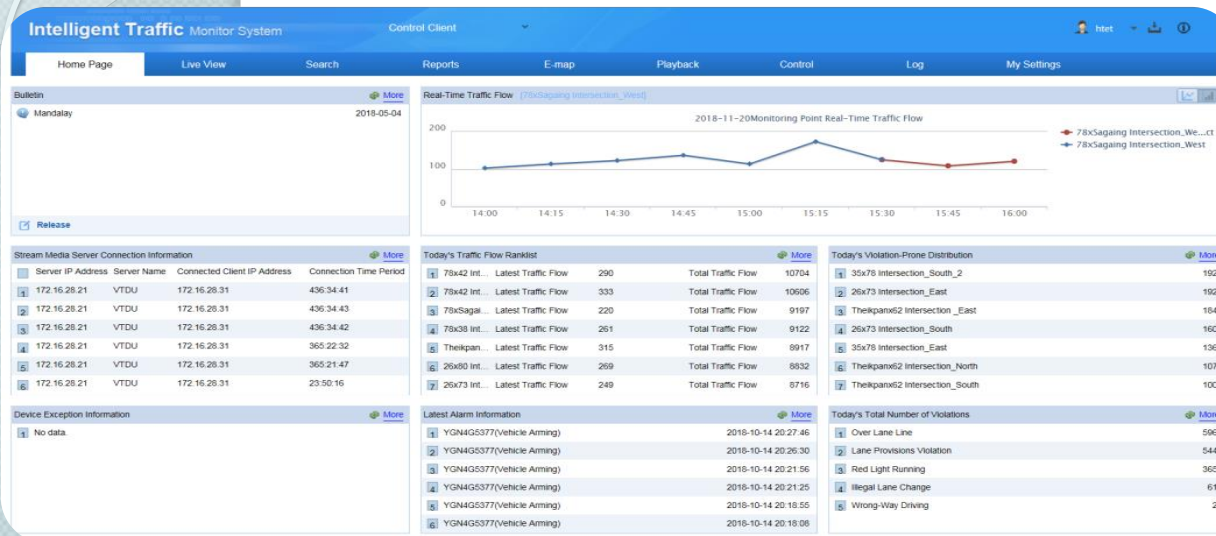
# Location

- ❖ (SCATS) Intelligent sensors and devices at 32 traffic signal
- ❖ ANPR CCTV camera (266) Nos.

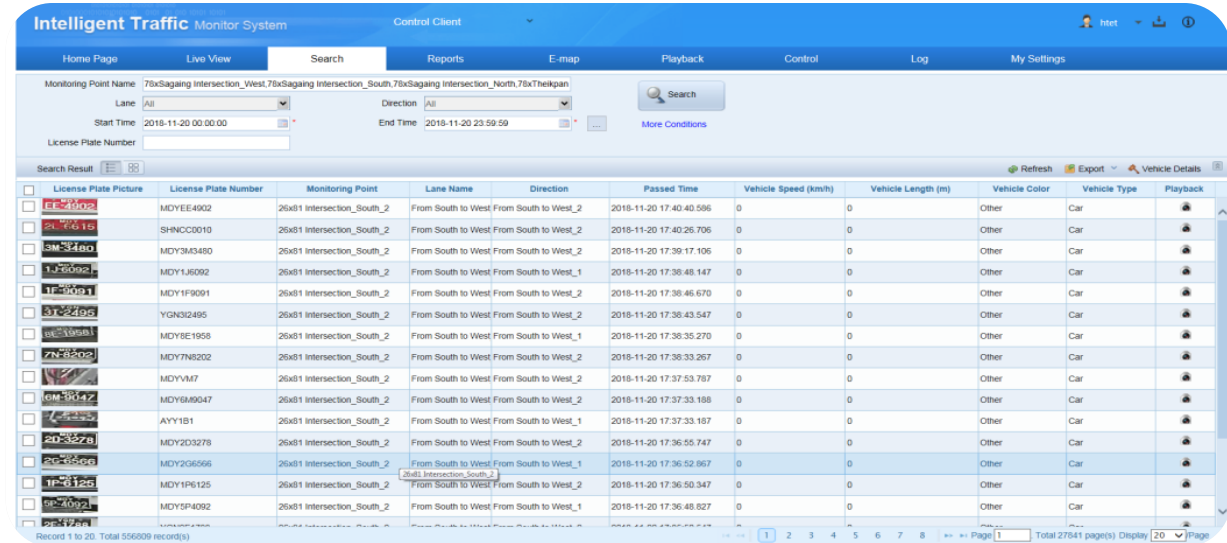
## Advantages

- ❖ Monitoring location, time, number plate and route of vehicle which violates traffic rule , and traffic accident location
- ❖ Automatically monitoring and recording the feature of accident contributors
- ❖ Traffic violation records
- ❖ Tracing the route of a vehicle on eMap
- ❖ Recording the number of vehicles entering and exiting the main location of downtown areas, time by time and location by location
- ❖ Monitoring the traffic flow using video wall
- ❖ Recording the time and location of possible traffic congestion
- ❖ Managing security, road construction and maintenance, and traffic route

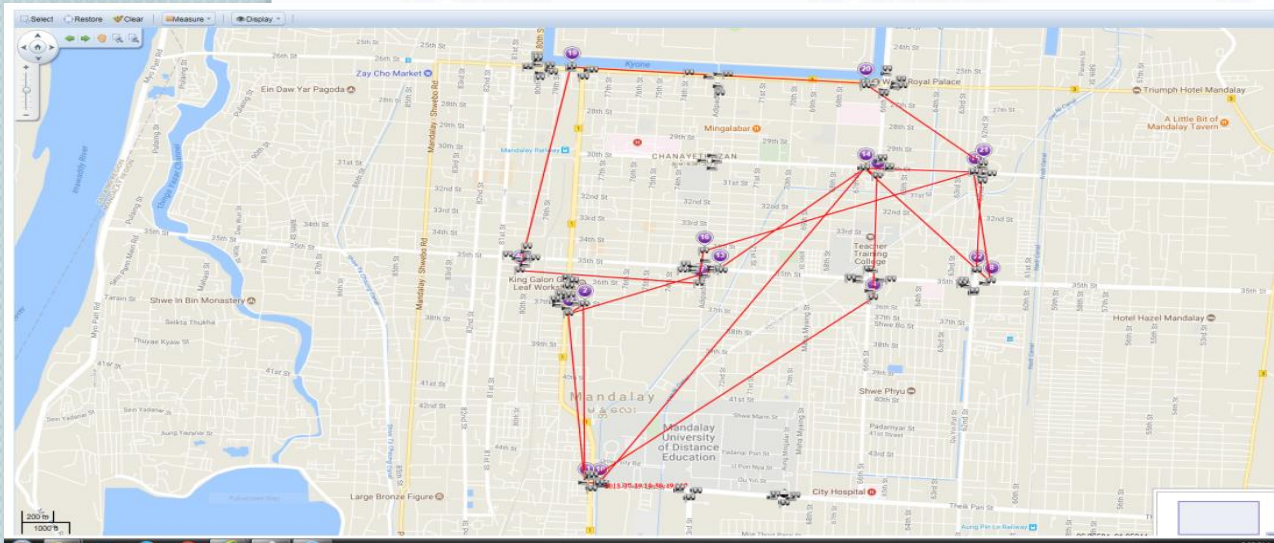
# Intelligent Traffic Monitoring System (HIK iVMS-8600 )



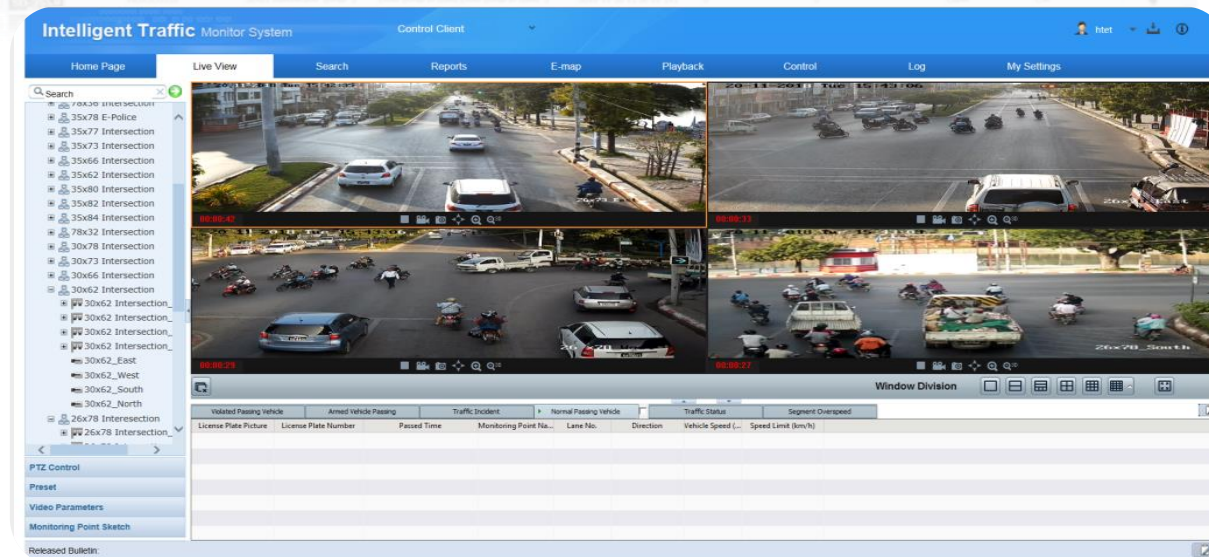
Dashboard of HIK iVMS-8600



Traffic Violation Records



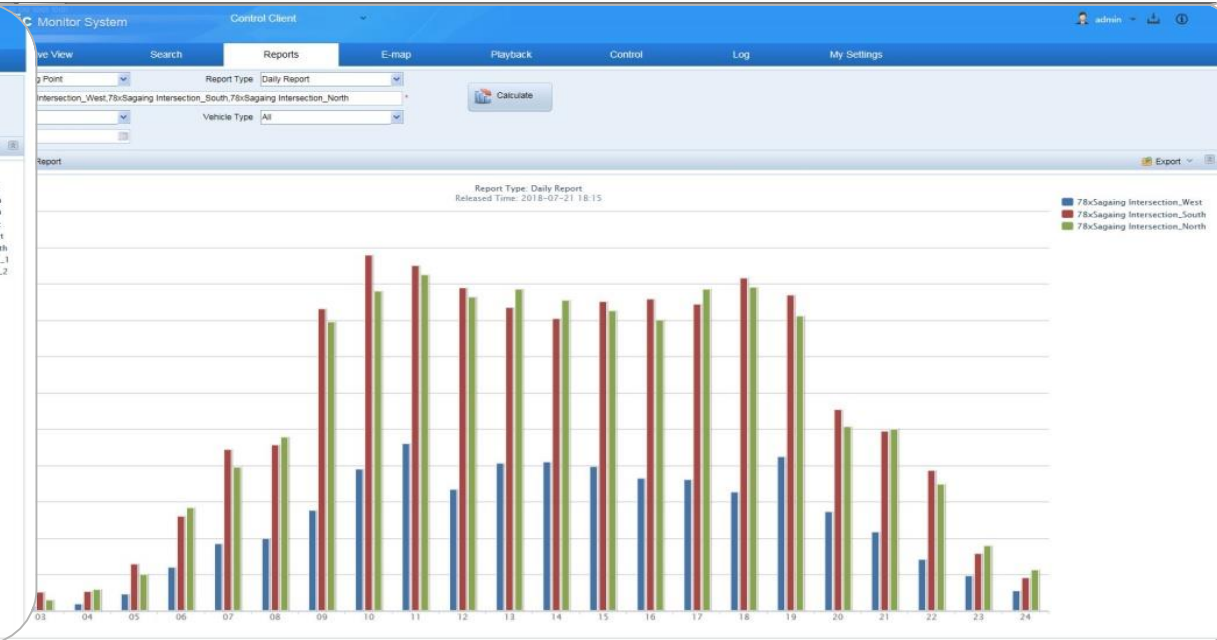
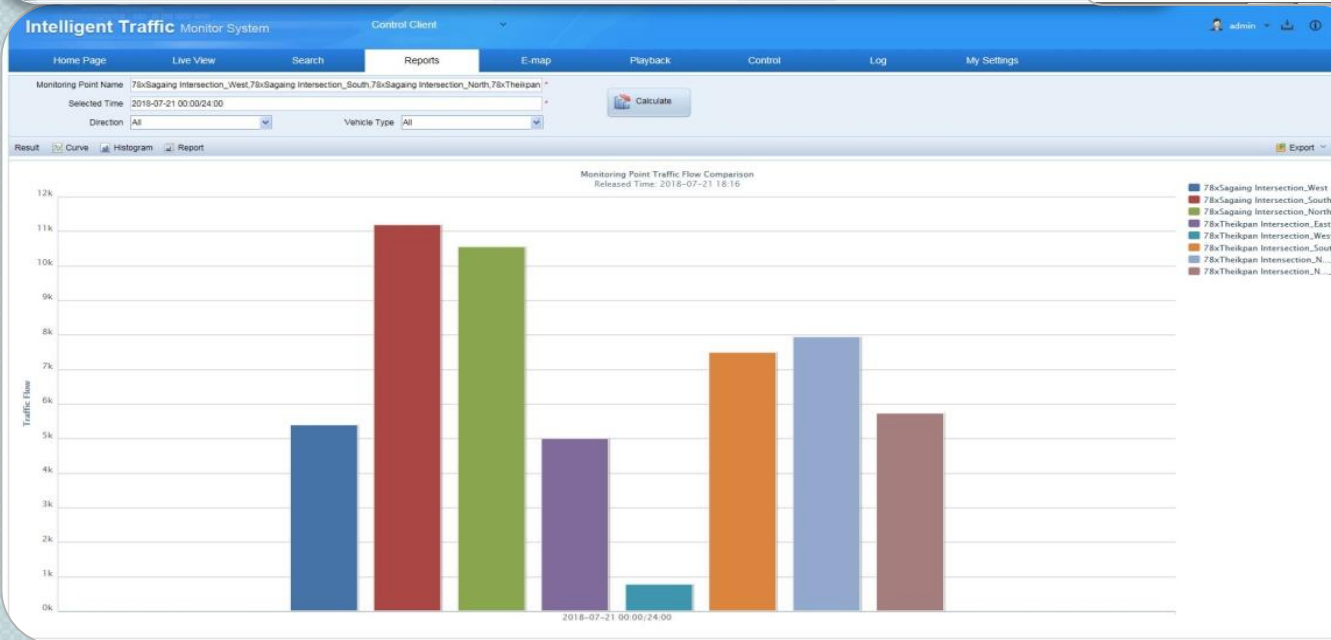
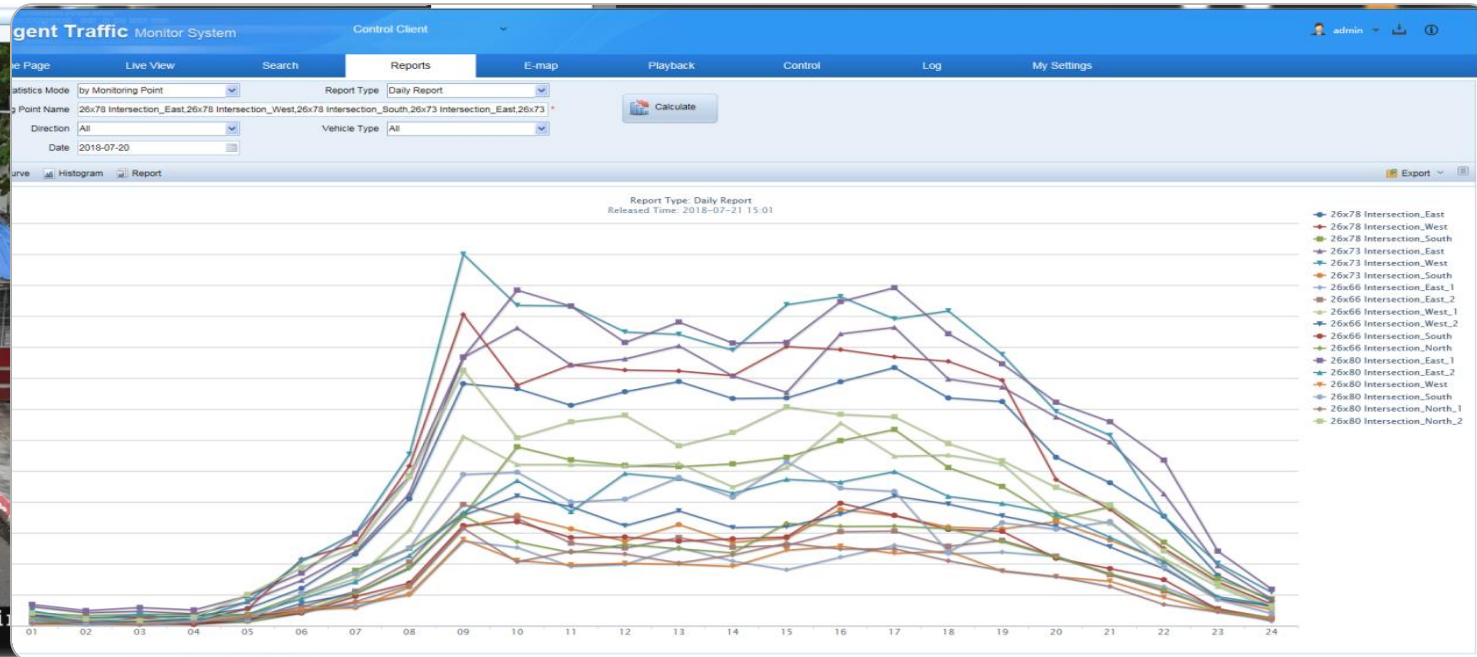
Monitoring the track of a vehicle on eMap



Traffic Violation Records



# Monitoring traffic records







**Real Time Traffic Control and Monitoring Room**





# 7. Facing Problems

- ✓ Weak in Accessibility, Facility, Service and Insufficiency of Public transport
- ✓ Discontinuity of Road Network
- ✓ Weak in Law enforcement & Low penalty

## Public transport

- ✓ Loading/Unloading at random place
- ✓ Frequency is low
- ✓ No time schedule

- ❖ Motor Vehicle Laws (1964)
- ❖ Motor Vehicle By-Laws (1989)
- ❖ Motor Vehicle Laws (2015)

- Usage of Motorcycles
- Behavioral problem

- ✓ Traffic accidents
- ✓ congestion
- ✓ Parking Spaces
- ✓ Environmental problems
- ✓ Being difficult to walk for pedestrians





**Parking**



**Mix traffic and Share lane**



**Walk on roadway**

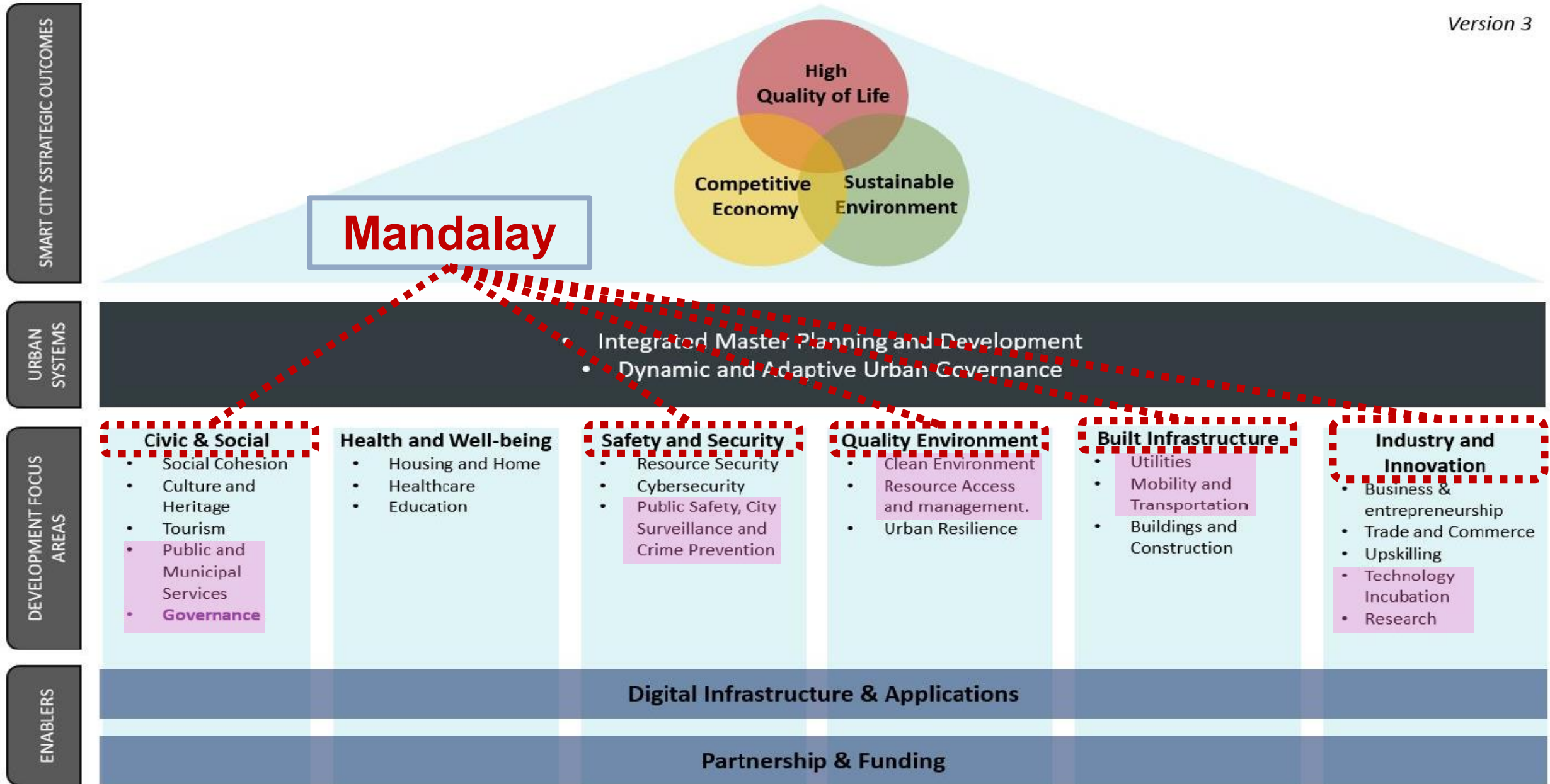


**Congestion**



**Behavioral Problem**







# Projects in Mandalay

## Civil and Social

- **Public and Municipal Services**
- **Governance**

1. *One stop Service System*
2. *Integratable Land Management and Information System*
3. *Virtual Office System*
4. *Electronic Document Management System*
5. *Billing System*
6. *Online Business Registration System*

## Safety and Security

- **Public Safety, City Surveillance and Crime Prevention**

1. *Toll gate Check Point System*
2. *CCTV and Terminal Server for Real Time Traffic Control*
3. *Street Light System*

## Quality Environment

- **Clean Environment**
- **Resource Access and Management**

1. *Solid waste Management System*
2. *Water Supply System*
3. *Fuel Management System*

## **Built Infrastructure**

- **Utilities**
- **Mobility and Transportation**

1. *Urban Mobility*
2. *Metropolitan Fiber Network*
3. *e-Toll Collection System*
4. *Weight in Motion System*
5. *Upgrading Server*

## **Industry and Innovation**

- **Technology Incubation**
- **Research**

1. *Business Process Analysis For Digital Transformation*
2. *Visitor Control System*

## **Soft Infrastructure**

- **Zip Code (post code)**
- **Standardization**

1. *City new address system*
2. *City new Road structure standardizing*



# Future Plan

- Horizontal Project Integration from silo systems
- GIS base Integrated City portal
- Transportation master plan and implementation
- Control center for City operations
- Cyber Security
- Environmental sensors for monitoring the city
- More energy efficient monitoring and control systems
- More efficient Public Utility services and payment gateway

Thank you for your attention

