

## **CHAPTER 7**

# **TRAFFIC MANAGEMENT AND TRAFFIC SAFETY**

## CHAPTER 7 TRAFFIC MANAGEMENT AND TRAFFIC SAFETY

### 7.1 TRAFFIC MANAGEMENT

The main objective of implementing traffic management is to enable traffic to move safely, speedily and comfortably on the existing roads. By applying suitable traffic regulations and control measures, as well as having roads that are well equipped with appropriate traffic management and safety facilities, traffic can flow more smoothly in an orderly manner. Under such condition, the road capacity would generally increased, thus a higher traffic volume can flow through the road. The orderliness also promotes higher traffic safety on the road.

The current traffic condition in Vientiane is one that faces some traffic congestions during the morning and evening peak hours. Daily large-scale traffic congestions are not present both in the urbanized areas and the suburbs. However, there are many noticeable signs that suggest major traffic congestions will soon appear in view of the traffic demand increases in the near future in the city.

The main traffic regulations and control measures implemented by Vientiane include one-way traffic control, parking control, traffic signal control, heavy vehicle movement control as well as by the use of various traffic signs and road surface markings.

#### (1) One Way Traffic Flow Control

- One-way traffic flow control measure is implemented in Vientiane.
- The representative road sections having this one-way traffic flow control are Samsenthai Road (the No.1 road in Vientiane, in the NW direction) and Setthaithilath Road (in the SE direction which is currently under improvement), forming a pair of one-way traffic road sections. Consequently, traffic entering from the intersecting roads into these one-way traffic road sections is therefore prohibited in either its left or right turning movement.
- With this one-way traffic regulation, the junctions of these regulated roads with their connecting roads now have simpler traffic treatment without any much conflicting movements. The upstream and downstream flows of traffic on the pair of one-way traffic roads are equally being treated. Intersections that have high right or left turning traffic volumes are now being managed fairly efficiently. Capacities of these intersections have increased as a result, and a higher level of traffic safety is achieved.
- The one-way traffic flow system is also being implemented on the grid-pattern road network in the old inner city area. With more efficient use of road space, curbside parking has also become possible in this area. This regulation has thus enabled an increase in

traffic handling capability of the road network, which in turn has improved the road safety level.

- In the suburban areas, no major one-way traffic system is being implemented. Except for special circumstance, there seems to be no necessity in implementing such regulation in these areas at present.

(2) Right and left turning prohibition

- There is no specific left or right-turning prohibitions at road intersections in the capital city of Vientiane, except those roads intersecting with the one-way traffic road sections as mentioned above. At these intersections, either the left or right turnings are prohibited, depending on the direction of the traffic flow on the regulated road sections.

(3) Intersection Traffic Control

- There are three methods of intersection traffic control being implemented in the capital city of Vientiane, namely i) Signalized Traffic Control, ii) Non-Signalized Traffic Control, and iii) Roundabouts.

1) Signalized Traffic Control

Currently, traffic signal equipment installed at traffic intersections in the city of Vientiane are from three different sources. One of which are signals installed with the assistance from the French Government (installed by Tyco Company of Thailand). The others are either Chinese-make signals or Vietnamese-make signal equipment.

Existing Signal location including French, Chinese and Vietnamese signals is shown in Figure 7.1-1.

Traffic Signal and CCTV System installed with the French Government's Assistance

- An Area Traffic Control (ATC) System was introduced to Vientiane with the assistance from the French Government. The installation of all the system equipment was carried out by Tyco Company Ltd of Thailand.
- A total of 26 major intersections in the city were signalized and controlled by this ATC System. In addition, 5 major intersections were also fitted with CCTV traffic surveillance cameras as shown in Figure 7.1-2. All the signals and CCTV cameras are centrally controlled from the Traffic Management Center housed in the VUDAA building in the city.
- Both the signal and CCTV systems are managed collectively by VUDAA. Currently, a workforce of 10 persons is running this Traffic Management Center. They are 6 persons from VUDAA, 3 traffic police personnel and 1 person from the Tyco Company who is permanently stationed here to manage both systems.

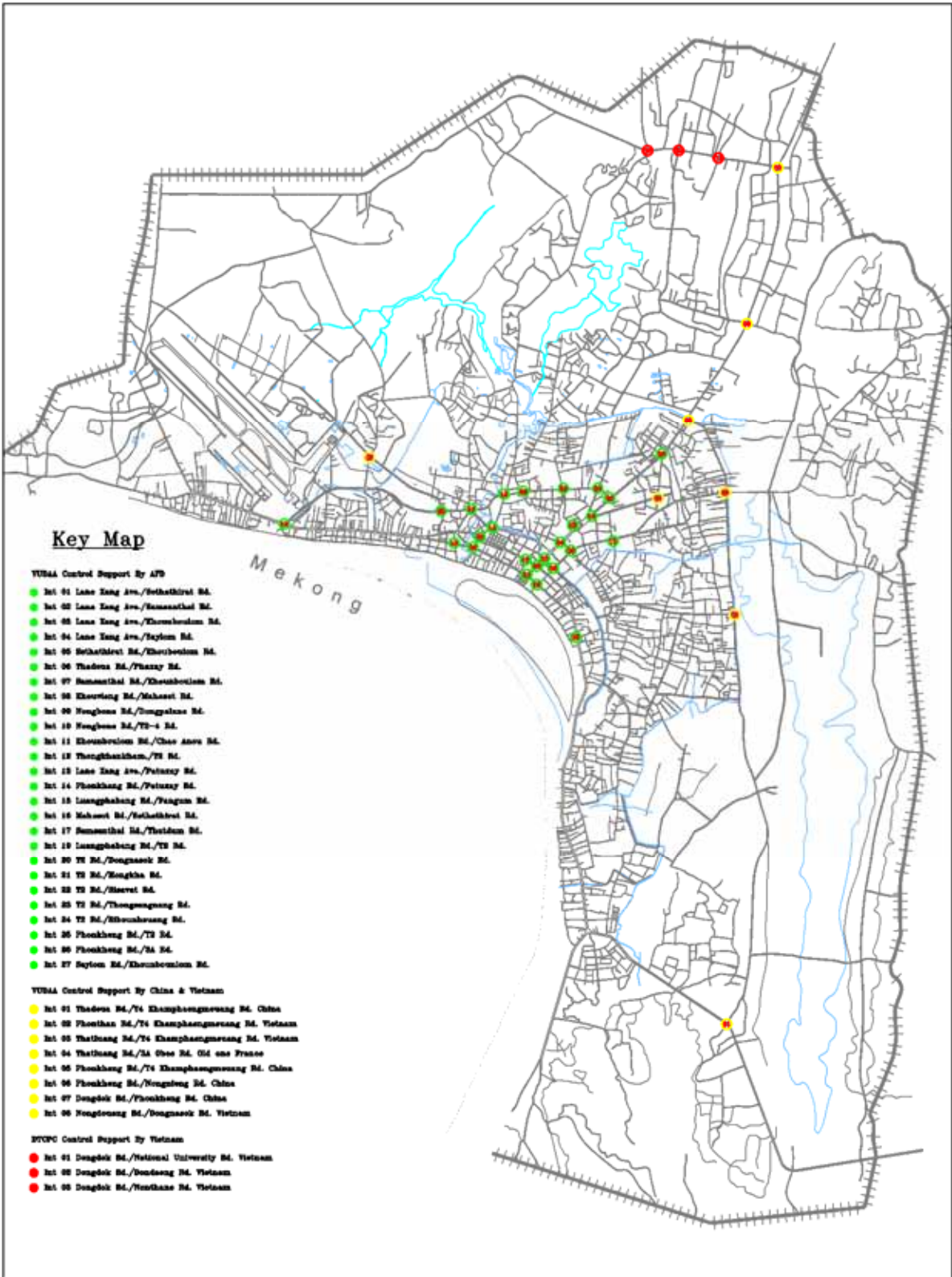


Figure 7.1-1 Location of Existing Traffic Signal

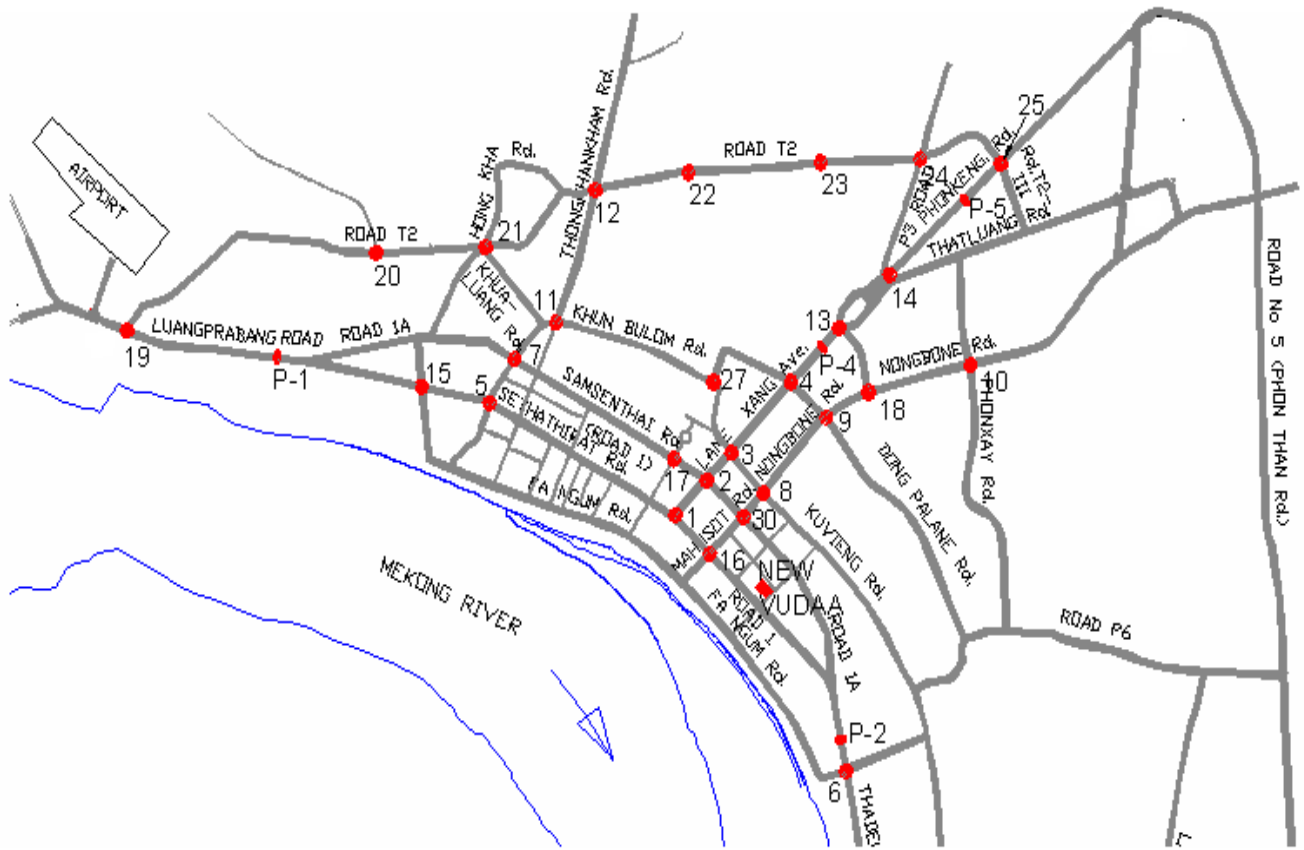


Figure 7.1-2 Existing Signalized Intersections Controlled by Traffic Management Center

- |                               |                              |                             |
|-------------------------------|------------------------------|-----------------------------|
| Int 1 Lane xang-Sethathirat   | Int 11 Chao Anou-Khounboulom | Int 21 T2-Hongkha           |
| Int 2 Lane xang-Samsanthai    | Int 12 Thongkhankham-T2      | Int 22 T2-Sasavat           |
| Int 3 Lane xang-Khounboulom   | Int 13 Lane xang-Patouxay    | Int 23 T2-Thongsangnang     |
| Int 4 Lane xang-Saylom        | Int 14 Thatluang-patouxay    | Int 24 T2-P3 Sibounheuang   |
| Int 5 Sethathirat-Khounboulom | Int 15 Luangphabang-Fangoum  | Int 25 T2-Phonkheng         |
| Int 6 Thadeua-Phaxay          | Int 16 Mahosot-Sethathirat   |                             |
| Int 7 Samsanthai-Khounboulom  | Int 17 Samsanthai-Thatdam    | Int 27 Khounboulom-Saylom   |
| Int 8 Nongbone-Khouvieng      |                              |                             |
| Int 9 Nongbone-Dongpalane     | Int 19 Luangphabang-T2       | Int 30 Mahosot - Samsanthai |
| Int 10 Nongbone-Phonxay       | Int 20 T2-Dongnaso           |                             |

- The signal control system is the Australian SCAT system used for ATC traffic signal control. This system uses on-line real-time traffic data gathered by vehicle detectors installed under the road surface. Using such data, the system automatically computes and applies the various signal control parameters (signal cycle, split and offset) at each intersection.
- Besides the normal three-lamp assembly signal heads, left turn green arrow signal lamps are also installed on site. Most signal controls are now operating with more than 2 phases. In addition, pedestrian signals using push buttons are also provided. The detection of pedestrian crossing demand is by means of these push buttons.
- Currently, signal parameters decided by the control center are well suited to the traffic demand at the intersections, thus appropriate traffic control can be executed. By examining the past traffic signal control parameters from the signal observation monitors at the center, it is possible to observe that the signal cycles are constantly changing in response to the changes in traffic volume demand at the site. The system is therefore very responsive to changing traffic demands.
- However, with traffic congestion expected in the near future, it is necessary to carefully review the capability of this present signal control system in its response to such future congestion problems. In particular, the capability and degree of accuracy by the vehicle detectors in sensing the large number of motorcycles during traffic congestion needs to be studied carefully.
- From observation, pedestrians, after pushing the demand buttons, have to wait for a long time before the signals turn green. In addition, there is also no indication to the pedestrians on when the signal lights will turn green. Due to these shortcomings, many pedestrians are found to ignore traffic signals when crossing the roads.
- The CCTV system has enabled the constant observation via the monitor screens at the control center, of traffic flow conditions at the 5 intersections where the cameras are installed. However, the camera control gadgets at the control center are not very satisfactory and require further improvements. In addition, due to the type of communication method used, problem such as failure of the monitor screen to display the camera zooming function often occurs.
- When installing the traffic signals equipment, traffic intersection configurations have been improved at the same time. However, it is observed that several intersections could have been improved further to achieve better traffic safety.
- VUDAA has already prepared its ATC system expansion plan for installing more signals equipment and CCTV cameras at additional intersections in the near future.

All these additional signals and cameras are designed to link to the control center. Figure 7.1-3 shows the target intersections to be signalized in the expansion plan.

- In future, when daily traffic congestion begins to appear, it will become necessary to widen the entry sections of many intersections and install exclusive left turning lanes. Such measures are possible to further increase the traffic processing capacity of the intersections.

#### Chinese and Vietnamese-make Traffic Signals

- Chinese and Vietnamese-make traffic signals are used only at stand-alone signal control intersections.
- Due to differences in specifications in the installation placement of these signal equipment at intersections, they often create confusions among road users.
- Maintenance of these signal equipment in particular has posed a big problem to the city administration. Spare parts for these different equipments are difficult to procure. In addition, technical manuals on the repairs and replacement of parts for these signal equipment are both written in their source-country languages, which make them difficult to comprehend.
- These signal equipment cannot be controlled from the ATC control center. If central control of these signals becomes necessary in future, they must be totally replaced.

#### 2) Non-Signalized Traffic Control

Traffic control measures applied at intersections that have undergone improvements in conjunction with recent road improvement works are significantly different from those at intersections that have not been improved.

#### Improved Intersections

- Intersections that have recently been improved in conjunction with road improvement works are also installed with short median islands and channelization islands. Alternatively, they are painted with clear road markings, demarcating the median and traffic lanes for channelizing the traffic flows.
- Generally, entry sections of most minor roads at these improved intersections do not have markings for the median, stop lines and pedestrian crossings. Stop signs are also very rare.
- It is observed that a number of these intersections could achieve even better traffic safety level if they are given some further minor improvements.

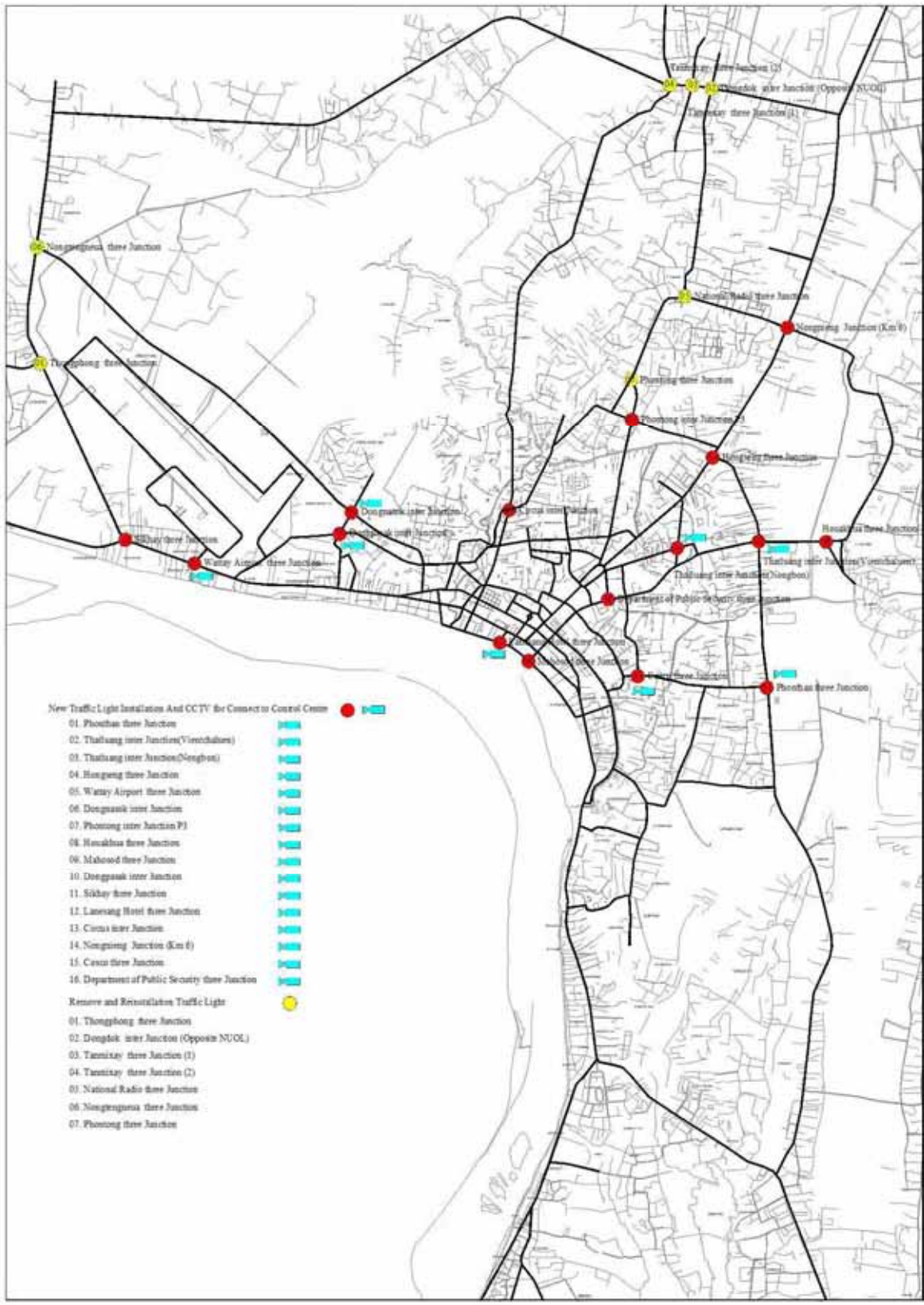


Figure 7.1-3 Expansion Plan for Installing more Traffic Signals and CCTV Cameras



### Unimproved Intersections

- In the urban fringe areas, there still exist some large intersections that have no traffic control installations. Analyses of past traffic accident data and improvements to these intersections are urgently needed. However, since there are still many unimproved intersections without any traffic control measures, it is necessary and more practical to improve them by order of their priority in terms of their traffic accident rates.
- In particular, road markings as well as median or channelization islands for channelizing passenger cars and motorcycles are important facilities but are not installed. Furthermore, there is almost no traffic sign for guiding the right-of-way traffic from the others.
- Roundabouts
  - There are several roundabouts within the urbanized areas of Vientiane. These roundabouts range in size from the very big to the small. Examples of very large roundabouts are the Victory Gate Roundabout (with two signals) and the National Road 13 with Ban Keun Roundabout.
  - The large roundabouts are generally well managed with smooth traffic flows. However, the medium and small roundabouts are generally not well managed, with inadequate traffic management or safety facilities. In addition, there are several roundabouts that would perform better as cross intersections from traffic management point of view due to their small physical size.

#### (4) Curbside Parking

- Road sections with curbside parking control in the city are usually displayed either with parking control signs or paint markings (colored dash lines) on the curbstones. (Red designates parking prohibition; yellow designates waiting allowed but not parking while black designates parking allowed sections).
- New parking control signs have been installed along the recently improved road sections. Although these control signs are easy to understand, but due to the poor placement, the intended road sections under parking control are difficult to understand among the drivers. This may create many disputes and difficulties for enforcement.
- Drivers are also frequently confused regarding road sections using colored painted curbstones for parking control. This is due to the fact that some road sections are not painted at all with any colors while some are. This inconsistency creates much confusion. Similarly, drivers have difficulty interpreting road sections with parking control signs as there is no consistency in the installation of these signs.

- Although curbside parking is enforced by the traffic police, widespread parking violations can be seen in the city. More stringent and increased enforcement by the police on illegal curbside parking is needed.
- In deciding the parking control road sections, it is very important to consider both the opinions of the local residents or owners of commercial establishments, as well as from the traffic engineering viewpoints such as potential dangers and effects of parked vehicles to the traffic flow.
- It is therefore necessary to establish an acceptable standard on parking control in the city. The current situation is that in some areas, parking is allowed on road sections that actually necessitate parking control while on the other hand, parking is prohibited on road sections that do not require such control. As an example of poor parking control measures is areas where parking is even allowed right next to the pedestrian crossings.

#### (5) Control of Heavy Vehicle Movements on City Roads

- In Vientiane, except for normal buses and trucks for on-going construction, movements of heavy vehicles on the city roads are strictly controlled according to specific time periods in a day. This traffic control measure has the effects of reducing or preventing traffic congestions, as well as improving traffic safety conditions.

#### (6) Traffic Signs and Road Markings

##### 1) Traffic Signs

There are basically three types of traffic signs. These are traffic control signs, traffic warning signs and traffic information signs.

- Traffic control signs are signs that display the traffic control regulations or measures. (e.g. no left-turn sign) If drivers ignore such signs, it is possible that they would face various dangerous situations. For this reason, enforcement of such traffic control signs is necessary. In the city of Vientiane, there is a lack of such control signs. In locations where such signs are installed, they are not easily recognized or understood by drivers, simply because of poor placement locations or maintenance. It is important to survey the appropriate placement locations in relation to the site conditions for installing such control signs and periodic maintenance of these signs must be carried out as well.
- Traffic information and warning signs are almost non-existence.
- Without these traffic signs, residents of Vientiane who use these roads daily may not feel the inconvenience or potential danger as a result, but for outsiders such as visitors and tourists, they would encounter huge confusions and may cause traffic accidents.

- In order that Vientiane can develop as a tourist attraction city in the future, it is therefore necessary to provide sufficient road information to all road users.

## 2) Markings

The installation of proper road markings has the positive effect of guiding traffic to flow in an orderly manner. As a result, the capacity of the roads would be increased while dangers would be reduced.

- For the above reasons, it is very necessary to provide easily understood central (median) and lane markings. However, in Vientiane city, many road sections are found to be without clear central markings. In some other sections, they have totally no central markings at all. It is possible that these road sections have been painted with central markings before, but due to poor maintenance, these markings have faded to the extent that they cannot be discerned anymore. Similar situation can be said for lane markings, which are not clear or have faded away.
- Central and lane markings are differentiated by the length of the dash lines. (central markings are 3 m, while lane markings are 1 m long). However, most of these markings in the city are difficult to recognize. Central lines are also normally painted either in a different color (such as yellow) or with a wider width so that these lines can be easily recognized by the drivers. (It is therefore necessary to review the standards of such markings used by the city or to change them to better standards).
- At large intersections, it is possible to install the necessary channelization island so that differing traffic streams can be separated and channeled into the appropriate directions, hence increasing their safety levels. In cases where installations of such islands are constrained by space, it is still possible to provide guidance to the traffic flow by the use of road markings. Although such kind of markings is widely used in Vientiane, there are still some intersections that are found to have no markings at all. Such road markings can be readily installed with very low-costs by using automated marking machines. For instance, if clear lane markings are provided at roundabouts, the many traffic streams can be made to flow in a more orderly manner.
- As mentioned previously, parking control in Vientiane is sometimes done using paint markings on curbstones. Before installing such markings, it is very important to carefully deliberate on the road sections that require such markings.
- Paint markings on the curbstones may affect the aesthetics of the cityscape, especially in the old inner city areas. It is therefore not very suitable for the tourist and historical city areas. This adverse effect can actually be reduced if the markings are done on the top surface only. Paint markings on the sides are not necessary.

#### (7) Standards for Uniform Traffic Control Devices

- The Lao PDR has adopted a set of road design standards to guide the country in constructing all roads in the country. However, as mentioned earlier, there is no proper standard adopted so far for traffic control installations or facilities. As a result, these facilities are installed without any uniformity. For this reason, confusions often arise among drivers. Drivers have difficulties in judging the meanings of these facilities in a split second as they drive along on the roads. This is especially true for drivers who suddenly enter an area with no markings or traffic signs at all. They can suddenly become disoriented and it is highly dangerous.
- Traffic control facilities that require uniformity include traffic signals, traffic signs, road markings, parking signs and markings, roadwork signs, speed control zone signs near schools, and others.

#### (8) Projects Directly Related to Traffic Management

VUDAA, with the assistance of the France Agency of Development, has carried out a Study to formulate a 'Vientiane Urban Masterplan' for the inner city center of Vientiane in June 2004. In its Study Report, the followings actions plans are proposed for short-term, mid-term and long-term implementations.

- Development of the city center
  - Optimization of the traffic flows in the road network
  - Enhancement of tourist and commercial trails
  - Revitalizing the heritage identified within the inner city center
  - Development of the Mekong River bank
- Urban road network
  - Implement a system of road hierarchy
  - Introduction of traffic circulation flow plan to minimize through traffic in the city center.
- Public transport
  - Strive for a balance between public transport and private transport modes,
- Parking
  - Regulate and monitor parking supply and demand in the inner city areas.
- Freight transport
  - Adopt regulations for controlling freight transport during peak periods
- Road safety
  - Road safety traffic engineering plan
  - Road safety awareness campaign
  - Road safety enforcement plan

## **7.2 TRAFFIC SAFETY**

This chapter discusses the various problems and issues on technology on traffic safety, traffic safety education and traffic enforcement based on available traffic accident data at present. This discussion is aimed at reducing traffic accidents in Vientiane in an effective manner.

### **7.2.1 Traffic Accidents**

MCTPC is currently in the process of implementing the 'National Road Safety Action Plan'. It is also in the process of carrying out the 'Collection and Analyses of Traffic Accident Data', which is a sub-project from the bigger Action Plan. This effort attempts to gather and analyze the traffic accident data in Vientiane in a more detailed and precise manner. This section uses partly the May 2006 to April 2007 traffic accident data gathered from this sub-project.

#### **(1) Traffic Accident Numbers and Injury Rates**

The following observations can be derived from Figure 7.2-1 and Table 7.2-1. The number of reported traffic accidents before 2004 were rather high, at 3,080 accidents for year 2003. This number has declined sharply in 2004 to 1,643 accidents. However, after 2004, the number of traffic accidents has steadily increased again, reaching a total of 2,091 accidents in 2006.

The annual variations in the number of injuries due to traffic accidents are similar to the number of accidents described above. The number of injuries was high in 2003 but declined in 2004. This number has again increased after 2004 and by the year 2006, the number of injuries has reached 3,572 persons.

Traffic accident fatalities have also increased from 2003 to 140 deaths in 2004. This number has however slightly decreased in 2005 and 2006 to only 119 deaths.

Therefore, the number of injury and fatality per traffic accident in 2006 was 1.8 persons.

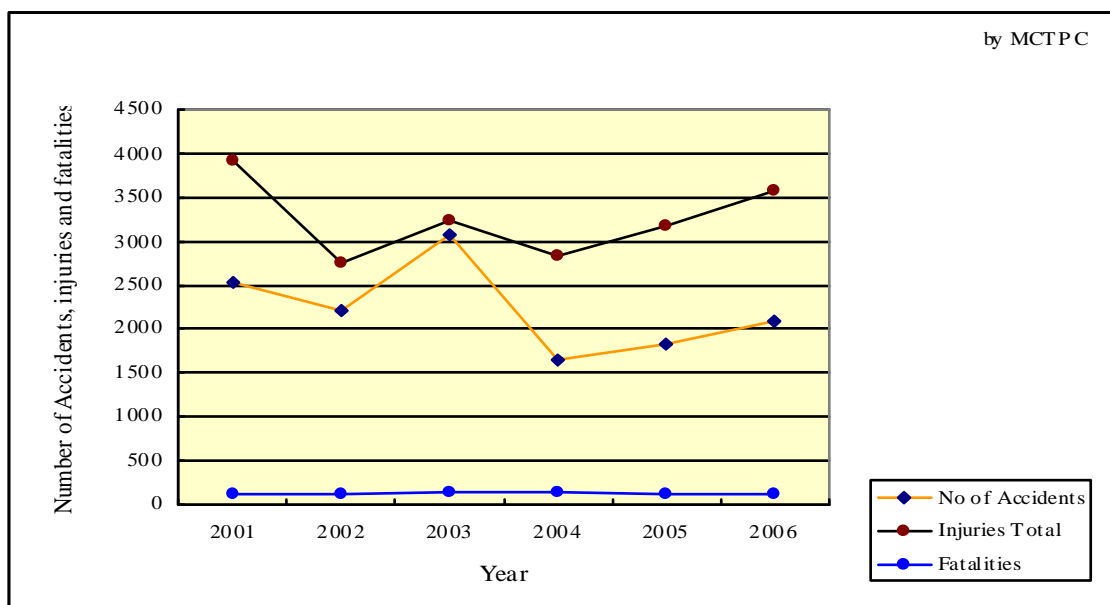


Figure 7.2-1 Annual Variations in Number of Accident, Injury and Fatality

Table 7.2-1 Annual Variations in Number of Accident, Injury and Fatality

	2001	2002	2003	2004	2005	2006
No of Accidents	2540	2205	3080	1643	1838	2091
Minor Injury	2963	1846	1901	1513	1579	2065
Medium Injury	873	847	1100	1123	1397	1268
Serious Injury	77	52	227	191	203	239
Total	3913	2745	3228	2827	3179	3572
Fatality	112	126	147	140	119	119

Source: MCTPC

## (2) Monthly Variations in Number of Traffic Accidents

Figure 7.2-2 and Table 7.2-2 illustrate the monthly variations in the number of traffic accident by percentage shares based on traffic accident data for May 2006 to April 2007. From these illustrations, it is obvious that the months of November, December and April were months with higher traffic accident rates. This phenomenon coincides with the large festive celebrations from late November to early December and in April every year. On the other hand, months with lower accident rates were June, July and March.

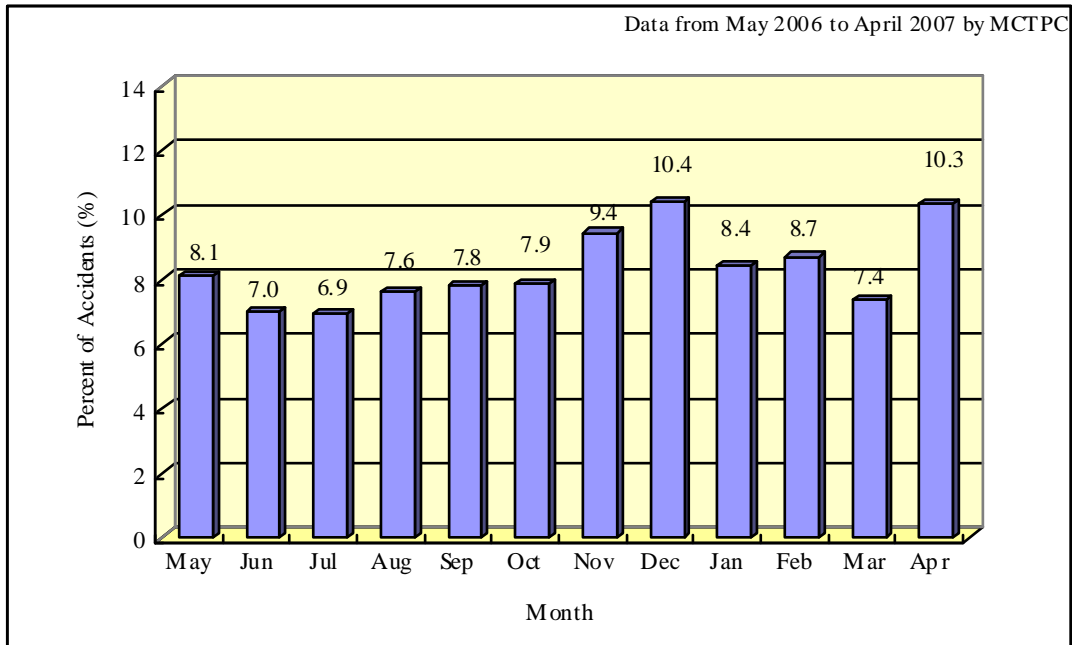


Figure 7.2-2 Monthly Variations of Traffic Accidents

Table 7.2-2 Monthly Variations of Traffic Accidents from May 2006 to April 2007

Year	2006								2007				Total
	Month	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
No. of Accidents	165	142	141	155	159	160	192	212	171	177	150	210	2034
Percent	8.1	7.0	6.9	7.6	7.8	7.9	9.4	10.4	8.4	8.7	7.4	10.3	100.0

Source: MCTPC

### (3) Hourly Variations of Traffic Accidents

Figure 7.2-3 and Table 7.2-3 illustrate the hourly variations of traffic accidents in 2006 and their percentage shares for the same twelve-month period. From these illustrations, the following observations can be made.

Traffic accidents tend to happen more frequently between the 10-hours period from 2 p.m. to 12 midnight. It recorded a total of 1,773 accidents, representing 84.8% to the total number of traffic accidents for that 12-month period. In particular, the 2-hours period from 6 pm to 8 p.m. has a highest percentage share of traffic accident at 27.4% or 573 accidents.

The plausible reasons for this pattern of accident occurrences could be the poor visibility during these time periods as dusk appears or when alcohol consumptions are customary higher in this country.

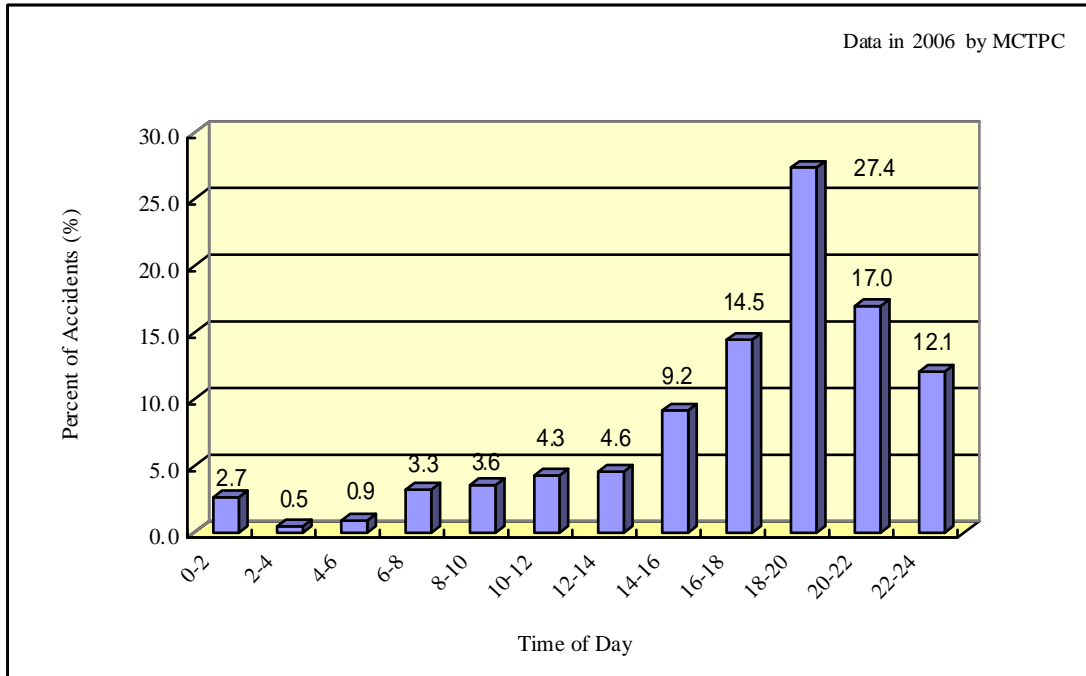


Figure 7.2-3 Hourly Variations of Traffic Accidents

Table 7.2-3 Hourly Variation of Traffic Accidents

Time	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18	18-20	20-22	22-24	Total
No. of Accidents	56	10	19	68	75	90	96	192	303	573	356	253	2091
Percent	2.7	0.5	0.9	3.3	3.6	4.3	4.6	9.2	14.5	27.4	17.0	12.1	100.0

Source: MCTPC

#### (4) Vehicles Involved in Accidents and Other Hindrances

Figure 7.2-4, Figure 7.2-5 and Table 7.2-4 illustrate the types of vehicles involved in traffic accidents in 2006. From these illustrations, the following observations can be made.

Motorcycle was the most common vehicle type involved in traffic accidents, representing 89.3% or 1,858 accidents to the total of 2,081 accidents. On the other hand, 4-wheeled vehicles were involved in 39.3% of the total traffic accidents or 818 accidents (218 accidents + 600 accidents between motorcycles and 4-wheeled vehicles).

Accidents between motorcycles were particularly numerous, with 982 accidents or 47.2% of the total. The next category of common accident type was between 4-wheelers and motorcycles with 604 accidents or 29.0% of the total. Accidents between 4-wheelers numbered 125 accidents or 6.0% of the total.

The accident numbers of involving pedestrians and bicycles were 126 (6.1%) and 96 (4.6%) respectively. Both types involving motorcycles were high.



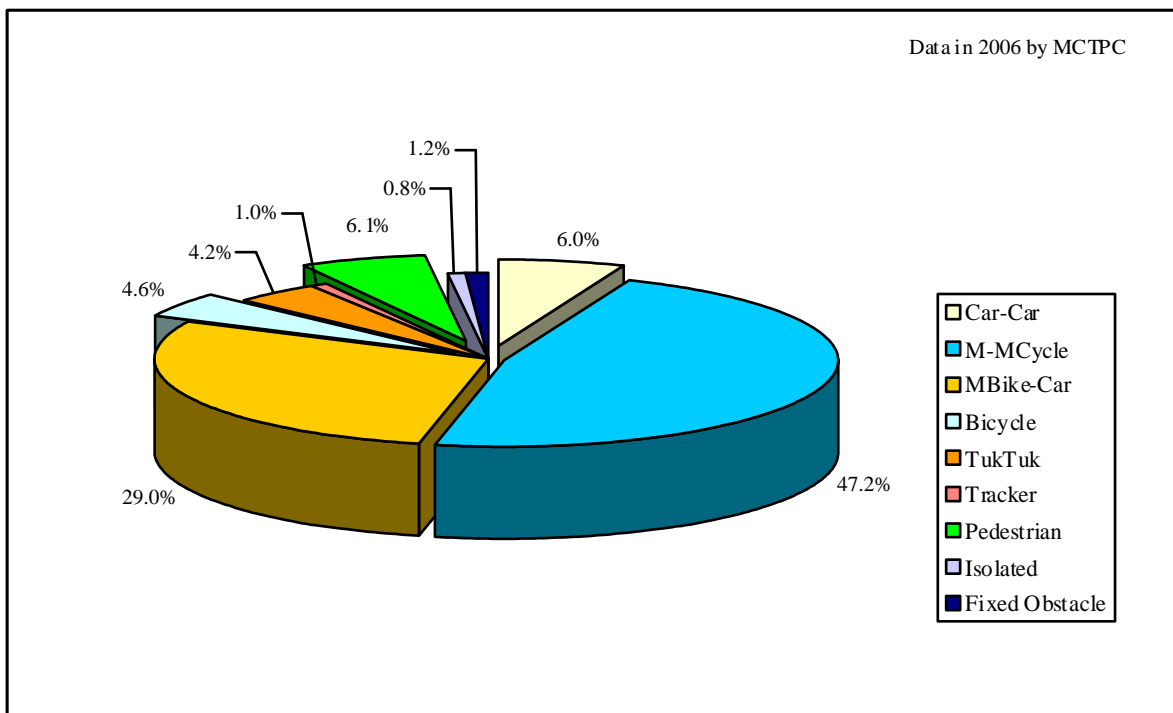


Figure 7.2-4 Percentage Shares of Traffic Accidents by Type of Vehicles and Obstacles

Table 7.2-4 Number of Traffic Accidents by Types of Vehicles and Obstacles

	Car	Motorbike	Tuk-tuk	Total	%
Car-Car	125			125	6.0
M-Mbicycle		982		982	47.2
MBike-Car	4	600		604	29.0
Bicycle	16	78	2	96	4.6
Tuk-tuk	22	64	1	87	4.2
Tracked	4	16		20	1.0
Pedestrian	28	96	2	126	6.1
Isolated	0	16		16	0.8
Fixed Obstacle	19	6		25	1.2
Total	218	1858	5	2081	100
%	10.5	89.3	0.2	100.0	

Source: MCTPC

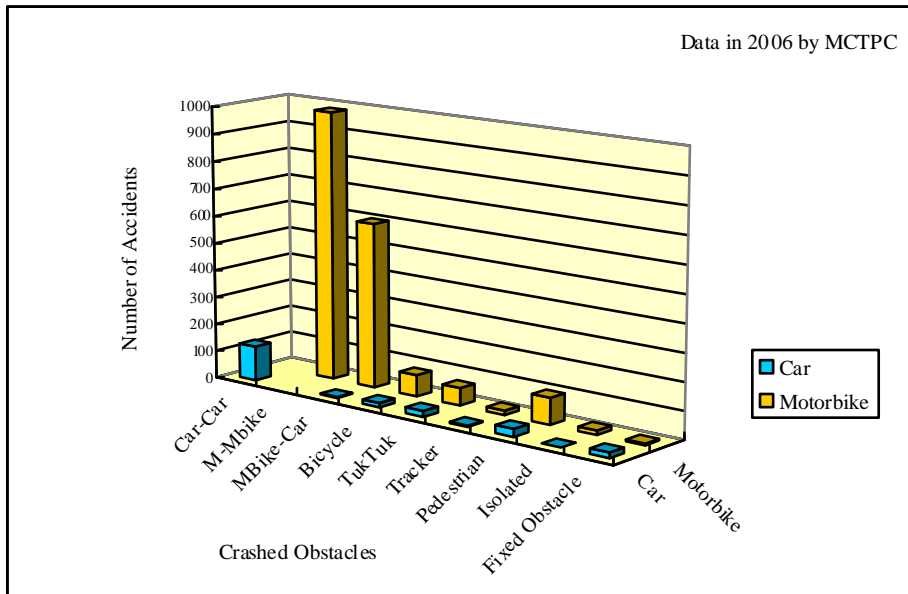


Figure 7.2-5 Number of Traffic Accidents by Types of Vehicles

(5) Major Causes of Fatality Accidents

Figure 7.2-6 and Table 7.2-5 illustrate the causes of traffic accidents and percentage share of the number of fatality. As shown in these illustrations, among the 121 deaths caused by accidents within the one year period between May 2006 to April 2007, more than half (52.1%) were due to driving under the influence of alcohol. This illustrates the high danger involved when drink and driving. The next common cause of accident was due to over-speeding.

About 19 persons involved in motorcycle accidents would have their lives saved if they were to wear their safety helmets.

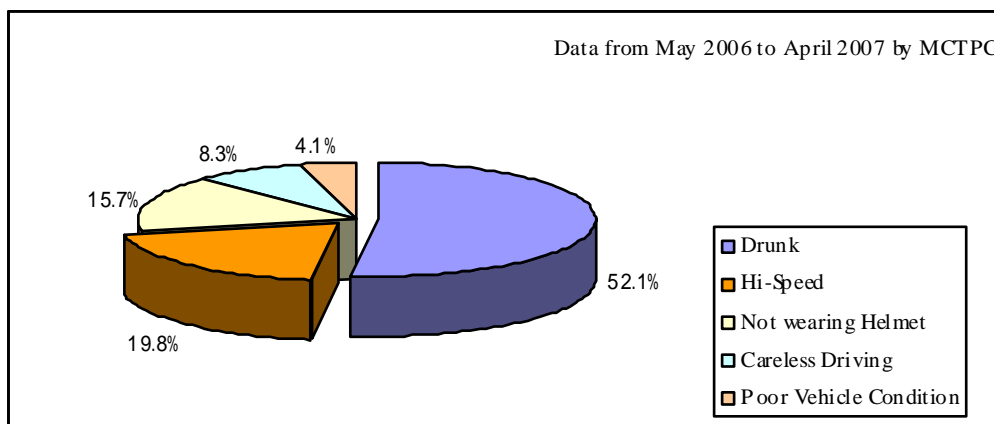


Figure 7.2-6 Percentage Shares of Accidents by Causes

Table 7.2-5 Shares of Accidents by Causes  
from May 2006 to April 2007

Cause of Fatalities	No. of Fatalities	Percent
Drunk	63	52.1
Hi-Speed	24	19.8
Not wearing Helmet	19	15.7
Careless Driving	10	8.3
Poor Vehicle Condition	5	4.1
Total	121	100.0

Source: MCTPC

#### (6) Traffic Accident Black-Spots

Traffic accident black spots in Vientiane are being analyzed at the moment. This new information will be announced soon. Data used in this section is obtained from the Project “Reducing Traffic Accidents in Vientiane by VVAAN”, 2005.

Figure 7.2-7 shows 15 traffic accident black spots. These black spots are listed below.

The rates of injuries and fatalities at these traffic accident black spots are astonishingly high. Most of these black spots are intersections, with one or two locations at road sections only. From this analysis, it is clear that road intersections are very dangerous locations in causing traffic accidents and their improvements are urgently needed.

- 1) ODEON intersection  
(Road T2 and 3 streets) 168 accidents / year
- 2) Circus intersection  
(Road P2 and Phonetong road) 3-4 accidents / week
- 3) Phonsay intersection  
(Road T2 and Phonekheng road) 28 accidents / 7 months of 2004
- 4) Phonkheng intersection  
(National Road 13 south and 2 other streets) 3 fatalities / 2004
- 5) Phonphanao intersection  
(National Road 13 south and road to Mitaphap hospital) 3-5 accidents / week
- 6) That Luang Neua intersection  
(Thatluang road and Phonthan road) 2-3 accidents / week
- 7) Phontong intersection  
(Phontong road and Mitaphap hospital road) 2 accidents / week
- 8) Ophthalmic hospital intersection  
(National Road 13 north and Thongpong) 2 fatalities / 2003
- 9) KM7 intersection at fuel station 2-3 fatalities / 2003

- (National Road 13 north and feeder road)
- |  |  |
|--|--|
| 10) Sharp curve at NongNieng market<br>(on National Road 13 north)   | 4 fatalities / 2003                            |
| 11) Nongteng intersection<br>(on National Road 13 north)<br>(Same situation as Ophthalmic hospital intersection) |  |
| 12) KM9 cemetery location  | 3 fatalities / 2003                            |
| 13) Thonghankham intersection<br>(intersection of Road T2 and Road P2)   | 28 accidents / 7 months 2004                   |
| 14) Many hazardous locations on Road 13 south<br>(between KM3 and KM12)  | more than 10 fatalities & many injuries / 2003 |
| 15) Intersections at That Luang square (north)<br>(Two junctions and one roundabout)                             |  |

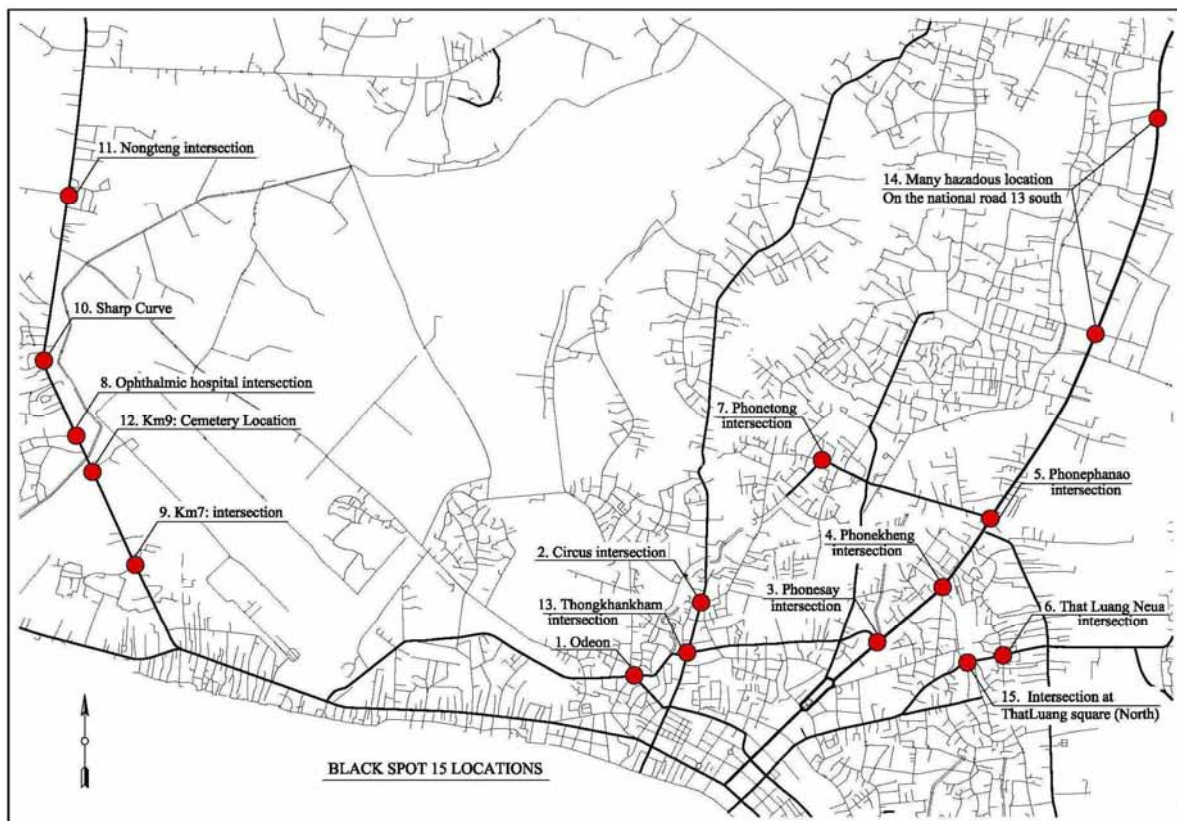


Figure 7.2-7 Traffic Accident Black Spots in Vientiane

## 7.2.2 Safe Driving and Traffic Safety Education

### (1) Traffic Control Devices and Safe Driving

#### 1) Mixed Traffic

- In observing the traffic flows on the roads in Vientiane, traffic flows are basically not operated in a smooth and safe manner. The problem in particular is due to the vast differences between the running speeds, physical sizes and engine modes among the heavy trucks, buses, passenger cars, motorcycles, Tuk-tuks and bicycles. In addition, there is also the frequent mixing of these motorized traffic with pedestrians on the roads.
- Due to this free mixing of vehicle types, all other vehicles in the city area are forced to travel at speed very close to those of Tuk-tuks or bicycles. This has greatly reduced the capacity of the roads. Headways between vehicles are very short and there are also frequent lane changes among drivers. This disorderly and haphazard traffic flow has increased the danger level for all road users.
- On the other hand, vehicles on the major trunk roads on the outskirts are found to travel at very high speed, in spite of the fact that there are many large trucks on these roads. This generates vast gaps in travel speeds between vehicle types and hence encourages frequent lane changes and overtaking, thus creating dangerous situations.

#### 2) Segregation of Traffic and Road Markings

- Median road marking is to segregate the two traffic streams traveling on the road in the opposite directions. Such marking is hardly visible on major roads and many road sections are devoid of such important road markings.
- Even on road sections with clear road markings, traffic is often observed to travel in a haphazard manner. Traffic on road sections without markings is mostly chaotic.
- On road sections without markings, vehicles intending to make a left turn at the downstream intersection would often overtake vehicles in front of them by intruding on to the other side of the roadway intended for traffic traveling in the opposite direction. Such dangerous driving behavior is particularly prevalent among motorcycles. This behavior is not only dangerous but has very bad effects on traffic flow in the opposite direction.
- Although lane markings are provided on multilane road sections, most drivers however, irrespective of their vehicle types, lack the awareness that they need to travel within these markings so that the entire traffic can flow smoothly, safely and in a speedy manner.

- Under such circumstances, it becomes necessary to segregate vehicles with large speed differences in separate lanes, as well as to monitor and order drivers to travel within the traffic lanes so as to avoid the haphazardness behavior among road users. (inner lane to be reserved for 4-wheelers while the outer lane to be used by all two wheelers).
- It is therefore most important to educate all drivers that the sooner they recognize the importance of driving within the traffic lanes and on the correct lane, the sooner they would benefit from having a smoother traffic flow, less dangerous and easier to drive situations on all the roads in the city.
- In Vientiane, the outer lanes on many road sections are being used for curbside parking. For this reason, bicycles and motorcycles have difficulty traveling continuously on the outer lane. Many of these road sections hence have little allowance for vehicles to change lanes or speeds.
- Median and lane markings are also found to have varying marking width, length and spacing, making them difficult to be recognized by drivers.

### 3) Traffic Behavior at Signalized Intersections

- Long queues and delays are not particularly common based on observations at all signalized intersections controlled by the Traffic Management Center. Traffic demands at these intersections at present are being processed efficiently by matching signal cycles. Generally, drivers are found to obey these signals, stopping on red and violations of signal lights are relatively rare. However, pedestrians are found to often ignore the traffic signals.
- Occasionally when these intersections are congested, vehicles tend to enter the intersection in spite of the fact that signal has changed to 'red'. Vehicles in the crossing traffic stream will then try to weave through the cars and motorcycles caught by the congestion within the intersection. Such behavior will only lengthen the congestion time period. Even when the signal changed to the next phase, vehicles within the intersection are still not clear for the next crossing stream.
- At intersections with no median islands, motorcycles waiting for the green light often go over the median marking and stopped on the opposite roadway. This behavior has adversely affected the smooth traffic flow in the intersection.
- In Vientiane, the stop lines at most intersections are generally placed at a relatively far distance away from the intersections. This makes the intersection area larger, giving a much bigger space for vehicles (both cars and motorcycles) to move about within the intersection. This condition encourages numerous conflicting movements between

vehicles and creates dangerous situations as well as adversely affecting the smooth traffic flow.

- There is no uniform standard for the placement of traffic signal lights. Signals are placed at intersections at locations depending on the country that donated these signals. Between different donor countries, the placements of signal equipment at signalized intersections are different. This creates widespread confusions among drivers. When a driver enter a signalized intersection, he expects or predicts to see the signal lights at a location he is used to see previously, but when the expected signal lights are placed at different locations, he gets disoriented and confused. Fundamentally, all traffic management facilities must be installed at uniform and consistent locations.

#### 4) Traffic Behavior at Non Signalized Intersections

- At non-signalized intersections, traffic at all the entry sections would just enter the intersection at will. As soon as they encounter potential head-on collisions, they would slow down their speeds and stop, allowing the other vehicle to pass. There is no concept among the drivers the need to differentiate between priority and lesser traffic streams. Wider roads with bigger traffic volumes seem to assume their priorities over the others.
- At intersection with high traffic volumes, vehicle on the main stream does not wait for a gap between the traffic flow to cross or make a left turn. Instead, it would simply enter the intersection to force a gap for him to cross or turn.
- Without such forceful behavior, many vehicles would face difficulties in crossing the road intersection. Similarly, turning traffic would face difficulties in making the turns at such intersection. Such complex and dangerous behavior does not occur only within a very specific space or location within the intersection, but anywhere within and around such intersection. This is extremely dangerous to all the road users.

#### 5) Pedestrian Crossings

- There are several pedestrian crossings provided on some road sections within the urban areas. However, few pedestrians actually use these crossings and they are often seen doing crossings at will on any road sections.
- Drivers are also found to pay little or no attentions in particular to these pedestrian crossings when they encounter them on the road network.
- Presently, pedestrian crossing facilities both within the urban areas and the suburban areas are inadequate. Moreover, both pedestrians and drivers are still not conscious and aware of the necessity and usage of this important traffic safety facility.

#### 6) Sidewalks

- Although sidewalks have been installed on road sections that have recently been improved, on most other road sections however, especially on minor roads, there are no sidewalks.
- Sidewalks are sometimes used for parking by cars and motorcycles (in some areas, such parking is not illegal but with special parking permission given by the city). Sidewalks are also often occupied by makeshift restaurants and hawkers. There is also little continuity for the safe and uninterrupted use of sidewalks by pedestrians as these sidewalks are of different levels and heights. Pedestrians are often forced to walk on the roadways.
- Hand-holes with missing covers and huge deep holes are also commonly seen on sidewalks. These pose great danger to pedestrians especially at night and under heavy raining conditions as these holes are not easily visible to unsuspecting pedestrians.

#### 7) Street Lighting

- Except for lighting provided along major roads and major intersections, streets in Vientiane are generally not well lighted. Even within the central business district, where street lighting is further aided by other lightings from shops, the streets still seem to be darker than they should be.
- In the suburbs, street lightings are even rarer, and this is rather dangerous for motorcycle and bicycle riders.

#### 8) During Rain and Inundation Conditions

- When it is raining, bicycle and motorcycle traffic tends to reduce on the roads, but there are some riders who would brave the rain and get drenched or use some form of covers, including holding on to umbrellas while riding on the roads, without realizing the dangers they face.
- After each heavy downpour, many road sections are frequently inundated with rainwater. As a result, traffic congestions would occur at these locations.

#### 9) Use of Non-roadworthy Vehicles

- There are still many very old, ill equipped and non-roadworthy cars and motorcycles traveling on the streets of Vientiane. Irrespective of whether these drivers are aware of such defects on their vehicles, they continue to use them on the roads. Most defects include loosened or broken brake system, badly bruised or poor condition tires, inadequate or missing light fixtures (head light, tail lamp, turning signal lights, high beam lamp setting) as well as reflective side mirrors.



- The brake system used on Tuk-tuks is not very safe and improvement to the overall vehicle structure is also needed.
- Most bicycles lack headlights and tail reflectors, thus putting the users at high risks at night.
- Vehicle inspections during registration or periodic vehicle inspections are not carried out regularly. The current vehicle inspection system needs to be reviewed and improved.
- In addition, more stringent enforcement on these defective and non-roadworthy vehicles must be strengthened further.

#### 10) Traffic Accident Data

- Traffic accident data is indispensable for formulating traffic safety countermeasures and for making effective decisions on locations that required urgent road improvements. One of the major problems facing traffic management practices in Laos and Vientiane is the lack of adequate and comprehensive traffic accident data.
- Currently, MCTPC is conducting a ‘National Road Safety Action Plan’ Project. In this Plan, a sub-project on the ‘collection and analysis of traffic accident data’ is being carried out. Traffic accident data with more precision and detailed information can be expected soon.
- Global Positioning System (GPS) should be used to measure accident location and accuracy of the traffic accident data.

#### 11) Lack of Qualified Traffic Engineers

- Various traffic management issues and problems are discussed in the above sections. However, even if there are sufficient budgetary allocations to improve and resolve these problems, many qualified technical personnel and good coordination between the related agencies are still needed to carry out and oversee the implementation of any improvement measures. The number of such qualified personnel available among the private and public sectors may not be adequate to implement all the measures and plans.
- Presently, there are many foreign technical experts who are employed in Laos to help provide such expertise to the Government. However, as a long term measure, it is important to begin training and educating locals to become qualified traffic management engineers, traffic enforcement officers and traffic analysts.

## (2) Traffic Safety Education

- Traffic safety education is an important part of traffic management in reducing traffic accidents, loss of human lives and properties. However, judging from the traffic situations and drivers' behavior in Vientiane, such safety education is obviously not provided adequately to all the vehicle drivers.
- All drivers, motorcycle and Tuk-tuk drivers in particular, lack sufficient basic knowledge on safe driving skills as well as traffic rules or regulations. Similarly, pedestrians also grossly lack traffic safety awareness.
- Recognizing this huge problem, MCTPC and TPD, as the main agencies in-charge, are implementing various programs on traffic safety education through the cooperation of the private sector and NGOs.
- Suitable textbooks and teaching materials on traffic safety are however not readily available in Laos. Textbooks on traffic regulations and ordinances for instance are not suitable for use by the general public and school children.

### 1) Driver Education

- Driver education is directly related to driver licensing system. When issuing driver licenses to drivers, it is imperative that authority carries out thorough checks as to whether the applicants possess sufficient safe driving skills, good knowledge on traffic safety, traffic regulations and rules. Applicants who satisfy such conditions only would be issued the licenses to drive.
- In Vientiane, there is only one public driving school while there are 10 such private schools in the city. Applicants are required to undergo two months of learning/training when applying for licenses for 4-wheeled vehicles while for buses and other occupational licenses, a learning period of 3 months is required. For these occupational licenses, the applicants must undergo lectures on vehicles and engine operations as well. After these lessons, applicants who pass their examinations would be able to obtain their driving licenses.
- On the other hand, motorcycle and Tuk-tuk drivers are not required by law to attend driving schools. They can directly apply to take the driving tests to obtain the required driving licenses. Due to this situation, these drivers may be issued the driving licenses without the opportunity to learn about safe driving skills and acquire knowledge on traffic safety, rules and regulations.
- Driving test is comprised of two parts at present. One is an oral interview test and the other a driving skill test. The interview form of test is not adequate to examine thoroughly the traffic safety knowledge of the applicants. In 2006, the passing rate of

all license applicants for all vehicle types was 74%. This is a relatively high passing rate and it is generally acknowledged that it is rather easy to obtain a driving license in Vientiane. For this reason, MCTPC is currently preparing and examining a list of questions for conducting a paper test instead. In addition, it is also proposing to amend the law to require all motorcycle driving license applicants to undergo driving skill and safety education at the designated driving schools.

- Under the current system, any repeat offenders or persons involved in accidents are not required to undergo re-education on traffic safety and driving skills when they apply to renew their driving licenses.

## 2) Safety Education for Students

- Students in the primary, secondary and high schools are currently given traffic safety education by staff from the Ministry of Public Security at the schools. In addition, Handicap International (HI) also pays visits to schools through its School Visit Program, to conduct traffic safety education to students. However such education is rather irregular and inadequate to impart sufficient knowledge on traffic safety to students.
- There is currently no provision in all the school curriculums for teaching traffic safety education regularly to students in any school. This situation is most urgently in need of change for secondary and high schools as these schools have many students that are motorcycle drivers.
- Furthermore, there are no suitable teaching materials prepared to suit different student age groups in the schools.
- Perhaps equally important for providing traffic safety education directly to students at the schools is the need to train and nurture teachers and instructors for such purposes.

## 3) Traffic Safety Education for the General Public

- Since 2004, there are many traffic safety campaigns being conducted aimed at educating the general public on traffic safety. HI has provided significant cooperative efforts in conducting such campaigns, targeting in particular the motorcycle drivers and convincing them the benefits of wearing the safety helmets.
- Public exhibitions were also carried out to provide information on traffic safety to the general public. During such exhibitions, photographs of accidents and accident statistics are displayed to educate the public.
- Traffic police from the Vientiane Traffic Police Division has been dispatched to schools, villages, transport companies and factories to conduct traffic safety education.

- However, there are no suitable teaching materials prepared by the traffic police for this purpose.

#### 4) Education for Traffic Police Officers

- As traffic congestions and traffic accidents are expected to increase in the near future, one of the urgent issues is the education for traffic police officers in the Vientiane Traffic Police Division. Traffic police officers are required to equip themselves with comprehensive knowledge on traffic rules, traffic regulations, traffic ordinances, as well as to undergo training for carrying out traffic enforcement, traffic guidance and instructions based on traffic engineering principles.
- Presently, officers from TPD are providing such educations to traffic police officers from the Vientiane Traffic Police Division to carry out their duties on site.
- However, based on observations of the current situations, traffic police officers are at times not well informed to response to the various traffic issues and problems. With the increase in traffic demand and possibly traffic accidents in the near future, the current traffic police force therefore requires urgent strengthening.

### (3) Traffic Enforcement

#### 1) Traffic Police Department

- Traffic control and enforcement are the duties of the Traffic Police Department and Ministry of Public Security. The TPD has 5 Divisions and 2 Troops. Overall the Department has a workforce of 86 personnel. In addition, site patrol and related works are conducted by traffic police officers positioned in 7 districts within the city from the Vientiane Traffic Police Division. This organization has a workforce of 225 personnel. (The 7 districts are under the TPD as well as the VTPD).
  - a. Administrative Division
    - Conduct of all administrative duties in the TPD.
  - b. Public Awareness Division
    - Planning, promotion and implementation of various campaigns, education and requests on traffic safety related issues or matters.
  - c. Traffic Control and Enforcement Division
    - Provision of guidance to achieve a smoother traffic flow, increase safety and instructions to traffic violators. Also carry out traffic control and enforcement.
  - d. Traffic Accident Investigation Division
    - Provision of on-site traffic guidance at accident sites and prepare traffic accident investigation report.
  - e. Enforcement Division of Driver Licenses and Non-inspected Vehicles

- Inspect driving licenses of drivers and vehicle inspection certificates for vehicles on site. (Vehicles that pass the compulsory vehicle inspections are issued with special seals to be displayed on the number plates)
  - i. VIP Troop:
    - Provide the necessary security protections to ensure safety for local and international VIPs, as well as facilitating their movements on the roads.
  - ii. Number Plate Management Troop:
    - Prepare number plates for all vehicles and their management.

## 2) Main Activities of the Traffic Police Department

- Every year, staff from the Public Awareness Division would conduct classroom education and site trainings for all traffic police personnel in each of the seven districts. In addition, this division would plan and carry out traffic safety campaigns, seminars and trainings jointly with MCTPC and other related agencies.
- Traffic police personnel from each of the districts would in turn meets with the local communities, villages, schools, and other private companies to carry out traffic safety education.

In Vientiane, the major enforcement targets are drunken drivers and those drivers who ignore the directional guidance gadgets at intersections. Major guidance is given to drivers who do not stop at pedestrian crossing even though there are pedestrians using such crossing. Other guidance targets are pedestrians who do not cross the street using the designated crossing facility.

- Investigation of traffic accidents is generally carried out by traffic police personnel from the VTPD. However, depending on the scale and seriousness of the accident, the reporting agency may differ. For example, if a foreigner causes or gets involved in an accident, it becomes the responsibility of the Central Traffic Police Department to handle and process the case.

## 3) Enforcement Equipment

- Presently, equipment used by the VTPD for traffic enforcement includes 1 Laser Speedometer and 1 breath-analyzer. These equipments were purchased and made available by the Road Maintenance Program (RMP) Project financed by the World Bank. The other 3 units of each type of the above equipment are given to the respective traffic police departments in the other provinces in the country.

- These equipments are used about once a month for traffic enforcement, targeting mainly drunken and over-speeding drivers, especially among the truck drivers. During the festival seasons however, such enforcement is carried out on all vehicle types.

#### 4) Penalty for Illegal Drivers

- Traffic police in Vientiane is empowered by the traffic rules and regulations to impose penalties in the form of fines on traffic offenders. The traffic police officer would issue a violation ticket to the driver caught committing an offence and at the same time, the police officer would confiscate his driving license. A copy of the violation ticket and the driving license would be sent to the traffic police headquarters. The driver has to pay the fine at the traffic police headquarters and the driving license would then be returned to him.
- 70% of such revenues collected from traffic violation fines would be sent to the central budgetary division, with the remaining 30% remains with the traffic police department.

### **7.2.3 Status/progress of the road safety action plan**

#### (1) National Level Road Safety Action Plan

- MCTPC has formulated a national level Action Plan that contains various strategies aimed at improving the road traffic safety in Laos. The Prime Minister officially approved this National Road Safety Action Plan in December 2004. It was also finally endorsed by the National Assembly for implementation.
- Following the approval of the Action Plan, a National Road Safety Committee (NRSC) was established in March 2005. Under this committee, MCTPC was to function as the main implementing and coordination agency. It is currently implementing various projects proposed in the Action Plan.
- During the process in preparing the Action Plan as well as during its implementation, the Government of Laos has requested various assistance and cooperation from international and national aid organizations such as ADB; as well as supports from NGOs and the private sector. Several NGOs and private sector organizations are now members of the NRSC and they are very actively involved in its activities.
- This Action Plan is comprised of 15 sectors, covering almost all disciplines in the field of road traffic safety. For each of these sectors, various specific short-term, medium term and long term measures were proposed. A total of more than 170 measures or actions have been put forward in this Plan. (for further details, refer to the Report on 'Road Safety Strategy and Action Plan' by Lao People's Democratic Republic, April 2005)

- 1) Coordination and management of road safety
- 2) Road accident data systems
- 3) Road safety funding
- 4) Safe planning and design of roads
- 5) Improvement of hazardous locations
- 6) Road safety education for children and young adults
- 7) Driver training and testing
- 8) Road Safety Publicity Campaigns
- 9) Vehicle road worthiness and safety standards
- 10) Traffic legislation
- 11) Traffic police and law enforcement
- 12) Emergency assistance to road accident victims
- 13) Road safety research
- 14) Road accident costing
- 15) Collaboration

- Table 7.2-6 shows, as of May 2007, the completed and on-going measures for each of these sectors, its main implementing agency and other supporting organizations.

(2) City Level Road Safety Action Plan in Vientiane

- VUDAA is currently implementing the 'Project on Road Traffic Accident Reduction in Vientiane Capital' based on the Final Report from the 'Road Traffic Accident Reduction Project' Study in November 2004.
- The city of Vientiane has set up its own 'Vientiane Capital Road Safety Committee' to oversee the implementation of the Project based on the Report.
- The Action Plan for Vientiane is made up of three phases. There are 8 sectors in the 1st Phase of the Project, while the 2nd and 3rd Phases are made up of 12 sectors.
- The followings are the 8 sectors that make up the 1st Phase of the Project:
  - 1) Reducing substantially the import of motorcycles
  - 2) Apply the traffic laws strictly and continuously
  - 3) Improve the traffic police of Vientiane capital
  - 4) Set up new traffic signals, road marking and street lights
  - 5) Publicity
  - 6) Teaching in the schools
  - 7) Budget
  - 8) Evaluation

- The 12 sectors that make up the 2nd and 3rd Phases of the Project are listed below.
  - 1) Information, Education and Awareness
  - 2) Handbooks
  - 3) Traffic signs and lighting
  - 4) Traffic police improvement
  - 5) Traffic Safety Funding
  - 6) Capacity building
  - 7) Improvement of Driver and vehicle management unit
  - 8) Pedestrian and bicycle protection
  - 9) Public transportation
  - 10) Urban Goods delivery
  - 11) Market and Parking
  - 12) Improvement of infrastructure
  
- (3) The ‘Vehicle Registration and Driver Licensing System (VRDLS)’ Project
  - A Pilot Implementation Plan for the ‘Vehicle Registration and Driver Licensing System’ is currently being implemented in Laos as a Consulting Service Project.
  - The Department of Transport and MCTPC are the main organizations from the Lao PDR Government for this Project, which is a follow-up project from the Road Maintenance Program-Phase II (RMP II), supported by the World Bank.
  - The foreign consultant that provides the Consulting Services is VicRoad International, a consultant from Australia.
  - This particular project is aimed at improving the current vehicle registration and driver licensing process in Laos. The final goal is to improve road traffic management in the country. With an improved process, accurate data can be managed easily, while service level to the users can also be improved. Data essential for formulating appropriate enforcement actions, for planning of traffic and transportation plans will also become readily available. Finally, revenue for the Lao PDR Government can also be increased.
  - The basic concepts for this VRDLS are :
    - i) prepare a national database on all vehicle registration and driver licenses, to be collectively managed using computers by the Department of Transport and MCTPC.
    - ii) improve the driving licensing and vehicle inspection processes.
  - The current consulting services are for a pilot site (Thong Pong) in Vientiane. As soon as this pilot site project is completed, the system or process will be expanded to cover the entire country.



- The current pilot study project is due to complete by November 2007
- The initial cost for this Pilot Project is estimated at \$182, 472, with an annual cost of \$60,710 a year. However, there is presently no specific budgetary plan by the Government for implementation at the national level.

Table 7.2-6 Status of Implementation on the Road Safety Action Plan

as of May 2007

	Actions	Status	Core Organization	Coordinating Organization
1	Coordination and management of road safety			
	S1 National road safety strategy approved by Prime Minister	12/2004	MCTPC	MCTPC
	S2 Draft action plan launched on WHO World Health Day	Completed	MOH,WHO,HI	MOH,MCTPC
	S3 Seek donor funding "seed" money to commence implementing Action Plan	On going	MCTPC	
	S4 Approved of Action Plan by Minister/ CTPC	09/2004		MCTPC
	S5 Approved of Action Plan by PM/ National assembly	12/2004	MCTPC	PM
	S6 NRSC-set up/ Inaugural meeting	03/2005		
	S7 Meeting schedule agreed	03/2005		
	S8 National RSC- Secretariats- set up	03/2005	MPC,MPH,MOE	MCTPC
	M1 Vientiane Capital- RSC pilot project operation	03/2006	DCTPC, VUDAA	DCTPC
2	Road accident data systems			
	S1 A more comprehensive accident form	Completed	DTP	DOT
	S2 A month pilot study of the data collection form	Completed	DTP	DTP
	S3 Training in collecting, storing and using RTA information	Completed	DTP	DTP
	S4 Review existing computer software & hardware needs	Completed	DTP	DTP
	S5 HI to continue with hospital surveys	Completed	HI, ThD	HI
	S6 URI & HI to collaborate in determining level of under-reporting	Completed	URI, HI	URI
	S7 Review and introduction of the revised form Nation wide	Completed	DTP	DTP
M4 Produce improved (second) Annual Accident Report & dissemination more widely	On going	MCTPC,HI,TP, Hospital &URI	MCTPC	
3	Road safety funding			
	S1 Where feasible each development aid project should have road safety component	On going	DOT	DOT
	S2 Seek donor support to implement RS action plan	On going	MCTPC, MPH, MOE	
	S3 Seek 10% levy from road fund for RS activities	On going	MCTPC	
	S4 Prepare legislation for levies /charges	On going	DOT	
	S5 Third party insurance compulsory for vehicles	On going	MCTPC, MPC	MCTPC
	S6 ADB project safety component available	On going	MCTPC	
	M1 Levies & user charges approved by government	On going	MCTPC	MCTPC
	M2 Adequate funds available for RS implementation	On going		
	M3 Road safety components in all development aid projects	On going	MCTPC	
4	Safe planning and design of roads			
	S1 MCTPC & Sida to discuss Road No8 recommendations including preparation of standards & guidelines	On going	DOT	DOR
M1 Establish safety audit team(s) to audit road design and construction in MCTPC	On going	DOR, DOT, LTEC	DOT	
5	Improvement of hazardous locations			
	S1 Establishment of national black spot team	On going	DOT, DTP, DOR, LTEC,	DOR
	S2 Co-ordination with donors (internal and international) on training and pilot project	On going	DOR	DOR, DOT
	S4 Analyze data& prepare preliminary designs for remedial measures at 10 black spots & complete 5 route studies	On going		DOR, DOT

	Actions	Status	Core Organization	Coordinating Organization
6	Road safety education for children and young adults			
	S1 Establish review team to support MoE research institute for educational materials	On going	HI, DTP, MCTPC	MOE-SSERI
	S5 HI school visit program- 15 secondary/ FE schools	Completed	DTP	HI
7	Driver training and testing			
	M3 Review first aid training for all drivers	On going	LRC, hospital	DOT
8	Road safety publicity campaigns			
	S1 Radio/ TV program, driver interviews	On going	TP	TP
	S2 Joint activity on World Health Day 2004 (including press conference & launch for RS Action Plan (final draft)	Completed	HI, WHO, private	MCTPC
	S3 2 RTS information stands (Exhibitions & live input)	Completed	HI, private	MCTPC
	S4 Contests: Slogans, songs, drawing	Partly	TP	MIC
	S5 Campaigns on helmets & general accident prevention using different media	On going	HI, TP	MCTPC
	S6 Radio spots for and with young people	On going	MCTPC	HI
	M2 Continue RTS campaign: poster, leaflet....	On going	HI, private, TP	MCTPC
	M4 Continue information stands	On going	HI, NGOs	MCTPC
M5 Set up RTS mobile team	On going	DTP	DTP, MCTPC	
9	Vehicle road worthiness and safety standards			
	S1 Prohibit unsafe modification of vehicles (increase of axle, extension of chassis) by implementation at VICs and through police	On going	DCTPC & TP	DTP
	S2 Review legislation on non-standard transportation means, old tires, smoke & noise emission	On going	DTP	DCTPC
	S3 Enforce regulation on sub-standard parts & usage of 2nd hand parts	On going	MOC	DOT
	M3 Training of Traffic Police in vehicle inspection(VI)	Partly	DTP	DOT
	M4 Authorize qualified vehicle service centers to carry out VI	On going	DCTPC & TP	DOT
10	Traffic legislation			
	S1 New fine rates approved and procedures established	On going	MCTPC	PMO
	S2 New regulations for helmets drafted and approved	On going		DoT
	S3 New professional driver regulations drafted	On going	MCTPC	
	S4 Drunk-driving regulations approved	On going	DTP, DOT	MCTPC
	S5 Review motorcycle training and licensing regulations	On going		MCTPC
	M1 Safety belt/ equipment/ regulations drafted	On going	DTP	MCTPC
	M2 Helmet regulations approved	On going	DTP	MCTPC
	M3 Review of regulations regarding age and responsibilities for traffic offences	On going	DTP	MCTPC
	M5 Review road safety responsibilities	On going	Everyone	MCTPC
	M6 Review insurance regulations	On going	MOF	MCTPC
11	Traffic police and law enforcement			
	S1 New fine rates approved and immediately implemented	On going	MPS	MCTPC
	S2 Continue to focus on motorcyclists to increase helmet wearing to 40% in Vientiane and 20% in secondary towns	On going	MPS	MCTPC
	S3 Complete training in safety equipment (speed, alcohol)	Partly Completed	MCTPC	MPS
	M1 Evaluate success of short term measures regarding helmets	Completed	DTP, URI, HI	DOT
	M2 Introduce re-education for serious and repeat offenders	On going	MOJ, DTP	DTP
	M3 Set new helmet targets for Vientiane/ 2nd towns and whole country	On going	DCTPC, DTP	DOT, DTP

	Actions	Status	Core Organization	Coordinating Organization
12	Emergency assistance to road accident victims			
	S2 Knowledge, attitude and practice on First Aid: World Health Day (RS)	On going	MOH, LRC, DOT, hospital	MPH
	S4 Apply improved First Aid curriculum, handbook, leaflet and printing to LRC First Aid training	Completed	MPH, LRC, hospital	LRC
	M1 Training of trainers on First Aid (Medical staff)	Partly Completed	Hospital, MPH, LRC	LRC
	M2 First Aid training for target groups: traffic and fire police, Tuk-tuk drivers, Teachers	Partly Completed	LRC, MPH, MOE, DTP	MPH
	M3 Knowledge, attitude and practice on First Aid: World First Aid Day, World Health Day, festivals, events	On going	DOT, MOE	DOT
13	Road safety research			
	S2 Preparation and discussion for evaluation of black spot program in Vientiane-including collection of before data from police files	On going	DOT,DCTPC	DTP,DOT
	S3 Discussion with concerned agencies on creation of a monitoring & evaluation system for this action plan	On going	URI	DOT
	S4 Initiate two hospital-based studies: head injury and alcohol	Partly Completed	HI	Hospital
	M1 Monitoring & evaluation implementation of road safety projects in Vientiane	On going	DCTPC, MOE, DTP, hospital,	DOT
	M2 Extend to secondary towns	On going	DTP, hospital,	DOT
	M3 Regular annual RS research program in place covering 5 major target groups	On going	DOT, DTP, hospital	URI
	M4 increasing liaison with ASEAN neighbors and collaborative research	On going	DOT	URI
14	Road accident costing			
	S1 Workshop on how to create criteria for RTA cost estimation	Completed	DTP,URI, hospital, DCTPC	DOT
	S2 Survey on cost components	Completed	DTP,URI, hospital, DCTPC	DOT
	S3 RTA cost estimation in 2004	Completed	DTP,URI, hospital, DCTPC	URI
15	Collaboration			
	S1 Private sector & NGOs will be members of NRSC Committees	Completed	MCTPC, HI priv. sectors.	MCTPC
	S5 Joint activities for WHD	Every year	all	DOT
	S6 That Luang festival activities involve many partner and new activities	Every year	all	HI, MCTPC
	M1 Increase the involvement of the private sector and NGOs to at least 15 organizations	On going	MCTPC, HI	MCTPC
	M2 Private sector and NGOs are members of VTE and secondary cities RS management committees	On going	DCTPCs, VUDAAs	DCTPCs

S: Short Term Plan

M: Medium Term Plan

## **CHAPTER 8**

# **SOCIAL AND ENVIRONMENTAL CONSIDERATION**

## **CHAPTER 8 SOCIAL AND ENVIRONMENTAL CONSIDERATION**

### **8.1 ENVIRONMENTAL LEGISLATION**

#### **8.1.1 Environmental Laws in Lao PDR**

Lao government started to consolidate the legal system on environmental sector in recent years. Based on the Environmental Action Plan adopted in the National Assembly in 1994, the Environmental Protection Law (EPL) was enforced in 1999 with the support of United Nations Development Programme (UNDP), Swedish International Development Agency (SIDA) and Norwegian Agency for Development Cooperation (NORAD). Accordingly, there are various and numerous laws, regulations and guidelines which contribute to environmental protection and management in the Lao PDR as shown in the following;

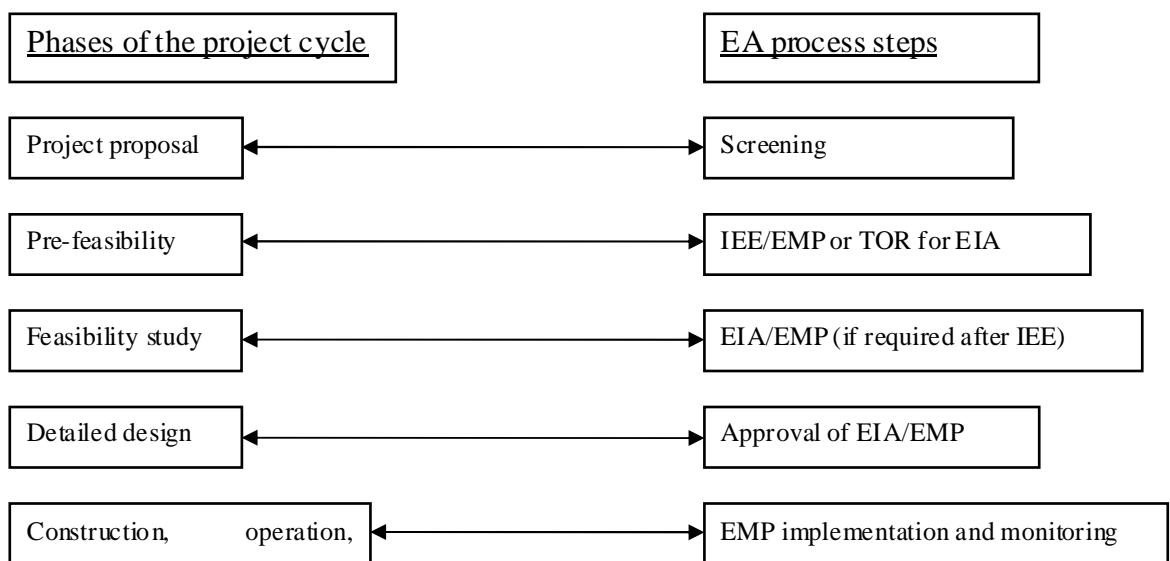
- 1) Regulation on Environment Assessment in the Lao PDR 2002
- 2) Decree on Implementation of the Environment Protection Law 2001
- 3) Decree on Implementation of the Water and Water Resources Law 2001
- 4) Prime Minister's Decree on Vientiane Urban Development and Administration Authority 2000
- 5) President's Decree on Urban Planning 1999
- 6) Decree on Implementation of the Land Law 1999
- 7) Environment Protection Law 1999
- 8) Mining Law 1997
- 9) Prime Minister's Decree on Urban Development and Administration Authority 1997
- 10) Land Law 1997
- 11) Provisions on Discharge of Wastewater from Factories 1994
- 12) Prime Minister's Decree on Management and Use of Forest and Forest Land 1993
- 13) Decree on Logging Ban 1991
- 14) Decree on Adoption of Tropical Forestry Programme 1991
- 15) Decree of Wild Animals, Fisheries, Hunting, and Fishing 1989

- (1) Initial Environmental Examination (IEE)

The “Regulation on Environment Assessment in the Lao PDR in 2002” states that no construction or other physical activities shall be undertaken at a project site until the Science, Technology and Environment Agency (STEA) has issued an Environmental Compliance Certificate (ECC) for the project. The ECC shall be obtained through environmental assessment procedures of the Lao PDR. The environmental assessment involves four counterparts: the project owner, STEA, Development Project Responsible Agency (DPRA), its concerned ministries and general public. Of which, DPRA shall be established for each development

project in the Lao PRD, and composed of the representatives of its related ministries and government agencies.

Firstly, before proceed to environmental assessment by STEA, a project explanation should be submitted to the DPRA in order to screen the project for possible environmental impact. Secondary, for taking account of the consequence, further environmental assessment will be decided to carry out or not. If a project is judged as no occurrence of environmental impacts in the project, STEA will issue an ECC with or without conditions. However, if a project is identified as occurrence of environmental impacts, the environmental assessment will proceed to carry out an IEE supervised by STEA. The project owner has to prepare an IEE report or appoint a consultant to do so. In general, the phases of project cycle corresponding to each step of environmental assessment by STEA are as shown in Figure 8.1-1.



Source: Regulation on Environment Assessment in the Lao PDR in 2002

Figure 8.1-1 Phases of Project Cycle Corresponding to Each Step of Environmental Assessment by STEA

General Contents and format of an IEE report for development projects in the Lao PDR are shown in Table 8.1-1.

Table 8.1-1 General Contents and Format of an IEE Report for  
Development Projects in the Lao PDR

**Chapter 1: Introduction**

- Name and address of project owner
- Name, address and affiliation of the author of the report
- Purpose of the report
- Objectives of the project

**Chapter 2: Project Description**

- Type, size and location of project
- Project activities and their timing/ sequence
  - Construction period
  - Operation period
  - Closure period
- Quantity and quality of raw material to be used
- Quantity and quality of waste products generated by the project
- Project costing

**Chapter 3: Environmental Description of Project Area (baseline data)**

- Physical
- Biological
- Economic
- Social

**Chapter 4: Environmental Impacts**

- Impacts during project construction period
  - Physical (air, water, land)
  - Biological (fauna and flora)
  - Economic
  - Social
- Impacts during project operation period
  - Physical (air, water, land)
  - Biological (fauna and flora)
  - Economic
  - Social
- Impacts during project closure phase
  - Physical (air, water, land)
  - Biological (fauna and flora)
  - Economic
  - Social

**Chapter 5: Environmental Management Plan or draft TOR for EIA**

If the project is not required to undertake EIA, the EMP must contain:

- Protective or reductive measures for environmental impacts

- Compensation measures (if any)
- Institutional arrangements, timing and budgets for implementation of EMP
- An environmental monitoring programme

In case the project is required to undertake EIA, the draft TOR on EIA must contain:

- The area of expected environmental impacts
- EIA methodology
- Persons or entities involvement activities during IEE

**Chapter 6: Description of Public Involvement Activities during IEE**

**Chapter 7: Conclusions and Recommendations**

Source: Regulation on Environment Assessment in the Lao PDR in 2002

(2) Environmental Impact Assessment (EIA)

If the project is not required to undertake EIA, an Environmental Management Plan (EMP) must be developed within the IEE report. On the one hand, if it is found that the project is required to undertake an EIA during the IEE process, the IEE report shall contain TOR for the scoping of a subsequent EIA. After the review of IEE by STEA, DPRA, concerned government agencies and general public, STEA determines whether to issue an ECC or to require an EIA. STEA is responsible to review and approve EIA reports in association with related government agencies and general public, and then the ECC should be issued. The steps of IEE/ EIA and the time frame to the final approval for development project are shown in Figure 8.1-2. General Contents and format of an EIA report for development projects in the Lao PDR are shown in Table 8.1-2.

(3) Line Ministries

In addition to the STEA, the Department of Roads (DOR) of MCTCP and the Department of Electricity of the Ministry of Industry and Handicraft (MIH) have their own EIA regulations, the former has Regulation on Environmental Impact Assessment of Road Projects in the Lao PDR, 2926/MCTPC, 29 July, 2003, and the latter, Regulation on Implementing Environmental Assessment for Electricity Projects in the Lao PDR, No 447/MIH, 20 November 2001. There are no other ministries and agencies that ever have regulations on EIA.

For road projects, MCTPC categorizes projects into two categories based on the “MCTPC Environmental Guidelines for Road Projects (April 1999)”.

- Category I: Projects with potentially no environmental impacts  
These are projects that only routine road maintenance, periodic maintenance or minor improvements of roads within the existing constructed width\* (roadway) without involving a change of class or category of the road and are not located in



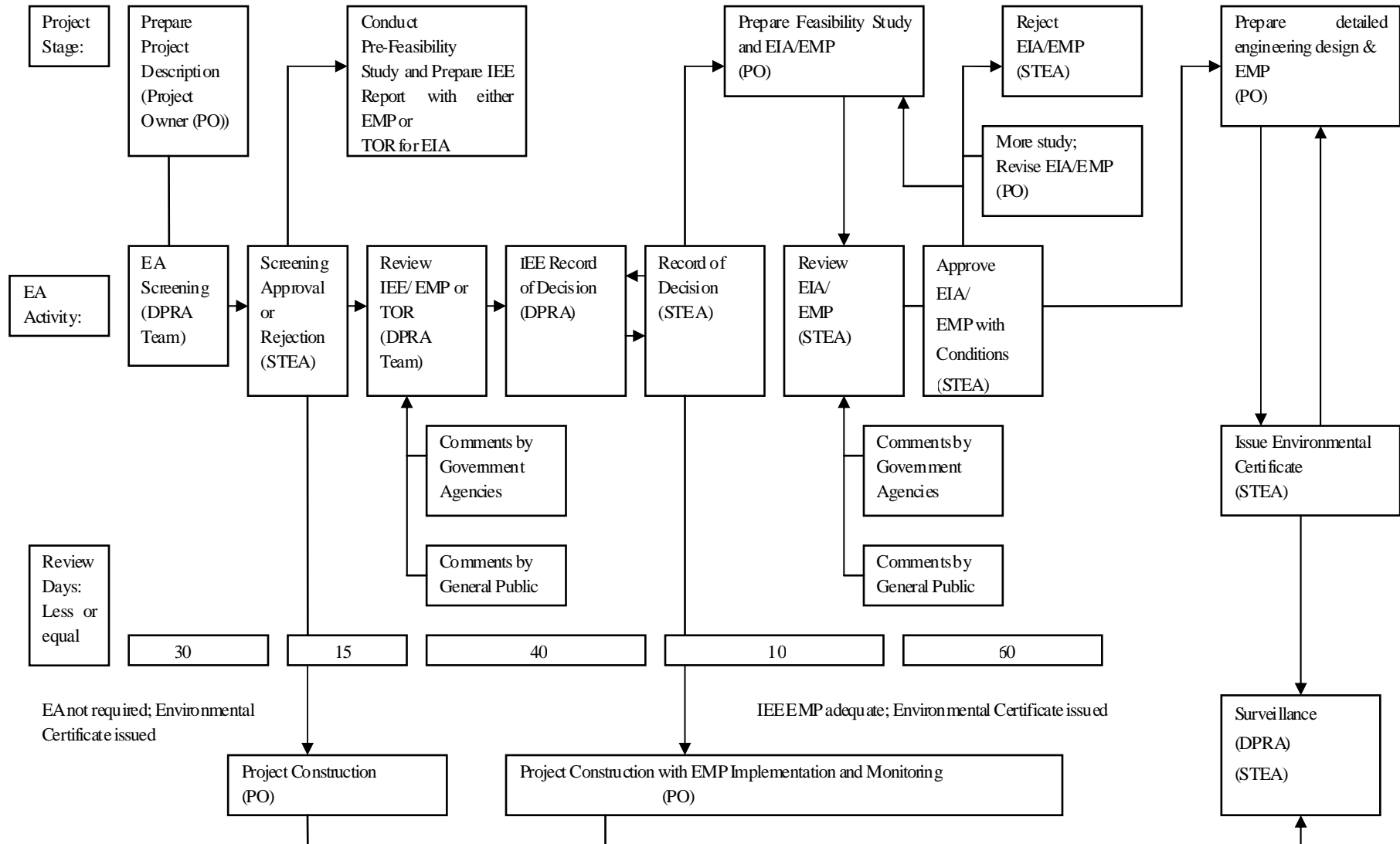
“environmentally sensitive areas”.

\*Constructed width (roadway) includes carriageway, shoulders, embankment, side drains, berms, structures, etc.

- **Category II: Projects with adverse environmental impacts**

These are all other construction/improvement/rehabilitation projects whether on the existing or modified alignment within the existing “right of way” or reconstruction/new roads that require the acquisition of new right-of-way. All projects involving improvement/construction outside the existing “roadway” especially all roads located in, or affecting, “environmentally sensitive areas” such as significant human habitation, ecologically important zones etc. must be included.

In the project where the DOR of MCTPC is the owner, the Social and Environmental Division (SED) will be the DPRA. Being established under the DOR in 2002, the SED is responsible for preparation of environmental impact forecasts and environmental and social management plans for road construction projects, analysis and comment on Environmental Impact Assessments (EIA) and check for correctness to propose to higher authorities for consideration, etc. STEA makes a final decision to issue an environmental compliance certificate (ECC) considering the comments from the SED.



Source: Regulation on Environment Assessment in the Lao PDR in 2002

Figure 8.1-2 Steps of IEE/ EIA and Time Frame to Final Approval for Development Project

Table 8.1-2 General Contents and Format of an EIA Report for Development Projects in the Lao PDR

<p><b>Chapter 1: Executive Summary</b></p> <p><b>Chapter 2: Introduction</b></p> <ul style="list-style-type: none"> <li>- Name and address of project owner and DPRA</li> <li>- Name, address and affiliation of the author of the report</li> <li>- Purposes of the project</li> <li>- Institutional framework including relevant laws, regulation and international treaties that pertain to the project</li> </ul> <p><b>Chapter 3: Description of the environment in the project Area (baseline data)</b></p> <ul style="list-style-type: none"> <li>- Physical</li> <li>- Biological</li> <li>- Economic</li> <li>- Social</li> </ul> <p><b>Chapter 4: Identification and evaluation of reasonable alternatives for achieving the project purpose(s)</b></p> <p><b>Chapter 5: Direct and indirect significant environmental impacts including cumulative impacts for each of the alternatives</b></p> <ul style="list-style-type: none"> <li>- Impacts during project construction period (including preparation)</li> <li>- Impacts during project operation period</li> <li>- Impacts during project closure period</li> <li>- Compliance with laws, regulations, international treaties and land use or watershed management plan in the project area</li> </ul> <p><b>Chapter 6: Summary on PI activities during preparation of EIA report</b></p> <p><b>Chapter 7: Identification of the chosen alternative and reasons for choosing the alternative</b></p> <p><b>Chapter 8: Detailed description of the chosen alternative</b></p> <ul style="list-style-type: none"> <li>- Work plan including time intervals for project</li> <li>- Construction and operation of project</li> <li>- Project costing</li> <li>- Economic benefits versus environmental damage</li> <li>- Social, natural resources, health risks and security of population</li> </ul> <p><b>Chapter 9: Environmental management plan to prevent and reduce environmental impacts</b></p> <ul style="list-style-type: none"> <li>- Protective or reductive measures for physical, biological, economic and social impacts</li> <li>- Compensation measures (if any)</li> <li>- Environmental monitoring programme</li> <li>- Training workshops for implementation of EMP</li> <li>- Institutional arrangement, timing and budgets for implementation of EMP</li> </ul> <p><b>Chapter 10: Conclusions and recommendations</b></p> <p><b>Chapter 11:</b></p> <p><b>Chapter 12: Annexes</b></p>
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Source: Regulation on Environment Assessment in the Lao PDR in 2002

## 8.1.2 Compensation and Resettlement in Development Projects in the Lao PDR

### (1) Land Tenure in Lao PDR

According to the Land Law (1997), all land officially belongs to the Government of Laos (GOL). Therefore, in the case where land acquisition is necessary, compensation by the GOL is not for land ownership but for loss of land use. In this regard, people possess a Land Registration document that identifies who has the legal right to use a particular plot of land together with who is responsible for paying the Land Tax. The user's name is indicated in the Land Registration together with a simple location map. Note that people can not use a Land Registration as collateral to borrow money from a bank, as the buying and selling of Land Registrations is prohibited and therefore illegal. In reality, however, the purchasing and selling of Land Registrations does take place. It can be said that the prohibition to buy and sell land freely is one of the main constraints on the development of the local economy. In response to the preceding, the Lao Land Titling Project, which is being funded by the World Bank and other donors, is registering and issuing land titles so that people can buy and sell land in accordance with the Land Law. This will encourage the development of the local economy as people will be able to borrow money from bank using land as collateral.

### (2) Compensation and Resettlement in Development Projects

Resettlement and land acquisition procedures are described in;

- Provisions of Decree 192 on Resettlement and Compensation issued on 7 July 2005
- Implementing Regulations on Compensation and Resettlement issued by the STEA, and the National Policy No. 561 Committee for Planning and Investment (CPI) on Environmental and Social Sustainability of the Hydropower Sector in Lao PDR issued on 7 June 2005.

Technical Guidelines on Compensation and Resettlement in Development Projects were prepared in accordance with those provisions and regulations in November 2005 by STEA.

Resettlement planning and implementation activities are an integral part of a development project and they run parallel to project planning and implementation activities in the project process cycle. A typical example of stages of project process and resettlement activities/outputs is shown in Figure 8 . 1- 3 and summarized in the followings.

#### 1) Initial Social Assessment

Initial Social Assessment (ISA) involving identification of potential social issues and impacts and key stakeholders is undertaken during the project identification stage. The exercise also includes screening of available information for assessment of the types, scale and degree of impacts (including land acquisition impacts) and to determine the

need for various documents that may be necessary for project process. Based on the results of the screening exercise, decision is taken on the level of surveys and the types of information required for various documents and necessary TORs for subsequent studies are prepared.

## 2) Social Assessment

Based on the recommendations of the screening exercise and where the projects may result in indirect social impacts on population within the project or adjoining areas a detailed social assessment study may be necessary. The Social Assessment (SA) study is conducted during the pre-feasibility phase of the project preparation. Detailed investigations carried out for SA studies include identification of the types and scale of social impacts, stakeholder analysis and institutional analysis. The studies help in formulation of appropriate mitigation measures and instruments necessary to address social issues in the project. Social Assessment generally covers macro level social issues and provides a framework for more detailed investigation and for planning and implementation of mitigation measures to address specific issues.

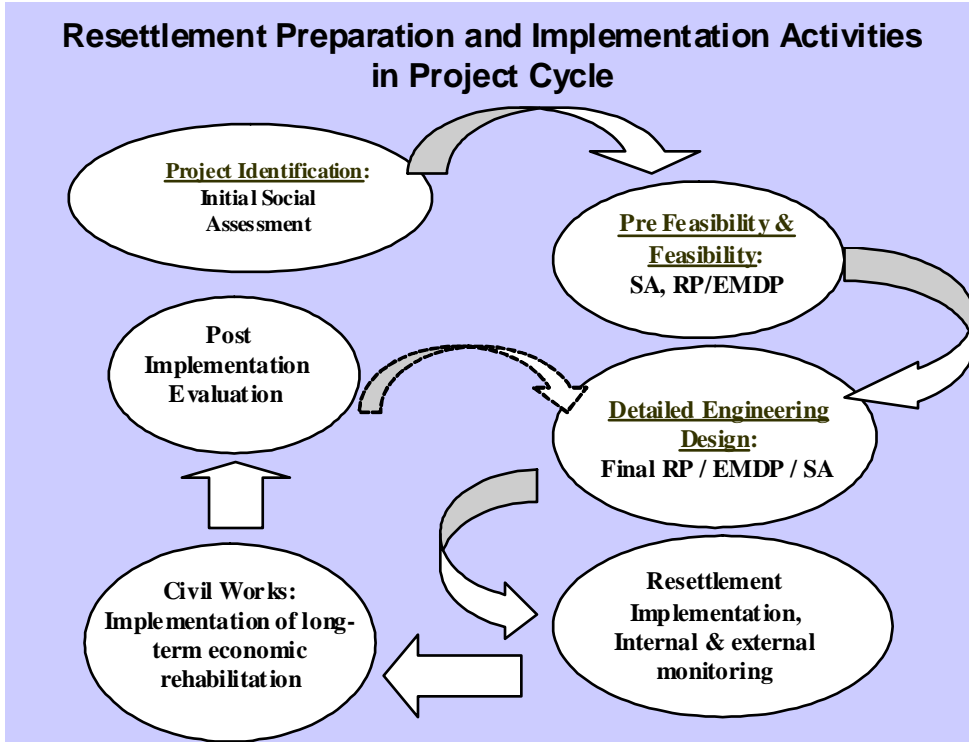
## 3) Land Acquisition and Compensation Report / Resettlement Plans

Land Acquisition and Compensation Reports (LACRs) or Resettlement Plans (RPs), as the case may be, are prepared during the feasibility study (FS) stage of project preparation. These documents are prepared based on field surveys covering census of affected people and detailed inventory of affected assets within the project boundaries. Where sufficient information on physical boundaries is not finalized at FS stage, preparation of these documents is still necessary as part of project preparation and for decision on resource allocation.

Normally very few changes in design criteria are made between the FS and detailed design. However, in case of any major change in design parameters effecting project boundaries, corresponding changes in resettlement planning may be necessary and the information provided in these documents is further updated after the detailed designs are ready or during the implementation stage. In case the changes in design parameters are only minor, corresponding changes in the resettlement plans are made during implementation of resettlement activities without any need for revision of these reports.

## 4) Ethnic Minority Development Plans (EMDPs)

In case the ISA identifies major impacts on some ethnic minority groups, and further confirmed during the SA studies, warranting the preparation of standalone EMDP, necessary surveys and investigations would be prepared during the FS phase of project preparation. EMDP preparation activities are carried out in parallel to the resettlement planning activities and EMDPs are prepared as an integral part of project preparation.



Source: Technical Guidelines on Compensation and Resettlement in Development Projects, STEA, 2005

Figure 8.1-3 Project Process Cycle and Resettlement Activities

Specific resettlement activities and outputs required at various stages of project process cycle are shown in Table 8.1-3.

Table 8.1-3 Project Process and Resettlement Outputs

SN	Stages in a Typical Project	Resettlement Activities/Outputs
1	Project Identification	<ul style="list-style-type: none"> <li>• Conduct Initial Social Assessment</li> <li>• Prepare TOR for Resettlement Plan (RP)/ EMDP/SA as necessary</li> </ul>
2	Pre-feasibility	<ul style="list-style-type: none"> <li>• Conduct field surveys (inventories, socio-economic status)</li> <li>• Prepare RP/EMDP/SA as necessary</li> </ul>
3	Feasibility	
4	Project Approval	<ul style="list-style-type: none"> <li>• RP and other documents are approved by the relevant line agencies and STEA</li> </ul>
5	Detail Technical Design	<ul style="list-style-type: none"> <li>• Adjustment (finalization) of RP and other documents following detailed design with specific project boundaries, if necessary</li> </ul>
6	Implementation	<ul style="list-style-type: none"> <li>• Implementation arrangements for RP/SA/EMDP</li> <li>• Monitoring and supervision</li> </ul>

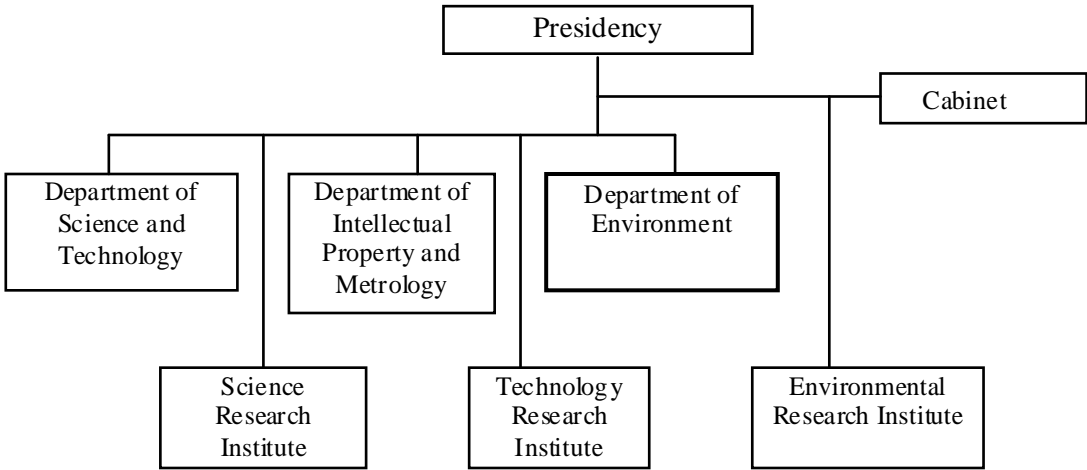
Source: Technical Guidelines on Compensation and Resettlement in Development Projects, STEA, 2005

**8.2 ENVIRONMENTAL MANAGEMENT SYSTEM**

**8.2.1 Organization**

(1) Science, Technology and Environment Agency (STEA)

The principal authority for the environment is the Science Technology Environment Agency (STEA). The STEA was established by the Prime Minister’s Decree No.68, May 1999. This reshaped STEA into its present structure as shown in Figure 8.2-1. It also formalized its core function as being to assist the government in research and service on science, technology and the environment at a macro level. The most important achievement from the last 10 years has been to prepare the Environment Protection Law, 1999. This will be the major legislation to shape living environment and manage natural resources for the benefit of the Lao people for generations to come. There are 143 staffs including 19 with postgraduate degrees from abroad.



Source: Lao PDR Annual Report of Science and Technology and Environment Agency for the Year 2002

Figure 8.2-1 Organization Chart of STEA

The STEA organizes 16 STE Provincial Offices, unified by each governor of the provinces. The environment bureau of the STEA is the unifying authority of the environmental administration.

The principal roles of the environment bureau are (i) drafting environment bills; (ii) drafting environment ordinances; (iii) supporting the provincial governments to enforce the environmental laws; (iv) making adjustments between the concerned authorities; (v) putting international treaties into effect; (vi) making adjustments and carrying out joint operation projects with foreign authorities.

The principal environment laws charged by the environment bureau are (i) the Environmental Protection Law (EPL); (ii) Ordinances of EPL; (iii) STEA Ministerial Ordinances of Environment.

Table 8.2-1 shows Summary of EIA Registration in Laos. EIAs were carried out for some of electricity and industry projects and IEEs, for all of road projects as shown in the Table.

Table 8.2-1 Summary of EIA Registration in Laos

No.	Project Name	Project Type	Type of EA	Date	Doc. No
1	Namyon Small Electricity Project	Electricity	IEE	1-Jan-05	2327/STEA.PMO
2	Vieningom Furniture Factory	Medium Industry	IEE	4-Jan-05	023/STEA.PMO
3	Namtheun 2 Hydropower Project	Electricity	EIA	28-Jan-05	0236/STEA.PMO
4	Gold Project	Mining	IEE	10-Feb-05	0339/STEA.PMO
5	Transmission Project (Ban Na-Attapeu)	Electricity	IEE	12-Feb-05	0340/STEA.PMO
6	Tin-Zinc and Gold Project	Mining	IEE	12-Mar-05	0092/STEA.PMO
7	Road No.1 Improvement Project	National Road	IEE	17-Mar-05	0595/STEA.PMO
8	R3 Feeder Road Development Project	National Road	IEE	25-Mar-05	0990/STEA.PMO
9	Rock Crystal Project (Tun-Bunghuana)	Mining	IEE	19-Aug-05	1705/STEA.PMO
10	Namtheun 1 Hydropower Project	Electricity	IEE	16-Sep-05	1967/STEA.PMO
11	Namtheun 1 Hydropower Project	Electricity	EIA	16-Sep-05	1967/STEA.PMO
12	Construction of Asbestos Factory (Building No2)	Medium Industry	IEE	5-Oct-05	2114/STEA.PMO
13	Lead Mining Project(Nongsun-Thongkha)	Mining	IEE	13-Oct-05	2187/STEA.PMO
14	Health Services Improvement Project	Health and Therapy	IEE	13-Oct-05	2176/STEA.PMO
15	7 Small Town Development Project	Construction	IEE	24-Oct-05	2233/STEA.PMO
16	Rock Crystal Project (Sibounheung-Sorklom)	Mining	IEE	17-Nov-05	2471/STEA.PMO
17	Luangprabang – Tard Kruangsi Improvement Project	National Road	IEE	17-Nov-05	2472/STEA.PMO
18	Cement Industry Co., Ltd	Medium Industry	EIA	7-Dec-05	2621/STEA.PMO
19	Northern Small Irrigation Project (Luangprabang, Xayabury, Viétiane Province)	Irrigation	IEE	23-Dec-05	2611/STEA.PMO
20	Samphan District Road Project	National Road	IEE	29-Dec-05	2734/STEA.PMO
21	Konglor Cave Entry Improvement Project	National Road	IEE	16-Jan-06	095/STEA.PMO
22	Luangnamtha Airport Improvement Project	Construction	IEE	13-Mar-06	507/STEA.PMO
23	Northern Small Irrigation Project (Xienkuang, Huaphan, Luangprabang, Xayabury, Viétiane Province)	Irrigation	IEE	3-Apr-06	0730/STEA.PMO
24	Cold Project(First Pacific Company)	Mining	IEE	13-Apr-06	801/STEA.PMO
25	Iron Project (First Pacific Company)	Mining	IEE	13-Apr-06	801/STEA.PMO
26	Iron Project(Viensay&samneua District, Huaphan Province)	Mining	IEE	2-Aug-06	1698/STEA.PMO
27	Construction of Road Km18(ADB9)-Phoukham Project	National Road	IEE	19-Oct-06	2446/STEA.PMO
28	Tin-Zinc Project	Mining	IEE	30-Apr-07	973/STEA.PMO

Source: Compilation of “Summary of EIA Registration in Laos, STEA, 2007”



(2) Social and Environmental Division (SED)

The Social and Environmental Division (SED) is a division within the Department of Roads, MCTPC and assists the Director in the public administration and management of the Department of Roads. The SED has the following duties; (i) Study and improve the draft regulations and guidelines for social and environmental impacts related to road and waterway activities, (ii) Create detailed plans on social and environmental management, (iii) Interact with all divisions within the Department of Roads and project managers, (iv) Raise awareness and knowledge on environmental issues, (v) Study and promote initiatives and technological progress in the division’s work, (vi) Train, improve, build capacity and promote the implementation of policies.

The SED comprises of two working units, “Road Environmental Assessment Unit” and “Waterway Environmental Assessment Unit”, each duty of which is shown in Table 8.2-2.

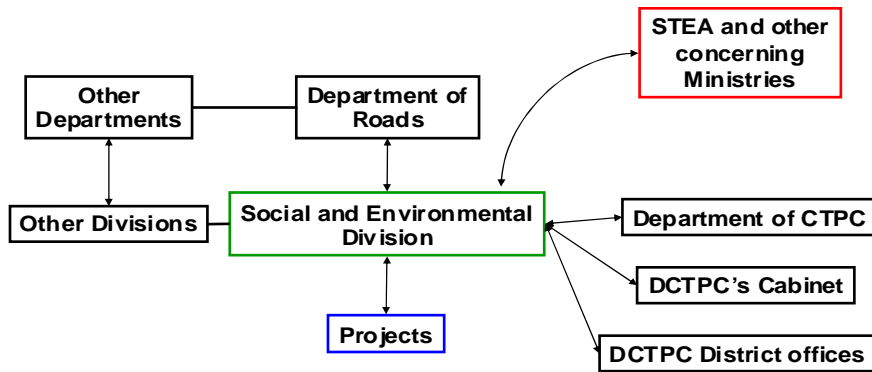
Table 8.2-2 Duties of the Units of SED

Road Environmental Assessment Unit	Waterway Environmental Assessment Unit
<ul style="list-style-type: none"> <li>· Study and improve the draft regulations and manuals on Environment and Social Management and Mitigation.</li> <li>· Develop Environmental and Social Management Plan for road construction projects.</li> <li>· Liaise with the relevant divisions, local staff, project managers, and experts to collect and compile field environmental data and prepare Environmental Impact Forecasts and Environmental and Social Management Plans for road construction projects and also act as a Roads Environmental Information center for the road sector.</li> <li>· Analyze and comment on Environmental Impact Assessments (EIA) and check for correctness to propose to higher authorities for consideration.</li> <li>· Study and create awareness of the environment for road construction project staff in the field and the local community.</li> </ul>	<ul style="list-style-type: none"> <li>· Study and improve the draft regulations and manuals on Environment and Social Management and Mitigation.</li> <li>· Develop Environmental and Social Management Plan for waterway construction activities.</li> <li>· Liaise with the relevant divisions, local staff, project managers, and experts to collect and compile field environmental data and prepare Environmental Impact Forecasts and Environmental and Social Management Plans for waterway construction activities and also act as a Waterways Environmental Information center for the waterways construction sector.</li> <li>· Analyze and comment on Environmental Impact Assessments (EIA) and check for correctness to propose to higher authorities for consideration.</li> <li>· Study and create awareness of the environment for road construction project staff in the field and the local community.</li> </ul>

Source: Regulations of the Director of the Department of Roads on the Establishment and Operation of the Environmental and Social Division, 2002

Figure 8.2-2 shows Relationship of SED. There are one director and 7 staffs in SED as of June 2007.

## Relationship of SED



STEA = Science, Technology and Environment Agency (environmental management and monitoring organization at the central level)

CTPC = District Communication, Transport, Post and Construction

DCTPC = Division of Communication, Transport, Post and Construction

Source: SED/DOR, 2007

**Figure 8.2-2** Relationship of SED

### (3) Vientiane Urban Development Administration Authority (VUDAA)

Environmental monitoring within the Vientiane urban area is the responsibility of VUDAA. Under the Law, VUDAA was to establish an environmental management and monitoring unit in cooperation with the STEA. The duties of this unit include (i) preparing and implementing plans for environmental protection of the Vientiane urban area; (ii) monitoring and controlling the implementation of environmental legislative instruments; (iii) conducting research and identifying methods for environmental protection and restoration; and (iv) collecting, analyzing, and disseminating information on the environment and related issues. The unit responsible for these activities within VUDAA is the Sanitation and Environment Division, which is also responsible for solid waste collection and disposal, septic tank emptying, and street cleaning.

### 8.2.2 Environmental Standards

One of the important provisions of the Environmental Protection Law (EPL) specifies that all organizations have an obligation to control pollution in accordance with environmental quality standards. In Chapter 23 of the EPL;

- Environmental management and monitoring unit at all levels shall issue regulations and determine environmental quality standard for environmental protection and pollution control in coordination with the concerned sectors, according to their roles and duties.
- Persons and organizations engaged in all kind of activities must strictly protect and control water, soil, air, waste, chemical, radioactive, vibration, noise, glare, discoloration and odor.

Although environmental quality standards (air quality, emissions, soil pollution) were to be issued by STEA by March 2003, they have not been issued yet as of May 2007.

Drinking water quality criteria applicable to natural water sources were promulgated by the Ministry of Health (MOH) in their Decree No.953 of 2003, whereby the ministry identified water quality monitoring parameters in accordance with their overall responsibility for ensuring the safety of rural water supply. Selected parameters and target maximum criteria as shown in Table 8.2-3 were determined by the Department of Hygiene and Disease Prevention of MOH.

**Table 8.2-3 National Drinking Water Criteria for Rural Water Supply**

Parameter	Units	Suggested Target
pH	-	6.5-8.5
Turbidity	NTU	<10
Taste and Odour	-	Acceptable
Conductivity	US/cm	1,000
Iron	mg/l	<1
Manganese	mg/l	<0.5
Arsenic	mg/l	<0.05
Fluoride	mg/ l	<1.5
Nitrate	mg/ l	40
Thermotolerant Coliforms	#/100m l	0
Total Hardness	mg/ l	<500
Residual Chlorine	mg/ l	0.2

Source: MOH, 2003

Responsibility for regulating urban water supply in the Lao PDR is under the Water Supply Authority (WASA) within the MCTPC. As part of their remit, WASA have prepared draft legislation on water quality standards encompassing bacteriological, chemical and physiochemical parameters.

## 8.3 ENVIRONMENTAL CHARACTERISTICS IN VIENTIANE CAPITAL

### 8.3.1 Protected Areas

Since 1993 the Government of the Lao PDR has established 20 National Biodiversity Conservation Areas (NBCAs) covering approximately 13 % of the country's area. This percentage is higher than the percentage of forests to be set-aside as conservation areas as recommended by International Union for Conservation of Nature and Natural Resources (IUCN). In addition, the Lao PDR has a number of protected areas at provincial and district levels. The priority of NBCA Policy is to link the conservation of NBCAs to the improvement of living conditions, the decrease of shifting cultivation, the stabilization of populations and poverty alleviation within and around the NBCAs.

There are two NBCAs as national level and four Forest Protected Areas as prefectural level in and around Vientiane Prefecture. Besides these protected areas, some forest reserves of district level are located in and around Vientiane Prefecture. Protected areas of national and prefectural level are as shown in Table 8.3-1.

**Table 8.3-1** Protected Areas in and around Vientiane Prefecture

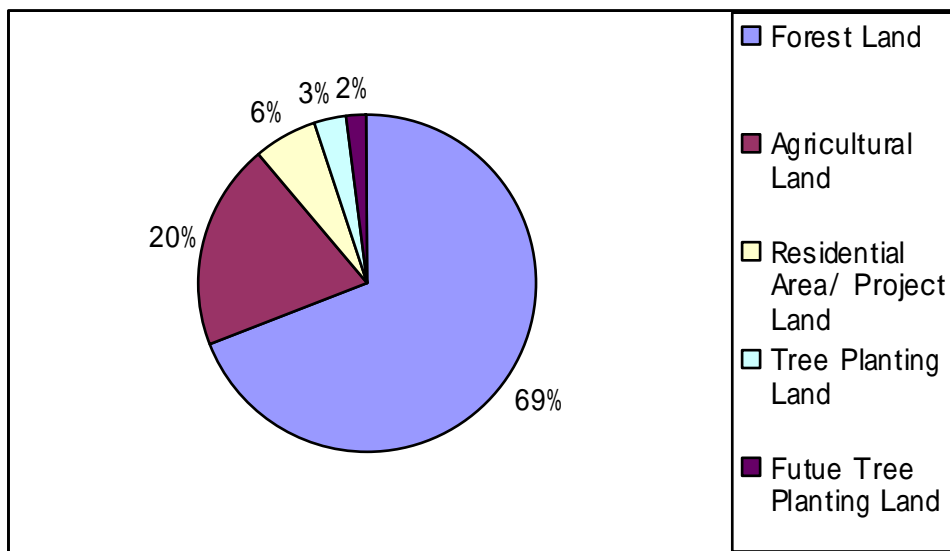
Protected Area	Type	Area (ha)	Place
1 ) Phou Koa Khoay	NBCA	200,000	Vientiane Prefecture, Vientiane Province & Borikhamxay Province
2 ) Phou Phanang	NBCA	70,000	Vientiane Prefecture, Vientiane Province
3 ) Houayang	MPA	70,808	Xaythany District, Vientiane Prefecture
4 ) Dong Ban Xay	MPA	1,025	Xaythany District, Vientiane Prefecture
5 ) Dong Pho Sy	MPA	1,793	Xaysatha & Hadxaifong District, Vientiane Prefecture
6 ) Pa Pe Ban Donexangphay	MPA	1,045	Mayparkngum District, Vientiane Prefecture

MPA: Municipality Protected Area

Dong Phosy Forest Reserve straddles two districts; an area of 934 ha in Xaysatha District and an area of 859 ha in Hadxaifong District (Figure 8.3-1). This forest reserve had been originally conserved as Nong Heo National Park by Department of Forest since 1941. Afterwards the jurisdiction of the park has shifted to the Vientiane Municipality with changeover to actual name in 1985. According to Forestry Law (1996), the forests in Lao PDR shall be categorized into five; 1) Protected Forests, 2) Forest Reserves, 3) Production Forests, 4) Rehabilitated Forests, and 5) Degraded Forests. Of which, Dong Phosy Forest belongs to the type of Forest Reserve, purpose of preserving species of flora and fauna, nature and other precious things. The most of lands are occupied by mix deciduous forest which makes up a 71 percent of the total. Principal Land Use of Dong Pho Sy Forest Reserve is shown in Figure 8.3-2.



**Figure 8.3-1** Dong Pho Sy Forest Reserve



Source: Agriculture and Forestry Division of Vientiane Capital, 2005

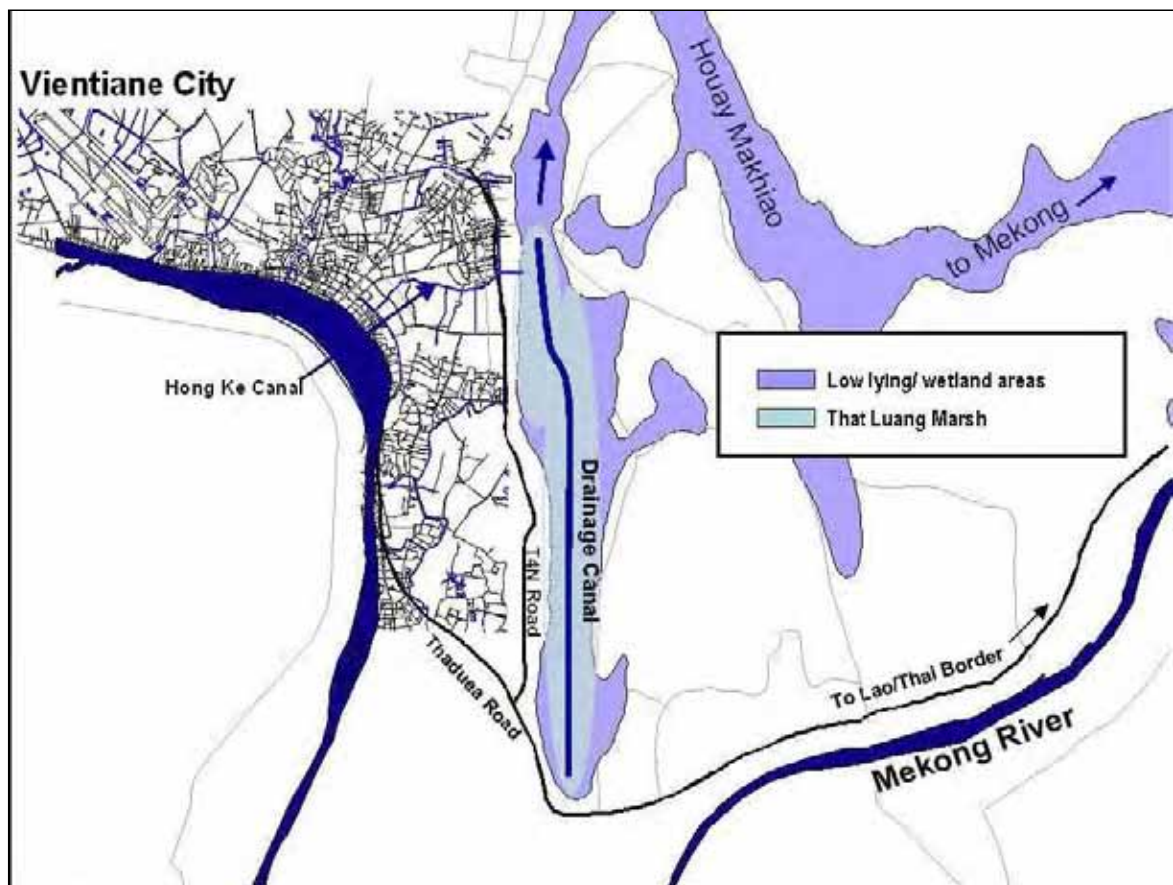
**Figure 8.3-2** Principal Land Use of Dong Pho Sy Forest Reserve

The European Union (EU), through their EU Asia Pro Eco Fund, will support Worldwide Fund for Nature (WWF) to improve wetland management and maintain ecosystems goods and services in That Luang Marsh, Lao PDR, through a collaborative project with WWF Germany, WWF Lao PDR, the Wild Fowl and Wetland Trust, and the government of Lao PDR (8.3.3).

That Luang Marsh is the largest remaining wetland area in Vientiane, covering 20km<sup>2</sup> and providing aquatic resources to over 3,000 households, as well as valuable ecosystem services to Vientiane, including wastewater purification and flood protection. That Luang Marsh has been valued at roughly US\$5 million annually for both direct and indirect uses, of which communities have earned as much as US\$514 per household from the marsh yearly.

The WATER Project - Wastewater Treatment through Effective wetland Restoration of That Luang Marsh - will provide guidance on how the functions of the That Luang ecosystem can be maximized for the benefit of both people and wildlife.

The project will examine the issue of wastewater management within the city, and the feasibility of creating a constructed wetland treatment system, within That Luang Marsh, to treat domestic and industrial wastewater while maintaining the important functions of flood detention and food web support.



Source: CASE STUDIES IN WETLAND VALUATION #10: July 2004, IUCN

**Figure 8.3-3** Location of That Luang in Vientiane

### 8.3.2 Natural Environmental Condition

#### (1) Environmental Quality

##### a. Air pollution

Energy use in the country is dominated by household consumption of traditional fuels, mainly wood and charcoal. In 2001, approximately 82 percent of the population used solid/biomass fuels for cooking or heating. It was estimated that around 70 percent of the vehicles still use diesel and 30 percent use unleaded gasoline. In general, air quality in the Lao PDR is considered very good. According to “Environmental Health Country Profile, World Health Organization, 2005”, the results of air quality study carried out around Vientiane from March to April 2004 showed that particulate matter levels were high during the period of study and that PM10 levels exceeded the international 24-hour standard most of the days. Sulfur and nitrogen dioxide levels were relatively low. Wind speed was found to be low during the measurement period indicating poor ventilation around the Vientiane area. Pollution is therefore trapped in the areas where they are generated, such as along roadsides where many people are affected.

##### b. Water pollution

According to the Ministry of Industry and Handicraft, there are about 112 industries generating wastewater. Most of these industries have no wastewater treatment facilities and discharge their effluent directly to rivers.

##### c. Waste

In Vientiane approximately 91,250 tons of solid waste was generated in 2001. The average solid waste generation in Vientiane is 0.75 kg per capita per day with a total daily generation of 250 tons. The waste generally consists of 30 percent organic matter, 30 percent plastic, 15 percent paper and 25 percent glass, cans and other metals. Of the total wastes discarded 50 percent is recyclable.

Hazardous and toxic wastes are often mixed with municipal wastes and no segregation is required. There is currently no available data on the volume of hazardous wastes generated by industries. In 1996, it was estimated that hospitals and health centers in Vientiane generated approximately 183 tons of health-care waste per day. The Minister of Health has approved regulation on Health Care Solid Waste Management in July 2004.

#### (2) Fauna and flora

Natural vegetation areas remain well in and around the National Biodiversity Conservation Areas (NBCAs). There are two NBCAs, Phou Phanang and Phou Khao Khoay being included in Vientiane Prefecture and Vientiane Province. According to the website of Lao National Tourism Administration;

Phou Phanang;

Location:	Vientiane, 1,525 sq km
Ecotourism Activities Available:	None yet
Key Species:	Gibbons, inomate squirrel, elephant.
Habitat:	Mostly degraded forest with a small area of semi-evergreen forest. Elevation from 200- 698 m.
Access:	Easy access from route 13 N just outside Vientiane Capital.

Phou Khao Khoay;

Location:	Vientiane, 2,000 sq km
Ecotourism Activities Available:	Elephant observation, trekking, kayaking, village home stay, bird watching.
Key Species:	White-cheeked gibbons, elephants and green peafowl.
Habitat:	Dry evergreen and mixed deciduous forest. Also large stands of coniferous forest in association with extensive fire-climax grasslands. The Nam Leuk reservoir covers 1,280 hectares at the height of the wet season.
Access:	Easy access to the western portion of the protected area 65 km from Vientiane up route 10 to Ban Napheng at km 54. To get to the eastern portion of the protected area, including Ban Na and Ban Hatkai take route 13 southwards for about 1.5 hours.

The identified fishes in main Mekong River in the Lao PDR reach more than 200 species, which are mainly Cyprinidae, Siluridae, Bagridae (Siluriformes) and Pangasiidae (Siluriformes). There are more than one hundred and twenty-seven fish species found in the Mekong River around Vientiane City, in which seven are rare and endangered fish species reported by the Department of Livestock and Veterinary.

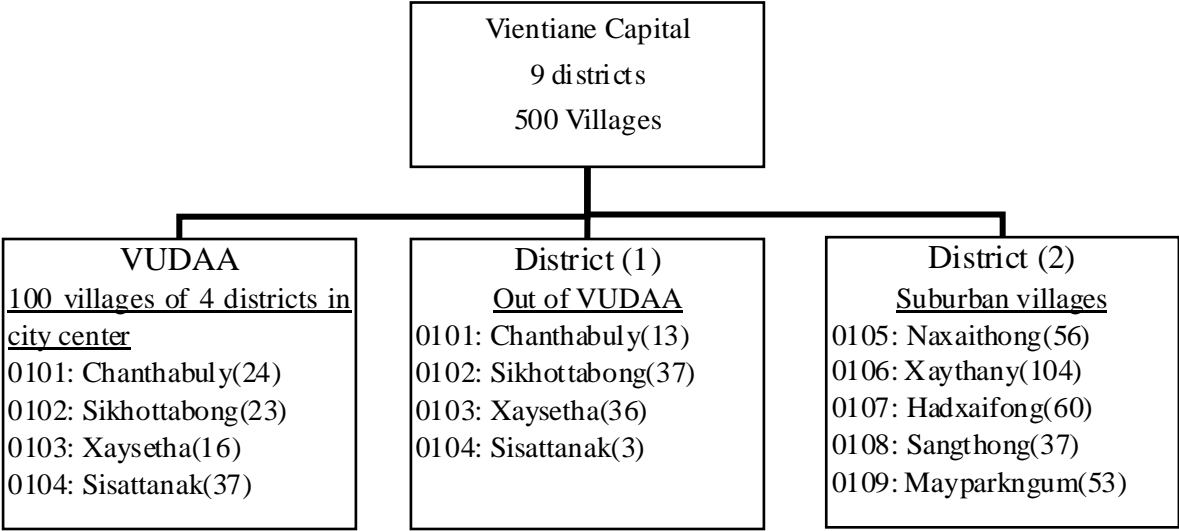
While the Lao PDR has a rich and diverse range of tropical flora and fauna, those in the urban and semi-urban areas covered by the Project are typical of flora and fauna in the urban environment. The most notable flora is the mature indigenous hardwood trees lining major thoroughfares. Sadly, only a few of these remain. Other trees are mostly ornamental and shade trees planted along roadsides and in gardens. There is some urban agriculture—largely irrigated and unirrigated rice land. The fauna in the urban area are primarily grazing animals such as sheep and goats, domestic animals such as chickens, dogs and ducks, and small reptiles—the common gecko and lizards. Also common are pests—rodents, stray cats, and insects that typically thrive on wastes in urban environment.



**8.3.3 Social Environmental Condition**

(1) Administration

The Lao PDR administratively consists of one capital city (Vientiane Capital), 16 provinces and one special region (Xaysomboon Special Region). The country is generally fallen into four regions, the metropolitan region, the northern region, the central region and the southern region. The metropolitan region consists of Vientiane Capital, Vientiane Province and Xaysomboon Special Region. Figure 8.3-4 shows Administrative system of Vientiane Capital.



Source: compilation by the study team.

**Figure 8.3-4** Administrative System of Vientiane Capital

(2) Population

According to the 2005 census, the Lao PDR had a population of 5.61 million people. This population increased by 1.04 million from the 1995 census. During the ten years between these censuses, the average growth rate was 2.1% per annum.

The population of Vientiane Capital in the 2005 census was 695,000 accounting for 12.4% of the national population. It has grown at an annual rate of 2.9% on average between the two censuses. The population density of Vientiane Capital was 177 persons/km<sup>2</sup>, which was much higher than the national density of 24 persons/km<sup>2</sup>. Vientiane Capital is heavily urbanized.

The number of households in Vientiane Capital was 126,000 in the 2005 census. Then, an average family size was calculated at 5.6 persons per household. Among the nine districts, Chanthabuly and Sisattanak Districts recorded the largest family size of 6.0 persons per household. On the other hand, Hadxaifong District had the smallest family size of 4.9 persons per household (Table 8.3-2).

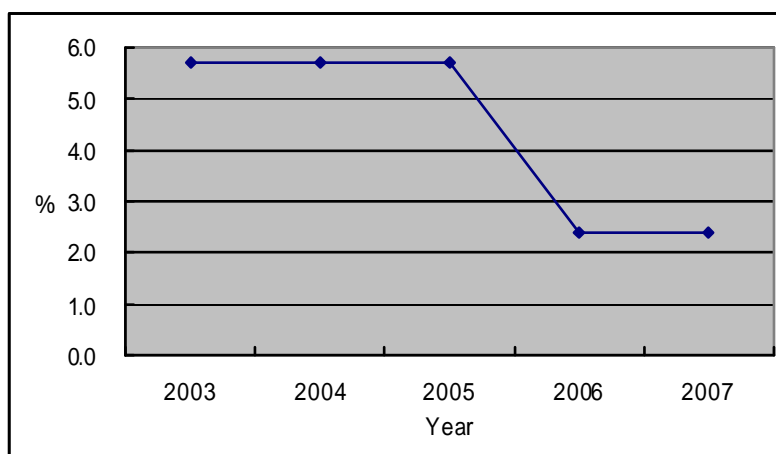
**Table 8.3-2** Total Population by Gender, and Number of Villages and Households  
in Vientiane Capital at 2005 Census

No.	District Name	Population (Person)			Number of Villages	Number of Households	Average Household size
		Female	Male	Total			
01	Chanthabuly	38 433	35 162	73 595	37	12 246	6.0
02	Sikhottabong	49 696	51 042	100 738	60	17 959	5.6
03	Xaysetha	48 242	48 347	96 589	52	17 785	5.4
04	Sisattanak	36 113	32 082	68 195	40	11 322	6.0
05	Naxaithong	29 150	29 401	58 551	56	10 899	5.4
06	Xaythany	73 687	75 820	149 507	104	26 820	5.6
07	Hadxaifong	39 542	38 843	78 385	60	15 859	4.9
08	Sangthong	12 057	12 630	24 687	37	4 947	5.0
09	Maypakngum	22 274	22 952	45 226	53	8 348	5.4
Total		349 194	346 279	695 473	499	126 185	5.5

Source: Population and Housing Census Year 2005, Vientiane Capital

### (3) Labor Force

The government of Lao PDR began decentralizing control and encouraging private enterprise in 1986. The results, starting from an extremely low base, were striking - growth averaged 6% per year in 1988-2006 except during the short-lived drop caused by the Asian financial crisis beginning in 1997. Subsistence agriculture, dominated by rice, accounts for about half of Lao gross domestic product (GDP) and provides 80 % of total employment in 2005. The remaining 20 % was provided by industry and services. The economy will continue to benefit from aid by the International Monetary Fund (IMF) and other international sources and from new foreign investment in hydropower and mining. Construction will be another strong economic driver, especially as hydroelectric dam and road projects gain strength. Several policy changes since 2004 may help spur growth. The unemployment rate has been dropping steadily as shown in Figure 8.3-5.



Source: CIA World Fact book, 2007

**Figure 8.3-5** Unemployment Rate in Lao PDR

#### (4) Poverty Condition

The incidence of poverty in the Lao PDR was presented as 46% of the national population in 1992/93, according to “Poverty in the Lao PDR during the 1990’s, Nanak Kakwani and others, 2002, National Statistical Centre (NSC)”. However, the incidence of poverty was improved to 39% by 1997/98.

The annual rate of poverty reduction was calculated at 3.3%. Since the GDP grew at 4.6% per annum on average during the same period, the incidence of poverty has been improved at modest pace.

The incidence of poverty in Vientiane Capital City recorded the lowest among the 18 provinces in the country. The incidence of poverty was 34% in 1992/93 and improved to 14% in 1997/98. Thus, the annual reduction rate of poverty was calculated at 18.2%. As can clearly be seen, the incidence of poverty in Vientiane Capital City has considerably been improved at a high rate.

#### (5) Education and Literacy

Of all persons aged 6 years and above in the Lao PDR, 26% had not received any education in 2005, down from 43% in 1995. About 16% had completed primary school, 6% completed lower secondary and 5% upper secondary schools respectively. According to the data on school completion by province, in Vientiane Capital there are no changes between 1995 and 2005. In all other provinces there are higher completion rates and in particular Xayaboury province seems to have been successful (Table 8.3-3).

Table 8.3-3 Education Completed by Province (part) for Population Aged 6 Years and above in 2005

Province	Population	Basic education			Lower secondary		Upper secondary	
		None	Primary		Completed	Not completed	Completed	Not completed
			Completed	Not completed				
Vientiane Capital	626,952	8.9	15.4	20.1	10.3	10.2	15.1	5.3
Xayaboury	293,120	18.1	30.5	26.9	7.2	7.2	2.9	2.8
Savannakhet	700,687	30.6	13.8	33.0	5.5	7.1	4.5	2.5
Whole country	4,760,493	26.4	15.5	30.8	6.1	7.6	5.1	3.1

Source: Results from the Population and Housing Census 2005, Steering Committee for Census of Population and Housing, 2006

Literacy rate was 73% in 2005, while 60% in 1995. Men were more literate than women, 83% compared to 63%, but the difference was larger in 1995 when men’s and women’s rate was 74% and 48%, respectively. The literacy rate was highest in Vientiane Capital (92%) and lowest in Phongsaly (43%) (Table 8.3-4).

**Table 8.3-4** Literacy Rate by Province (part) for Population Aged 15 Years and above in 2005

Province	Female			Male			Total		
	Literate	Population	Rate	Literate	Population	Rate	Literate	Population	Rate
Vientiane Capital	223,731	254,067	88.1	238,160	249,894	95.3	461,891	503,961	91.7
Phongsaly	16,418	48,925	33.6	25,301	47,791	52.9	41,719	96,716	43.1
Savannakhet	151,260	255,691	59.2	189,599	241,555	78.5	340,859	497,246	68.5
Whole country	1,091,698	1,726,633	63.2	1,383,598	1,678,070	82.5	2,475,296	3,404,703	72.7

Source: Results from the Population and Housing Census 2005, Steering Committee for Census of Population and Housing, 2006

#### (6) Ethnic Groups and Religion

69% of the country's people are ethnic Lao, the principal lowland inhabitants and the politically and culturally dominant group. The Lao belong to the Tai linguistic group who began migrating southward from China in the first millennium AD. A further 8% belong to other "lowland" groups, which together with the Lao people make up the Lao Loum. Hill people and minority cultures of Laos such as the Hmong (Miao), Yao (Mien), Tai dumm, Dao, Shan, and several Tibeto-Burman speaking peoples have lived in isolated regions of Laos for many years. Mountain/hill tribes of mixed ethno/cultural-linguistic heritage are found in northern Laos which include the Lua (Lua) and Khammu people who are indigenous to Laos. Today, the Lua people are considered endangered. Collectively, they are known as Lao Soung or highland Laotians. In the central and southern mountains, Mon-Khmer tribes, known as Lao Theung or mid-slope Laotians, predominate. Some Vietnamese and Chinese minorities remain, particularly in the towns, but many left in two waves; after independence in the late 1940s and again after 1975.

The predominant religion is Theravada Buddhism which, along with the common Animism practiced among the mountain tribes, coexists peacefully with spirit worship. There also are a small number of Christians, mostly restricted to the Vientiane area, and Muslims, mostly restricted to the Myanmar border region. Christian missionary work is regulated by the government.

#### (7) Public Health and Medical Conditions

There are 5 government hospitals, namely "Mohosot", "Saysethe", "150", "103" and "109" Hospitals, and many clinics. All of these services are available for local and provincial people. There are some people in Vientiane who also wish to go to the hospitals in Thailand by using Road No.1 to Friendship Bridge.

Table 8.3-5 shows Number of cases in Vientiane capital and the whole country in 2005. In Vientiane no patients died from those diseases, however less than 0.2 % patients died from

those in the whole country in 2005. Number of patients suffering from Malaria is the third in Vientiane, while the highest in the whole country.

Table 8.3-5 Number of Cases in Vientiane Capital and the Whole Country in 2005

Disease	Vientiane	Whole country
Malaria	102	20,384
Death from malaria	0	24
Diarrhea	2,201	8,765
Death from diarrhea	0	6
Dengue fever	627	4,314
Death from dengue fever	0	10
Typhoid fever	0	634
Death from typhoid fever	0	0

Source: Ministry of Health, 2005

HIV prevalence is thought to be low in Laos. Approximately 1,700 adults are thought to be living with HIV/AIDS; 170 new infections were reported in 2003, according to the HIV Surveillance undertaken. This does not however necessarily indicate low risk. Socioeconomic changes are occurring rapidly in Laos, including international tourism, which is leading to sexual behaviors that may place some Laotians at increased risk for HIV infection. The National Action Plan on HIV/AIDS and sexually transmitted diseases for the 2002–2005 period has a strong focus on prevention and advocacy. By the end of 2003, Laos had raised \$11 million in international funding to implement its action plan.

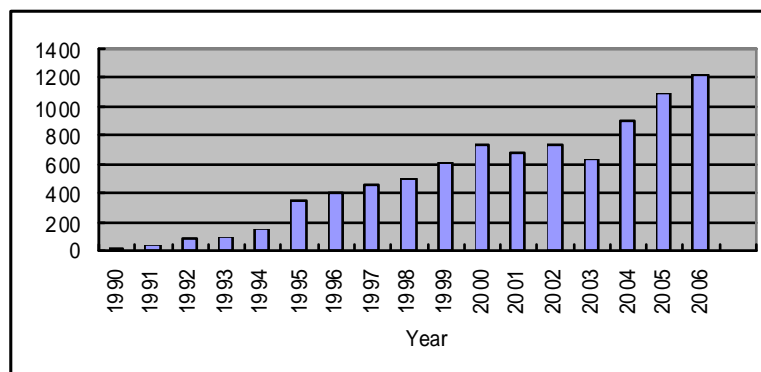
#### (8) Tourism

Tourism policies of Lao PDR are:

- The state and society promote, develop and broaden culture, history and nature-based tourism activities. All tourism undertakings detrimental to good national traditions and in violation of regulations and laws of the Lao PDR are prohibited.
- Create the Lao PDR to have new unique tourism sites for attracting foreign visitors, as to develop Lao tourism industry for export and make more income for the nation.
- Tourism is an important component for opening up the country and a potential revenue source for the country.
- Tourism and service is one of the eight national socioeconomic priority programs.

National Tourism Development Strategy for Lao PDR 2005 to 2015 identifies and recommends actions to address the policies and national issues that are affecting tourism development in Lao PDR. Local issues, such as the development of a new resort or a village-based tourism initiative, should be determined locally but in accordance with national planning objectives.

Figure 8.3-6 shows Number of Tourist Arrivals to Laos from 1990 to 2006. The number of tourist arrivals to Laos increased constantly from 1990 to 2000 with an average growth rate of 39%. However, the number of visitor arrivals decreased slightly from 737 thousand in 2000 to 674 thousand in 2001, and declined from 736 thousand in 2002 to 636 thousand in 2003. The main factors which influenced the decrease were the terrorist attacks on September 11<sup>th</sup>, 2001 in the United States and the spread of the SARS epidemic in Asia in the first quarter of 2003. Nevertheless, tourism recovered again in 2004 and 2005 with total tourist arrivals reaching 895 thousand and 1,095 thousand (an increase of 22%) with total revenue of more than 118 million US dollars and 146 million respectively. In addition the number of tourist arrivals to Laos continued increasing in 2006 with about 1,215 thousand tourist arrivals and the total of revenue of 173 million dollars.



Source: 2006 Statistical Report on Tourism in Laos,  
Lao National Tourism Administration

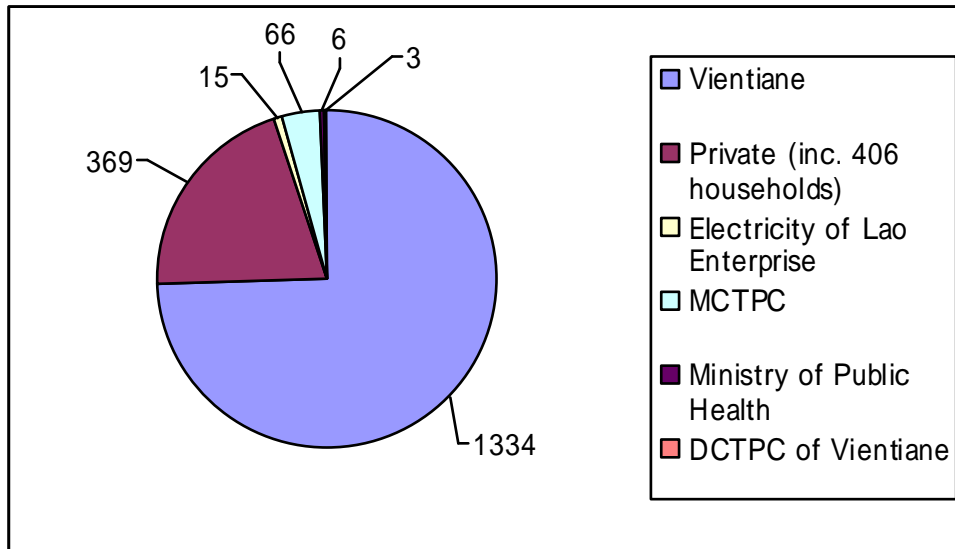
Figure 8.3-6 Number of Tourist Arrivals from 1990 to 2006 (Unit: thousand)

56% of all arrivals are from Thailand, followed by Vietnam (less than 16%). Many Thais and Vietnamese are short duration visitors using border passes that only permit entry into neighboring provinces. None of the other countries contributes a share of over 5% to total visitor arrivals. Occupancy rates of hotel rooms are relatively high, 66% in Vientiane Capital and 72% in Luang Prabang but are lower than 30% in Houaphanh and Phongsaly.

### 8.3.4 Constraints on Urban Development

#### (1) Dong Pho Sy Forest Reserve

As for Dong Pho Sy Forest Reserve as described in Section 8.3.1, most of the area belongs to the Vientiane City, and the other area to the private sector and several government agencies. The land ownership of Dong Phosy Forest Reserve is shown in Figure 8.3-7.



Source: Agriculture and Forestry Division of Vientiane Capital, 2005

Figure 8.3-7 Land Ownership of Dong Pho Sy Forest Reserve (Unit: ha)

In terms of land acquisition, it is necessary to obtain the permission of land development in the forest reserve by concerned authorities.

#### (2) That Luang Marsh

As for That Luang Marsh as described in Section 8.3.1, The European Union (EU) will support WWF to improve wetland management in That Luang, the largest remaining wetland area in Vientiane, covering 20km<sup>2</sup> and providing aquatic resources to over 3,000 households through the government of Lao PDR etc.

Issues of threats related to uncontrolled development and pollution in and around That Luang Marsh were raised by participants at the stakeholders consultation held as part of the development of the Wetland Alliance Programme in September 2006 (Table 8.3-6).

**Table 8.3-6 Stakeholders Consultation on That Luang Marsh**

Place	The Vientiane Prefecture
Date	20 <sup>th</sup> September 2006
Chairman	the Vice Governor of Vientiane
Key stakeholders	government implementing agencies, local communities, and industries
Representatives	<ul style="list-style-type: none"> <li>- Provincial Agriculture and Forestry Office</li> <li>- Division of Livestock and Fisheries</li> <li>- Vientiane Urban Development and Administrative Association</li> <li>- Provincial Communication</li> <li>- Transportation, Post and Construction Office</li> <li>- Vientiane City Planning (VCP)</li> <li>- Science, Technology and Environment Office (STEO)</li> <li>- WWF</li> </ul>
Aim	To improve the understanding of the stakeholders and policy makers involved in city planning and development, in regards to the importance of the That Luang Marsh
Remarks	<p>Wetland Alliance Programme;</p> <p>Collaborated with:</p> <ul style="list-style-type: none"> <li>-WWF,</li> <li>-World Fish Centre</li> <li>- Coastal Resources Institute (CORIN)</li> <li>- Asian Institute of Technology (AIT)</li> </ul> <p>Supported by:</p> <ul style="list-style-type: none"> <li>- Cultural Industries Development Agency (CIDA)</li> </ul> <p>Funded by:</p> <ul style="list-style-type: none"> <li>-Swedish International Development Cooperation Agency (SIDA)</li> </ul>

Source: Compilation of “Support to That Luang Marsh, WWF, 2006”.



## **CHAPTER 9**

# **INSTITUTIONAL STRUCTURE AND LEGISLATION**

## **CHAPTER 9 INSTITUTIONAL STRUCTURE AND LEGISLATION**

### **9.1 INSTITUTIONAL STRUCTURE**

#### **9.1.1 Overview**

As for institutional arrangement is concerned, the urban transport planning in Vientiane can be looked at from two angles; transport/urban development and local administration. The matters related to transport and urban developments are dealt with by the Ministry of Public Works and Transport (MPWT) which functions as the line ministry of the central government. On the other hand, the matters relevant to local administration such as urban management and administration are undertaken by Vientiane Mayor's Office, which is under the Prime Minister's Office (PMO).

Although the Vientiane Mayor's Office is under the PMO, the line departments under the Mayor are under the supervision of the line ministries of the central government. For example, the Department of Public Works and Transport (DPWT) is, in a sense, a branch of DPWT in the Mayor's Office. Thus, the policy of the central government is well transmitted to the local governmental level.

The Ministry of Public Works and Transport (MPWT) was transformed from the Ministry of Communication, Transport, Post and Construction (MCTPC) in November 2007. Similarly, the Department of Public Works and Transport (DPWT) was former Department of Communication, Transport, Post and Construction (DCTPC) transformed from. Hereafter, the words MCTPC and DCTPC are used interchangeably with MPWT and DPWT, respectively.

#### **9.1.2 Transport Policy and Administration**

##### **(1) Ministry of Communication, Transport, Post & Construction**

The Ministry of Communication, Transport, Post & Construction (MCTPC) is defined as a state management organization in the central level both for transport sector and urban sector. MCTPC comprises eight departments, two committee and an institute: Departments of i) Transport, ii) Road & Bridge, iii) Housing and Urban Planning, iv) Civil Aviation, v) Posts and Tel-communications, vi) Planning and Cooperation, vii) Inspection, and viii) Organization and Personnel; Authorities for i) Railway, ii) Water Supply, and iii) Urban Research Institute. Figure 9.1-1 shows organization structure of MCTPC.

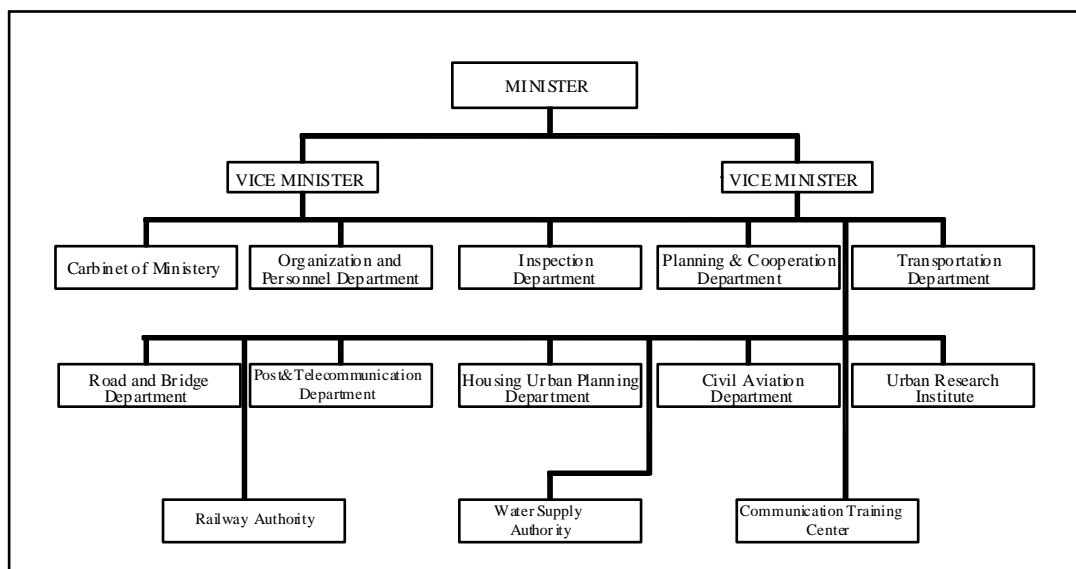


Figure 9.1-1 Ministry of Communication, Transport, Post & Construction

The Department of Transport has seven divisions; i) Road Transport Development, ii) Road Traffic Safety Management, iii) Vehicle and Machinery Management, iv) Transport Control, v) Waterway Transport, vi) Planning and Budgeting, and vii) Personnel and Administration Division. Table 9.1-1 shows jurisdictions of divisions in Transport Department.

Table 9.1-1 Divisions in Transport Department.

No.	Division	Function/Responsibility
1.	Department of Transport (DOT)	
1.1	Road Transport Development Number of staff: 4	Regulation or promotion of the transport industries; setting of fares and routes for passengers services and transport of dangerous goods; issuance of transport business licenses and documents
1.2	Road Traffic Safety Management Number of staff: 4	Controls of driving rules and overseeing driver licensing; road safety program and implementation in Vientiane and provinces;
1.3	Vehicle and Machinery Management Number of staff: 4	Vehicle technical inspection standards and vehicle repair standards. Licenses for vehicle imports and overseeing vehicle registration.
1.4	Transport Control Number of staff: 3	Control of vehicle overloading. Established in January 2001. Supervision of the weigh stations and provincial staff training.
1.5	Waterway Transport Number of staff: 4	Overseeing provincial inspection and licensing of water vessels; determination of routes and setting and port tariffs.
1.6	Planning and Budgeting Number of staff: 5	Preparation of budgets, payment for works and other expenditures, compilation of statistics
1.7	Personnel & Administration Number of staff: 7	Responsible for administration of the DOT.

## (2) National Transport Committee

The National Transport Committee is authorized by Article of the Law on Road Transport passed by the National Assembly (No.039-97/NA, 12 April 1997). In order to facilitate the

management of domestic, cross border and transit transport, the Government may organize a National Transport Committee as proposed by MCTPC. The rights and duties are; i) to research strategic plans and transport development plans, ii) to research technical standards of transport vehicles, iii) to research method of safety in transport operations; iv) to advice providers on problems of goods and passengers transport, and ;to research determination of transport routes and prices, as fixed from time to time.

Where necessary, transport committees may be organized at provincial, municipal or special zone levels, which have main duties such as; i) to give advice on transport operations; ii) to determine transport routes and pricing on the basis set forth by MCTPC, and; iii) to encourage the enforcement of transport laws and regulation.

Only the national committee, the NTC, has been established. It was established by Prime Minister's Decree No.03/PM 28 January 2002. NTC membership comprises the Minister/Deputy Minister of MCTPC as the President, the Deputy Minister of Commerce (MOC) as the First Vice President, Director General, Cabinet of MCTPC as the Second Vice President, Director General, Transport Department, MCTPC as a Member & Head of NTC Secretariat and nine other members representing the relevant institutions, including transport industries for cargo and passengers.

### (3) Ministry of Commerce (MOC)

Most relevant to the transport services is to issue the international trading licenses by Department of Trade. To operate internationally, the procedure is: i) to obtain an international business license from DOT; ii) obtain an international transport business licenses from DOT, and iii) obtain a tax certificate from MOF.

### (4) Ministry of Security (Interior)<sup>1</sup> (MOS) and Traffic Police

Traffic enforcement comes under the Traffic Police Department within MOS. In urban areas, on-the ground enforcement is carried out by Traffic Police employed by the Vientiane.

## **9.1.3 Urban Development<sup>2</sup> in National Level**

### (1) Prime Minister Office

The following central ministries and agencies have responsibilities for urban development; (i)Prime Minister's Officer, under the PMO, (ii) Public Administration and Civil Service Authority, (iii) Science, Technology and Environmental Authority, (iv) National Geographic Department, and (v) Department of National Land Use Planning and Development.

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<sup>1</sup> The former Ministry of Interior was renamed Ministry of Security in 2004.

<sup>2</sup> Department of Housing and Urban Planning, "Northern and Central Regions Water Supply & Urban Development Project, National Urban Sector Strategy and Investment Plan, Final Report, Volume 2: Main Report", March 2005

(2) Department of Housing and Urban Planning of MCTPC

The Department of Housing and Urban Planning (DHUP) plays a significant role in the urban sector, and has a mandate to study, develop, plan and manage matters related to; i) housing construction; ii) construction materials; iii) urban development and management; and iv) water supply and wastewater management. DHUP also is responsible for; i) development of strategic plans and policies; ii) management and coordination of project implementation; iii) mobilization of internal and external finance to improve and expand infrastructure and services; iv) development of technical standards and promotion of new, appropriate technology; v) monitoring of projects; vi) overseeing urban planning; vii) development of training programs; and viii) upgrading capacity for urban services management.

DHUP has six divisions: i) Personnel and Administration; ii) Planning, Finance and Budget; iii) Housing; iv) Urban Planning; and Water Supply. Table 9.1-2 shows the three DHUP divisions most concerned with technical aspects of urban and transport.

Table 9.1-2 DHUP Divisions Related to Urban Sector

No.	Division	Function/Responsibility
1.	Department of Housing and Urban Planning (DHUP)	Commercial based operation with 43 permanent and 20 contractual staff
1.1	Urban Planning Division (UPD) Number of Staff: 4	Urban planning policy and legislation, and for the monitoring of master plan preparations to ensure that plans are in line with agreed government policy and investment priorities.
1.2	Urban Development Division Number of staff: 4	Implementation monitoring to components of urban master plan; constant field visits and first-hand inspections
1.3	Urban Research Institute (URI) (Decree No.1727/CTPC of May 2000)	To assist the Minister on urban planning Preparation and review of development plan and standards, and monitoring its application; training of MCTPC and DCTPC staffs; undertaking and promotion of development research and application of advanced technology and procedures within urban sector
1.3 (1)	Personnel and Administration Division	Administration, logistics, personnel management, finance and equipment management
1.3 (2)	Research and Evaluation Divisions	Project documents, statistics, research, technical standards, ,monitors, inspections and evaluation of impacts
1.3 (3)	Cooperation and Information Division	Dissemination of information including town plans, technical standards, technology of activities
1.3 (4)	Urban Planning Division	Studies of all level of town planning as mentioned in the Town Planning Law
1.3 (5)	Urban Engineering Division	Mapping, collection of data and materials, maintenance of URIData Bank, and plans and rural services

(3) Ministry of Finance

The Ministry of Finance (MOF) is represented at the provincial level by the Department of Finance (DOF). The DOF collates the budgets of provincial government offices and assist in the submission of aggregate budgets requests to the national level for approval. Through its line office down to the district level, the MOF collects land tax which is returned in its entirety to the central level.

Department of Land (DOL) is and MOF department working with WB and AusAID assisted Land Titling Project (LTP) in the provincial level.

## 9.1.4 Local Government

### (1) Local Administration

According to the Constitution and Local Administration Law, the local administration consists of three levels; Provinces, Districts, and Villages. Under the Prime Minister’s Office (PMO) of the central government, the Office of Governor of Province (PGO) or the Office of Mayor of the City (CMO), the Office of Chief of District (DCO), and the Office of Chief of Village (VCO) have responsibility for administration in their jurisdictions.<sup>3</sup>

Table 9.1-3 Local Administration

Level	Title	Head*	Office
Province • City Level	Provinces	Governor	Governor Office
	City (Vientiane)	Mayor	Mayor Office
	Special Zones	Governor	Governor Office
District Level	Districts	Chief	Chief Office
	(Municipalities)	Chief	Chief Office
Village Level	Villages	Head	Head Office

Note: \* The Constitution uses a word of Governor for the title of local head. But the Constitution of Laos LRD is written in Lao and no official English translation is reported.

### (2) Administration of Vientiane

The Study area covers the urbanized part of Vientiane. The local administration structure of the Study Area is City (NAKHON LUANG), Districts (MEUANG) and Villages (BAN). The meaning of NAKON LUANG in Lao is the biggest city, the Capital. The City is the same administration level as the Province. There is no city in Laos except Vientiane.

### (3) Historical Name of “Vientiane”

Until 2004, the Vientiane was called “KAMPOENGNKON” (Wall City) in Lao language. In 12th century, the city area was surrounded by the five bamboo walls and the capital was built inside the walls. The foundation of the second wall has been found along the Road No.1 (Thadeua Road) during its reconstruction and the other relics have been found at 9 Km south of the Road No1.

### (4) Name of Vientiane in English

There are different studies for this area which used own English translation of the Vientiane such as “Vientiane Prefecture”<sup>4</sup> or “Vientiane Municipality”. The name of the Capital was

<sup>3</sup> Department of Housing and Urban Planning (March 2005), “ Northern and Central Regional Water Supply & Urban Development Project, NATIONAL URBAN SECTOR STRATEGY AND INVESTMENT, Final Report, Volume 2: Main Report”, p2.36

<sup>4</sup> ADB (July 2001), “Report and Recommendation of the President to the Board of directors on a Proposed Loan to the Lao People’s Democratic Republic for the Vientiane Urban Infrastructure and Services Project, ADB, p50. “Prefecture” was used.

officially changed to “NAKHONLUANG” (The Biggest City) by the Constitution on 6 May 2003 and the English official translation was announced as “Vientiane, Capital of Laos PRD” by an instruction letter of the Ministry of Foreign Affairs on 7 July 2004. Besides the above expression, the English word “Vientiane” is also allowed to be used. However, “Vientiane City”, “Municipality”, “Vientiane Capital” or “Vientiane Capital City<sup>5</sup>” are still practically used without observation of the MOFA instruction.

#### (5) Establishment of VUDAA

While the jurisdiction of the capital area and demarcation of local administration has been unchanged, Vientiane Urban Development Administration Authority (VUDAA) has been established as implementing agency for ADB-financed “Vientiane Urban Infrastructure and Services Project”(VUISP). The project aims to improve the infrastructures (road and drainage) and administrative organization for urban area of Vientiane. As the VUISP aims to improve urban infrastructures, MCTPC plays a role of a policy maker and VUDAA is tasked as the executing agency. VUDAA has the technical staffs seconded from DCTPC of provincial organization of MCTPC. Therefore, VUDAA assumes a role of a local office of MCTPC.

As shown in Table 9.1-4, the project area of VUDAA has 100 Villages of four Districts in the urban area of Vientiane by the Decree dated on 20 May 2007. The selection of the project villages is not based on the District boundary, and hence, each District are divided into two kind of villages; VUDAA project villages and non-project villages.

Table 9.1-4 also shows the number of villages to be included in the “Metropolitan Vientiane” which is currently being discussed.

Table 9.1-4 Administration Demarcation Between Vientiane and VUDAA

District	Vientiane	VUDAA	New Metro Vientiane
MEUN*	NAKHON LUANG*	OPOBO*	(Plan only**)
0101: Chanthabuly	37	24	37
0102: Sikhottabong	60	23	50
0103: Xaysetha	52	16	36
0104: Sisattanak	40	37	40
0105: Naxaithong	56	0	2
0106: Xaythany	104	0	9
0107: Hadxaifong	60	0	18
0108: Sangthong	37	0	0
0109: Mayparkngum	53	0	0
Total	499	100	192

Note: \*Source of Laotian word : Steering Committee of Population census, Secretariat office (National Statistic Center), Population and Housing Census Year 2005, Preliminary Report (Results on the province and district level), Vientiane Capital, September 2005

\*\* The number of villages to be included in the Metropolitan Vientiane” is under discussion and is subject to change.

<sup>5</sup> ADB (4-13 December 2006), “Draft Aid Memoir, Vientiane City-Asian Development Bank Mission, LOAN 1834-LAO(SF): Vientiane Urban Infrastructure and Services Project”, Loan Review Mission. “Vientiane Capital City” was used.

(7) “Metropolitan Vientiane” Concept

Establishment of “Metropolitan Vientiane” is currently being discussed. The official name and its jurisdiction are still under discussion. The new administration “Metropolitan” is to be created based on the VUDDA project area. By the end of 2007, the first concept of metropolitan may be formalized. It is required to arrange the Local Administration Law to establish the Metropolitan Vientiane for urban and urban transport development. It should include realignment of boundary of attached districts and demarcation of villages.

(8) Department of Communications, Transport, Post and Construction (DCTPC)

The Department of Communication, Transport, Post and Construction (DCTPC) is a part of the Vientiane Mayor’s Office. DCTPC staff and activities are funded by Vientiane budget. Article 8 of the Law on Road Transport states the function and power of provincial or Vientiane DCTPC be: i) to prepare strategies and master plan of road transport development; ii) to study and comment on applications for undertaking domestic commercial transport enterprises within the province (Vientiane); iii) to register vehicles within the province (Vientiane) in accordance with the regulation set forth by MCTPC; iv) to manage the vehicle registration list within the province (Vientiane); v) to issue transport vehicle permit operating within the country; vi) to manage and inspect road transport operations within country, cross border and transit transport; vii) to inspect transport vehicle technique, manage repair workshops and vehicle technical inspection stations; viii) to determine the location of transport depots and manage them, and ; ix) to perform other rights and duties assigned by MCTPC. Figure 9.1-2 shows Organization of DCTPC in Vientiane with OCTPC below.

(9) Office of Communications, Transport, Post and Construction

Each district has an Office of Communications, Transport, Post and Construction (OCTPC). Article 37 of the Law on Road Transport defines and OCTPC’s duties: i) to manage transport vehicles and vehicle parking lots within their respective districts as assigned by the provincial DCTPC. The OCTPC acts as the DCTPC’s local agency.



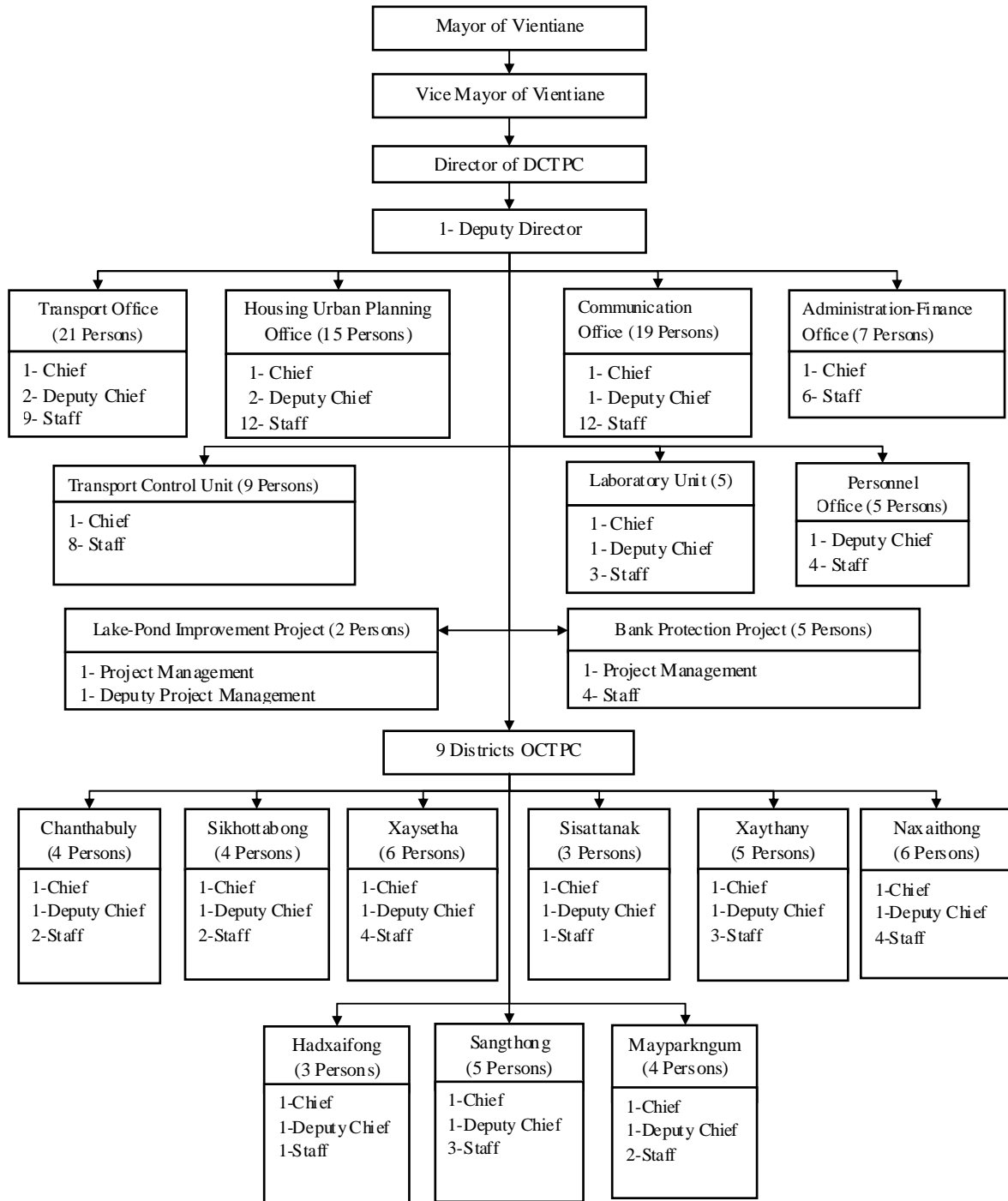


Figure 9.1-2 Organization of DCTPC in Vientiane with OCTPC

## 9.2 LEGISLATION

### 9.2.1 Road Transport<sup>6</sup>

There are three primary legislations related to road transport in Lao PDR: the Road Law, Road Traffic Law and Road Transport Law. The provisions of these laws are made more specific by subsidiary laws.

#### (1) Road Law

The Road Law is the most basic law. Article 1 states as follows; “The Road Law defined principles, regulations and measures related to management, use, planning, survey, design, construction and maintenance of public roads, as well as safety and protection of the environment to ensure and facilitate year-round traffic between provinces, cities and remote areas, in order to contribute to socio-economic development and to support defense and security activities of the country, and to link the national economy to the countries of the region.”

This law categorizes the public roads in Lao PDR into six classes: i) National Road, ii) Province Road, iii) District Road, iv) Urban Road, v) Rural Road, and vi) Specific Road. Definitions of these six classes are found in the Road Law. The definitions are supplemented by the “Guidelines for Classification of Road According to the Road Law, Local Roads Division, Department of Roads, MCTPC, November 2001.

The Road Law stipulates that MCTPC, DCTPCs, OCTPCs and Village Authorities be responsible for monitoring the public roads (Article 30). MCTPC, DCTPCs and OCTPCs prepare strategic development plans for the road network, set out procedures and specifications, and records statistic data for their respective jurisdictions. Village Authorities monitor roads within village, submit reports to the OCTPCs, and encourage the population to contribute to construction, maintenance and repair of roads in the village.

#### (2) Road Traffic Law

The Law on Road Traffic No.02/NA was approved by the National Assembly on 8 March 2000. It deals with the usual matters of traffic control needed for orderly and safety road use, standards to be met by drivers, road vehicles and vehicle loading. The provisions are sensible, but quite often not effectively enforced. Article 13, for example, stipulates on driving and loading regulations as follows:

“Motorcycles are permitted two adults and one child no more than 11 years old. Motorcycle drivers must wear crash helmets. Drivers are not permitted use telephones whilst driving.

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<sup>6</sup> ADB, Dr. Allan. R, “Institutional and regulatory Framework for Road Transport in Lao PDR”, December 2005

### Highway Patrol and Traffic Police (Article 6)

Article 6 defines the authority of traffic control is vested on the Highway Patrol for highway or rural road, and Traffic Police for cities and urban areas. Articles 21 – 23 stipulates that supervision of the Highway Patrol and Traffic Police rests with MCTPC and MOS.

### Road Traffic Management (Article 29)

Article 29, defines that the authority for road traffic management at the central level is vested on MCTPC and MOS. At the local level it is vested on DCTPCs.

#### Duties and Rights of MCTPC (Article 29)

The function and power of MCTPC in the management of road traffic are as follows.

- To set up a short, medium and long term strategic plans and master plans for road traffic management
- With MOS, to implement road traffic management regulations for the whole country and to monitor, inspect and evaluate implementation of the Road Traffic Law, Road Transport Law, Road Law and Traffic Regulations.
- To manage and inspect registration certificates, registration number plates and driving licenses nation-wide,
- To study and analyze accident statistics and traffic volumes nation-wide,
- To cooperate with international organizations and mobilize financial resources for road traffic development, and
- To perform other functions as assigned by the Government.

#### Duties and Rights of MOS (Article 30)

The rights and duties of MOS in the management of road traffic are as follows.

- To formulate a budget for implementing the function of police in highway patrols and traffic police.
- With MCTPC, to deal with problems of traffic management, implement regulations in respect of the Road Traffic Law, Road Transport Law, Road Law and Traffic Regulations.
- To monitor and evaluate implementation of the above Regulations and Laws, and
- To perform the other functions as assigned by the Government.

#### Duties and Rights of DCTPCs (Article 31)

The rights and duties of DCTPCs in the management of road traffic are as follows.

1. To interpret strategic and master plans of road traffic development and formulate detailed action plans.
2. Management of road traffic consists of the following tasks:
  - To control the orderliness of road traffic,
  - To install traffic signals and signs to facilitate smooth and safe traffic flow,
  - To summarize accident statistics and traffic volumes,
  - To educate drivers and conduct examinations of driving licenses,

- To inspect vehicles and issue inspection certificates,
- To issue registration certificate, driving licenses, and registration plates as assigned by MCTPC,
- To educate and disseminate the Road Traffic Law, Road Transport Law, Road Law and Traffic regulations,
- To comment on drafts of traffic regulations and construct parking lots,
- To directly manage and supervise the Highway Patrol and Traffic Police in the province,
- To perform the other functions as assigned by the Government.

#### Duties and Rights of OCTPCs (Article 32)

The functions and power of DCTPCs in the management of road traffic are as follows:

- To educate and disseminate the Road Traffic Law, and Transport Law, Road Law and Traffic regulations,
- To maintain the traffic signals and signs, and
- To implement the functions as assigned by the Government.

#### (3) Road Transport Law

The Law in Road Transport, No.03-97/NA, passed by the National Assemble on 12 April 1997, controls the operation of domestic, cross boarder and transit goods and passenger transport. The law defines such items as types of transport (commercial and private, domestic and cross-border) and classification of vehicles (large and small, cargo and passenger vehicle).

The also law covers driver's regulations, vehicle repair workshop, vehicle inspections, third party insurance, transport business licenses, carriage of hazardous goods, commercial transport contract, foreign transport operation, transport depots or bus stations, vehicle rental business, fines against violation of the law.

#### (4) Licensing a Transport Businesses

In accordance with Business Law No.03/NA 18 July 1994, Customs Law No.04/NA 18 July 1994 and Accounting Law No.12/NA 29 November 1990, MCTPC issues Regulation 1413/MCTPC, 22 June 1996, entitled 'Regulation on Establishment of State-owned, Joint venture, Private and Individually-owned Transport Business, Freight Forwarders, and Repair Workshops'. Vehicle inspection centers are also covered by this regulation.

To operate a business it is necessary to have a business license. Transport business licenses are issued by MCTPC or the provincial DCTPC. The MCTPC issues licenses for state enterprises responsible to MCTPC, foreign enterprises, and enterprise wishing to undertake cross-border operations. DCTPC issues licenses for state, private and collective enterprises responsible to the DCTCP, and for individual repair workshops (Article 13).

## 9.2.2 Urban Development/Land Management

(1) Law on Urban Planning (Law No. 03/99/NA, Date 3/4/1999)

Town planning in the Lao PDR is stipulated in the “Law on Urban Planning” (No 03/99/NA, Date 3/4/1999). According to Article 2 of the Law, town planning accounts for an arrangement and development of city together with an outline of regulations and measures concern the administration, technical standards, socio-economy, and preservation of the environmental setting in its harmony, rationality and compliance with stages of socio-economic development of the country. A set of town plans consists of graphical drawings, presentation reports and regulations related to town management.

### Levels of Town Planning

From Article 6 to Article 10 describe contents of town planning at the following four levels:

Town planning at the national level:

At the national level, the planning shall identify medium and long-term general directions for the whole area of the country in terms of land demarcation for the future construction and expansion of cities, zones with socio-economic importance, forest and protected forest, natural resource zones, military and defense zones, road networks, etc. In doing so, geographic locations, population density, natural resource capacities, economic activities, and connections with other parts of the country shall be included as factors for determination. The Ministry of Communication, Transport, Post and Construction is responsible for the investigation, design and submission of the plans to the government for consideration and to the National Assembly for Approval.

Town planning at the regional level:

At this level, the planning shall identify medium and long-term directions for a particular area of the country in terms of land demarcation for the future construction and expansion of cities, etc. In comparison to the national level, this category of plans shall be more detailed.

Town planning at the provincial level:

At this level, the planning shall identify medium and long-term directions for the whole territory of a province in terms of land demarcation for the future construction and expansion of cities, etc. In comparison to the regional level, this category of plans shall be more detailed.

Town planning at the district level:

At this level, the planning shall cover a demarcation of land for construction and extension of a city into functional zones that include: dwelling, offices, agriculture, trading and services, communication and transportation networks, culture and sports, public parks, military and defense, infrastructure and public facilities. The Ministry of Communication, Transport, Post and Construction, the provincial, prefecture or special zones, and district authorities in collaboration with the concerned field offices are responsible for the preparation of town plans under their control, respectively.

## Regulations in Town Planning

The state obtains the rights to reserve or expropriate land for public use and for future development which includes: new community development sites, roads, industrial zones, agriculture areas, protected forests, tourist sites, military and defense zones. The expropriation of developed community or private land by the state for public use must be followed by adequate compensation. In a town plan, land divided into different zones, including residential, office, commercial, service, public park, heritage preservation, socio-cultural, tourist, agricultural, industrial, military and defense. At district level of town planning, the land in a city is classified as follows:

For cities under controls of the central government and provincial authorities:

### 1) City Center

The City Center, compared to the others, is classified by a higher density of both construction and population and is supplied with complex infrastructure and facilities. This zone is also the location of commercial, service and business centers, and is prohibited for all categories of industries or large storages.

### 2) Peri-Center

The Peri-Center is classified by a lower density of both construction and population compared to the City Center, and includes green space, infrastructure and facilities. This zone is also the location of commercial, service and business activities, and is prohibited for industry categories 1 and 2.

### 3) Peripheries

Peripheries are the land surrounding the Peri-Center, which have a lower density of both construction and population, compared to the Peri-Center. This zone is also known as the location of agricultural activities, handicraft, and industry categories 2 and 3, which is combined with a reasonable amount of open space. The Peripheries consist of land preserved for residential, commercial, service, office, stadiums, public parks, and space for socio-cultural activities.

### 4) Development Zones

The Development Zones are the land areas adjacent to Peripheries, which are designated for city expansion and socio-economic activities as a result of the population growth. The Development Zones consist of land preserved for residential, educational, airport, commercial, service, handicraft, industry category 1, transportation purposes as well as land protected for agriculture,

For cities and municipalities under controls of district authorities:

#### 5) Central Zone

The Central Zone is similar to the Peri-Center of cities under controls of the central government and provincial authorities. The Central Zone consists of land preserved for residential, office, commercial, service, handicraft, agricultural, small and medium size industries and other purposes.

#### 6) Development Zones

The Development Zones cover land areas designated for city expansion and socio-economic activities as a result of the population growth. The areas consist of land preserved for residential, educational, airport, commercial, service, handicraft, industry category 1 and transportation purposes as well as land protected for agriculture, forest, recreation, and tourism. In addition to land zoning, the detailed planning shall take into consideration the following:

#### 7) Partial Development in Urban Centers

The purpose of partial development in urban centers is to improve the existing infrastructure, facilities and create conditions for new socio-economic activities. The numbers of partial development projects in a city plan might be more than one depending on the real requirements.

#### 8) Rehabilitation or Renovation of Areas with Ancient Building Sites

In a city, the areas with ancient building sites that do not fit into the needs of land use regulations are subjected for rehabilitation or renovation.

#### 9) Land Plotting

The land plotting refers to a land subdivision in a way that ensures security, discipline, aesthetics, comfort and compatibility with the requirements of urban regulations.

### Punitive Measures

There are punitive measures for individuals or entities violating the provisions of this law, which are outlined as follows:

- (i) Special Education
- (ii) For the violation such as: disposal of construction materials, garbage or waste in a site not defined for that purpose, extension of construction sites at the at the costs of the public area, or accomplishment of similar insignificant offences, the offenders will be warned, called for special education, and at the same time, ordered to halt or demolish their construction sites according to the nature of the offence.
- (iii) Compensation Measures

#### (2) Land Law (Law No. 04/NA, 21/10/2003)

Land ownership and management of the Lao PDR is regulated by the Land Law (No. 04/NA,

21 October 2003). The summary of this law is shown in Appendix 9.

Article 3 of this law states that the ownership of land belongs to the National Community, based on Article 17 of the constitution.

This law also stipulates the following:

“The State authorized Lao citizens to lease land from the State for a period not exceeding 30 years.”

Therefore, the Government may terminate the lease of land if necessary, for example



## **CHAPTER 10**

### **FINANCIAL CONDITION**

## **CHAPTER 10 FINANCIAL CONDITION**

### **10.1 BUDGETARY SYSTEM**

#### **10.1.1 Budget Law**

The principle legislation affecting all State revenues and expenditures is State budget law, Budget Law No. 05/94/LNA, dated 18 / 7 / 94. Following the Law the GOL undertakes implementation and auditing throughout the country in terms of budget preparation including revenues collection and expenditure both in central and provincial levels. Under the Law, the promulgation of political programs, policies, regulations, orders, resolutions, and decrees concerning the management of finance, budget and the State treasury must be centrally controlled. The Law requires that all sources of revenues and expenditures of the State be consolidated into a unified budget plan. In accordance with this law, all state organizations undertake capital investments and meet recurrent costs from the approved national budget.

#### **10.1.2 Budget Preparation**

In the budget preparation, the role of the Ministry of Finance is to mobilize the funds to execute the budget, and later on, to supervise budget execution, while Committee for Planning and Cooperation (CPC) is responsible not only for the investment budget of capital expenditures in Public Investment Program but also for sector allocations, in accordance with aggregate ceilings for budget expenditure. The budget ceiling for each province is based on its revenue collection capacity, in line with the government's policy to encourage provinces to be financially self-sufficient. For the moment, revenues in most provinces can cover their recurrent spending needs. In FY 2001-2002 provincial and district budgets were divided between 25 per cent for recurrent expenditures and 40 per cent for capital investment.

Concerning local budget preparation, the role of provincial and district authorities has become much more important since 1997-98. The aim of the budget preparation process is to ensure that spending patterns reflect local priorities and the budget preparation is characterized by a decentralized (rather than de-concentrated) and essentially "bottom-up" process, especially in the social sectors (health and education). This bottom-up budget planning is done within guidelines that are defined in a decree signed by the Prime Minister at the start of budget preparation.

Expenditure ceilings are established for total provincial spending (not divided by sectors) and there is an equalization formula that determines the size of transfer from the rich to the poor provinces in order to reconcile revenue and expenditure ceilings for each province. The expenditure ceiling is divided between capital and current expenditures, based on the expenditures of the previous year and the established national norms for wages, office

material utilities, vehicle expenses, etc. These standards, when applied to established programs, determine in reality recurrent spending at the provincial level.

Both budget preparation and budget execution are highly decentralized, in particular for the social sectors. Within the guidelines of the Prime Minister's decree, provincial governors propose expenditure ceilings for each sector. A similar process occurs at the district level where the 141 district chiefs propose the division between education, health, roads, etc. for their district. The proposed district budget, however, can be renegotiated at the provincial level, if there is a problem of consistency. District budgets are built up from the villages. Since 1997, the National Assembly approves both provincial and district budgets.

Since late 1991 the negative effects arising from decentralization during the year 1986-1991 period have led to a recentralization of the State. The Central Bank became responsible for controlling monetary developments. All revenues and expenditures are now consolidated into the national account and budget, and fiscal reform has removed any authority that the provincial administrations had to raise their own funds.

### **10.1.3 Annual Public Investment Program**

Budget preparation also includes the approval of a capital expenditure budget, a one-year Public Investment Program: PIP by the Government. Preparation of the PIP is also "bottom-up" and starts with the identification of projects at the district level. These projects are analyzed (especially regarding their relevance and realism) and then computed at the provincial level on the basis of the development plans and their ceilings, before being sent to the Committee for Planning and Co-operation, during June and the beginning of July. The Ministry of Finance will not fund projects unless they are in the Public Investment Program. Problems sometimes arise when actual spending bears little relation to the approved plan.

The annual budgetary allocations depend on the ability of the Central Government to consolidate provincial revenues from customs duties and do not necessarily reflect program needs. Such powers, introduced by to enable newly established local administration units to raise revenue through user charges and land taxes to provide the sustainable delivery of urban services, and progressively build a capacity to carry out capital investments. Following a trial period of several years, it is expected that these local administrations will be transformed into municipal governments, enabled through constitutional reform.

#### **10.1.4 The Role of Central Government in Local Government Finance**

The Budget Department in the Ministry of Finance sets the ceiling for capital spending, which determines funds available for counterpart payments and thus the general upper limit on donor funding. This ceiling is based on an assessment of the balance of current and capital expenditures taking into account the Medium-term Expenditures Framework. It shows the implementation of projects currently in process and a general assessment of sector and provincial needs.

The funding of investment projects consists mainly of two activities. The province submits its proposals for capital expenditure for each sector (such as health and education), including capital allocations, to its districts, to the Committee for Planning and Cooperation (CPC) and the planning department of the relevant line ministry.

The line ministry then combines all investment proposals from the provinces with the national level proposals into a combined sector-wide request to CPC. At the same time, provinces submit budget requests for all program areas of the province and the governors send a province wide-request to CPC. Some capital projects are funded through national rather than provincial budgets (e.g. construction of primary schools is managed through the budget of the Ministry of Education), while the procurement and bidding committees for this type of national investment programs are the responsibility of the provincial governor.

#### **10.1.5 Budget Execution**

Budget execution is even more decentralized than budget preparation, particularly in the social sectors. In the case of education, for example, the provincial education service is responsible for upper secondary and technical education, while the district education bureau is responsible for lower secondary, and the villages are responsible for primary education.

District chiefs are entitled to use a block of funds from the provincial governor. They then split the total amount allocated between education, health, local roads, etc. according to the adopted plans. By contrast, the village does not receive a block grant, but separates on the basis of special purpose grants. This means that the village receives a grant from the district for a specific purpose (teacher salaries, buying books etc.).

A quarterly cash plan ensures that expenditures do not run ahead of revenues during the course of the budget year. Line ministries and provinces must forward a budget plan to the Ministry of Finance, on a quarterly basis, based on the budget nomenclature. This enables the Treasury to strictly inspect every proposed disbursement against budget allocation.

The Ministry of Finance aggregates all the draft cash plans received, balances them against

budget allocation and available resources, and decides on postponement to the next quarter of expenditures that cannot be covered.

Budget transparency at the central level has been improved by the inclusion of donor funding in the national budget, through counterpart payments, by the publication and translation of the detailed budget reports and the introduction of a new pilot accounting system to allow expenditures and commitments to be against the budget. This latter will enable the tracking of cash balances and ministries access to provincial data regarding their respective sectors.

At the provincial level, efforts are being made to improve the coding system functional classification, in order to improve tracking of actual budget expenditures (by sector/category of expenditures, etc.) and thus to provide for accurate a budget data. As there is a single accounting classification system for the whole country, and budget allotments are transferred in 'block form', sector budget provinces and districts do not allow, for instance, for reporting budget transactions against national guidelines (national development priorities) and thus complicate the task of line ministries to monitor progress. Provincial and district transparency will also improve once a workable fit accounting systems has been introduced and correctly managed at the district level.

#### **10.1.6 Finance Arrangement for Urban Development**

In urban centers, project planning and implementation became separated from financial aspects. While the provincial departments of different line ministries have responsibility over urban infrastructure and services, revenue collection and transfer allocation is done by the Ministry of Finance, independent of any strategic urban development needs. Budget allocations are purely on an annual basis, with little multiyear planning or programming.

A major constraint to the provision of urban infrastructure facilities and the delivery of urban services is the inadequacy of the present levels of financing for the urban sector. The central government has traditionally provided budget for both the development and O&M of the country's domestic resources for infrastructure.

Given the Central Government's limited capacity to generate revenue, and thus provide budget support for urban development and O&M throughout the country, it is imperative to mobilize financial resources at the local level as a means of funding. Under the ADB-assisted urban development projects in Vientiane and the principal secondary towns, local resources are being mobilized through the application of user charges for solid waste and seepage management services. Current costs for O&M of infrastructure such as roads, drainage, and flood protection are being met from the central Government budget, and land tax in the case of Vientiane. This is seen as a short-term solution, until such time as a framework is in place for indirect cost recovery through the application of land and property taxes, and possibly

surcharges on vehicle user charges. The World Bank and AusAID are assisting the Government to put such a framework in place with the implementation of a land-titling project in pilot areas in Vientiane and the principal secondary towns.

Financial resources allocated to these services have been limited, which together with the lack of any cost-recovery mechanisms and a low level of management skills has resulted in low service levels and deteriorating and inadequate infrastructure.

In addition, the question of financial decentralization is an ongoing issue. Against an established background of strong central fiscal control, the delegation of budget control is a slow process. The ADB has been actively encouraging the Government to expedite this process as this is pertinent to loan covenants in the projects for Secondary Towns and Small Towns. In response to this, the Minister of Finance issued a decision in October 2002 empowering Provincial Governors to authorize Urban Development Administration Authorities (DAAs) to collect revenue from a range of urban services.

The guiding principles for the generation of local resources include (i) direct cost recovery by the application of user charges for services; and (ii) application of mechanisms for indirect cost recovery of infrastructure maintenance, such as land or property taxation. This will require the introduction and acceptance of changes in financial accounting and budget management at the national and local levels, and will include measures such as multiyear budgeting to enable the financing of development programs. These changes will need to be gradually introduced with the development of market-oriented resource mobilization mechanisms for local government administrations, a growing institutional capacity, and increasing human skills.

## 10.2 FINANCING AND RESOURCE FOR DEVELOPMENT<sup>1</sup>

### 10.2.1 Macro-Economic Target

A new National Socio-Economic Development Plan (NSED) in 2007-2006 is still under review by the National Assembly. The latest version of NSED in 2006-2007 was approved by National Assembly on 3<sup>rd</sup> July 2006. The followings are a summary for financial and resource for development in Vientiane based on the latest version. To achieve the development goals, NSED in 2006-2007 decided the macro-economic target of GDP of 37,926 billion Kip or increased 7.5% compared to the last year.

### 10.2.2 Public Investment Program

From the original request of the all provinces and sectors in 2006/7, the total public investment needed is estimated at 5,551.8 billion Kip; domestic source is 2,205.9 billion Kip and foreign source is 3,345.9 billion Kip. After the review with the priority based on the policy and guidelines, the final amount of the total public investment is decided 3,649.04 billion Kip (65.7% approved compared to the original request); domestic source is 517 billion Kip and foreign source is 2,836 billion Kip. These are 23.4% and 84.8% in total respectively.

### 10.2.3 Allocation for Transport Sector and Vientiane

Allocation for transport sector and Vientiane is summarized in Table 10.2-1. There are two categories of allocation; ministries for sector and provinces for local administration. The total of 3,353,000 million Kip was allocated to 2,234,079.24 million Kip for ministries and 1,118,920.76 million Kip for provinces, respectively, of which shares are 66.6% and 33.4%. Within ministries allocation, transport has 1,009,866.00million Kip or 45.2%, which also presents 30.1% of the total of PIP; within provincial allocation, Vientiane has 210,292.29 million Kip or 18.8% presenting 6.3% of the total PIP.

Table 10.2-1 Allocation for Transport and Vientiane in FY 2006/7

Item		Total (Million Kip)	Domestic (Million Kip)		Foreign (Million Kip)	
<b>Total Investment</b>	<b>100%</b>	<b>3,353,000.00</b>	<b>517,000.00</b>	<b>15.4%</b>	<b>2,836,000.00</b>	<b>84.6%</b>
<b>Ministries</b>	<b>66.6%</b>	<b>2,234,079.24</b>	<b>274,500.00</b>	<b>12.3%</b>	<b>1,959,579.24</b>	<b>87.7%</b>
Transport (30.1%)	45.2%	1,009,866.00	122,000.00	12.1%	887,866.00	87.9%
<b>Provinces (17 provinces)</b>	<b>33.4%</b>	<b>1,118,920.76</b>	<b>242,500.00</b>	<b>21.7%</b>	<b>876,420.76</b>	<b>78.3%</b>
Vientiane (6.3%)	18.8%	210,292.29	36,500.00	17.4%	173,792.29	82.6%

<sup>1</sup> Committee for Planning and Investment, National Socio-Economic Development Plan, 2006-2007 (approved by resolution of National Assembly Numbered 10/NA-VI, dated 3<sup>rd</sup> July, 2006 during the Initial Meeting of the National Assembly, Legislature VI), 2006

#### **10.2.4 Resource Allocation for Public Investment**

As shown above Table, there are two resources; National Budget and Grant/aid and foreign loan. National budget is limited by the national income capability. In 2006/7, a total of 517 billion Kip of the national budget was approved. This covered 15.4% only. To fulfill the balance, foreign aids should be mobilized from grant aid and foreign loan. The amount of 421.9million US\$, equivalent to 2,836 billion Kip is planned; 220.0million US\$ from grant-aid and 209.1 million US\$ from foreign loan.



## **10.3 AVAILABLE FUND**

### **10.3.1 Budget of MCTPC and DCTPC of Vientiane in the Past 5 Years**

Table 10.3-1 shows the expenditure of MCTPC and its major departments in the past 5 fiscal years (from 2000 – 01 to 2004 – 05). The following features are noted:

- (i) Department of Road spends majority (more than 80 %) of the entire MCTPC budget.
- (ii) The MCTPC budget steadily increased from FY 2000 –01 to FY 2002 – 03 and jumped to more double in FY 2003 – 04 and then, decreased in FY 2004 – 05 but remained larger than FY 2002- 03.
- (iii) The total budget of MCTPC in the past 5 years were in the range of 300 to 900 billion Kips (equivalent to US\$ 30 to 90 million) except in FY 2003 – 04.

Table 10.3-2 shows the expenditure of DCTPC of Vientiane in the past 5 fiscal years (from 2001 – 02 to 2005 – 06). The following featuresave noted.

- (i) There have been considerable fluctuation in the past 5 years. Especially the expenditure in FY 2004 – 05 decreased to large extent.
- (ii) In general, the expenditure of DCTPC – Vientiane has been decreasing in the past 5 years.

Table 10.3-1 Expenditure of MCTPC by Its Department in the Past 5 Years (in million Kips)

Ministry/ Department	2000 – 01			2001 – 02			2002 – 03			2003 - 04			2004 – 05		
	D*	F*	T*	D*	F*	T*	D*	F*	T*	D*	F*	T*	D*	F*	T*
Entire Ministry	71,052	254,558	325,610	65,026	507,709	572,735	110,394	474,179	584,574	233,081	910,641	1,143,721	123,369	768,860	892,229
Road	67,603	201,127	268,730	63,338	397,488	460,826	109,584	368,857	478,440	190,911	827,956	1,018,864	120,557	656,932	777,489
Transport	50	0	50	40	0	40	65	0	65	0	0	0	0	0	0
Housing & Urban Planning	261	28,753	29,013	411	64,226	64,637	75	81,057	81,132	65	37,457	37,522	38	9,740	9,778
Civil Aviation	1,343	15,477	16,820	579	0	579	277	0	277	39,305	0	39,305	2,043	53,296	55,339
Railway	60	0	60	66	0	66	9	0	9	10	0	10	0	40	40

\*D: Domestic F: Foreign T: Total

Table 10.3-2 Expenditure of DCTPC – Vientiane (in million Kips)

	2001 – 02	2002 – 03	2003 – 04	2004 – 05	2005 – 06
From Vientiane's Own Fund Source	15,013	8,913	5,878	520	7,829
From MCTPC	3,647	3,842	2,730	3,269	3,966
Total	18,660	12,755	8,607	3,789	11,795

### 10.3.2 Current Available Fund for Urban and Transport in Vientiane

Table 10.3-3 shows public investment of urban and transport development in Vientiane in 2005. VUDAA project is financed by ADB with soft loan and the implementation agency is MCTPC, but Vientiane is not. However, the project is included in the PIP in Vientiane. Thus, estimation of amount invested for urban transport sector is based on the national budget ceiling and foreign aids which will be provided on a project by project based negotiation with foreign donors. Private direct investment has started to enter the urban bus services, but not continued in the last experiences.

Table 10.3-3 Public Investment of Urban Transport in Vientiane (2005)

Item	Domestic	Foreign	Total	Allocation
<b>Total PIP</b>	<b>22,000</b>	<b>288,484</b>	<b>310,484</b>	Ministry & Province
VUDAA	18,924	214,169	233,093	MCTPC
CTPC	520	56,474	56,994	Vientiane
<b>Urban Development</b>	<b>19,444</b>	<b>270,643</b>	<b>290,087</b>	-
Share of Total PIP	88.4%	93.8%	93.4%	-

Table 10.3-4 shows budget allocation for the year 2006-2007, which is only Government budget distribution not including foreign aid, grant aid or loan.

Table 10.3-4 Budget Allocate for the year 2006-2007

(Only Government budget distribution not including Foreign Aid, Grant, Loan.)

No.	Central level	No.	Local level ( )		
1.	Sector	Million Kip	2. Province	Million Kip	
1.2	Ministry of Communication, Transport, Post and Construction : MCTPC	605,385.90	2.1	Vientiane Administration	36,500.00
1.3	Department of Transportation :DOT	31,135.90	2.2	Department of Communication, Transport, Post and Construction: DCTPC Vientiane	10,309.21
1.4	Department of Road and Bridge :DRB	351,400.00	2.3	Vientiane Urban Development Administration Authority (VUDAA)	10,983.24
1.5	Department of Housing Urban Planning :DHUP	140,150.00		DCTPC+VUDAA (2.2+2.3)	21,292.45
1.6	Department of Aviation :DOV	82,700.00	2.4	Division of Transport of Vientiane	NA
1.7	Department of Telecom and Post :DTP	0.00			
1.8	Railway Authority: RA	0.00			
	Total (93.9%)	1,210,771.80		Total (6.1%)	79,084.90
	Grand Total (100%)				1,289,856.7

Source: Public Investment by sectors and provinces fiscal year 2006-2007, Committee for Planning and Investment (CPI), Vientiane, 2006.

## **CHAPTER 11**

### **TRANSPORT PROBLEMS / ISSUES**

## CHAPTER 11 TRANSPORT PROBLEMS / ISSUES

### 11.1 ROAD NETWORK AND ROAD CONDITION

Based on the examination of existing condition, the following problems and issues shall be considered for the road development plan.

- (1) The present road network in Vientiane comprises mostly radial roads with less circumferential (ring) roads. The radial roads are coded “P” and circumferential roads of “T”. MCDP and URI have prepared a road network improvement plan by construction or rehabilitation of “T” roads from T1 to T7. However, the extension of these ring roads are limited between National No.13 and P2 N, where mostly urban areas exist.
- (2) With the extension of T4N and T7N, an inner ring road and an outer ring road will be constructed. These roads become main circumferential roads which are situated at 5km and 10km-diameter apart from the city center, respectively. A part of inner ring road, from the National No.13 North to the middle of Nong Duag Road, is already upgraded by ADB; the remaining portion should be new construction or widening of the local roads. The outer ring road is planned using the full stretch of Dongdok Road and be extended from T7N to a new route in the south.
- (3) A grid typed road network is found only in the urban area, where VUDAA project have improved the local roads by pavement in 100 urban villages. However, spontaneous and unplanned local road network and low accessibility still remain. These road networks must be reviewed under community-based infrastructure and land use development by consolidation of the residential housing to facilitate feeder public transport services and installation of urban utility networks, such as water and electricity pipe lines and drainage and sanitation systems. These measures shall improve living standards in the poor areas substantially.
- (4) No road is planned to access to the new railway stations and a new town development. It is important to coordinate public transport system.
- (5) In the official classification of the road network in nationwide, the rural highways and roads have both clear hierarchically functional classification and administrative classification. However, urban roads are not defined into the sub-classification such as urban highway, arterial, distributor and collector by road hierarchical functions, for example in American Highway Capacity Manual. Sub-classification for the urban roads is required.
- (6) In addition, the road classification shall coordinate with traffic control and public transport. In Vientiane, heavy and large trucks are not allowed to run on the urban roads

except National Roads. Road geometrical design and pavement standards shall be reviewed by the classification.

- (7) Junction improvement is urgent issues. A junction between Boulevard Kamphengmeuang (T4N) and National Road No.13 South (Kaysone Phomvihane Road) is crank-shaped junction with the minor road of Phonphanou Road (T4N). The traffic is controlled by traffic signal now. Elevated intersection and land acquisition will be required in the future traffic.
- (8) Besides the above major junction, there are many junctions which need improvement from T-typed or crank typed intersections to conventional four-road intersection. In addition, roundabout typed intersections also will have capacity problems due to the small center circles. Signalization should be considered for the future traffic.
- (9) Most of major roads have enough outside lane for the slow speed vehicles, such as Tuk-tuk or motor bikes. However, illegal parking is found on these lanes in the urban center and commercial areas. The smooth traffic flow should be disturbed.
- (10) Road maintenance, in particular, drainage cleaning is a crucial issue. Rain intensity during the rainy season in Vientiane is quite high. Bad-maintained road drainage and ditches may cause inundation on the road. It stooped the road traffic and became causes of traffic accident.

## **11.2 TRAFFIC MANAGEMENT AND PARKING**

Problems related the present traffic management and parking are identified as shown below.

- (1) The rapid increase of the number of vehicle and traffic volume is expected. It will cause the serious issues such as traffic congestion and accident increase. Countermeasures by the traffic management such as safety devises, safety education and law enforcement are required.
- (2) There are mixing modes such as passenger car, truck, bus, motorcycle, Tuk-tuk, bicycle and pedestrian on the road. This situation needs appropriate traffic control between low and rapid speed vehicles; the different modes are characterized by the travel speed, vehicle size and engine power. Without traffic control, driver's behavior may make traveling out of order.
- (3) Traffic signal, road sign and road marking need proper installation standards. Irregular positions and lack or not visible road signs exist. The drivers may confuse directions of the control devices.
- (4) There are insufficient parking control signs. Many illegal parking vehicles are found in commercial zones and market areas. Clear reasons of parking prohibition are required for the pubic observation.

- (5) Data collection and analysis of the traffic accidents is insufficient for reducing black spots where traffic accidents frequently occur. It must necessary to prepare the countermeasure of improvement of traffic safety and upgrading of traffic management facilities including staff training.

### **11.3 TRAFFIC CONDITION**

Based on the result of traffic survey, the following problems and issues shall be considered.

- (1) The share of motorbike is the highest, 64% of all vehicles. The second higher is pick-up car (14%). The share of public transport as Tuk-tuk(4%) and bus(2%) are low.
- (2) A peak hour in the direction to city center is 7:15 – 8:15 in the morning and especially a time between 7:30 - 8:00 is very high. A peak hour rate is 15%. The peak hour in the direction from city center is 16:45-17:45 in the evening and the peak hour rate is 10.8%.
- (3) Based on travel speed survey, Asian road (T2 road), Khouboulom rond, Khouvieng road, Mahosot road and Nongbone road are less than 20 km/h in the evening peak. The low speed is caused by traffic signal control at the intersections, but most of signalized intersection can be passed only one time-waiting. There is not seen the serious traffic congestions and the long queue now. With increase of traffic volume, travel speed will be lower than now then it will be needed to undertake the measurement of capacity increase in the signalized intersections and traffic management in the near future.

### **11.4 PUBLIC TRANSPORT**

The typical problems of public transport are summarized below.

- (1) Mass transit of urban bus is operated only by State Bus Company. They have insufficient number of buses so that it is not convenient for the bus users. It is important to meet users demand and to involve the private operators for the urban public transport.
- (2) A bus fare policy should consider public benefit to offset the social cost like traffic congestion and environmental degradation.
- (3) A bus way or bus priority lane for Bus Rapid Transit System (BRT) should be required with road improvement in order to secure “rapidness” of the bus transport.
- (4) Rail way transport (LRT or MRT) will be considered as a commuter, connecting new towns and factories on outer edge of Vientiane Urban. In this case, the main rail way line should be connected with road based-public transport system.

The detailed identification of problems and suggestions are shown below.

- (1) Mass Transit Urban Bus: Vientiane State Bus Company (VSBC)

- Insufficient budget for renewal of aged buses has reduced bus operation numbers which are so small to meet passengers' demand; the bus route numbers are 17 and total bus frequencies are 348. Service time is short.
- To improve the service quality with reliability, direct investment to the Company or private sector participation by applying the Public and Private Partnership (PPP) is required.
- A bus fare is politically low and permission of government for raising the fare is needed. Level of profitable fare charged should be estimated for the durable operation of the Company.
- In addition, a fare system to alleviate burdens over the poor is considered for their affordability of payment of the transport. A subsidy for the public transport users should be reviewed. In the case of introduction of electric bus, the cost of electricity for the public transport may be controlled or reduced by the government. A government policy of public transport promotion is substantially required.

(2) Paratransit: Three Associations of Sonteo, Tuk-tuk / Jambo, and Taxi

- Memberships of associations are requirement of operator, and the associations under DOT of Vientiane to try to manage and organize the paratransit operators to meet the user needs and upgrade the quality of services. Only Tuk-tuk is operated in the town to supplement the urban bus system. Meanwhile Sonteo is operated on urban-rural routes and Taxi on-demand at the station-base.
- Coordination with mass transit modes of the bus system should be required. For example, Sonteo may be involved in urban public transport like minibus. Promotion of usage for feeder transport by Tuk-tuk or Sonteo should be required.
- Up-grade of services level should be required by introduction of new vehicles or safety vehicles by continuous vehicle inspection with station operation monitoring.

(3) Public Transport Policy

- Promotion and increasing of users of public transport will be dealt with traffic demand management which may orient to reduce the private vehicles running at the specific areas and public transport corridors.
- Improvement of the present public transport operation should meet the future user requirements. The public transport routes should cover all main road networks with feeder route arrangement.
- No plan exists for using a planned railway for promoting the urban public transport in Vientiane. To coordinate a new railway, a commuter and a modal exchange plan at the railway stations should be required.



(4) Bus Rapid Transit System (BRT)

- Introducing Bus Rapid Transit system including route selection, lane arrangement and operation system should be formulated with incremental action plan such as bus priority or exclusive lanes first.

(5) Traffic Demand Control

- As mentioned above, private cars and motorbikes should be controlled from the BRT routes.

(6) Land Use Planning

- Unplanned and low density expansion of urban areas is proceeding. A town development policy and comprehensive land use plan should be urgently formulated with all stakeholders consensus.
- No land use policy and strategies exists for promoting urban public transport as “on-urban infrastructure”. The land use plan should focus on the movement of people and goods, not cars. Hence the land use plan will be regulated with a particular emphasis on public transport. Transit Oriented Development is required.
- Encouraging the integration of both land use and transport planning and mixed-use development, favoring concentrated development around public transport nodes, should be reviewed.
- Urban revitalization and beautification plan in the central area is also required with public transport, NMT and TDM.

(7) Urban Transport Infrastructure

- A transportation infrastructure favorable to the public transport should be planned with the new hierarchical road system.
- In the Villages, a local road network and its improvement should be considered by efficient introduction of feeder public transport services.

(8) Non-motorized Transport (NMT)

- Coordination of NMT and public transport is required. At the main bus station, bicycle parking facilities will be considered.

(9) Social Equity and Gender Perspectives

- Need for and contribution of safe and affordable public transport in urban transport system to the alleviation of poverty and the promotion of social development should be considered.

- As mentioned above, the policy of special fare charged and the subsidy policy for the fare charged should be reviewed. The policy should consider conditions for women, the most vulnerable users including children, the elderly, and the physically disabled.

#### (10) Road Safety and Maintenance

- To reduce traffic accident related to the public transport, a special public transport safety plan is reviewed with all stakeholders of the public transport including the operators and users. A National Road Safety and Action Plan exists, but not specific for the public transport safety.
- Improvement of bus stops and its pedestrian crossing should be considered.

#### (11) Strengthening Environment and Assessment

- A National Environmentally Sustainable Transport (EST) Plan is under development which expects to complete along with this Master Plan.
- Need to reduce air pollution from public transport vehicles on road side by cleaner fuel promotion and high-quality public transport system.
- A land use plan along the road side should include the environmental belts with plantation and buffer zone.
- Planning for eventual transition to renewable fuels should be needed by promotion of electricity use and promotion of bio-fuels.

### **11.5 TRAFFIC SAFETY**

Corresponding with increasing traffic, safety issues shall be carefully considered. Through the site investigation carried out in the Study, the Team suggests the significant issues to be examined.

- (1) Many drivers ignore the lane marking which control the traffic flows safely. The common driving rule, such that the fast vehicle runs on the inner lane and the slow vehicle runs on the outer lane, is not well known.
- (2) The training and education of the traffic safety for the riders of motorbike is insufficient. Many dangerous actions are found. The riders should have the knowledge of safe driving and driving technique at the application of license. The examination process of the driving license should be reviewed.
- (3) Law enforcement to the drivers who neglect the traffic laws and regulation is insufficient. If all drivers observe the traffic regulations, traffic safety on road and then road capacity will be improved.

## 11.6 ENVIRONMENTAL ISSUES

Based on the result of environmental survey, the following problems and issues shall be considered.

- (1) Dong Pho Sy Forest Reserve is needed the concrete conservation policy. Most of the areas belong to the Vientiane, and the remaining areas to the private sector and several government agencies. All concerned authorities should follow the conservation policy prepared on issuing the permission of land development in the forest reserve.
- (2) Should be preserved That Luang Marsh, the largest remaining wetland area in Vientiane, covering 20km<sup>2</sup> and providing aquatic resources to over 3,000 households.
- (3) One of the important provisions of the Environmental Protection Law (EPL) specifies that all organizations have an obligation to control pollution in accordance with environmental quality standards. Although environmental quality standards (air quality, emissions, soil pollution) were to be issued by STEA by March 2003, they have not been issued yet to date.
- (4) Environmentally Sustainable Transport (EST) has become a national policy adopted for transport development. Vientiane has already committed to promote this policy in coordination with a nationwide “National EST Strategy Plan” being developed by MCTPA and UNCRD this year.
- (5) Socioeconomic changes are occurring rapidly in Vientiane, including international tourism, which is leading to sexual behaviors that may place some Laotians at increased risk for HIV infection. One of the EST Initiatives related to the public health such as HIV/AIDS is that TV, Radio and Newspaper should be used as effective public awareness campaigns and information dissemination mechanism on public health impacts caused by transport and traffic.
- (6) A new agency was created for better water and environment management under the Prime Minister’s Office on 23<sup>rd</sup> July 2007<sup>1</sup>. Relevant organizations and ministries handed over their department and officials to the Water Resource and Environment Agency (WREA), as a part of effort to improve the management of water resources and environment. The WREA covers one office and five departments, including an Environment Department, the Research Institute for Water Resources and Environment, and Lao national Mekong Committee Secretariat, Water Resources Department and the Department of Meteorology and Hydrology. In Vientiane, a land use plan related to the urban transport should follow the direction of the new WREA.

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<sup>1</sup> Vientiane Times, July 24 2007

## 11.7 INSTITUTION AND LEGISLATIVE ISSUE

The problems of institution and legislative issue are summarized below.

### Institution

- (1) There are many ministries and stakeholders involved for urban transport development in Vientiane. For the public sector, two kinds of implementing and administrative structures exist. MCTPC for line ministry and Vientiane Mayor's Office (VMO) for local administration under PMO.
- (2) An integrated administrative institution should be required for undertaking total urban transport management, following an overall urban management policy to be planned in Vientiane. Under this, all administrative line institutions, district head offices and village chief offices should be arranged in terms of urban transport.
- (3) The project-based organization, such as VUDAA, should be created only in limitation for sector development and its project areas in coordination with the above total urban transport management agency.
- (4) Private partners must be involved as a key actor for urban transport management. To secure the stakeholder participation, Vientiane Transport Committee (VTC) should be organized under the guidance of National Transport Committee. VTC should have representatives of all line ministries, local administrations and the private partners.
- (5) DCTPC should report to MCTPC and VMO. But their staff salaries and recurrent expenditures are paid by the VMO budgets. Their responsibility should be defined clearly.
- (6) The GOL and VMO are undertaking review of the jurisdiction of VMO and intend to create so-called temporarily "Metropolitan or Greater Vientiane" for administration of Vientiane all areas or "Vientiane" only for Vientiane Urban to be included 198 villages and more. Conclusion is expected to be issued in end of 2007.

### Legislation

- (1) There are three major laws for transport sector; Road Law, Road Traffic Law and Road Transport Law.
- (2) For urban development, Law on Urban Planning is prevailing.
- (3) Coordination of transport laws and urban development in implementation of urban transport should be required.

## 11.8 FINANCIAL CONDITION

The followings are problems in financial conditions in urban transport.

- (1) The central government has traditionally provided budget for both the development and O&M of the country's domestic resources for infrastructure. However, a major constraint to the provision of urban infrastructure facilities and the delivery of urban services is the inadequacy of the present levels of financing for the urban sector.
- (2) Available funds for urban transport in Vientiane comprise the public finance including foreign aids and the private direct investment. The public domestic finance is national budgets including the provincial Public Investment Program (PIP) and line-ministries PIP. National budget is under ceiling by MOF. Budget estimation will be made based on the last year allocation.
- (3) The foreign aids aim at investment for the specific donor projects. The amounts invested and its timing may vary depending on negotiation process. Hence the aid amount has large fluctuations by year. For long-term plan, preparation of foreign aids should be started earlier in the project identification stage.
- (4) In addition, the local administration is not entitled to negotiate the foreign aids directly, because the Central Bank has become responsible for controlling monetary developments. All revenues and expenditures are now consolidated into the national account and budget, and fiscal reform has removed any authority that the provincial administrations had to raise their own funds.
- (5) In urban management, the project planning and implementation have been separated from an annual financial process. While the provincial departments of different line ministries have responsibility over project planning and implementation of urban infrastructure and services, the Ministry of Finance undertakes revenue collection and transfer allocation, independent of any strategic urban development needs. Budget allocations are purely on an annual basis, with little multiyear planning or programming.
- (6) Thus financial resources allocated to these services have been limited, which together with the lack of any cost-recovery mechanisms and a low level of management skills, all have resulted in low service levels and deteriorating and inadequate infrastructure.
- (7) The guiding principles for the generation of local resources should include (i) direct cost recovery by the application of user charges for services; and (ii) application of mechanisms for indirect cost recovery of infrastructure maintenance, such as land or property taxation. This will require the introduction and acceptance of changes in financial accounting and budget management at the national and local levels, and will include measures such as multiyear budgeting to enable the financing of development programs. These changes will need to be gradually introduced with the development of

market-oriented resource mobilization mechanisms for local government administrations, a growing institutional capacity, and increasing human skills in the long-term direction.

(8) Estimation of project fund for the Study will be made as follows.

- The current allocation of the public fund for the Sector and Province budget will be applied.
- All budgets shall include 30% of debt repayment in accordance with GOL financial policy.
- An available Provincial budget is estimated based on the current share of Vientiane. In the Five Year plan, Vientiane may receive 15%; approximately 15 to 16% of total provincial budget may be available.
- From the current Provincial budget, Vientiane allocated approximately 30% for urban development in CTPC.
- Among the 30% of CTPC allocation, 10% for ODA related local fund, 29% for new project, 31% for on-going projects, and 30% for debt repayment.
- The balance of investment for the Master Plan projects will be provided by the foreign aids and/or private direct investment.
- The foreign fund of the Sector budget will fluctuate depending on the donor finance. Therefore the estimation of available fund may be on requirement-base.
- The private financing scheme must be applied income-generation projects of urban public transport.

# PART III

## URBAN DEVELOPMENT SCENARIO AND TRANSPORT DEMAND FORECAST

## **CHAPTER 12**

# **FUTURE SOCIO-ECONOMIC PROSPECTS FOR LAOS AND VIENTIANE**



## **CHAPTER 12 FUTURE SOCIO-ECONOMIC PROSPECTS FOR LAOS AND VIENTIANE**

### **12.1 FUTURE PROSPECTS FOR LAOS**

The final output of future socio-economic prospects is presented for the years 2013 (short-term), 2018 (medium-term) and 2025 (long-term). However, in order to clarify the relation with the National Statistical Center (NSC) population projection and the National Socio-Economic Development Plan (2006-2010) (NSEDPP), the projections and planning targets for the years 2010, 2015, 2020 and 2025 were set first.

#### **12.1.1 Population**

The NSC has made new population projections until 2020, based on the data obtained from the 2005 Census. The projections are for 1 March each year from 2006 to 2020, and composed of two cases: Case 1 and Case 2. The assumptions used for the respective case are as follows:

##### Case 1

- 1) Total Fertility Rate (TFR) will decline from 4.5 in 2005 to 2.1 in 2020.
- 2) Life expectancies for males and females will increase from 59 and 63 years in 2005 to 70 and 74 years in 2020 respectively.
- 3) Infant mortality will decrease from 70 per 1000 in 2005 to 34.2 per 1000 in 2020.
- 4) Net migration is assumed to increase from -15,000 persons to -20,000 persons in 2020.

##### Case 2

Fertility, mortality and net migration are assumed to be constant at the 2005 level.

The United Nations Population Division has made public "World Population Prospects: The 2006 Revision". The future population of each country is projected from an estimated population for 1 July 2005. The projection includes four variants: Medium Variant, High Variant, Low Variant and Constant-fertility Variant. For the Lao PDR, estimated mid-year population is 5,664 thousand, a little more than the Census population (1 March 2005) of 5,622 thousand. Assumptions for The Medium Variant and the Constant-fertility Variant are as follows:

##### Medium Variant

- 1) Fertility is assumed to follow a path derived from models of fertility decline established by the UN Population Division on the basis of the past experience of all countries with declining fertility during 1950-2005.
- 2) Mortality is projected on the basis of models of change of life expectancy produced by

the UN Population Division.

- 3) The future path of international migration is set on the basis of past international migration estimates.

#### Constant-fertility Variant

Fertility remains constant at the level estimated for 2005-2010.

Comparing the NSC and UN population projections, the following is pointed out:

- 1) Case 1 of the NSC projection for 1 March of each quinquennial year exceeds a little the UN projection for 1 July of the corresponding year. For 2020 the projected population by NSC is 7,261.6 thousand, which exceeds about 40 thousand the UN projection of 7,223 thousand.
- 2) Case 2 of the NSC projection also exceeds the UN projection. However, these constant-fertility assumptions are not realistic.
- 3) In the Lao PDR, fertility is declining. But the UN projection seems to be based on a too rapid declining assumption than the probable one made by NSC.
- 4) Accordingly, the projected population in NSC Case 1 is considered appropriate as the basis for the future population of the Lao PDR.

As described before, the NSC projection is made for 1 March of each year and the final year is 2020. The Study Team estimated a mid-year population for each quinquennial year until 2020 on the basis of NSC projected population. For 2025, the cohort method was applied to the estimated population by sex and 5-year age group for 2015 and 2020. The cohort method uses Survival Rates by sex and age group, Age Specific Fertility Rates for women of aged 15-49 and Sex Ratio of live births. All these factors were obtained from the projected population by sex and age group for 2015 and 2020 made by NSC.

Table 12.1-1 shows the projected population by the Study Team, compared with NSC and UN projections.

Table 12.1-1 Projected Population of Laos, 2005-2025, for Quinquennial Years

Year	NSC (01/03)		UN (01/07)		Study Team (01/07)	
	Case 1	Case 2	Medium Variant	Constant Fertility	NSC Case 1 Based	
					Population	G.R.(%)
2005	5,622,000	5,622,000	5,664,000	5,664,000	5,663,400	
2010	6,230,200	6,309,600	6,173,000	6,265,000	6,269,800	2.06
2015	6,802,000	7,108,900	6,699,000	6,990,000	6,836,900	1.75
2020	7,261,600	7,991,200	7,223,000	7,812,000	7,289,000	1.29
2025			7,713,000	8,693,000	7,597,800	0.83

Source: Study Team, NSC and UN

For the planning purposes of this Study, future population of the Lao PDR as a whole is projected as shown in Table 12.1-2.

Table 12.1-2 Future Population of Laos for Target Years of Planning Periods

Planning Period	Target Year	Population	Annual Growth Ratee. (%)
The Present	2007	5,909,100	
Short-term	2013	6,604,200	1.87
Medium-term	2018	7,104,700	1.47
Long-term	2025	7,597,800	0.96

Source: Study Team

## 12.1.2 GDP

The Committee for Planning and Investment (CPI) of NSC has made public annually GDP by industrial origin at 1990 constant prices and at current prices. The most recent fixed estimates are for 2005. The total GDP at 1990 constant prices was 1,531,634.8 million kip and was 30,594,085.4 million kip at current prices in 2005. GDP per capita (corresponding to GDP at current prices) was expressed both in kip and US dollars. In the Study, 2005 estimates are used as the base for future GDP projections from 2007 to 2025.

NSEDP (2006-2010) shows annual planned socio-economic indicators from 2005 to 2010. According to the Plan, GDP at 1990 constant prices was 1,509 billion kip and GDP at current prices was 28,682 billion kip in 2005. The Plan also shows shares of Gross Value Added (GVA) by sector until the target year of 2010. GDP at current prices are projected until 2010 both in kip and US dollars. In the Study, future GVA growth rates by sector and future exchange rates between kip and US dollar are used until 2010. After 2010, GVA growth rates are fixed at 4.5% for agriculture, 10.5% for industry and 8.5% for services.

The reasons for assuming these sectoral growth rates are shown in the following:

### (1) Agriculture Sector

In the Fifth Plan (2001-2005) the target growth rate of agriculture sector was 4-5%, but the actual result was 3.4%. In The Sixth Plan (2006-2010), calculated growth rate is 2.9% based on the target total GDP and the share of GVA of agriculture sector.

The causes of such low growth are mainly as follows:

- Small scale and subsistence production is still widespread.
- Agriculture production is still concentrated on rice.
- Modernization of cultivation systems and market development remain slow.
- Overall food production is sufficient to meet the domestic demand, but about one-third of the districts do not yet have a sufficient production of rice to meet the consumption requirements for the whole year.

In the Sixth Plan, development guidelines for the agriculture sector are described as follows:

- **Food crops and vegetables:** The production volumes of food crops should continue to be increased to adequate levels to ensure food security and maintenance of food reserves. The volume of all food crops production in 2010 should reach 3.8-4 million tons (including 3.2-3.3 million tons of rice production), providing for an average food availability of 450-500 kilograms per capita. The agricultural focal areas should be developed with specialization of plantations, vegetables, and fruits with Lao characteristics.
- **Industrial trees:** The general guideline is to establish various special plantation areas for certain types of trees in order to secure the quantity of supply to domestic/local processing industries and for export. The plantation of such crops as rubber, coffee, tea, tobacco, cotton and cashew should continue to be expanded in areas suitable for these types of crops.
- **Livestock:** First, it is necessary to ensure the supply of a sufficient amount of meat to domestic markets. Big animals such as goats and pigs, and poultry are for domestic markets. Second, export of meat of cows and buffalos should be promoted.
- **Fish production:** The production of aquatic animals of high commercial value should be increased, especially fish raising in the Mekong and its tributaries. The fish processing industry should be improved and expanded to increase the value-added in this sector.
- **Forestry:** The categorization of different types of forests, including the identification of ownership types (such as state-owned, collective, community and other forms of ownership) should be accomplished. The exploitation (use) forest areas in the watersheds should be reduced by organizing strong management by the state units and increasing the forest cover. The forest cover should be increased to above 50% of the total land area of the country by 2010, and to 70% in 2020.
- **Implementation Measures:** It is necessary to establish development regions, such as tree plantation regions and livestock production regions (rice and corn production areas have already been allocated), with special supporting policies in accordance with large-scale production guidelines by starting the implementation in areas where favorable conditions exist as a first step. The agricultural production should be continued, especially in the seven plains, including Vientiane, with special focus on the plantation of rice, corn, and vegetables for export. Food production should be promoted in some mountainous areas to meet the consumption needs of the local communities. The development of the regions with raw materials should be encouraged in order to sustain the supply of quality raw materials to the processing industry.
- **Land Policy:** The program of long-term land allocation to local communities should be implemented to support their production activities and to sustain the forestry development in the long-run. The people should be entitled to the ownership of land to be used for agriculture, for operating businesses and for supplying of products, within the right of land use management.

Expecting these planning targets to be achieved, the annual growth rate of this sector after 2010 is assumed to be 4.5% , planned growth level in the Fifth Plan.

## (2) Industry Sector

The main present development problems in the industry sector are pointed out as follows:

- The production costs in the industrial sector remain quite high. Very few enterprises use modern technologies and most of these are foreign-owned.
- Public investment in the industrial sector remains low due to the excessive focus on the agriculture sector (particularly irrigation), infrastructure (mainly roads and ports) and services. There is a lack of incentives for different economic sectors to invest in industrial development; and coordination between line agencies and local authorities to encourage industrial development remains weak.
- The handicrafts sector is not sufficiently developing at the local level. Although advanced techniques are used, its development remains limited.

NSEDP (2006-2010) describes the planning targets for the main industrial sub-sectors as follows:

- The orientation of industrial development in the coming years is to give priority to developing the electricity and industries catering to domestic consumption and exports, while continuing to promote mining and developing selectively some industries serving agricultural and rural economic development (such as fertilizer, machinery manufacture, electronics, garments, footwear and food processing).
- **Electricity:** In the coming five years, attempts will be made to bring some new power stations into operation to boost the electricity exports and to meet the steadily growing need of domestic production and consumption.
- **Mining:** More investments will be encouraged in exploiting minerals such as gold, tin and copper. The proposed growth of the total mining industry is 15% per year.
- **Cement Industry:** In cement production, attempts will be made to reach a growth rate of over 20% per year. To reach this goal, it is necessary to continue to speed-up investments in on-going cement projects, as well as to seek capital to carry out new projects.
- **Machinery:** The focus is to concentrate on the manufacture of products serving agricultural and rural areas. Machinery serving construction, shipbuilding, and the automobile and motor cycle industries will be developed. Production lines in the cement industry, paper, electricity, and chemical fertilizer industry will be redesigned and improved by gradually replacing imported equipment.
- **Electronics, IT and Telecommunications:** The development of electronic assembly, information technology, software serving administration, education and training, services to develop e-commerce, including managing finance and banking will be continued. Attraction of foreign investment into this field will be promoted.
- **Chemical Industry:** Efforts will be made to try to speed-up fertilizer production. There are plans to develop some industrial chemical products such as phosphates, hydrochloric acid and nitric acid for the fertilizer industry, and for the production of pesticides and rubber manufacture.

- **Textile Industry:** A basic change in the structure of garment products will be tried, increasing the share of high value products, to gradually meet the requirements of the fashion industry, increasing the domestic value added in the exports. The Government will cooperate with experienced Vietnamese enterprises to gradually participate in the global distribution networks of trans-national groups.
- **Footwear Industry:** The leather and shoe industry would emphasize investments to increase product quantity and quality by introducing software into the design and sewing of shoes. The sources of leather will continue to be developed by strongly developing the herds of cattle and importing modern processing technologies.
- **Beverage Industry:** Investments in developing factories manufacturing juices and mineral water will be prioritized. New beer factories will be developed and the enlargement of existing beer factories should rapidly increase productivity. The total growth rate is to be about 10% per year.
- **Tobacco Industry:** It is planned to continue investing in the renewal of equipment and technologies to improve product quality, and maintain an annual growth rate of 3-4%.

With these efforts, the Plan intends to achieve a high annual growth rate of 13.4% in the industry sector as a whole. However, it appears difficult to continue for a long period from 2010 to 2025. Considering this, a more moderate growth rate of 10.5% per year is adopted from 2010 to 2025.

### (3) Services Sector

The present problems in the services sector are summarized as follows:

- The services sector infrastructure is still very limited and is not adequate to meet the socio-economic development requirements. As a result, the quality of many types of services is still low.
- The coordination between Government officers and sectors at the local level in planning the development of infrastructure, tourism, and others is still very weak, resulting in low efficiency.

In order to address these problems, the Sixth Plan presents the following measures for main sub-sectors:

- The Government will concentrate on facilitating the development of services with a quick turnover of capital, and those that generate significant revenues to the state budget such as tourism and financial, banking, transportation and telecommunications services. It will continue to encourage the steady development of trading and services in accordance with the economic potential.
- **Domestic Trade and Markets:** The Government will ensure the demand-supply relation for such as essential products as petroleum, steel, iron, cement and fertilizer. It will formulate and implement an overall development program, paying attention to the market system (including border markets), trans-border economies department stores, shops, distribution systems, distributors, warehouse systems bus stations, and sports.

- **Financial, Banking, and Insurance Services:** The Government is committed to recapitalize the three major state-owned commercial banks (SOCBs). It is also exploring the feasibility of partial privatization/joint ownership of the Lao Development Bank. The Agriculture Promotion Bank will be transformed into a self-sustaining, market-oriented rural financial institution, Insurance businesses will be encouraged to study new products and diversify their service, especially those catering to the agriculture, forestry and fisheries programs.
- **Transportation Services:** The key target is to reduce the cost of moving freight and people domestically and internationally. The Government will develop public transportation, and open up new routes in urban areas to attract passengers to use public transport.
- **Telecommunication Services:** The Government will continue to diversify postal and telecommunication services of different types and forms, raising the quality and gradually reducing costs.
- **Tourism Development:** The Government will research and amend policies to facilitate the growth of the tourism sector, diversify funding resources, especially mobilizing private and foreign investment. It is important to cooperate with the mass media in order to advertise and access different types of tourists. The Government will organize the International Trade Fair in coordination with the Airlines, and Trade, Information and Cultural agencies, to promote the tourist sites in the country. The Government will continue to complete the overall program on tourism development in 939 tourist sites, 570 of which are ecological tourist sites, 257 are cultural tourist sites and 112 are historical sites. In addition, the development of 364 potential tourist sites is under way, with the attraction of investment and the development of new tourist sites to be encouraged in the Sixth Plan period. The Government will establish a tourism department in the National University in order to develop highly qualified tourist officers.
- **Sports:** The Government will help improve sports education and develop professional sports suitable to the situation. It will continue to encourage and increase the development of sports for young people to have a variety of professional athletes who can take part in the regional (SEA) Games, the Olympics and other international sports events.

The Plan's growth target for the services sector during the period 2006-2010 is 8.8% per annum. Considering the possible growth of tourism and related activities, trading, transportation and financial systems, a growth rate of 8.5% is assumed after 2010.

Table 12.1-3 shows forecasted results of GDP by Sector and GDP per capita from 2005 to 2025, for quinquennial years. GDP per capita will reach US\$830 in 2010 and about US\$2,400 in 2025. In order to use the forecast for the planning purposes, a modification of Table 12.1-3 is carried out to show the indicators in 2007, 2013, 2018 and 2025 (see Table 12.1-4). According to Table 12.1-4, GDP per capita will reach about US\$1,000 in 2013, which means the minimum requirement to graduate from the Least Developed Countries (LDCs) in accordance with the UN standard.

Table 12.1-3 Projected GDP by Sector and GDP per Capita, 2005-2025, for Quinquennial Years

	Unit	2005	2010	2015	2020	2025
Population	1000 pns	5,663	6,270	6,837	7,289	7,598
GDP at Current Prices	Billion Kip	30,594	61,151	101,520	170,869	291,263
GDP at 1990 Constant Prices	Billion Kip	1,532	2,241	3,288	4,891	7,368
Agriculture	Billion Kip	682	787	981	1,222	1,523
Industry	Billion Kip	449	843	1,389	2,289	3,771
Services	Billion Kip	401	610	917	1,379	2,074
GDP Growth Rate	%		7.90	7.97	8.27	8.54
Agriculture	%		2.91	4.50	4.50	4.50
Industry	%		13.44	10.50	10.50	10.50
Services	%		8.76	8.50	8.50	8.50
GDP per Capita	Million Kip	5.40	9.75	14.85	23.44	38.33
Exchange Rate	Kip/US\$	10,644	11,752	12,975	14,325	15,816
GDP per Capita	US\$	508	830	1,144	1,636	2,424

Source: NSEDP and Study Team

Table 12.1-4 Future GDP by Sector and GDP per Capita for Target Years of Planning Periods

	Unit	Present	Planning Period & Target Year		
			Short Term	Medium Term	Long Term
		2007	2013	2018	2025
Population	1000 pns	5,909	6,604	7,105	7,598
GDP at Current Prices	Billion Kip	38,570	82,747	138,526	291,263
GDP at 1990 Constant Prices	Billion Kip	1,783	2,815	4,166	7,368
Agriculture	Billion Kip	721	898	1,119	1,523
Industry	Billion Kip	581	1,138	1,875	3,771
Services	Billion Kip	482	779	1,172	2,074
GDP Growth Rate	%		7.91	8.15	8.54
Agriculture	%		3.73	4.50	4.50
Industry	%		11.86	10.50	10.50
Services	%		8.35	8.50	8.50
GDP per Capita	Million Kip	6.53	12.53	19.50	38.33
Exchange Rate	Kip/US\$	11,074	12,471	13,769	15,816
GDP per Capita	US\$	589	1,005	1,416	2,424

Source: Study Team

### 12.1.3 Employment

According to the NSEDP, the ratios of employment to total population in 2005 and 2010 are calculated at 48.38% and 54.57%, respectively. This increase is mainly attributable to the change in the age structure of population, which shows increase of working age population. Changes in the sector shares of employed persons from 2005 to 2010 are also presented in the Plan; agriculture from 76.6% to 73.9%, industry from 7.7% to 9.3%, and services from 15.6% to 16.9%. Applying the sector GVA at 1990 constant prices to the sector employment, the sector labor productivity can be calculated.

In the Study, the following assumptions are adopted for the future forecast of employment:

- Employment indicators shown in the NSEDP are used as the base for the forecast until 2010.



- After 2010 to 2025, the ratio of employed to total population will increase along a straight line from 54.57% in 2010 to 73.14% in 2025.
- In order to continue a comparatively high growth rate of 4.5% per annum in the agriculture sector, some rise of labor productivity will be required.
- GVA, number of employed persons, and labor productivity by sector should be balanced until 2025.

Table 12.1-5 shows the results of forecasted future employment for every quinquennial year.

Table 12.1-5 Projected Employment of Laos, 2005-2025, for Quinquennial Years

	Unit	2005	2010	2015	2020	2025
Employment	1000 pns	2,740	3,422	4,154	4,880	5,557
Agriculture	1000 pns	2,100	2,527	2,968	3,256	3,547
Industry	1000 pns	212	317	428	621	787
Services	1000 pns	428	577	758	1,003	1,223
Sectoral Shares of Employed	%	100.00	100.00	100.00	100.00	100.00
Agriculture	%	76.64	73.86	71.45	66.73	63.83
Industry	%	7.74	9.27	10.31	12.73	14.16
Services	%	15.62	16.87	18.23	20.55	22.00
Employed to Total Population	%	48.38	54.57	60.76	66.95	73.14

Source: NSEDP and Study Team

As shown in Table 12.1-5, the number of employed persons will increase in all sectors and total employment will reach more than 5.5 million (about two times the 2005 level) in 2025. However, the sector share of employed in agriculture will continue to decline.

Table 12.1-6 is a modification of Table 12.1-5, intending to utilize the forecast for the short-term, medium-term and long-term planning.

Table 12.1-6 Future Employment of Laos for Target Years of Planning Periods

	Unit	Present	Planning Period & Target Year		
			Short Term	Medium Term	Long Term
		2007	2013	2018	2025
Employment	1000 pns	2,995	3,849	4,580	5,557
Agriculture	1000 pns	2,263	2,787	3,143	3,547
Industry	1000 pns	249	381	539	787
Services	1000 pns	483	681	899	1,223
Sectoral Shares of Employed	%	100.00	100.00	100.00	100.00
Agriculture	%	75.56	72.41	68.62	63.83
Industry	%	8.32	9.89	11.76	14.16
Services	%	16.12	17.69	19.62	22.00
Employed to Total Population	%	50.68	58.28	64.47	73.14

Source: Study Team

## 12.2 FUTURE PROSPECTS FOR VIENTIANE

### 12.2.1 Population

Vientiane has prepared the “Sixth Five Years Social Economic Development Plan (2006-2010) of Vientiane” (VSDP) in conformity with the NSEDP. In VSDP, it is forecast that the population of Vientiane will increase by about 136,000 persons from 2005 to 2010. Based on this forecast, the mid-year population is projected to increase from 705,000 in 2005 to 841,000 in 2010. Comparing with the population of Lao PDR as a whole, the share of Vientiane population will increase from 12.4% in 2005 to 13.4% in 2010, showing about 1 percent point rise during the 5 years. It is assumed that this trend will continue after 2010 to 2025, reaching the share of 16.3%.

Table 12.2-1 Projected Population of Vientiane, 2005-2025, for Quinquennial Years

Year	National Population	Population of Vientiane		
		Share in Nation (%)	Population	Annual Growth Rate (%)
2005	5,336,400	12.4	705,000	
2010	6,269,800	13.4	841,000	3.59
2015	6,836,900	14.4	983,100	3.17
2020	7,289,000	15.3	1,118,400	2.61
2025	7,597,800	16.3	1,239,100	2.07

Source: VSDP and Study Team

Corresponding to the planning period, future population shown in Table 12.2-1 is modified for years 2007, 2013, 2018 and 2025 (see Table 12.2-2).

Table 12.2-2 Future Population of Vientiane for Target Years of Planning Periods

Planning Period	Target Year	Population	Annual Growth Rate (%)
The Present	2007	756,500	
Short-term	2013	923,600	3.38
Medium-term	2018	1,062,200	2.84
Long-term	2025	1,239,100	2.23

Source: Study Team

### 12.2.2 Gross Regional Domestic Product (GRDP)

The VSDP describes the economic growth targets during the planning period 2005-2010 as follows:

- Annual growth rates of GRDP by sector are; 7.79% for agriculture, 12.51% for industry, and 11.28% for services.
- Total GRDP at current prices will reach 11,130 billion kip in 2010; of which agriculture sector 1,892.10 billion kip (17.0%), industry sector 6,143.76 billion kip (55.2%), and services sector 3,094.14 billion kip (27.8%).

According to the VSDP, such a high economic growth will be achieved by making the following efforts in each sector:

1) Agriculture

- **Rice Production:** To obtain 1,904,727 tons during the plan period of 2005-2010, on an average 380,945 tons each year, by upgrading the productivity. To promote to plant rice for supply to brewery factory, plastic factory, and for selling to Japan.
- **Irrigation:** To expand the irrigated rice areas, and invest in the construction of small size reservoirs in order to keep water for the production in the dry season. To find suitable methods for preventing the flood areas in order to protect the public assets and plantation areas.
- **Vegetable Plantation:** To concentrate on vegetable plantation in areas with suitable conditions such as Kao Liow area along the Mekong River, and Districts of Hathsayfong, Xaythny and Naxaythong, by planting vegetables with no chemical. Estimated production of vegetables is 392,358 tons from 005 to 2010, on an average 78,472 tons each year in areas of 9,530 ha.
- **Short-term Plantation of Industrial Vegetable:** To expand the potential cereals such as: hard maize, tobacco, sugar cane, soybean, peanut, other beans (red beans, black beans), starchy roots-potato, medical vegetable in areas of 9,000 ha, with total production of 613,674 tons. Besides that, to concentrate on the plantation of soft maize for supplying to factory.
- **Fruit Tree Plantation:** To attempt to plant fruit trees to substitute the importation such as banana, coconut, mango, lemon, litchi, and so on. Estimated increase of plantation areas are 5,500 ha until 2010, with an average production of not less than 51,869 tons each year.
- **Plantation of Industrial Trees:** To promote planting of Mon trees for developing the profession on Mon raising in order to supply silk to the markets and to bring up professionals in textiles. At present, the demand of silk is 100 tons per year, by focusing the Districts of Sangthong, Xaytny and Mayparkngum.
- **Animal Raising:** To focus on types of animal such as; buffaloes, cattle, pigs, goats and sheep, and fish
- **Forests:** Must strictly protect and develop remaining natural forests and water resource protection forests, rehabilitating destroyed forests. To complete the inspection of forest resources for further management and protection, and to set up a plan for expanding forests. To enhance the community to invest in the production of small trees, with plantation areas of 2,000-2,500 ha each year.
- **Land Use Development Plan:** To complete land use adjustment for the preparation of land use development plan. Works are; data collection, management and inspection on the use of land in 9 districts, survey on the identification of the boundary areas in ponds and lakes, classification of land type for the management and use, land adjustment for the residents and production, and survey-design for the development plan at the village level.

- **Rural Development and Poverty Eradication:** To continue to solve the poverty problems of the remaining families and to identify new family poverty in villages in conformity with special characteristic of each area in Vientiane. To promote establishment of Poverty Eradication Fund. To establish village development groups pursuant to Polibureau Decree No. 09. To establish rural markets.

## 2) Industry

- **Development Objectives:** To encourage the potential industrial development such as: processing industries, light industries and handicrafts. To expand the small and medium enterprises (SME), competing with international markets. To develop Khok Saat industrial areas to cope with the different sizes of industries. To encourage the existing enterprises for further investment, intending to introduce new technologies for high productivity and reduced capital costs to enable competition and opening up markets.
- **Processing Industry for Agricultural-forestry Products:** To expand and upgrade the existing wood factory and to stop the establishment of new wood factory, plywood. To upgrade the quality of sugar factory, cigarette factory, meat processing factory (pig, duck, chicken, cattle, buffalo), and milk factory, soybean milk, processing of vegetable products, fruit can, powder production (maize, rice, etc.) and production of vegetable oil.
- **Material Production Industry:** Must choose the condition for enabling raw material supply and improve the quality of products for domestic consumption in order to substitute the import, and to export products by concentrating on the production of bricks and blocks..
- **Mining Exploitation Industry:** To rehabilitate and develop the existing mining factory and gravel processing factory to serve as construction raw materials. To encourage the exploitation and processing the important minerals such as potassium chloride salt, and so on, to obtain 200,000 tons per annum for exporting to China, exploitation of coal, and survey gold exploitation to fulfill the Government target plan.
- **Garment Industry:** Must be high quality products and meet supply and demand of clients, reduce to produce the garments to serve the foreigners, try to find the new markets by ourselves, because so far the products export to EU and USA are not required detailed procedures, and try to establish the garment factory of more than 10 places.
- **Chemical Industry:** Must emphasize the products that have high demand by the markets such as plastic bag, agricultural fertilizer, plastic products, medicines, soaps, and production of bio fertilizer for domestic consumption and substitute the importation by introducing advanced technology and modern equipment which will invest the fund of about US\$6.35 million.
- **Handicraft Production:** Must improve and expand the handicraft production by upgrading the quality to be the exported products more and more such as wood products, ceramics, silver and gold products, souvenirs, and consumption products by investing in improving, maintaining and constructing glass factory and ceramic factory.
- **Development of Khok Saat Industrial Area:** Formulate technical feasibility study,

design industrial area planning by continuing survey for collecting the land list of citizen and other parties in the industrial area to be completed and formulate plan for compensation as appropriate in order to expedite the development and investment in such area as soon as possible

- **Rural Electricity Network:** Must attempt to expand electricity network to rural area to be completed 14 villages that have no electricity use and also expand electricity to the production areas, and tourist attractive places to meet the development requirement of tourism.

### 3) Services

- **Development Objectives:** To improve and adjust the new markets to make all economic sectors actively participating in trade activities. To develop the exportation by generating main export products and by improving and expanding the new markets. To bring up the export implementing joint venture both domestic and foreign business entities, looking for market channels. To select the import goods for protecting domestic products, promoting the introduction of new advanced technologies of more civilized countries for the production use. To transform the country from land-locked into land-linked, requiring Vientiane to classify tourism sector to be one of the spearhead economic sectors. Tourism of Vientiane should adhere with the tourism across the country and to be a chain linking with regional tourism and step up toward global tourism. To open up the tourism in all aspects such as cultural tourism, natural tourism, ancient place tourism, recreation, sports, regional and international meetings.
- **Border Trades:** To carry out inspection and management of border trades, and to control illegal trading at the border. To make survey-design and construct border markets at the end of the Friendship Bridge. To develop import and export enterprises, purchasing and packing industrial and agricultural products.
- **Improvement and Construction of Markets:** To improve and construct trading centers at rural areas and districts. To improve the Moming Market, Non Chan Market, That Luang Market and Thong Khan Kham market to be standard or modern market. To construct dried and cool warehouses for the protection of agricultural products.
- **Tourism Development:** To increase the tourists by 5% per annum from 2006 to 2010, and to generate income of US\$238.11 million and expand the day rooms increased by 7.6% per annum. To upgrade the foreign languages of tourist guides especially English, French, Chinese and Japanese. To formulate tourism strategic plan by linking with tourism groups of China, Thailand and Vietnam. To promote development of hotels, guest houses and restaurants.

These VSDP's development targets are adopted by the Study Team until 2010. However, after 2010 it is considered difficult to continue such a high economic growth for Vientiane. Accordingly, more moderate sector growth rates are assumed for future economy of Vientiane. Assumed growth rates by sector during the period from 2010 to 2025 are shown in Table 12.2-3.

Table 12.2-3 Sector Growth Rates, 2010-2025 (%)

	2010-15	2015-20	2020-25
Agriculture	7.50	7.00	6.50
Industry	12.50	12.00	11.00
Services	11.50	11.00	10.50

Table 12.2-4 shows forecasted results of Vientiane's GRDP by Sector and GRDP per capita from 2005 to 2025, for quinquennial years. The share of the industry sector in total GRDP is more than 50% in 2005 and will occupy more than 60% in 2025. GRDP per capita will reach about US\$1,100 in 2010 and about US\$3,800 in 2025.

Table 12.2-4 Projected GRDP by Sector and GRDP per Capita, 2005-2025, for Quinquennial Years

	Unit	2005	2010	2015	2020	2025
Population	1000 pns	705	841	983	1,118	1,239
GRDP at Current Prices	Billion Kip	6,405	11,130	21,546	41,045	75,831
GRDG at 1990 Constant Prices	Billion Kip	321	546	933	1,572	2,566
Agriculture	Billion Kip	71	103	148	208	283
Industry	Billion Kip	162	292	526	928	1,563
Services	Billion Kip	88	150	259	436	718
GRDG Growth Rate	%	9.79	11.22	11.34	10.98	10.30
Agriculture	%	7.40	7.79	7.50	7.00	6.50
Industry	%	10.82	12.51	12.50	12.00	11.00
Services	%	12.50	11.28	11.50	11.00	10.50
GRDP per Capita	Million Kip	9.09	13.23	21.92	36.71	61.20
Exchange Rate	Kip/US\$	10,644	11,752	12,975	14,325	15,816
GRDP per Capita	US\$	854	1,126	1,689	2,563	3,870

Source: VSDP and Study Team

In order to use the forecast for the planning purposes, Table 12.2-4 is modified to show the indicators in 2007, 2013, 2018 and 2025 (see Table 12.2-5). According to Table 12.2-5, GRDP per capita will reach about US\$1,400 in 2013, the target year of the short-term plan. In 2018, the target year of the medium-term plan, population of Vientiane is expected to grow over 1 million and GRDP per capita to exceed US\$2,000.

Table 12.2-5 Future GRDP by Sector and GRDP per Capita for Target Years  
of Planning Periods

	Unit	Present	Planning Period & Target Year		
			Short Term	Medium Term	Long Term
		2007	2013	2018	2025
Population	1000 pns	757	924	1,062	1,239
GRDP at Current Prices	Billion Kip	8,020	16,530	31,695	75,831
GRDG at 1990 Constant Prices	Billion Kip	397	752	1,275	2,566
Agriculture	Billion Kip	82	128	182	285
Industry	Billion Kip	205	416	739	1,563
Services	Billion Kip	109	208	354	718
GRDG Growth Rate	%		11.26	11.13	10.51
Agriculture	%		7.64	7.20	6.64
Industry	%		12.50	12.20	11.28
Services	%		11.39	11.20	10.64
GRDP per Capita	Million Kip	10.59	17.90	29.85	61.20
Exchange Rate	Kip/US\$	11,074	12,471	13,769	15,816
GRDP per Capita	US\$	957	1,435	2,168	3,870

### 12.2.3 Employment

According to the VSDP, the ratios of employment to total population in 2005 and 2010 are calculated at 46.95% and 50.64%, respectively. This increase is mainly attributable to the change in the age structure of population, which shows increase of working age population. Changes in the sector shares of employed persons from 2005 to 2010 are also presented in the Plan; agriculture from 35.2% to 25.0%, industry from 16.6% to 20.0%, and services from 48.3% to 55.0%.

In the Study, the following assumptions are adopted for the future forecast of employment:

- Employment indicators shown in the VSDP are used as the base for the forecast until 2010.
- After 2010 to 2025, the ratio of employed to total population will increase along a straight line from 50.64% in 2010 to 61.86% in 2025.
- In order to continue a comparatively high growth rate of 7% per annum in the agriculture sector, some rise of labour productivity will be required.
- GVA and number of employed persons by sector should be balanced until 2025.

Table 12.2-6 shows the results of forecasted future employment for every quinquennial year.

Table 12.2-6 Projected Employment of Vientiane, 2005-2025, for Quinquennial Years

	Unit	2005	2010	2015	2020	2025
Employment	1000 pns	331.0	425.9	534.6	649.8	766.4
Agriculture	1000 pns	116.5	106.5	97.9	90.4	83.2
Industry	1000 pns	54.8	85.2	120.5	159.6	198.3
Services	1000 pns	159.7	234.2	316.2	399.8	485.0
Sectoral Shares of Employed	%	100.00	100.00	100.00	100.00	100.00
Agriculture	%	35.20	25.00	18.31	13.91	10.85
Industry	%	16.56	20.00	22.54	24.56	25.87
Services	%	48.25	55.00	59.14	61.53	63.27
Employed to Total Population	%	46.95	50.64	54.38	58.12	61.86

Source: VSDP and Study Team

Table 12.2-7 is a modification of Table 12.2-6, intending to utilize the forecast for the short-term, medium-term and long-term planning.

Table 12.2-7 Future Employment of Vientiane for Target Years of Planning Periods

	Unit	Present	Planning Period & Target Year		
			Short Term	Medium Term	Long Term
		2007	2013	2018	2025
Employment	1000 pns	366.6	488.4	601.3	766.4
Agriculture	1000 pns	113.2	102.5	94.2	83.2
Industry	1000 pns	65.9	105.1	142.8	198.3
Services	1000 pns	187.5	280.7	364.2	485.0
Sectoral Shares of Employed	%	100.00	100.00	100.00	100.00
Agriculture	%	30.88	20.99	15.67	10.85
Industry	%	17.98	21.52	23.75	25.87
Services	%	51.15	57.49	60.58	63.27
Employed to Total Population	%	48.43	52.88	56.62	61.86



## **CHAPTER 13**

# **URBAN DEVELOPMENT SCENARIOS**

## CHAPTER 13 URBAN DEVELOPMENT SCENARIOS

### 13.1 FUTURE URBAN LAND REQUIREMENT

#### 13.1.1 Residential Land

In Vientiane, almost all urban houses are single houses with or without garden spaces except urban buildings with commercial/services activities on the first floor and residential spaces on the second and third floors in the central area or along the trunk roads. At present, high-rise apartment houses are not found in the city. This situation will continue in the near future.

Accordingly, urban residential land requirement is roughly calculated as single house equivalent for medium and high class families on the following assumptions:

##### 1) Medium Class Net Residential Area

- 30 square meters per person
- 5.25 persons per household (average household size between 2007 and 2025)
- 2 stories
- Ground coverage 50%
- Plot ratio 100%
- Net urban residential land requirement for one increased household: 157.5 square meters

##### 2) High Class Net Residential Area

- 60 square meters per person
- Other assumptions are same as for the medium class
- Net urban residential land requirement for one increased household: 315 square meters

##### 3) General Residential Zone

For the general urban residential area (mixture of medium and high classes), an average lot size is estimated at 236.25 square meters and a required space for one person is 45 square meters. Assuming that the net residential area occupies 75% of an urban residential zone including roads, parks and public spaces, a required unit residential zone for increased one person is calculated as 60 square meters.

##### 4) Residential Land Requirement between 2007 and 2025

According to the Study Team's future population projection, 482,460 persons will increase from 2007 to 2025 in Vientiane. Of this increase 85%, 410,000 persons, are expected to live in urban areas. Based on the above assumptions, urban residential land (including roads and other necessary spaces) of 2,460 hectares will be required to develop during the next 18 years.

### 13.1.2 Commercial/Services Land

Commercial/business activities include various types of services and scales. In the central area of Vientiane the most typical activities are small-scale retail shops including mini market and handicraft shops, restaurants and hotels, and personal services such as laundry and beauty shops. Large-scale facilities like public markets, five-star hotels, administration offices, bus terminals, temples and schools are also located in the central area. Such variety makes it difficult to determine a unit land area per employed person for services activities.

#### 1) Land Use Zoning of the Central Area and Services Sector Employment Density

According to the present land use zoning, the core of central area (Zones 101, 102 and 401) designated as follows:

Zone 101 (Total Land Area of Zone, 96.7 ha): ZPP-Ua (Old Urban Heritage Conservation Zone), UAa (Administrative Center and Commercial Zone) and UC (Mekong River Bank Zone)

Zone 102 (Total Land Area of Zone, 125.5 ha): ZPP-Ua, UAa and UAb (New Center Zone)

Zone 401 (Total Land Area of Zone, 118.9 ha): ZPP-Ua and NE (Conservation Zone)

Numbers of employed persons of services sector working in Zones 101, 102 and 401 are 9,452, 11,807 and 4,852, respectively. Except for the NE of Zone 401, services sector employment densities are calculated as: 97.7 (persons per hectare) for Zone 101, 94.1 for Zone 102 and 108.3 for Zone 401. The average is 97.8 persons per hectare or 102.3 square meters per person.

#### 2) Commercial/Business Land Requirement

The employment density of the central area is considerably low. Vacant lands and residential quarters still remain. Few high-rise buildings are found, while some large-scale lots such as temples, the government guest house, the bus terminal and schools are located. Roughly speaking, a unit land area per increased employed person for services activities is assumed 50 square meters per person (almost the half of the present situation) with roads and necessary public spaces.

According to the Study Team's future projection, 297,500 employed persons for the services sector will increase from 2007 to 2025. About 90% of this increase, 267,750 persons will work in urban areas. Based on the above assumptions, urban services land of 1,340 hectares will be required from 2007 to 2025.

### 13.1.3 Industrial Land

The industry sector is composed of four sub sectors: mining & quarrying, manufacturing, electricity, gas & water supply, and construction. In 2007, the percentage composition of the employed persons in the industry sector is 1.4% for the mining & quarrying, 42.0% for the manufacturing, 10.3% for the electricity, gas & water supply, and 46.3% for the construction.

#### 1) Land Use Zoning for the Industrial Area and Employment Density

At present, the Industrial Zone (I) is designated for Zone 408 and Zone 503. For a model study of the Industrial Zone, Zone 503 is selected because the scale of the Industrial Zone and the number of employed persons in the industry sector are the largest among the VUDAA area. The land area of the Industrial Zone is 190.2 ha. The numbers of employed persons in the industry sector on working place base is 4,929 persons in 2007. Excluding employment in the construction sub sector, the total number of employed persons is 3,598 persons. The employment density is 18.9 persons per hectare or 528.6 square meters per person.

#### 2) Industrial Land Requirement

The present industrial zone is scarcely occupied. If the occupancy ratio is 40%, the present land area per person is about 211 square meters. The above calculation assumes that very small-scale manufacturing industries such as bakeries, printing factories and handicraft workshops are all located in the Industrial Zone. If the number of employed persons of these activities occupies 70% and is excluded from the employment in the industrial zone, the land area per person is calculated as 301 square meters.

Considering these facts, a unit land area per increased employment for medium-large scale industries is assumed 300 square meters per person.

The number of employed persons in the industry sector will increase 132,400 persons from 2007 to 2025. It is assumed that 50% (66,200 persons) of this increase is for construction, 35% (46,300 persons) for medium-large scale industries and 10% (19,900 persons) for small scale industries. Based on the above assumptions, industrial land for medium-large scale industries of

1,390 hectares will be required during the period of 2007-2025.

## **13.2 URBAN DEVELOPMENT SCENARIOS**

### **13.2.1 Development Scenario Formation**

As described in Section 12.2, population will increase 482,460 from 2007 to 2025 in Vientiane. Vientiane is divided into two areas, the Study Area and the Outer Zone. Applying the past trend, population of the Study Area will increase from 447,037 in 2007 to 691,900 in 2025 (increase of 244,863). On the other hand, population of the Outer Zone will increase from 309,503 to 547,100 during the same period (increase of 237,597). Zone 604 (Xaythany 4) in the Outer Zone will occupy 55% (130,628) of population increase of 237,597. This means that future population increase will occur mainly in the Outer Zone especially in Zone 604.

Population density of the Study Area is 11.7 persons per hectare in 2007, and will be 18.1 persons per hectare in 2025. This future population density appears too low and inefficient as an urban area. Main causes of this population dispersion are low land price and lack of land use control in the Outer Zone, and will result in an extension of disordered urban areas without roads and basic public spaces and facilities.

It is necessary to implement some measures for the prevention of such probable disorder and for the formation of comfortable and sound urban areas.

Considering these facts, the following three development scenarios are formed and studied.

- Uncontrolled Pattern
- Controlled Finger Pattern
- Corridor Network Development Pattern

### **13.2.2 Uncontrolled Pattern**

The existing land use regulation area established by VUDAA covers 20,950 hectares, about 55% of the Study Area of 38,190.2 hectares. Within the VUDAA area, use zoning is designated and numerical land use regulation such as ground coverage and plot ratio is determined for each use zone. Recent urbanization is proceeding mainly in the uncontrolled area of the Study Area and the neighboring Outer Zone.

Due to the lack of delimitation between urbanization zone and protection zone (for agriculture and natural environment), sporadic low density urban areas will extend in future. Residents in such urban areas will suffer from daily life inconvenience and risk of disasters.

Figure 13.2-1 shows an image of Uncontrolled Pattern. The characteristics of this pattern are summarized as follows:

- Trunk road network is poor compared to the extended urban areas
- An idea of development of new town of about 1,000 hectares along Route 13 could be realized, but traffic will be congested due to the high car ownership of assumed residents of high income classes.
- Industrial area development in Khok Saat would be difficult, the reason why latent location demand could not be made tangible due to the insufficient road network.
- District centers of Xaythany and Naxaythong would not be developed to central places with vivid commercial/services activities and sufficient public spaces and facilities.

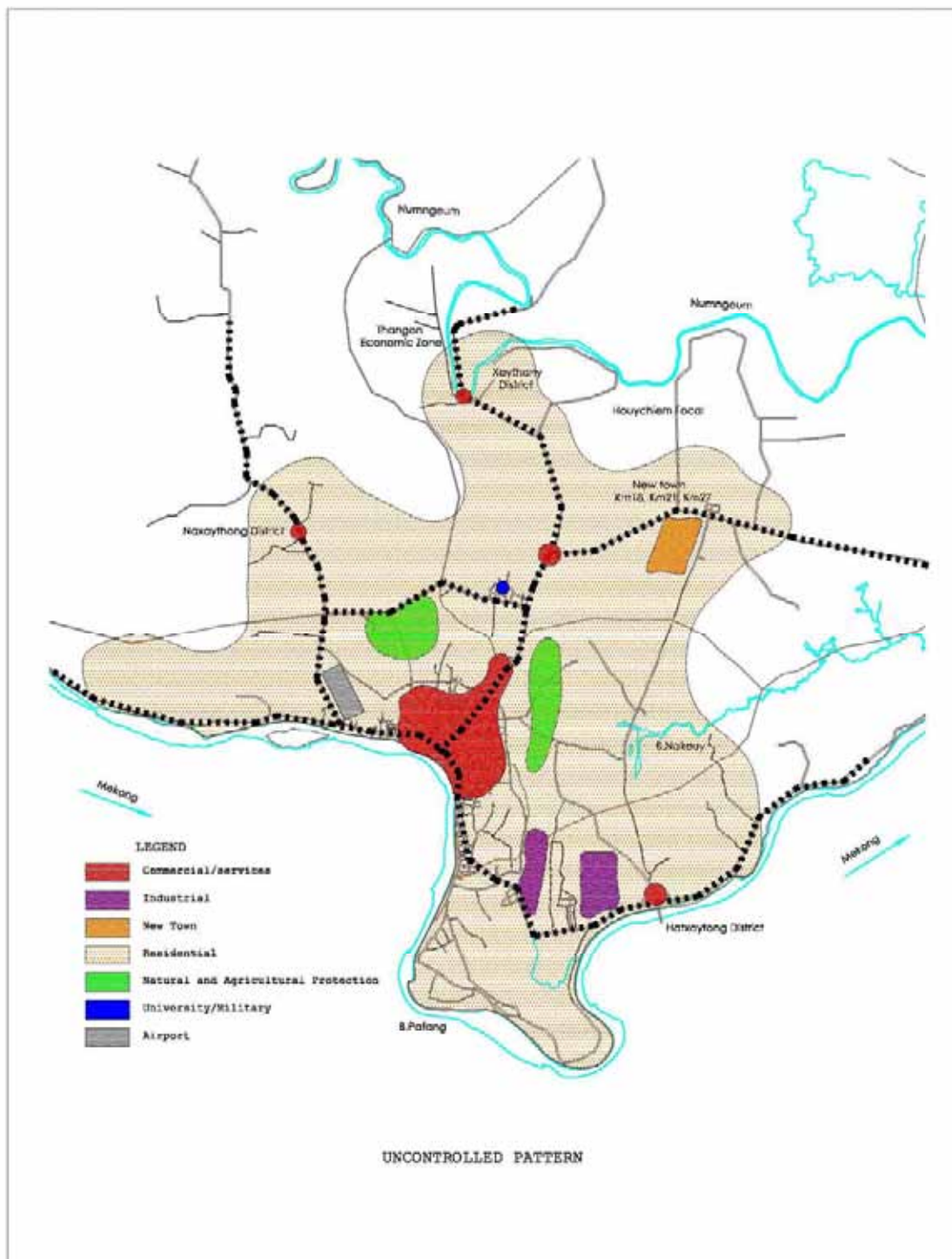


Figure 13.2-1 Image of Uncontrolled Pattern

### 13.2.3 Controlled Finger Pattern

The present urban structure can be called as imperfect finger pattern. This development pattern intends to form a strengthened finger pattern. Land use regulation area should be expanded to cover the Study Area as a whole and the neighboring part of the Outer Zone. Urban area will be formed along the trunk roads and clearly delimited from agriculture zone and natural environment protection zone. Densification of urban areas will be planned. In order to achieve this purpose, the existing numerical land use regulation for residential and commercial/services zones should be studied and revised.

Figure 13.2-2 shows a concept of Controlled Finger Pattern. Characteristics of this pattern are as follows:

- Trunk road network is almost the same as the Uncontrolled Pattern.
- Urban development in protection zone is strictly prohibited except for the construction of houses of farmer families and buildings necessary to agricultural activities.
- Industrial development in Khok Saat will be abandoned.
- District centers will be developed along trunk roads for commercial /services cores of the districts, especially Xaythany and Naxaythong Districts.
- The trunk road forming axis of each finger should be widened to be enough for passing though the increased traffic and introducing a public transport facility.

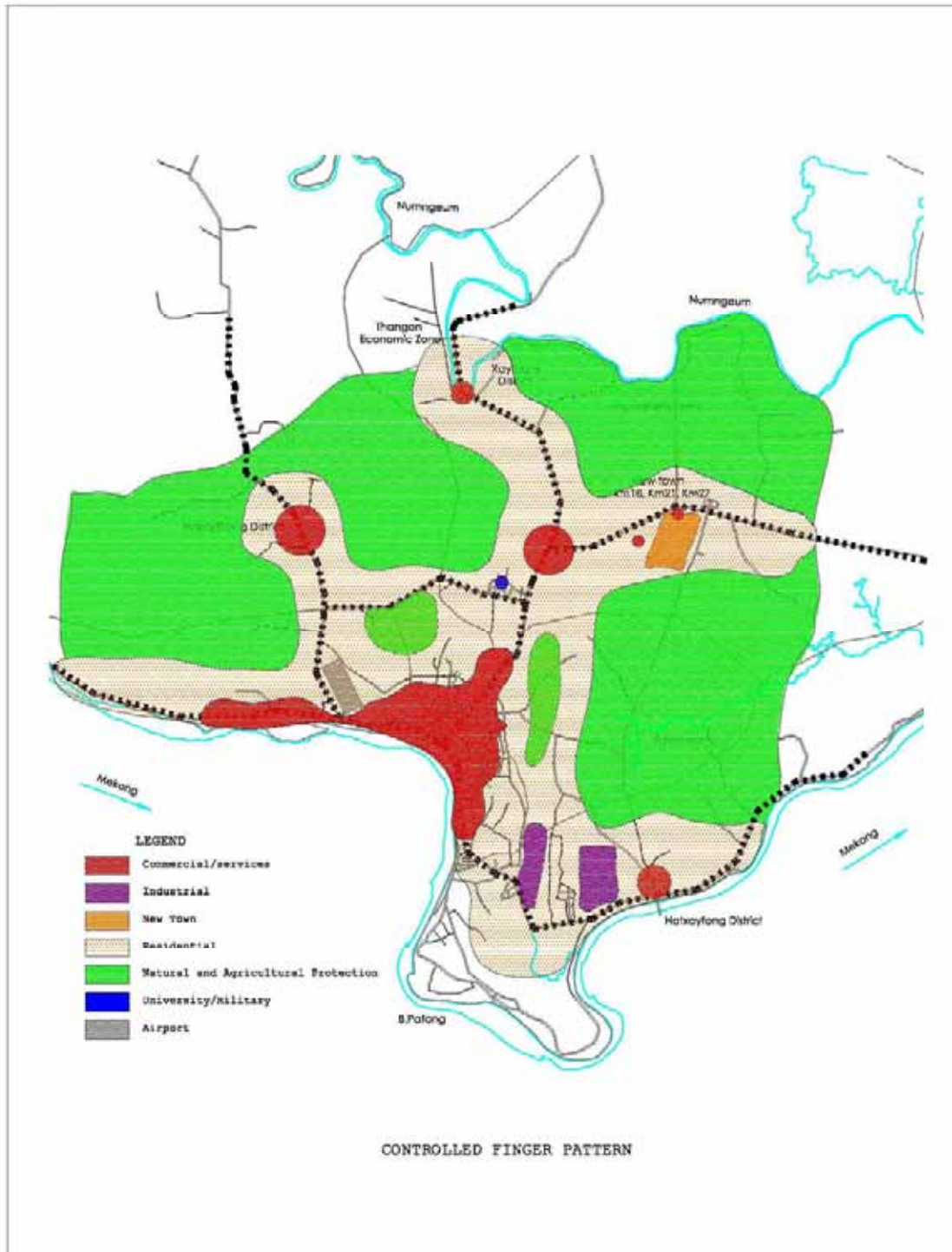


Figure 13.2-2 Concept of Controlled Finger Pattern

#### 13.2.4 Corridor Network Development Pattern

In addition to the Controlled Finger Pattern, this pattern intends to connect the district centers and large-scale urban development projects and to form a network of the corridors. Land use regulation area should be expanded to cover the Study Area as a whole and the neighboring part of the Outer Zone. The numerical standard for residential and commercial/services zones



along the planned corridors should be revised in order to realize the corridors.

Figure 13.2-3 shows a concept of the Corridor Network Development Pattern. Characteristics of this pattern are as follows:

- Khok Saat industrial development project will be positively adopted as a measure to dealing with new industries and removed factories from the existing urban areas.
- For the formation of corridors, construction of new trunk roads and improvement of the existing ones.
- Public transport network should be established along the trunk road network.
- For the formation of public transport network, the railroad is expected to play a role of passenger transport. Railroad stations will be important to develop local centers.
- Xaythany and Naxaythong District Centers, and the Friendship Bridge point are expected to grow as future cores of trade and service functions.

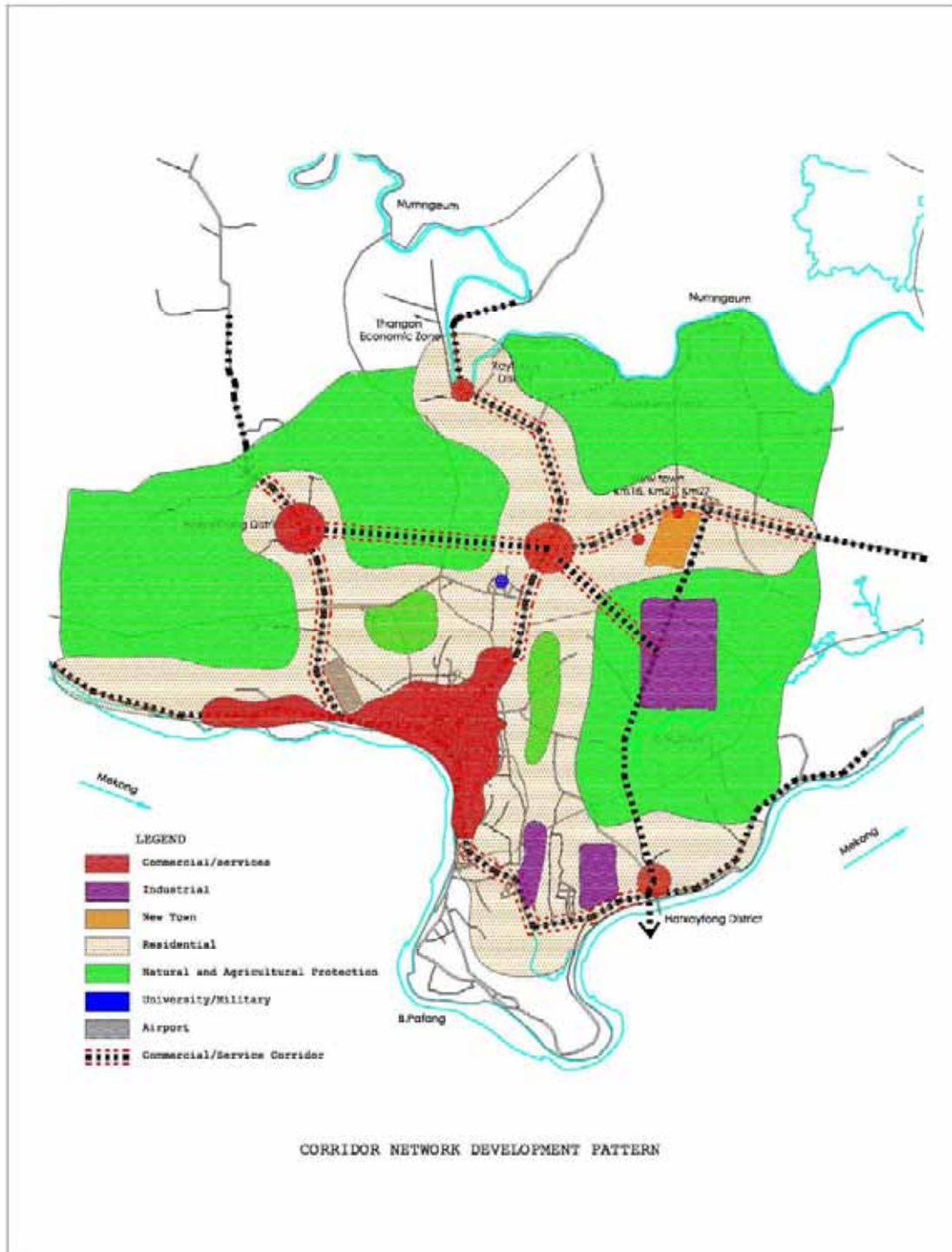


Figure 13.2-3 Concept of Corridor Network Development Pattern

### 13.3 SUMMARY OF DEVELOPMENT PATTERNS

Main features of the three development patterns can be summarized as follows:

#### Uncontrolled Pattern

- Development is not controlled.
- Thus, many of the existing protected zones will be converted into residential area
- Residential areas will spread requiring extensions of utility network including, power lines, water supply pipes and sewage pipes.

#### Controlled Finger Pattern

- To reduce the above problems of Uncontrolled Development, ‘Controlled Development’ is introduced.
- Development of the existing controlled zones is strictly controlled to preserve desirable environment.
- To prevent uncontrolled expansion of the urbanized area, densification of population is induced through such measures as easing building height regulation.

#### Corridor Network Development Pattern

- In addition to the Controlled Finger Pattern, developments along transport corridors are encouraged by strengthening of the trunk road network and public transport network along the trunk roads.
- Through these developments of along the transport corridors, employment along these corridors will be prompted reducing the concentration of traffic demand in the existing urbanized area and its surrounding areas.

Considering these, the Corridor Network Development Pattern is recommended as the future urban pattern of Vientiane.

### 13.4 VISION OF FUTURE VIENTIANE

After several discussions with the senior officials of the government of Vientiane, it is assumed that the common vision of future Vientiane among the senior officials is “**clean (clean air, clean water and clean town) and safe town**”. This vision is adopted as the base for the policy of this Study.

In addition, it is naturally assumed that Vientiane will continue to be the center of economic, social, cultural and political activities of the nation.

This future vision of Vientiane interpreted from the viewpoint of urban transport master plan to achieve the following targets:

- Smooth and safe traffic environment (safe town and support for economic and other activities)

- Good living environment (clean air through reduction of traffic congestion and reduction of use of private vehicles)
- Safe and convenient transport for vulnerable people (support for social and cultural activities)
- Good urban amenity (clean air and other good environment)

## **CHAPTER 14**

# **FUTURE SOCIO-ECONOMIC FRAMEWORK**

## **BY ZONE**

## **CHAPTER 14 FUTURE SOCIO ECONOMIC FRAMEWORK BY ZONE**

### **14.1 APPROACH**

In this chapter, socioeconomic indicators by traffic zone are presented. The selected indicators are:

- Population
- Number of employed persons by sector on residence base (ER)
- Number of employed persons by sector on working place base (EW)

The base year is 2007 and future target years are 2013, 2018 and 2025 corresponding to the short-term, medium-term and long-term plans of this Study. The population and the number of employed persons of Vientiane for years 2007, 2013, 2018 and 2025 described in Chapter 12 are used as the control total. The Vientiane total of ER by Zone is the same as the total of EW by Zone. ER of a Zone corresponds to Zone population, while EW distribution is almost unrelated to population distribution. EW concentrates to Zones of the central part of Vientiane. Ratios of EW to ER are more than 1 in Zones of the central part and less than 1 in rural Zones.

Three projection cases are prepared, corresponding to the Uncontrolled Pattern, the Planned Finger Pattern and the Corridor Network Development Pattern, shown in Chapter 13.

### **14.2 UNCONTROLLED PATTERN**

The future projection is based on the recent changing trend of population by Zone. As shown in Table 14.2-1, population of the Study Area will increase 244,863 from 2007 to 2025, while that of the Outer Zone will increase 237,597 during the same period.

The ER total of the Study Area will increase 211,498 from 2007 to 2025. The sector changes of ER are decrease of 6,249 for the agriculture, increase of 94,364 for the industry and increase of 123,383 for the services. As for the Outer Zone, the sector changes are: agriculture, decrease of 23,751; industry, increase of 38,037; services, 174,116.

The EW changes of the Study Area are: decrease of 5,958 for agriculture, increase of 114,305 for industry and increase of 256,420 for services. In the Outer Zones, the EW changes are: decrease of 24,042 for agriculture, increase of 18,095 for industry, and 41,080 for services.

The characteristics of the projection are summarized as follows:

- Population will disperse into the Outer Zone.

- ER and EW of the agriculture sector will decrease in both of the Study Area and the Outer Zone.
- ER of the industry and services sectors will increase corresponding to the population increases of the Study Area and the Outer Zone.
- EW increases of the industry and services sectors are concentrated in the Study Area.

### **14.3 CONTROLLED FINGER PATTERN**

The purpose of this pattern is to control the future population and employment distribution by expansion of the VUDAA area for land use regulation to the entire Study Area and to the neighboring area belonging to the Outer Zone. The development pattern is to form the medium density urban axes along the existing trunk roads pattern similar to the finger. For the future population distribution, it is intended to distribute more population than the trend pattern to the Study Area. The results of the projection are summarized in Table 14.3-1. The characteristics of the projection are as follows:

- Population increase of the Study Area is 316,143 from 2007 to 2025.
- That of the Outer Zone is 166,318 during the same period.
- ER and EW of the agriculture sector is the same as the Uncontrolled Pattern.
- ERs of industry and services will increase more than those of the Uncontrolled Pattern in the Study Area corresponding to the population increase, while in the Outer Zone the increase in ERs of industry and services are less than those of the Uncontrolled Pattern.
- EWs of industry and services also increased more in the Study Area and less in the Outer Zone.

### **14.4 CORRIDOR NETWORK DEVELOPMENT PATTERN**

This pattern intends to reflect the increase in the number of employed persons of the industry sector on working place base in the planned Khok Saat Industrial Area, which is located at Zone 307 and Zone 604. The other indicators are the same as the Controlled Finger Pattern. As the Industrial Area is located in the Outer Zone, the distribution of the number of employed persons is changed from the Controlled Finger Pattern as follows:

- EW of the industry sector in the Outer Zone in 2025 is assumed about 29,000, which is 13,000 more than that of the Controlled Finger Pattern
- It means a new industrial area development of about 400 ha in the Outer Zone.
- The industry EW in the Study Area is decreased the same number as the increase in the Outer Zone.

Population of 2007 and 2025 by district is shown in Figure 14.4-1.

Table 14.2-1 Future Socioeconomic Indicators for the Uncontrolled Pattern

2007											
	Area (ha)	Population	Density (ps/ha)	Number of Employed Persons (Residence Base)				No. of Employed Persons (Working Place Base)			
				Agriculture	Industry	Services	Total	Agriculture	Industry	Services	Total
Study Area	38,190.2	447,037	11.7	15,622	49,665	151,502	216,788	14,895	60,160	173,378	248,433
Outer Zone		309,503		97,578	16,235	35,998	149,812	98,305	5,740	14,122	118,167
Vientiane	392,000	756,540	1.93	113,200	65,900	187,500	366,600	113,200	65,900	187,500	366,600

2025											
	Area (ha)	Population	Density (ps/ha)	Number of Employed Persons (Residence Base)				No. of Employed Persons (Working Place Base)			
				Agriculture	Industry	Services	Total	Agriculture	Industry	Services	Total
Study Area	38,190.2	691,900	18.1	9,373	144,028	274,885	428,286	8,937	174,465	429,798	613,200
Outer Zone		547,100		73,827	54,272	210,115	338,214	74,263	23,835	55,202	153,300
Vientiane	392,000	1,239,000	3.16	83,200	198,300	485,000	766,500	83,200	198,300	485,000	766,500

2007-2025											
	Area (ha)	Population	Density (ps/ha)	Number of Employed Persons (Residence Base)				No. of Employed Persons (Working Place Base)			
				Agriculture	Industry	Services	Total	Agriculture	Industry	Services	Total
Study Area	0.0	244,863	6.4	-6,249	94,364	123,383	211,498	-5,958	114,305	256,420	364,767
Outer Zone	0.0	237,597	0	-23,751	38,037	174,116	188,402	-24,042	18,095	41,080	35,133
Vientiane	0.0	482,460	1.23	-30,000	132,400	297,500	399,900	-30,000	132,400	297,500	399,900



Table 14.3-1 Future Socioeconomic Indicators for the Controlled Finger Pattern

2007											
	Area (ha)	Population	Density (ps/ha)	Number of Employed Persons (Residence Base)				No. of Employed Persons (Working Place Base)			
				Agriculture	Industry	Services	Total	Agriculture	Industry	Services	Total
Study Area	38,190.2	447,037	11.7	15,622	49,665	151,502	216,788	14,895	60,160	173,378	248,433
Outer Zone		309,503		97,578	16,235	35,998	149,812	98,305	5,740	14,122	118,167
Vientiane	392,000	756,540	1.93	113,200	65,900	187,500	366,600	113,200	65,900	187,500	366,600

2025											
	Area (ha)	Population	Density (ps/ha)	Number of Employed Persons (Residence Base)				No. of Employed Persons (Working Place Base)			
				Agriculture	Industry	Services	Total	Agriculture	Industry	Services	Total
Study Area	38,190.2	763,180	20.0	9,373	158,866	304,170	472,409	8,937	180,799	442,870	632,607
Outer Zone		475,821		73,827	39,434	180,830	294,091	74,263	17,501	42,130	133,893
Vientiane	392,000	1,239,000	3.16	83,200	198,300	485,000	766,501	83,200	198,300	485,000	766,500

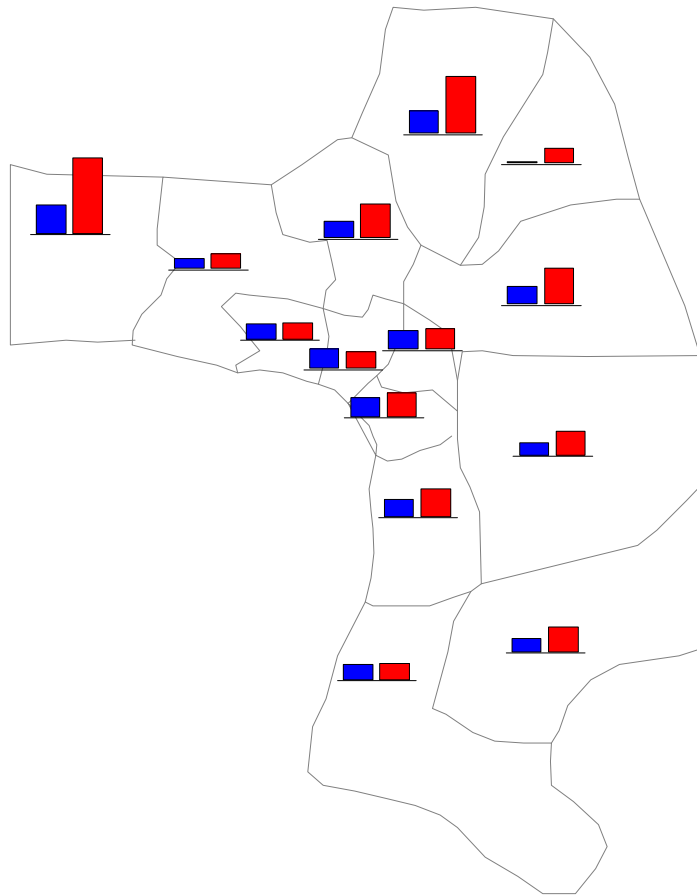
2007-2025											
	Area (ha)	Population	Density (ps/ha)	Number of Employed Persons (Residence Base)				No. of Employed Persons (Working Place Base)			
				Agriculture	Industry	Services	Total	Agriculture	Industry	Services	Total
Study Area	0.0	316,143	8.3	-6,249	109,201	152,668	255,621	-5,958	120,639	269,492	384,174
Outer Zone	0.0	166,318	0	-23,751	23,199	144,832	144,279	-24,042	11,761	28,008	15,726
Vientiane	0.0	482,460	1.23	-30,000	132,400	297,500	399,901	-30,000	132,401	297,500	399,900

Table 14.4-1 Future Socioeconomic Indicators for the Corridor Network Development Pattern

2007											
	Area (ha)	Population	Density (ps/ha)	Number of Employed Persons (Residence Base)				No. of Employed Persons (Working Place Base)			
				Agriculture	Industry	Services	Total	Agriculture	Industry	Services	Total
Study Area	38,190.2	447,037	11.7	15,622	49,665	151,502	216,788	14,895	60,160	173,378	248,433
Outer Zone		309,503		97,578	16,235	35,998	149,812	98,305	5,740	14,122	118,167
Vientiane	392,000	756,540	1.93	113,200	65,900	187,500	366,600	113,200	65,900	187,500	366,600

2025											
	Area (ha)	Population	Density (ps/ha)	Number of Employed Persons (Residence Base)				No. of Employed Persons (Working Place Base)			
				Agriculture	Industry	Services	Total	Agriculture	Industry	Services	Total
Study Area	38,190.2	763,180	20.0	9,373	158,866	304,170	472,409	8,937	167,665	442,870	619,472
Outer Zone		475,821		73,827	39,434	180,830	294,091	74,263	30,635	42,130	147,028
Vientiane	392,000	1,239,000	3.16	83,200	198,300	485,000	766,501	83,200	198,300	485,000	766,500

2007-2025											
	Area (ha)	Population	Density (ps/ha)	Number of Employed Persons (Residence Base)				No. of Employed Persons (Working Place Base)			
				Agriculture	Industry	Services	Total	Agriculture	Industry	Services	Total
Study Area	0.0	316,143	8.3	-6,249	109,201	152,668	255,621	-5,958	107,505	269,492	371,039
Outer Zone	0.0	166,318	0	-23,751	23,199	144,832	144,279	-24,042	24,895	28,008	28,861
Vientiane	0.0	482,460	1.23	-30,000	132,400	297,500	399,901	-30,000	132,400	297,500	399,900



LEGEND:



District	L Zone	Y2007	Y2025	Y2025/Y2007
Chanthabouli 1	1	38,111	32,554	0.85
Chanthabouli 2	2	33,221	62,871	1.89
Sikhotabong 1	3	29,823	32,065	1.08
Sikhotabong 2	4	21,049	29,815	1.42
Sikhotabong 3	5	53,224	136,104	2.56
Saysettha 1	6	36,856	40,696	1.10
Saysettha 2	7	34,225	67,179	1.96
Saysettha 3	8	24,037	46,484	1.93
Sisatthanak 1	9	36,468	44,623	1.22
Sisatthanak 2	10	34,837	53,976	1.55
Hathsayfong 1	11	28,617	32,831	1.15
Hathsayfong 2	12	27,721	48,683	1.76
Xaythny 1	13	42,712	106,025	2.48
Xaythny 2	14	6,137	29,273	4.77
<b>Study Area Total</b>		<b>447,038</b>	<b>763,179</b>	<b>1.71</b>

Figure 14.4-1 Population in Year 2007 and 2025

## 14.5 HOUSEHOLD INCOME AND VEHICLE OWNERSHIP

### 14.5.1 Household Income

Household income in Vientiane is estimated to be 4.04 times larger than that for 2025. With increase of household income, car and motorcycle will drastically increase in Vientiane. To forecast the car and motorcycle ownership, the cross sectional analysis of car and motorcycle ownership by income level derived from Person Trips Survey was applied.

### 14.5.2 Household Car Ownership Rate

Household car ownership correlates highly with household income in this case. Based on the Person Trip Survey data, the average household car ownership rate in 2007 was 40.8%, while the average household income was 3.4 million KIP per month.

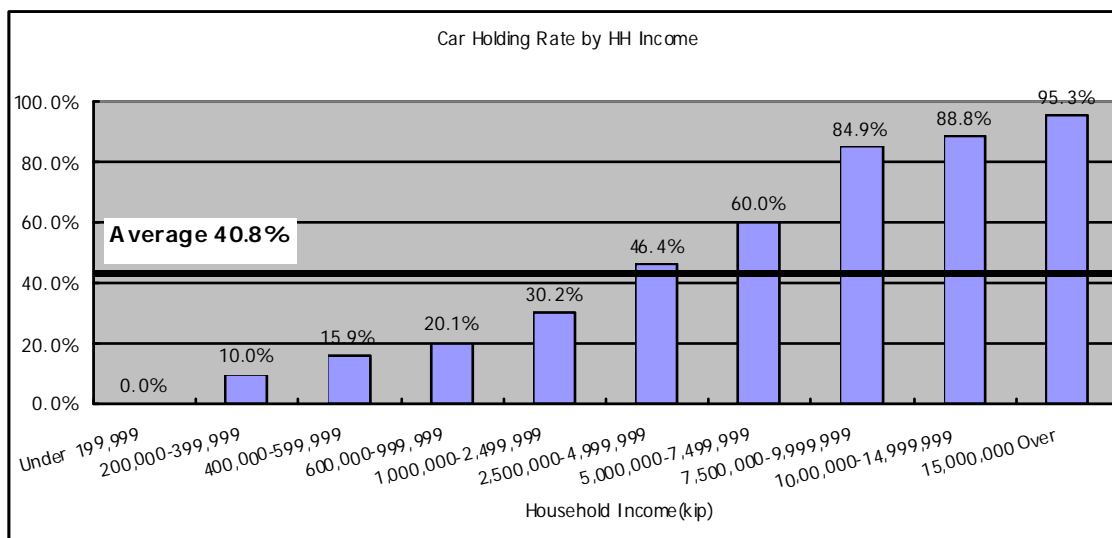


Figure 14.5-1 Car Ownership Rate by Household Income

The relationship between household car ownership and income is shown in Figure 14.5-2. The modes is express in the following function:

$$\text{Rate\_Car} = y = 0.0046x^2 + 0.0637x - 0.0768$$

Where,

Rate\_Car: Household Car Ownership Rate

Income: Household Income Class

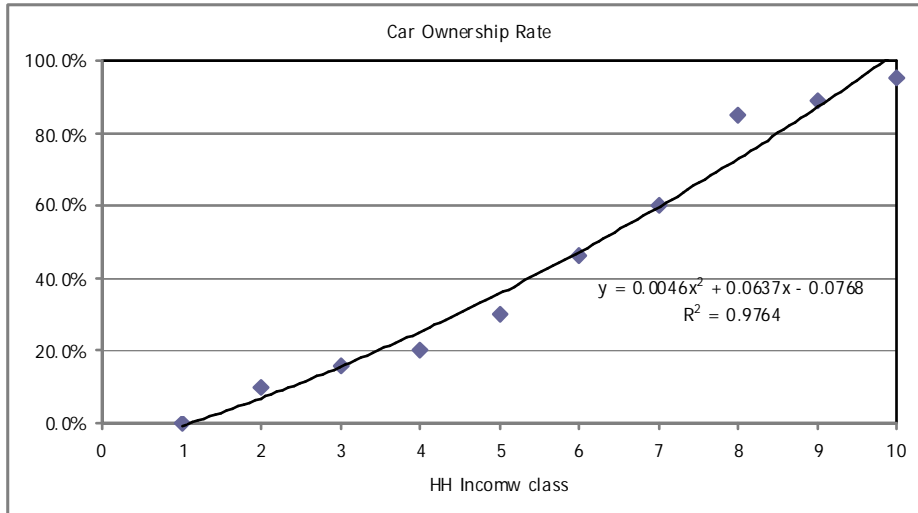


Figure 14.5-2 Household Car Ownership Rate Model

### 14.5.3 Household Motorcycle Ownership Rate

In income class of less than 7.5 million KIP per month, household motorcycle ownership increase also correlates highly with household income shown in Figure 14.5-3. In high income class of more than 7.5 million KIP per month, household motorcycle ownership decrease with household income. It is thought that the high income class uses mainly the private car, not motorcycle. Based on the Person Trip Survey data, the average household motorcycle ownership rate in 2007 was 2.23, while the average household income was 3.4 million KIP per month.

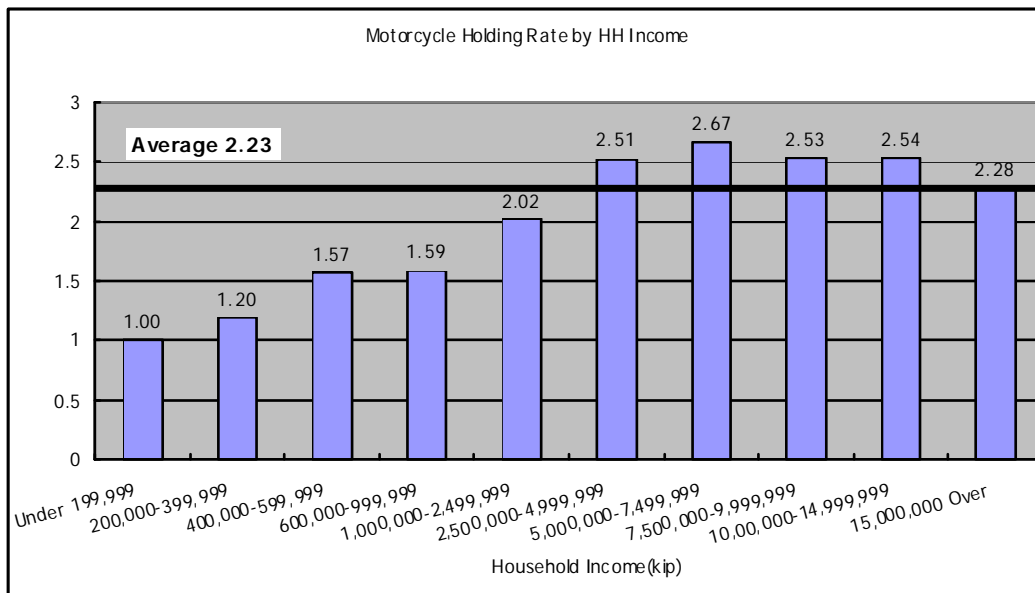


Figure 14.5-3 Motorcycle Ownership Rate by Household Income

#### 14.5.4 Forecasting Future Household Car and Motorcycle Ownership Rate

As shown in Table 14.5-1, forecasting the future household car ownership rate using the above function and the future household income indicates a steady increase from 40.8% in 2007, to 49.4% in 2013, 61.9% in 2018 and 84.0% in 2025, the target year of the Master Plan. As same as above, future household motorcycle ownership rate increase from 2.23 in 2007, to 2.51 in 2013, 2.45 in 2018 and 2.40 in 2025

Table 14.5-1 Future Household Car and Motorcycle Ownership Rate in Study Area

	2007	2013	2018	2025
GDP per capita(Vientiane) (US\$)	957 (1.00)	1,435 (1.50)	2,168 (2.27)	3,870 (4.04)
Number of household	81,470	103,702	123,731	152,245
Population 6 & above	379,982	481,238	569,822	692,204
Car ownership rate per household	40.8%	49.4%	61.9%	84.0%
Number of private car	33,240 (1.00)	51,228 (1.54)	76,618 (2.30)	127,956 (3.85)
Number of MC rate per household	2.23	2.51	2.45	2.40
Number of motorcycle	181,294 (1.00)	260,693 (1.43)	303,184 (1.67)	365,831 (2.02)

MC: Motorcycle

Note: Number of private car and motorcycle is estimated by Person Trip Survey data.