

**Siem Reap Provincial Government
Kingdom of Cambodia**

**The Follow-up Study on
Integrated Master Plan for
Sustainable Development of Siem Reap City
in
the Kingdom of Cambodia**

Final Report

June 2010

JAPAN INTERNATIONAL COOPERATION AGENCY

**PACET CORPORATION
NIPPON KOEI CO., LTD.**

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PREFACE

In response to a request from the Royal Government of Cambodia, the Government of Japan decided to conduct “The Study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town in the Kingdom of Cambodia” and entrusted the Study to the Japan International Cooperation Agency (JICA). The Study was completed in March 2006.

As a follow-up cooperation of the above mentioned study, JICA conducted the Follow-up Study on Integrated Master Plan for Sustainable Development of Siem Reap City in the Kingdom of Cambodia. JICA sent a study team headed by Mr. Kanao ITOH of PACET Corp. to Cambodia from February 2010 to May 2010.

The team held discussions with the officials concerned in the Royal Government of Cambodia, and conducted field surveys in the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to sustainable development of Siem Reap City and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials of the Government and those concerned in Cambodia for the close cooperation they have extended to the study.

June 2010

Yasujiro SUZUKI
Chief Representative
Japan International Cooperation Agency

Mr. Yasujiro SUZUKI
Chief Representative
Cambodia Office
Japan International Cooperation Agency

June 2010

Letter of Transmittal

Dear Mr. Suzuki,

We are pleased to formally submit herewith the final report entitled “The Follow-up Study on Integrated Master Plan for Sustainable Development of Siem Reap City in the Kingdom of Cambodia”.

This report compiles the results of the study, which was undertaken in the Kingdom of Cambodia from February 2010 to May 2010 by the Follow-up Study Team organized jointly by PACET Corp. and Nippon Koei Co., Ltd. under the contract with JICA.

We had been assisted by many people for the accomplishment of the Follow-up Study, especially from Siem Reap Provincial Government and Siem Reap Urban Development Technical Committee. And we have also received cooperation of the following agencies: MPWT (Ministry of Public Works and Transport), DPWT (Department of Public Works and Transport), MLMUPC (Ministry of Land Management, Urban Planning and Construction), DLMUPC (Department of Land Management, Urban Planning and Construction), MOT (Ministry of Tourism), DOT (Department of Tourism), APSARA Authority and Siem Reap Municipal Government, etc. In addition, we would like to express our sincere gratitude and appreciation to many others who assisted the Follow-up Study and helped to ensure the selection of the proper projects.

Also we acknowledge the effective assistance by all the officials of your agency and the Embassy of Japan in the Kingdom of Cambodia.

We hope that this report will contribute to the realization of appropriate measures for the further development of Siem Reap City.

Very truly yours,



Kanao ITOH
Team Leader, JICA Follow-up Study Team
The Follow-up Study on Integrated Master Plan for
Sustainable Development of Siem Reap City in the Kingdom
of Cambodia

Executive Summary

1 Introduction

Siem Reap has the World Heritage Site of Angkor, and is the most popular tourist destination in the Kingdom of Cambodia. However, sharp increase of the number of tourists has accelerated urbanization in Siem Reap. In 2008, population in Siem Reap City was 170,000. In the past ten years, population in Siem Reap City increased 70%.

The Royal Government of Cambodia (RGC) and Japan International Cooperation Agency (JICA) had foreseen this rapid urbanization in Siem Reap City. Based on the agreement between RGC and JICA, JICA had conducted the Study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town (the M/P Study with the future vision for Siem Reap in the year 2020) from 2004 to 2006. To realize the vision, 69 projects/programs had been proposed. Several project/programs and some actions have already been taken. However, projects/programs in the Transportation sector and Urban Development sector have not been progressed yet.

In this context, Follow-up Study on Integrated Master Plan for Sustainable Development of Siem Reap City (the Follow-up Study) was conducted, aiming at the realization of the M/P development plan for the transportation sector and urban development sector.

The objectives of the Follow-up Study are to;

- Review the progress of the M/P Study;
- Review the development plans of Urban Development Sector and Transportation Sector of the M/P Study; and
- Update of the development plans, including the priority projects

The Study area covers the jurisdiction of Siem Reap Municipality.

- Siem Reap was upgraded to “Municipality” from “District” in 2008 and has thirteen Sangkats (communes).
- The City Center area is focused on Old Quarter area and peri-urban area, and extended to the surroundings area.
- Arterial road network is the same area as the M/P Study, and extend to the surrounding area.

The Follow-up Study was commenced in February 2010 and was completed in June 2010. The major components of the Follow-up Study were; an analysis of the current situation, review of the progress of the M/P, review of priority projects and reporting.

2 Current Development Status of Siem Reap after the M/P Study

2.1 Socioeconomic changes and its impact (tourism sector and affected fields)

Historical and cultural tourism in Siem Reap and Angkor Area was initiated and enhanced by increasing international tourists. International tourist arrivals were rapidly increased as sky rocketing from around 83,000 in 1999 to 560,000 tourist in 2004 (6.75 times as 1999, 46% per annum). In 2009, international tourist arrivals into the area were 998,000.

Domestic tourism activities in Siem Reap and Angkor area were started from 1999. At that time, the government promoted and enhanced millennium tourism through events in Siem Reap.

Because of this government's effort, number of domestic tourist arrivals was rapidly increased from 230,378 in 1999 to 1,279,356 in 2009 (40% of average annual growth rate in the past 15 years).

Population of the original 10 communes in Siem Reap District increased from around 99,000 in 1998 to 198,000 in 2009, which was double in 1998 and 6.5% per annum. Population growth rate of 6.5% per annum of the District was counted around 3.8 times as 1.7% per annum national population growth rate (UN data 2005-2010). Most of additional increased population were commuters from surroundings and settled in the existing City Center or urbanized areas, or Zone 1 and 2 of Angkor Archeological Park (AAP). Therefore, population density was getting higher in the City Center area and surrounding urbanized area.

Siem Reap Municipality was upgraded from district with additionally including three (3) communes of Tiuk Vil (western part of Zone 1/2 and suburb), Krabeireil (southwest suburb), and Ampil (eastern part of Zone 2). Total population of those three communes in 2009 were 25,557. Total Municipal population of 13 commune (sangkat) is counted 223,376 in 2009.

Considering conditions on tourist arrivals and population in Siem Reap mentioned above, socioeconomic framework is modified. Table 1 shows comparison of socioeconomic framework of the M/P and the Follow-up Study.

Table 1 Modified Socioeconomic Framework

Study Title		2009	2012	2020
The M/P Study	International Tourist		1,648,000	2,007,000
	Domestic Tourist		572,000	795,000
	Population (10 commune)		171,000	211,000
The Follow-up Study (Modified)	International Tourist	998,000	1,650,000	2,000,000
	Domestic Tourist	1,300,000	1,620,000	2,500,000
	Population (13 commune)	183,000	200,000	251,000

Source: The M/P Study and the Follow-up Study

2.2 Changes and trend of urban structure and area

Urbanized area of Siem Reap City in 2005, where is dense area, was spread mainly along NR6 and in and surrounding the central business district (CBD). Most of the new buildings/structures constructed between 2005 and 2008 are located mainly the fringe of the dense area as of 2005 and inside the ring road and the northern part of NR6. Therefore it cannot be recognized there is noticeable expansion/sprawling of the urban area of the City. However, some large scale developments have been and/or are implemented in and near the City.

Hotels and guesthouses have been continuously and rapidly constructed along NR6 and Zone 3 in between the City Center area and AAP and in the fringe area of CBD within the City Center area after preparation of the M/P. Therefore, residential area in the City Center area is rapidly changing to mixed use of tourism and residential. Number of restaurants also increased from 90 to 120 after development of the M/P. Most of the restaurants increased have been constructed in the old market area and along Sivatha Road and NR6.

3 Progress of the Proposed Projects/Programs in the M/P

69 projects/programs in 11 sectors were proposed in the M/P. Of which, progress of proposed

projects/programs in urban sector and transportation sector is as follows.

3.1 Progress of the Proposed Projects/Programs in Urban Sector

Five (5) projects/programs have been proposed in urban sector in the M/P. Table 2 shows progress of projects/programs proposed in urban sector in the M/P.

Table 2 Progress of Proposed Projects/Programs in Urban Sector

Project ID	Title	Progress / Remark	Progress Status
U-1	City Center area improvement	UDTC discussed the improvement of the City Center area. APSARA Authority has some plans supported by AFD. (pedestrian bridge, roadside tree etc.) Most part of the sidewalk in the Old Quarter area has been improved.	△
U-2	Urban planning capacity building	Land Use Plan of Siem Reap District had already completed by Siem Reap District with support from DED. A JICA urban management advisor has been dispatched for Siem Reap Province. A JICA senior volunteer in urban planning has been dispatched for APSARA Authority. A JICA volunteer in GIS has been dispatched for APSARA Authority.	△
U-3	Inventory for historical architectures	APSARA Authority will conduct an inventory survey for historical architectures with support from AFD.	△
U-4	Residential development promotion	Some housing estates have been developed. However they are not affordable for local people.	△
U-5	Cultural and Tourism Zone development	Some tourist spots, such as convention center, Sihanouk Museum (AEON), etc., have been developed. Land acquisition has been progressing by APSARA Authority. However no hotel development is in progress.	△

△: There are some progresses.

Source: The Follow-up Study

A program of “U-1 City Center Area Improvement” consisted of eight (8) components/projects. Progress of those 8 components/projects is as follows.

Table 3 Progress of City Center Area Improvement

No	Title	Progress / Remark
1	Improvement of Sidewalk	About 3km (Sivatha Street and streets within Old Quarter Area) Have been improved already. However some of them are unpaved and/or very narrow.
2	Tree lining in Old Market area	About 2km (Sivatha Street and streets within Old Market) More than half of proposed parts of tree lining have been completed.

3	Improvement of street lighting	Street lights along all streets proposed in the M/P have been installed except for one (1) street.
4	Construction of an urban park	No progress.
5	Redevelopment of the Provincial Hospital Area	No progress.
6	Redevelopment of the crowded area in city center	No progress.
7	Improvement of pavement of urban roads	About 10.5km (mostly in peri-urban area) About 80% of the proposed urban roads have been improved.
8	New construction of roads	About 1.1km (for east and south boundary of peri-urban area) Has not been implemented yet.

Source: The Follow-up Study

3.2 Progress of the Proposed Projects/Programs in Transportation Sector

Ten (10) projects/programs have been proposed in the M/P. Table 4 shows progress of projects/programs proposed in transportation sector in the M/P.

Table 4 Projects/Programs proposed in Transportation Sector

Project ID	Title	Progress / Remark	Progress Status
TR-1	French Bridge improvement	A new bridge has been constructed at about 270m upstream from the French Bridge and used as one way route from west to east. The French Bridge is also used as one way route from east to west.	○
TR-2	Sub-arterial road network (Phase 1)	Only a little part of proposed roads have been paved. However, most of the parts are not in progress.	△
TR-3	Sub-arterial road network (Phase 2)	Hun Sen Peace Road has been upgraded in Jan. 2010. The road is assigned as “Siem Reap Bypass Road,” and heavy vehicles are requested to pass the bypass road instead of entering into the City Center via NR-6. The bypass road is a toll road, charging a toll to heavy vehicles only and operated by APSARA Authority.	○
TR-4	Sub-arterial road network (Phase 3)	Some parts of roads network have been completed. However, most parts have not been completed yet.	△
TR-5	Sub-arterial road network (Phase 4)	Some parts of roads network have been completed. However, most parts have not been completed yet.	△
TR-6	Institutional improvement for road safety	There are eight (8) action plans. There is no remarkable attainment.	△
TR-7	Rural heritage road network rehabilitation	Majority of the rural heritage road network have already been improved. Some sections are now under construction.	△
TR-8	Environmental public transport	50 electric cars are in operation in AAP. Increase of electric cars is planned by Tourism Department of APSARA Authority.	△

TR-9	Bicycle track construction	There is no progress.	×
TR-10	Institutional improvement for efficient road maintenance	There are three (3) action plans. These are not implemented.	×

○: completed, △: There are some progress, ×: There is no progress.

Source: The Follow-up Study

TR-1 and 2 have been completed, however, TR-9 and 10 have not been implemented yet. Some progresses have been seen at remaining six (6) projects.

4 Development Plan of the Selected Sector

Development/improvement plans of City Center area improvement and Transportation sector are as follows.

4.1 City Center Area Improvement Plan

The City Center area in Siem Reap City is the planning area in the Follow-up Study. To improve the City Center area, 4 programs and 16 projects are proposed. Among those programs/projects, 9 projects in 4 programs are selected as priority projects in urban sector. Of which, 3-1 conservation of urban heritage & old street tree and 3-3 conservation and improvement of riverside area were already committed implementation by AFD.

Table 5 Priority Projects/programs selected in City Center Area Improvement

Program	Project
Enhancing Urban Tourism Attractiveness and its Urban Function	1-1 Improvement Streets in Old Market Area with Trigger Pilot Project
	1-2 Development of Small Corner Parks in Old Market Area
	1-3 Organizing Task Force for Old Market Area Improvement with Organized Local Community
Strengthening Mobility Management	2-1 Integrated Traffic Management (public parking, walk-free zone, one-way control, etc)
Conserving and Utilizing Natural and Urban Heritages	3-1 Conservation of Urban Heritage & Old Street Tree
	3-2 Improvement of Urban Heritage Information Board
	3-3 Conservation and Improvement of Riverside Area
Enhancing Urban Management and its Capacity in Efficient Land Use and Revitalization	4-1 Capacity Development for Urban Planning and its implementation (control and guide)
	4-2 Strengthening Coordination and Cooperation Mechanism among Urban Planning/Development Authorities regarding Siem Reap City

Source: The Follow-up Study

4.2 Road Development Plan

Nine (9) projects/programs are proposed in the Follow-up Study. Among them, four (4) projects/programs are selected as priority projects/programs. Table 6 shows priority projects/programs in transportation sector.

Table 6 Priority Projects/programs selected in Transportation Sector

No	Proposed Projects/Programs
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1	Improvement of Sub-arterial Road Network within the NR6 and the Ring Road
2	Improvement of Sub-arterial Road Network outside the Ring Road
3	Construction of Sub-arterial Road Parallel to NR6
4	Rural Heritage Network Rehabilitation Project

Source: The Follow-up Study

5 Conclusions and Recommendations

5.1 Implementation of Priority Projects/Program

Table 7 shows cost estimate and implementation/responsible body of priority projects/programs selected.

Table 7 List of Priority Projects/Programs in City Center Area Improvement and Transportation Sector

Priority Projects/Programs		Responsible Agency (Member of Taskforces)	Cost (,000 US\$)
City Center Area Improvement			
Enhancing Urban Tourism Attractiveness and its Urban Function	Improvement Streets in Old Market Area with Trigger Pilot Project	DPWT (PG, PS, PPO)	1,680
	Development of Small Corner Parks in Old Market Area	DPWT / DTC (PG, MG, LDs)	50
	Organizing Task Force for Old Market Area Improvement with Organized Local Community	PG / MG (PS)	10
Strengthening Mobility Management	Integrated Traffic Management (public parking, walk-free zone, one-way control, etc)	DPWT / PPO (PG, MG, DH, PS)	1,110
Conserving and Utilizing Natural and Urban Heritages	Conservation of Urban Heritage & Old Street Tree	PG / APSARA	AFD
	Improvement of Urban Heritage Information Board	DCA / APSARA	31
	Conservation and Improvement of Riverside Area	APSARA	AFD
Enhancing Urban Management and its Capacity in Efficient Land Use and Revitalization	Capacity Development for Urban Planning and its implementation (control and guide)	DLMUPC / MG (PG, APSARA)	540
	Strengthening Coordination and Cooperation Mechanism among Urban Planning/Development Authorities regarding Siem Reap City	PG (MG, LDs, APSARA)	372
Sub-total of Urban Sector			3,793
Transportation Sector			
Improvement of Sub-arterial Road Network within the NR6 and the Ring Road		DPWT	52,300
Improvement of Sub-arterial Road Network outside the Ring Road		DPWT	23,600
Construction of Sub-arterial Road Parallel to NR6		DPWT	11,500
Rural Heritage Network Rehabilitation Project		DPWT	40,000
Sub-total of Transportation Sector			127,400
Total			131,193

Legend: PG = Provincial Government, LDs= Line Departments, MG = Municipal Government, PS = Private Sector, DLMUPC = Dept Land Management, Urban Planning and Construction, DPWT = Dept Public Works and Transportation, DT = Dept Tourism, DTC = Dept Trade and Commerce, DH = Dept Health, DCA = Dept Culture and Art, DC=Development Committee, PPO = Province Police Office, TFFT=Taskforce for Tourism Transportation, TFOMAI=Taskforce for Old Market Area Improvement, TFUGM=Taskforce for Urban Growth Management

Source: The Follow-up Study

Urban Development Technical Committee (UDTC), which has already been established, is proposed to grade up to as an Urban and Tourism Development Technical Committee (UTDTC)

under the Provincial Development Committee (DC).

For smooth and proper execution of multi-sector urban and tourism development, taskforces are proposed to be organized for each proposed program and project from executive agencies and related government agencies of UTDTTC members.

Necessary financial resources for implementation of priority projects should be secured by a combination of loan for road/infrastructure/facility development projects and technical assistances for soft programs from potential donors under a strong ownership and leadership of provincial government with responsibility of related execution agencies in the region. Tourism sector loan system will be a potential mean to realize the proposed tourism infrastructure/facility development programs and projects from a view point of financial and economic feasibility with improved and strengthened taxation and collection system. Proposed soft programs of capacity development and plan formulation, etc will be covered by a part of a loan project or grant technical cooperation schemes of potential donors.

5.2 Further Issues

Relocation of Provincial Government buildings to Zone 2

Urban expansion of Siem Reap was clearly set to south-east direction and the southern part of area from NR6 in the M/P. The new government offices, however, are located in Zone 2 of the conservation zoning and on the north-eastern fringe of new Siem Reap City jurisdiction, and the access road from NR6 in Prasat Bakong District to the new offices located at north of NR6 is improved. It may impact on direction of urbanization set in the M/P and the conservation zoning in AAP. Future urban development activities has to be carefully managed and controlled to avoid conflict with conservation and preservation of Zone 1, 2 and 3 of AAP.

Jurisdiction of Siem Reap City

The newly established Siem Reap City with 13 sangkats jurisdiction should be reviewed to avoid follow issue.

- In order to coordinate with the coverage area of the newly formulating and enacting Zoning Plan in the eastern area of the city, urbanize area of zoning plan covers beyond the city jurisdiction and adjacent commune in Prasat Bakong District.

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Abbreviations and Glossary

AAP	Angkor Archaeological Park
AC	Asphalt Concrete
ADB	Asian Development Bank
AFD	Agence Française de Développement
ASEAN	Association of SouthEast Asian Nations
BOT	Build Operate Transfer
CBD	Central Business District
CPs	Counterparts
DBST	Double Bituminous Surface Treatment
DC	Development Committee
DCA	Department of Culture and Art
DD	Detailed Design
DED	Deutschen Entwicklungsdienstes/German Development Service
DFR	Draft Final Report
DH	Department of Health
DLMUPC	Department of Land Management, Urban Planning and Construction
DOIMAE	Department of Industry Mine and Energy
DOT	Department of Tourism
DPWT	Department of Public Works and Transport
DTC	Department of Trade and Commerce
FR	Final Report
GIS	Geographical Information System
GMS	Greater Mekong Subregion
ICR	Inception Report
JICA	Japan International Cooperation Agency
JST	JICA Study Team
KHR	Khmer Riel
M/P	Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town
MLMUPC	Ministry of Land Management, Urban Planning and Construction
MOI	Ministry of Interior
MOT	Ministry of Tourism
MPWT	Ministry of Public Works and Transport
NR	National Road
ODA	Official Development Assistance
PDRD	Provincial Department of Rural Development
PPO	Province Police Office
RGC	The Royal Government of Cambodian
SC	Steering Committee
SHM	Stakeholder Meeting
SRIA	Siem Reap International Airport
SRMG	Siem Reap Municipal Government
SRPG	Siem Reap Provincial Government
SRWSA	Siem Reap Water Supply Authority

TC	Technical Committee
TFOMAI	Task Force for Old Market Area Improvement
UDTC	Urban Development Technical Committee
UTDTC	Urban and Tourism Development Technical Committee
WG	Working Group

1 Introduction

1.1 Background of the Follow-up Study

Siem Reap has the World Heritage Site of Angkor, and is the most popular tourist destination in the Kingdom of Cambodia. However, sharp increase of the number of tourists has accelerated urbanization in Siem Reap. In 2008, population in Siem Reap province was 890,000 and population in Siem Reap City was 170,000. In the past ten years, population in Siem Reap City increased 70%. The Royal Government of Cambodia (RGC) and Japan International Cooperation Agency (JICA) foresee this rapid urbanization and recognized a great need for an integrated plan to develop the economy, to build necessary infrastructures and, to maintain the quality of the tourism resources and environment in Siem Reap City. Based on the agreement between RGC and JICA, JICA conducted the Study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town (the M/P Study) from 2004 to 2006.

The M/P Study set the future vision for Siem Reap in the year 2020 as “Siem Reap/Angkor Town 2020” to be “A beautiful and unique tourist city based on a harmony of history, arts and nature of Khmer.” Six (6) strategies were presented towards the vision, such as [1] Promoting Tourism Focused on Up-market, [2] Maximizing Local Benefits from Tourism, [3] Making Town More Attractive to Tourists, [4] Making Town More Sustainable in Environment, [5] Strengthening Infrastructure for Tourists and People, [6] Strengthening Local Administration and Finance. To realize the vision, 69 projects/programs based on the above six (6) strategies were proposed.

From May 2008, a JICA Urban Management Adviser has been dispatched to strengthen the urban management and coordination capacity in the Siem Reap Provincial Government (SRPG) and now being implemented the activities such as establish the Siem Reap Urban Development Technical Committee (UDTC) and so on.

Almost four (4) years passed after the completion of the M/P Study, several project/programs and some actions have been taken in the water resource/water supply sector and sewerage/drainage sector. However, projects/programs in the Transportation sector and Urban Development sector have not been progressed yet. Although the road network development/improvement in the urban area was proposed in line with the “[Strategy 5]: Strengthening Infrastructure for Tourists and People”, detailed plan has not been made and thus the plan has not been implemented. While, the City Center area development projects/programs, which are crucial for achievement of the “[Strategy 3]: Making town more attractive to tourists” has not been realized yet though this matter has been discussed in the UDTC.

In this context, Follow-up Study on Integrated Master Plan for Sustainable Development of Siem Reap City (the Follow-up Study) was conducted, aiming at the realization of the M/P development plan for the transportation sector and urban development sector.

1.2 Objectives of the Study

The objectives of the Follow-up Study on Integrated Master Plan for Sustainable Development of Siem Reap City in the Kingdom of Cambodia are to;

- Review the progress of the M/P Study;
- Review the development plans of Urban Development Sector and Transportation Sector of the M/P Study; and
- Update of the development plans, including the priority projects

1.3 Study Area

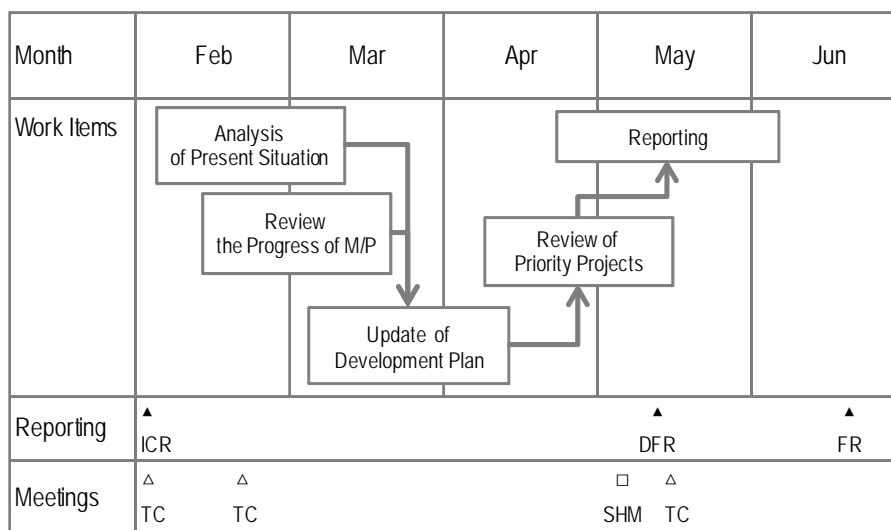
The Follow-up Study area covers the jurisdiction of Siem Reap Municipality.

- Siem Reap was upgraded to “Municipality” from “District” in 2008 and has thirteen Sangkats (communes).
- The City Center area is focused on Old Quarter Area and peri-urban area, and extended to the surroundings area.
- Arterial road network is the same area as the Master Plan Study, and extend to the surrounding area.

1.4 Study Overview

1.4.1 Study Schedule

The Follow-up Study was commenced in February 2010 and was completed in May 2010. The major components of the Follow-up Study were; an analysis of the current situation, review of the progress of the M/P, review of priority projects and reporting. Three (3) UDTC and one Stakeholder’s Meeting (SHM) were held as shown in below.



Source: The Follow-up Study

Figure 1.1 Study Schedule

Table 1.1 List of Meeting

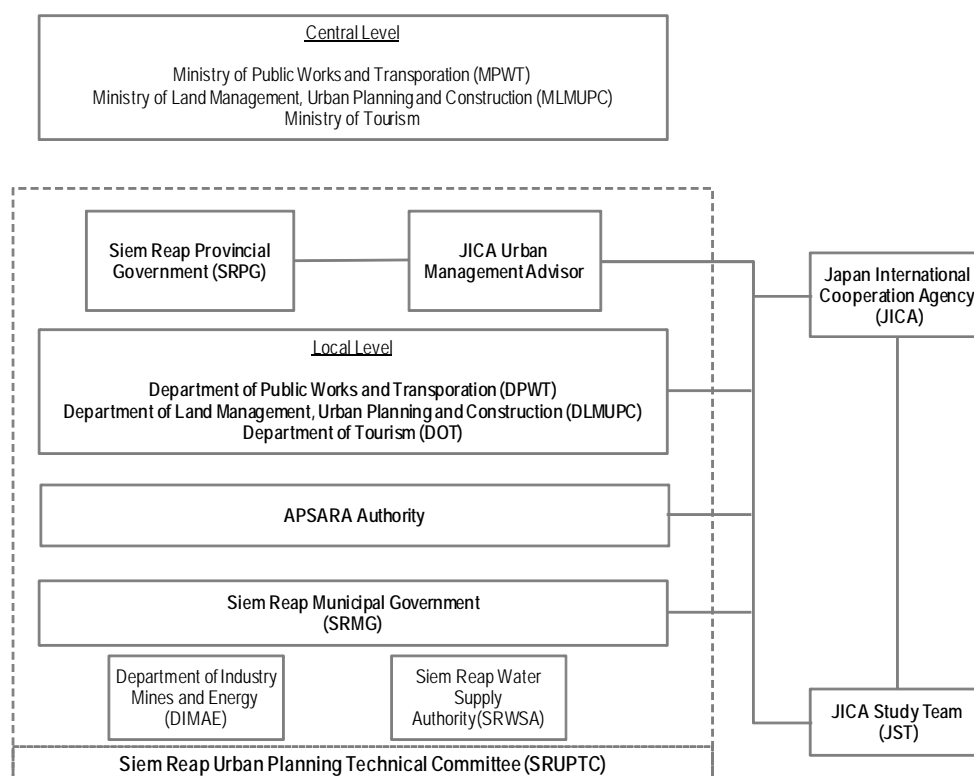
	Date	Topics	Participants
5 th TC	February 11, 2010	- Discussion on ICR	UDTC member
6 th TC	February 25, 2010	- Result of traffic survey - Report on Progress	JST
7 th TC	May 10, 2010	- Discussion on DFR	
SHM	May 5, 2010	- Discussions and exchange ideas for the City Center area improvement - Preliminary building consensus for future direction of improvement	UDTC member JST Commune leader, etc.

Source: The Follow-up Study

1.4.2 Organization Structure

The Follow-up Study organization has the following structure. The Siem Reap Provincial Government (SRPG) is a counterpart agency for this Follow-up Study. APSARA Authority, Department of Public Works and Transport (DPWT), Department of Land Management, Urban Planning and Construction (DLMUPC), Department of Tourism (DOT), and Siem Reap Municipal Government (SRMG) are the related agencies.

For the mature communication among the related organizations, the JST utilized the UDTC to discuss the Study progress. UDTC is formed by officials from eight organizations, i.e. SRPG, APSARA, DPWT, DLMUPC, DOT, SRMG, Siem Reap Water Supply Authority (SRWSA), and Department of Industry Mines and Energy (DIME).



Source: The Follow-up Study

Figure 1.2 Organization Structure for the Study

1.5 Structure of this Report

The main report consists of five (5) chapters. Following an introduction in Chapter 1, the current development status of Siem Reap after the M/P is presented in Chapter 2. In Chapter 3, the progress of priority projects/programs of the M/P is reviewed and explained. Based on the analysis of the present situation and the progress of the project/programs of the M/P, development plan for the transportation and urban development is studied and described in Chapter 4. Chapter 5 compiles conclusions and recommendations to the next step of the urban development and transportation network for Siem Reap City.

2 Current Development Status of Siem Reap after the Master Plan Study

After the M/P formulation, around four (4) years have been past including world economic crisis. Rapid socioeconomic growth conditions before the M/P have been continuously kept and exceeded the targeted figures of tourist arrivals and population on the M/P. On the other hand, proposed measures to develop and manage Siem Reap City could not be said enough to catch-up the rapid socioeconomic growth after the M/P.

2.1 Socioeconomic Changes and its Impact (Tourism Sector and Affected Fields)

2.1.1 Increased Tourist Arrivals

(1) Trend of Tourist Arrivals into Siem Reap and Angkor Area

1) Trend of International Tourist Arrivals

Registration of Angkor Archeological Park (AAP) for World Heritage by UNESCO in 1992 created an opportunity to change an image of unstable and unsecured place through internal war into an interesting, historical and cultural tourism destination. Historical and cultural tourism in Siem Reap and Angkor Area was initiated and enhanced by increasing international tourists. After 1999 till 2004, international tourist arrivals were rapidly increased as sky rocketing from around 83,000 to 560,000 tourist (6.75 times as 1999, 46% per annum). International tourism trend was stagnated by global Severe Acute Respiratory Syndrome (SARS) affected international tourism in Siem Reap and Angkor Area. However international tourist arrivals into the area were immediately cached up on 2004.

After 2004 till 2009, international tourist arrivals into the area were continuously increasing to 1.1 million in 2007. However, the global economic crisis from 2007 severely affected to reduce international tourism markets in the world. Trend of international tourist arrivals into the area were also decreased from 1.1 million to 998,000 in 2009. But these phenomena has been already changed and back to a growth trend before the economic crisis, which are justified by increased visitor arrivals to AAP in January 2010 (more than January 2007). The average annual increase ratio of international tourist arrivals into the area in the past 15 years is counted around 28%. In the past ten years from 1999, average annual growth rate is also counted 28%. But in the past 5 years from 2004, average annual growth rate is slowing down to 12%.

The original historical and cultural heritages in Siem Reap and Angkor Area could be categorized as one of the top international historical and cultural tourism destinations in the world. On the past serious international tourism market issues or crisis, Siem Reap and Angkor Area could solve and recover those depressions of tourist arrivals within the shortest period based on their accumulation of unique historical and cultural tourism resources. On the other hand, increased tourists are also generating negative impact to historical climate and social environment, which require mitigation measures of infrastructure and management to solve negative impacts.

2) Trend of Domestic Tourist Arrivals

Domestic tourism activities in Siem Reap and Angkor Area were started from 1999. At that time, the government promoted and enhanced millennium tourism through events in Siem Reap. After the events, the total number of domestic tourist arrivals in 2001 was decreased from 230,000 to around 84,000 but it was still more than 7 times as 1998. After 2000, domestic tourist arrivals were steadily increasing till 2002, after 2003, domestic tourist arrivals were boosted and increasing as sky rocketing, of which phenomena was generated by growing domestic market based on increasing disposable household income of urban middle in major cities in the country. Average annual growth rate of domestic tourist arrivals were 40% in the past 15 years (1994-2009), and 19% in the past 10 years

(1999-2009), 30% in the past 5 years (2004-2009).

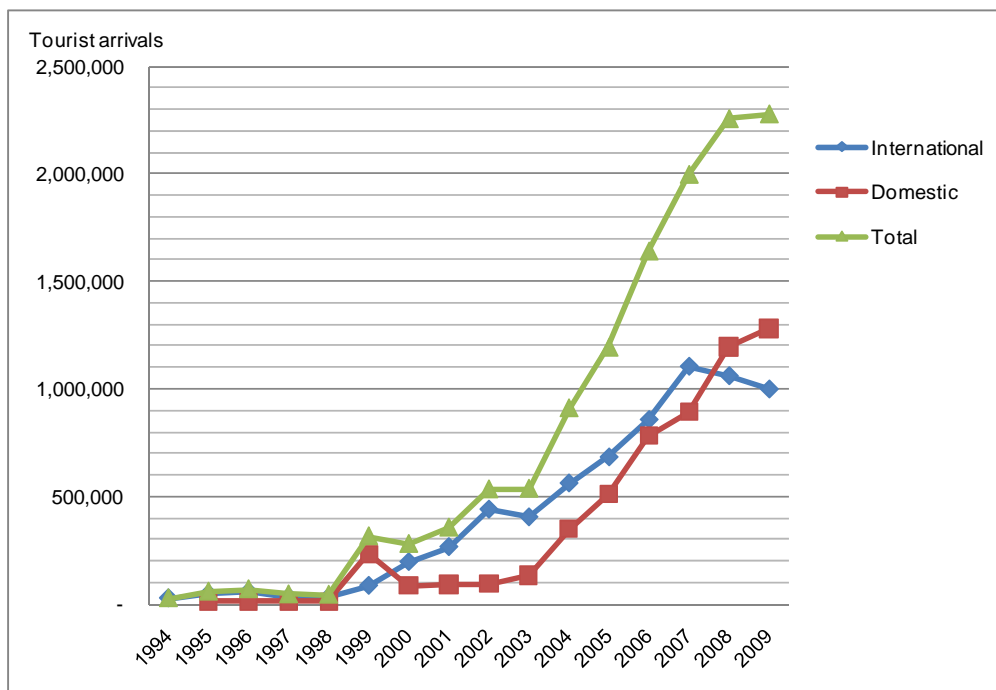
Historical and Cultural Khmer Heritages in Siem Reap and Angkor Area is understood to be a cradle and/or identity of peoples and societies of Cambodia. At the present, economic growth on stabilized society is pushing up disposable additional household income and it generates domestic tourists. Most of generated domestic tourists are visiting Khmer Homeland /or Cradle under the condition of un-diversified domestic tourism development in Cambodia.

Table 2.1 Trends of International and Domestic Tourist Arrivals into Siem Reap and Angkor Area in the past 15 years

Year	International	Increase ratio	Domestic	Increase ratio	Total	Increase ratio
1994	25,294		-		25,294	
1995	44,833	77%	11,336	-	56,169	122%
1996	55,561	24%	11,703	3%	67,264	20%
1997	31,472	-43%	11,925	2%	43,397	-35%
1998	30,255	-4%	11,503	-4%	41,758	-4%
1999	83,641	176%	230,378	1903%	314,019	652%
2000	194,180	132%	83,948	-64%	278,128	-11%
2001	264,057	36%	89,912	7%	353,969	27%
2002	438,374	66%	93,942	4%	532,316	50%
2003	402,672	-8%	132,643	41%	535,315	1%
2004	560,479	39%	349,109	163%	909,588	70%
2005	681,797	22%	509,520	46%	1,191,317	31%
2006	856,157	26%	782,895	54%	1,639,052	38%
2007	1,104,069	29%	892,226	14%	1,996,295	22%
2008	1,059,870	-4%	1,195,264	34%	2,255,134	13%
2009	998,084	-6%	1,279,356	7%	2,277,440	1%
*1: 94-		28%		40%		35%
*2: 99-		28%		19%		22%
*3: 2004-		12%		30%		20%

*1: average annual increase ratio 1994-2009, *2: 1999-2009, *3: 2004-2009

Source: Statistical Data 2009, DOT (Jan. 2010)



Source: Statistical Data 2009, DOT (January 2010)

Figure 2.1 Trends of International and Domestic Tourist Arrivals into Siem Reap and Angkor Area in the past 15 years

(2) Characteristics and Impact of International Tourist

Average length of stay of international tourists was counted 8 days in Cambodia at the initial stage in 1995. It was reduced to 5.2 days in 1998. However it has been extended to 6.65 days in 2008, which could be said not short stay under the condition of high share of group tourist.

Total number of guest nights of international tourists in Cambodia are estimated around 1.8 million in 1995, 2 million in 1999, 6.6 million in 2004 (3.7 times of 1995), and 14 million in 2009 (7.8 times of 1995).

Occupancy rate of hotel rooms in Cambodia started from 37% in 1995. It was incredible low figure to survive and make balance. After 1997, occupancy rate has been steadily going up to 64% in 2009, which could be said reasonable figure to make balance and create profit. Based on the occupancy rate, seasonal fluctuation issues of international tourist arrivals have been slowly mitigated. In Siem Reap and Angkor Area, index of total tourist arrivals in 4 top months was around 1.28 to 1.30 in average. And index of total tourist arrivals in 4 bottom months was 0.70 to 0.74 except 2007 in the past 3 years as shown in the table below.

Tourism receipts of international tourist was counted and started US\$ 100 million in 1995. Average tourist expenditures could be estimated US\$ 455 per person/trip and US\$ 57 per person/day. Average tourist expenditures per trip and per day was fluctuated but total amount of tourism receipts were increased. After 2004, tourist expenditures and tourism receipts have been constantly increased to US\$ 112/day, US\$722/trip, and US\$ 1.56 billion (15.6 times as 1995). Amount of tourism receipts could be already defined as self-sustainable scale of international tourism destination through tax revenue, when it is properly systemized and collected.

Table 2.2 Trend of Characteristics of International Tourist

Year	Number of visitor arrivals	Average length of stay	Total visitor nights (000)	Hotel room occupancy rate	Estimated hotel rooms	Tourism Receipt (million US\$)	Average tourist expenditures	
							US\$/ person/ trip	US\$/ person/ day
1995	219,680	8.00	1,757	37%	8,000	100	455	57
1996	260,489	7.50	1,954	40%	8,000	118	453	60
1997	218,843	6.40	1,401	30%	8,000	103	471	74
1998	289,524	5.20	1,506	40%	6,000	166	573	110
1999	367,743	5.50	2,023	44%	7,000	190	517	94
2000	466,365	5.50	2,565	45%	9,000	228	489	89
2001	604,919	5.50	3,327	48%	11,000	304	503	91
2002	786,524	5.80	4,562	50%	15,000	379	482	83
2003	701,014	5.50	3,856	50%	12,000	347	495	90
2004	1,055,202	6.30	6,648	52%	21,000	578	548	87
2005	1,421,615	6.30	8,956	52%	28,000	832	585	93
2006	1,700,041	6.50	11,050	55%	33,000	1,049	617	95
2007	2,015,128	6.50	13,098	55%	39,000	1,400	695	107
2008	2,125,465	6.65	14,134	63%	36,000	1,595	750	113
2009	2,161,577	6.45	13,942	64%	35,000	1,561	722	112

Source: Tourism Statistics, Annual Report 2009, MOT

Table 2.3 Monthly and Seasonal Fluctuation of International Tourist Arrivals into Siem Reap and Angkor Area

Month/ Season	Number of int. tourist arrival by month and season			Index of int. tourist arrivals by month and season		
	2006	2007	2008	2006	2007	2008
Jan.	121,975	185,163	86,279	1.38	1.98	1.21
Feb	120,657	111,459	81,787	1.37	1.19	1.15
Mar	113,758	103,190	73,719	1.29	1.11	1.03
Apr	91,105	85,769	64,765	1.03	0.92	0.91
May	72,447	68,292	45,516	0.82	0.73	0.64
Jun	58,852	61,573	43,294	0.67	0.66	0.61
Jul	65,896	62,976	56,421	0.75	0.67	0.79
Aug	78,254	69,196	74,365	0.89	0.74	1.04
Sep	64,855	56,170	55,954	0.73	0.60	0.78
Oct	79,200	86,833	71,086	0.90	0.93	1.00
Nov	95,984	107,330	95,058	1.09	1.15	1.33
Dec	96,887	122,635	107,913	1.10	1.31	1.51
Total	1,059,870	1,120,586	856,157			
high season (4months)	453,277	526,587	371,037	1.28	1.41	1.30
mid season (4months)	344,543	452,651	283,935	0.98	1.21	0.99
low season (4months)	262,050	141,348	201,185	0.74	0.38	0.70

Source: Tourism Statistics, Annual Report 2009, MOT

(3) Origin of International Tourists

Major tourism market region for Cambodia as a whole has been shifting from Eastern Asian Region to ASEAN region based on new international economic relations. On the other hand, Siem Reap and

Angkor Area is keeping a major market in East Asian countries and certain size of market in North and West Europe regions and America region. Although, statistical data of Siem Reap International Airport do not cover tourists from Vietnam, who are utilizing bus and other land transportation, tourism market in Vietnam is rapidly increasing within the last one to two years.

Major potential market regions and countries for Siem Reap and Angkor international destination are identified as follows based on the trend of tourist arrival and the policy recommendation of strategic market change (mid/low change to high) in the M/P.

Short and Mid Term: Matured high market in North/West Europe and America regions. Japan, USA, France, Germany, Australia and United Kingdom of the current top ten market country could be strategic market countries.

Mid and Long Term: Eastern Asia and ASEAN regions. South Korea, Taiwan, China, Malaysia, Thailand will be high potential market based on matured economy and society.

Table 2.4 International Tourist Arrivals to Cambodia and Siem Reap International Airport by Origin of Region

Origin region	2008 ^{*1}	Share (%)	2009 ^{*2}	Share (%)	2009 SRIA	Share (%)
ASEAN	552,461	26	692,819	32	52,303	9
Japan	163,806	8	146,286	7	109,203	19
South Korea	266,525	13	197,725	9	120,020	21
China	129,626	6	128,210	6	33,256	6
Eastern Asia Total	646,432	31	548,422	26	291,794	51
Southern Asia	15,452	1	15,975	1	4,175	1
Oceania	99,087	5	98,678	5	23,885	4
Northern Europe	153,376	7	153,311	7	38,256	7
Western Europe	215,227	10	226,057	11	78,760	14
Eastern Europe	30,219	1	34,457	2	10,793	2
Southern Europe	44,795	2	40,145	2	17,582	3
America	204,878	10	201,130	9	61,850	11
Africa	4,040	0	5,403	0	806	0
Middle East	7,375	0	6,921	0	1,401	0
Others	124,031	6	115,842	5	-	-
Totals	2,097,373	100	2,139,160	100	581,605	100

Note: 2008^{*1} and 2009^{*2} are yearly international tourist arrivals to Cambodia in 2008 and 2009.

2009 SRIA is yearly international tourist arrivals on Siem Reap International Airport in 2009

Source: Tourism Statistics, Annual Report 2009, MOT

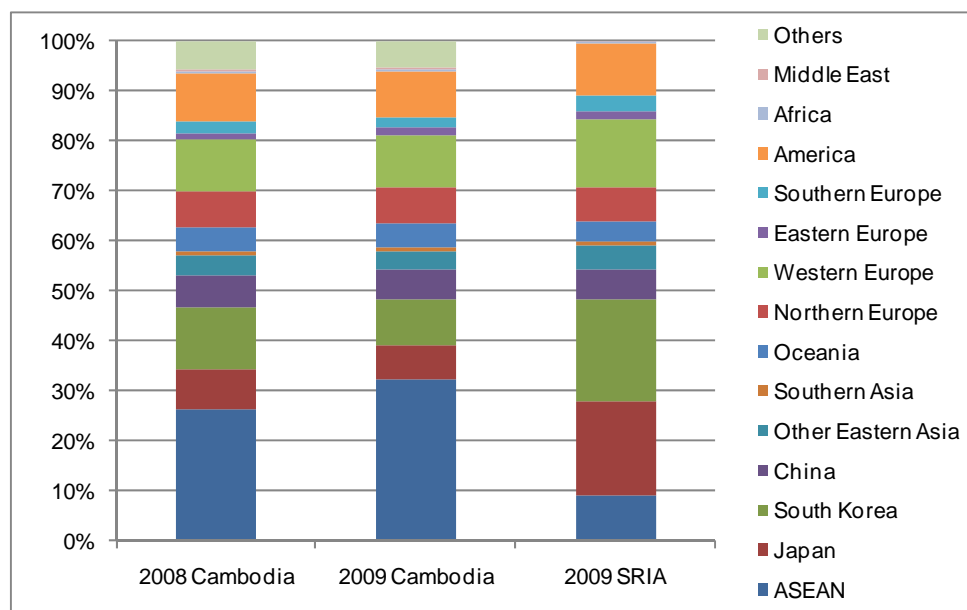
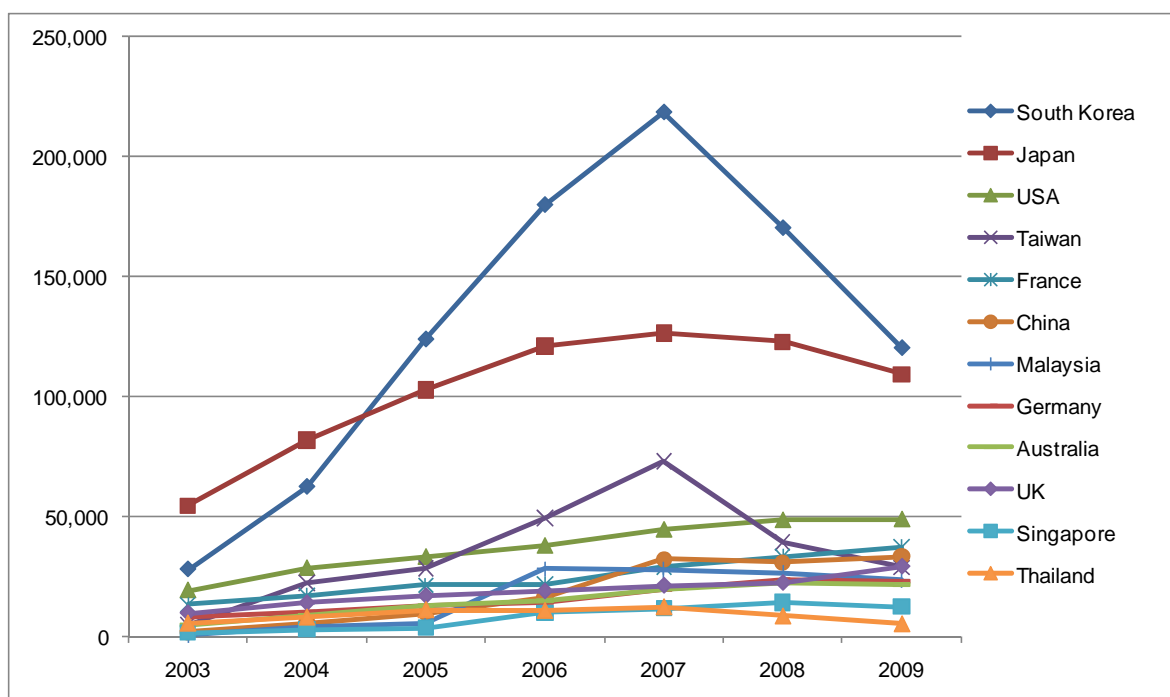


Figure 2.2 Share of International Tourist Arrivals to Cambodia and Siem Reap by Origin of Region



Source: Tourism Statistics Annual Report 2003-2009, MOT

Figure 2.3 International Tourist Arrivals from Major Top 10 Market Countries to Siem Reap International Airport

2.1.2 Increased Population

(1) Rapid Population Increase in Siem Reap and Angkor Area

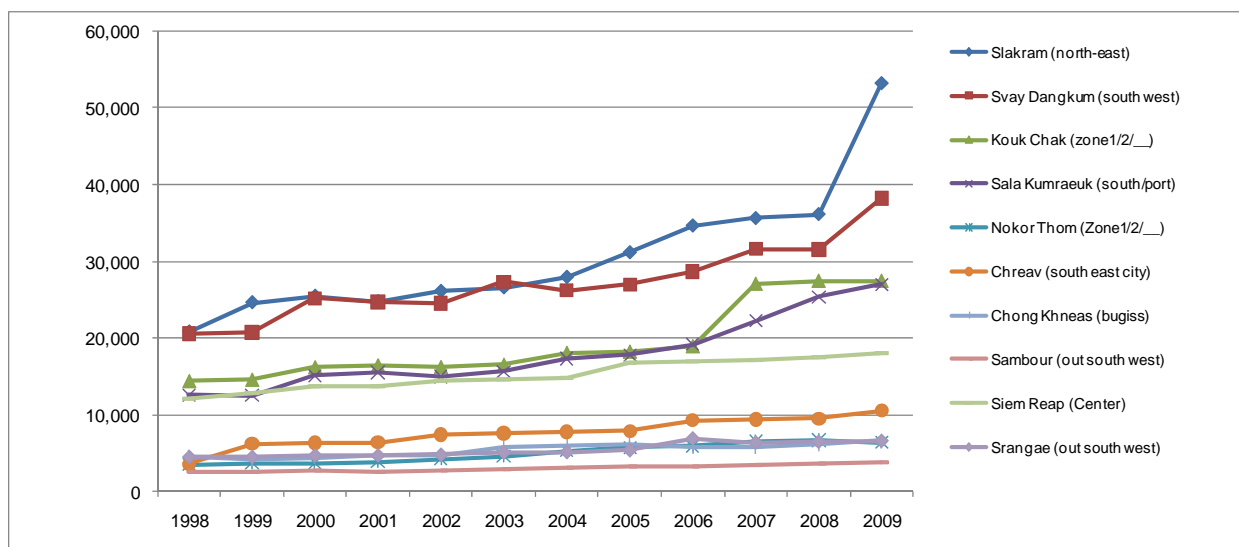
According to District Statistic Books in the past 11 years, population of the original 10 communes in Siem Reap District increased from around 99,000 in 1998 to 198,000 in 2009, which was double in 1998 and 6.5% per annum. Population growth rate of 6.5% per annum of the District was counted around 3.8 times as 1.7% per annum national population growth rate (UN data 2005-2010). Rapid

population growth in the District was a phenomena of social in-migration, which were generated by urban and rural imbalance and good job opportunities of tourism sector in the District.

Around half of additional increased population was distributed and absorbed in two (2) rapid population growing communes, which are Sla Kram and Svay Dangkum located in the central part of urbanized area of Siem Reap. Their average annual population increase ratio were counted very high ratio of 24% in Sla Kram and 17% in Svay Dangkum. Around 33,000 additional increased population were distributed and absorbed in three (3) communes, which are Kuok Chak (Zone1, 2 and urban center), Sala Kurauk (urban center) and Siem Reap (suburb along Siem Reap River). The remaining 17,000 additional increased population were distributed in other five (5) communes naturally as shown in the following figure.

Most of additional increased population were settled in the existing city center or urbanized areas or Zone 1 and 2 of AAP. Therefore, population density was getting higher in the City Center area and surrounding urbanized area. On the other hand, areal residential and appartment development projects have been implemented in urbanized and suburb area. Most of developed units were sold for speculation purpose, thus those unit are un-used till now.

Siem Reap Municipality was upgraded from district with additionally including three (3) communes of Tiuk Vil (western part of Zone 1, 2 and suburb), Krabeireil (southwest suburb), and Ampil (eastern part of Zone 2). Population in 2009 were counted 11,183 in Tiuk Vil, 7,647 in Krabeireil, and 6,727 in Ampil commens, 25,557 in the total of three (3) commuens. Total Municipal population of 13 commune (sangkat) is counted 223,376 in 2009.



Source: Total number of inhabitants in Siem Reap Municipality 1998-2010 by Sangkat, SRMG

Figure 2.4 Trend of Population Increase by 10 communes in Original Siem Reap District

(2) Characteristics of Population Data

In the District Data Book, population statistics include two (2) types of population data as follows,

- A: Temporal Stay Population and
- B: Living family on public land (illegal settler)

Excluding two (2) categories of population above, population of the original district with 10 communes could be estimated around 131,000 in 2006, 144,000 in 2007, 148,000 in 2008, and 175,000 in 2009. Population of new Siem Reap City with additional three (3) communes is estimated around 200,000 in 2009.

Table 2.5 Trend of Population Growth and Factors

No.	Commune	1998	2000	2002	2004	2006	2007	2008	2009*1
1	Slakram (north-east)	20,787	25,445	26,079	27,910	34,624	35,599	36,116	53,209
2	Svay Dangcum (south west)	20,533	25,192	24,503	26,225	28,634	31,618	31,556	38,166
3	Kouk Chak (zone1/2/___)	14,401	16,201	16,228	18,068	18,940	27,051	27,444	27,444
4	Sala Kumraeuk (south/port)	12,566	15,118	14,960	17,319	19,191	22,261	25,358	26,954
5	Nokor Thom (Zone1/2/___)	3,554	3,722	4,257	5,332	5,942	6,552	6,702	6,406
6	Chreav (south east city)	3,567	6,365	7,402	7,790	9,285	9,412	9,516	10,532
7	Chong Khneas (bugiss)	4,630	4,406	4,678	6,057	5,803	5,829	6,093	6,661
8	Sambour (out south west)	2,532	2,729	2,796	3,160	3,293	3,474	3,575	3,803
9	Siem Reap (Center)	12,158	13,657	14,374	14,820	16,915	17,131	17,564	18,049
10	Srangae (out south west)	4,531	4,758	4,822	5,165	6,901	6,392	6,485	6,595
Original District (10 commune)		99,259	117,593	120,099	131,846	149,528	165,319	170,409	197,819
growth rate per annum			18%	2%	10%	13%	11%	3%	16%
A	Temporal Stay	-	-	-	-	8,169	6,723	8,080	(8,080)
B	illegal settlement family	-	-	-	-	1,813	2,501	2,555	(2,555)
C	illegal settler (pop)	-	-	-	-	10,298	14,206	14,512	(14,512)
Pop exclude Temporal/Illegal stay		-	-	-	-	131,061	144,390	147,817	175,227
growth rate per annum							10%	2%	19%
11	Tikvill (new: Zone1/2/___)	-	-	-	-	-	-	-	11,183
12	Krabeireil (new south west)	-	-	-	-	-	-	-	7,647
13	Ampil (new east)	-	-	-	-	-	-	-	6,727
City 13 commune		-	-	-	-	-	-	-	200,784

2009*1: data is provided by Municipality. But temporal and illegal settler data is not available (temporarily utilize same figure of 2008)

Source: District Data Books - 2009 (data coverage 1998 - 2008)

2.1.3 Related Socioeconomic Framework

Socioeconomic frameworks have been set for the future development of Siem Reap District /or Siem Reap City by the M/P 2006, DED Land Use Plan 2007, and JICA Siem Reap Water Supply Expansion Project (under way at the present).

Comprehensive socioeconomic framework was set by the M/P. The DED Land Use Plan up-dated the statistical data of their base year 2006 and then projected population based on the M/P Scenarios. Newly formulating JICA Water Supply Expansion Project is also up-dating base year figures of tourist arrivals, and population and those key figures are projected by their development scenarios.

The followings are outline of socioeconomic frameworks and scenarios of above three (3) plans.

(1) Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town (The M/P)

Based on the policy directions of environmental and economic sustainability, two (2) development scenarios were set as follows,

Scenario A: Trend Growth Projection, keeping growth trends of mid/low class mass market with fluctuated tourist arrivals

Scenario B: Moderate Growth Projection, - changing to up-market in the world and slow down growth rate, - within the existing airport capacity, - tourist arrivals into major historical and cultural tourist destinations in the southeast Asian countries, - increasing amount tourist receipts.

1) Projection of Tourist Arrivals:

Scenario A: Trend Growth Projection, growth rate of international and domestic tourist arrivals were set in the past growth trend analysis. Growth rate of international tourists was set at 14.9% per annum from 2004 to 2012, 8.7% from 2012 to 2020, and 11.8% from 2004 to 2020. Growth rate of domestic tourists was set at 9.5% per annum from 2004 to 2012, 6.1% from 2012 to 2020, and 7.8% from 2004 to 2020.

Scenario B: Moderate Growth Projection, growth rate of international and domestic tourist arrivals were set on the above conditions. Growth rate of international tourists was set at 14.4% per annum from 2004 to 2012, 2.5% from 2012 to 2020, and 8.3% from 2004 to 2020. Growth rate of domestic tourists was set at 8.5% per annum from 2004 to 2012, 4.2% from 2012 to 2020, and 6.3% from 2004 to 2020.

Growth rates and the number of tourist arrivals of Scenario A and B were not much different up to 2012. However, growth rates and the number of tourist arrivals of both scenarios were deviated after 2012 to 2020 as follows. Finally Scenario B: Moderate Growth Projection was selected to formulate the M/P.

Table 2.6 Projection (Framework) of Tourist Arrivals in the M/P

	Base Year 2004	Scenario A: Trend Growth Projection		Scenario B: Moderate Growth Projection	
		2012	2020	2012	2020
International (000)	561	1,709	3,343	1,648	2,007
per annum		14.9%	8.7% (11.8%)	14.4%	2.5% (8.3%)
Domestic (000)	297	614	988	572	795
per annum		9.5%	6.1% (7.8%)	8.5%	4.2% (6.3%)
Total (000)	858	2,324	4,331	2,220	2,802
per annum		13.3%	8.1% (10.6%)	12.6%	3.0% (7.7%)

Note: population of year 2020 (): average annual growth rate from 2004 to 2020.

Source: The M/P Study

2) Projection of Population:

Statistical data of 155,000 populations in the district in 2004 was divided into 139,000 residents (90%) who lived in the district, and 16,000 commuters (10%) who worked in the district. Resident projection (framework) for Siem Reap District was set at 171,000 pop in year 2012 and 211,000 pop in year 2020 based on the policy direction to establish compact city. The other additional increment population, who were acceleratedly increased by each development scenarios, were categorized and distributed as commuters to work in Siem Reap and Angkor Area from outside of the district. Resident framework of the district was set by constant growth rate of 2.6% per annum from 2004 to 2020. Commuter framework for the district was set at 3 to 5 times of growth rate of residents as follows.

Total population growth of the district was projected from 155,000 in year 2004 to 276,000 (Scenario B) and 311,000 (Scenario A) in year 2020. The estimated average annual growth rate of 4.45% and 3.67% of the both scenarios were set lower than urban population growth rate of Cambodia 2005 - 2010 (UNDP).

Table 2.7 Population Projection (Framework) of the Master Plan

	Base Year 2004	Scenario A: Trend Growth Projection		Scenario B: Moderate Growth Projection	
		2012	2020	2012	2020
Residents (000)	139	171	211	171	211
per annum		2.62%	2.66% (2.64%)	2.62%	2.66% (2.64%)
Commuter (000)	16	44	100	39	65
per annum		13.48%	10.81% (12.14%)	11.78%	6.59% (9.16%)
Total (000)	155	215	311	210	276
per annum		4.17%	4.72% (4.45%)	3.87%	3.48% (3.67%)

Source: The M/P Study

(2) Land-Use Plan for Siem Reap District (DED)

This planning study for Siem Reap District was conducted as one of two pilot district of Asia Urbs Project, which focused to promote decentralization and strengthen district authorities under the Royal Government Decision No. 47. This study was conducted from two study periods of 2001 - 2004 and 2004 - 2007 by District Master Plan Team of Siem Reap supported by German Development Service (DED), Konrad Adenauer Foundation (KAF), Asia Urbs Project 3 (AUP3), and two ministries of MOI, MLMUPC in Cambodia.

Targeted area and year were 10 communes and year 2020 the same as the M/P. The base year population data was up-dated in 2006 by statistical data after the M/P formulation. The framework was also set by 3 scenarios based on the M/P as follows.

Table 2.8 Framework of Land-Use Plan for Siem Reap District

Trend of Population Growth of Siem Reap in 1998 – 2005			Population Projection 2020 in Siem Reap District by Scenario		
Pop in 1998	Pop in 2006	Growth rate per annum	Scenario 1: (2006- 2020: 3%)	Scenario 2: (2006- 2011: 4%) (2012-2020: 3%)	Scenario 3: (2006- 2011: 4%) (2012-2020: 3.5%)
99,259	146,379	5%	221,400	230,100	241,600

Source: The Final Draft Land-Use Plan for Siem Reap District Oct. 01, 2007

(3) Water Supply

The Preparatory Study on the Siem Reap Water Supply Expansion Project is in pursuance of the Scope of Works, signed on 29th January 2009, between the Ministry of Industry, Mines and Energy (MIME), the Siem Reap Water Supply Authority (SRWSA), and Japan International Cooperation Agency (JICA). The Study started in May 2009, and will be completed by the middle of September 2010.

The objectives of the Study were set as follows;

- To select new water source(s) for efficient and sustainable water supply system;
- To conduct surveys of existing wells and assess the potential yield of groundwater;
- To identify an urgent water supply expansion project to satisfy the estimated water demand for Siem Reap up to a selected target year of the Project;
- To conduct a feasibility study for the proposed water supply expansion project, provided that the Project is to be implemented under a finance by the Japan's ODA loan;
- To formulate a long-term water supply development plan up to year 2030; and
- To pursue technology transfer to the Cambodian counterpart during the course of the Study.

The target area is not only covering newly established Siem Reap City (12 communes exclude Chong Khnies commune) but also, covering one another adjacent commune (Kandaek) on the south-east,

where the western part of commune was proposed for the future urbanization area except Zone 1 and 2 of Bakong of the M/P. The target area and year were set at 13 communes and year 2030 from a view point of the future water supply area and long term development perspective of SRWSA.

Population framework was set in applying the exponential curve trend analysis with up-dated 2009 statistic data as follows.

Table 2.9 Population Projection (Framework) of Water Supply

	Year 2010	2015	2020	2025	2030
Projected Population	205	244	283	322	362
Growth rate		2011-2015: 3.82% to 3.33%	2016-2020: 3.23% to 2.86%	2021-2025: 2.79% to 2.51%	2026-2030: 2.45% to 2.24%

Source: Draft final report of The Preparatory Study on The Siem Reap Water Supply Expansion Project 2010

Tourist arrivals projection (framework) was set based on three (3) scenarios of 2%, 3%, and 4% growth rate per annum based on the past growth trend in the area and tourist arrivals of other historical and cultural tourism destinations in the southeast Asian countries as follows.

Table 2.10 Tourist Arrivals Projection (Framework) of Water Supply

Year	2010	2015	2020	2025	2030
Scenario 1	2 % growth				
Projected tourists	2,300	2,539	2,803	3,095	3,418
Rate for 2008*	1.02	1.12	1.24	1.37	1.51
Scenario 2	3 % growth				
Projected tourists	2,322	2,692	3,121	3,618	4,195
Rate for 2008	1.03	1.19	1.38	1.60	1.86
Scenario 3	4 % growth				
Projected tourists	2,345	2,853	3,471	4,223	5,138
Rate for 2008	1.04	1.26	1.53	1.87	2.27

Source: Draft final report of The Preparatory Study on The Siem Reap Water Supply Expansion Project 2010

Table 2.11 Target Water Supply Coverage

	2015	2020	2025	2030
For Resident	55%	80%	85%	90%
For Tourist	55%	80%	100%	100%

Source: Draft final report of The Preparatory Study on The Siem Reap Water Supply Expansion Project 2010

2.1.4 Future Scenarios of Socioeconomic Framework

It has been past four (4) years since formulation of the M/P in 2006. The part of the selected socioeconomic framework of “Scenario-B: Moderate Growth Projection” has to be modified and adjusted to the trend of socioeconomic development and the changed administration system from district to municipality and its’ covering area in the past 4 years.

Projection and framework of international tourist arrivals into the area is still usable and effective under the past situation change and the policy direction for international high-market development. However domestic tourist arrivals projection and framework have been deviated from the increase of domestic tourist arrivals into the area in the last 4 years. Therefore domestic tourists projection and framework have to be revised based on a development scenario. Population projection and framework have to be adjusted to newly established Siem Reap City area (10 communes district to 13 communes City).

(1) Review of International Tourism Framework: 1.65 million in 2012 and 2.0 million in 2020

The framework of international tourist arrivals in 2012 in the M/P was set at around 1.65 million by 14.4% continuous high growth rate per annum. Based on the growth rate, international tourist arrivals could be projected 1.26 million in year 2010.

According to the tourism statistics, international tourist arrivals into Siem Reap and Angkor Area were counted 1.1 million in year 2007. The growth trend after 2004 was continuously accelerated to 2007. On the other hand, world economic crisis after 2008 seriously influenced to reduce world tourism market, and it also affected and stagnate international tourist arrivals into the area as 1.06 million in year 2008 and one (1) million in year 2009. However, after the end of 2009 and early 2010, phenomena of affected world economic crisis to international tourist arrivals into the area has been solved and catch-up the monthly tourist arrivals before the crisis.

Under the circumstances, Scenario B: Moderate Growth Projection of international tourist arrivals could be assessed still valuable development framework. The past trend of international tourist arrivals on the rapid growth and economic crisis are still in line with the Scenario B of the M/P 2006. Therefore the set of international tourist framework at 1.6 million tourists in 2012 and 2.0 million in 2020 have to be maintained under the active and strategic promotion to up-market in the world.

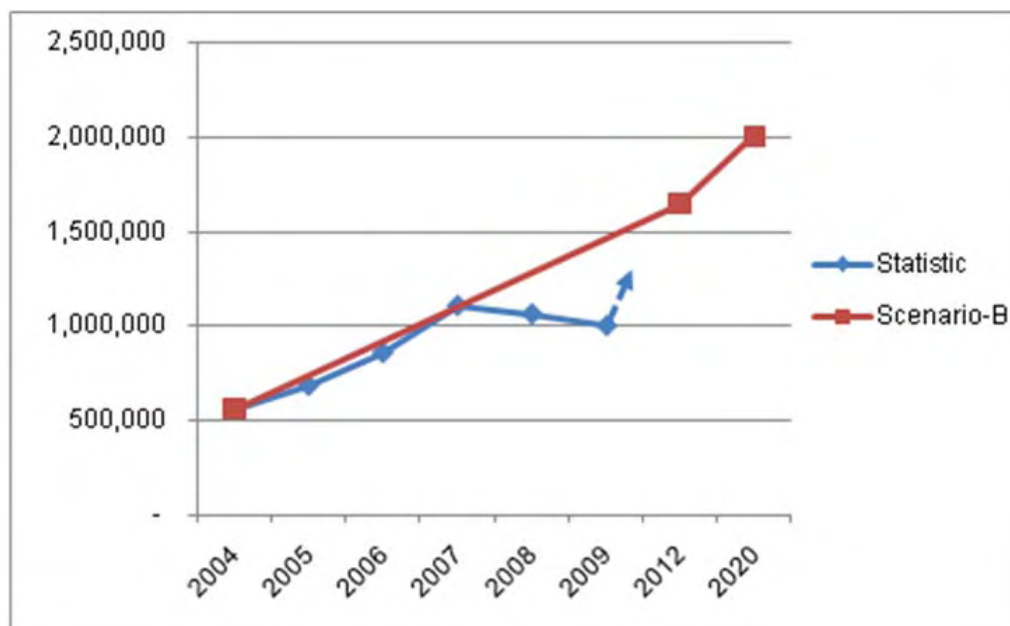


Figure 2.5 Comparison of Past Trend and Framework of International Tourist Arrival into Siem Reap and Angkor Area

(2) Projection (Framework) of Domestic Tourist Arrivals: 1.62 million in 2012 and 2.34 million in 2020

Trend of economic development in Cambodia especially in major urban areas was generating middle class income citizens, and this situation has been generated domestic tourism market in rapidly. Generated domestic tourists were mostly concentrated into Siem Reap and Angkor Area (tourist statistics do not cover domestic tourist arrivals into Phnom Pen and other major cities). Trend of domestic tourist arrivals into the area was rapidly increasing at 30% per annum in 2004 and reached around 1.28 million in 2009, which exceeded one (1) million international tourist arrivals in 2009 and also the framework of 0.8 million domestic tourist arrivals in 2020. Domestic tourism market was promoted through event programs and others organized by the government. And it may not only contribute to economic development but also strengthening a unity of Khmer society. Promoted Angkor tour for domestic tourism market, which is “visit cradle of Khmer Culture” and religious

tourism, may continue to grow and reach a certain level. Under the conditions, projection of domestic tourist arrivals has to be revised for future tourism development in Siem Reap and Angkor Area.

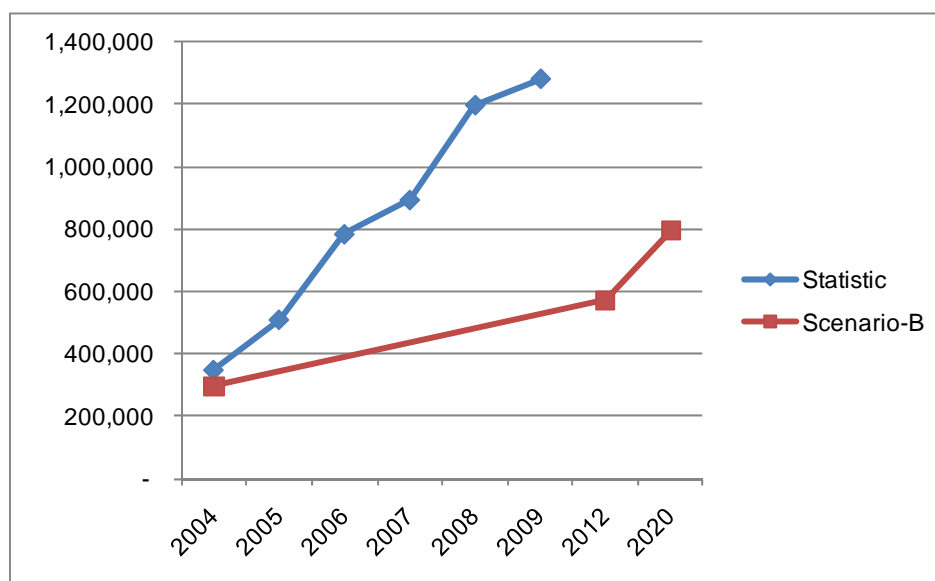


Figure 2.6 Comparison of Past Trend and Master Plan Framework of Domestic Tourist Arrivals into Siem Reap and Angkor Area

Under the circumstances, domestic tourism market of Cambodia is understood to be an initial stage of rapid increasing. Domestic tourist arrivals into the area were continued to increase at 7% per annum in 2009 though GDP per capita growth in Cambodia was stagnated in 2009. Projection of domestic tourist arrivals into the area could be set based on the future urban population and disposable household income (or GDP per capita) in Cambodia.

1) Future Economic Situation in Cambodia

Based on forecasts of GDP growth prepared by World Bank (WB), Asian Development Bank (ADB) and other international organizations, GDP growth in Cambodia will recover in 2010 and reach around 7% growth in 2011 before the economic crisis. GDP per Capita in Cambodia and disposable household income of urban middle class will be back and continuously follow the growth trend before the economic crisis.

2) Future Urban Population in Cambodia

Urbanization ratio was around 20% (around 2.8 million urban pop of 14.2 million national pop) in 2009. An urban population growth rate was estimated 4.6% per annum (1.765% of national total) from 2005 to 2010 by international organizations and banks. The future urban population is estimated 3.2 million in year 2012 and 4.6 million in 2020 based on the above growth rate. However 4.6 million urban population in year 2020 are 26.5 % of urbanization ratio, which could be said so rapid. Projection of domestic tourist arrivals into the area are set based on two (2) development scenarios of high and moderate, which are estimated two (2) cases of urbanization ratio of 4.6% and 3.8% for the period of 2012 - 2020.

The both frameworks 0.99 million/Scenario-A and 0.8 million/Scenario-B of domestic tourists in the year 2020 in the M/P have been exceeded by 1.3 million domestic tourist arrivals in year 2009. Therefore it is proposed to be revised to 2.7 million with high growth scenario and 2.5 million with moderate growth scenario.

Table 2.12 Projection of Domestic Tourist Arrivals into Siem Reap and Angkor Area

	2009	2012	2020	
			High scenario	Moderate scenario
National population (million)	14.2	15.0	17.3	17.3
Urban population (million)	2.8	3.2	4.6	4.3
Urbanization ratio	19.6%	21.4%	26.5%	25%
Urban pop growth ratio per annum	4.6%	4.6%	4.6%	3.8%
Domestic tourist generation in Cambodia (Siem Reap)	(1.3)	1.8	4.2	3.9
Trip generation ratio of urban pop	46.4%	56.8%	90.5%	90.5%
GDP growth rate per annum		7%	6%	6%
Domestic tourist arrivals in Siem Reap/Angkor (million)	1.3	1.62	2.7	2.5
Share of Siem Reap/Angkor of domestic tourist	(100%)	(90%)	(65%)	(65%)
Estimated growth rate of domestic tourist arrivals		7.6%	6.6%	5.5%

Source: The Follow-up Study

(3) Projection (Framework) of Population: 189,000 in 2012 and 233,000 in 2020

After formulation of the M/P, the district population growth was following the M/P framework of moderate growth Scenario B till year 2008. However around 27,000 (19%) population were additionally increased in 2009, which could not be naturally increased and would be generated by social and temporal migration from outside the district. But 2009 population excluding temporal stay and illegal stay on public land is estimated 175,000, which was not so deviated from 171,000 framework of Scenario-B in 2012. The policy direction of “Compact City” concept is still valid under the existing slow urban development situation.

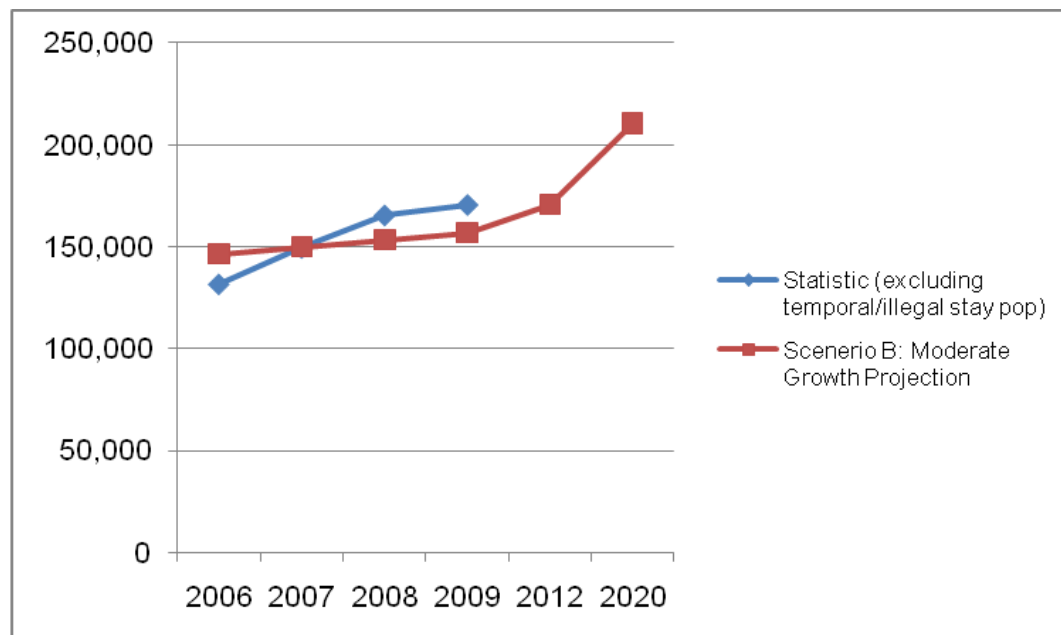


Figure 2.7 Comparison of Past Trend and Framework of Population within 10 communes Siem Reap District Area

The coverage area of the framework had been changed from 10 communes in Siem Reap District to 13 communes in newly established Siem Reap City in year 2008. Therefore population in 3 additional communes has to be added to the district framework of the M/P. Illegal settlers on public land are planned to remove to the north-eastern area outside AAP and outside the city through Run Ta-Ek Eco Village Project by the Provincial Government and APSARA Authority.

Projected future population in the expanded Siem Reap City (13 communes) is composed of resident and temporally stay (commuter from surroundings of the city). Projected residents and commuters in the city and totals are set at 189,000, 11,000, and 200,000 in year 2012 and 233,000, 18,000, and 251,000 in year 2020, respectively, as follows.

Table 2.13 Revised Population Framework

	2009 base year	2012	2020
1.Residents (000) in district: Scenario-B of MP	158 (2.62%)	171 (2.62%)	211 (2.66%)
2.Commuter (000) in district: Scenario-B of MP	28 (11.8%)	39 (11.8%)	65 (6.59%)
3.Totals in district: Scenario-B of MP	186 (3.7%)	210 (3.7%)	276 (3.48%)
4.Residents (000) in City	175	189	233
5.Temporal stay (commuter) in City	8	11	18
6.Totals of City	183	200	251
7.Relocation of illegal settler (Run Ta-Ek eco village project)	14.5		

Source: The Follow-up Study

(4) Revised Socioeconomic Framework

Based on the above projections, the Socioeconomic Framework of the M/P is proposed to modify international tourist arrivals, domestic tourist arrivals and population in year 2012 and 2020 as follows.

Framework of international tourist arrivals is not required to be modified. The marketing strategy of the M/P to promote high markets in the world is proposed to continue and be implemented properly to push up and grow tourist receipts.

Framework of domestic tourist arrivals is proposed to change from around 0.8 million in the M/P into 2.5 million (around 3 times) in year 2020. Promoted domestic tourism is not only contributed to develop local economy but also focus to strengthen unity and Khmer culture by the government. It is proposed to be continued.

Population Framework of Siem Reap District in the M/P has to be adjusted and modified to the newly established Siem Reap Municipal Territory with 13 communes. 40,000 population in the additional 3 communes in year 2020 are proposed to be added to 211,000 population framework of the M/P. Population framework of Siem Reap Municipality is proposed 251,000 in year 2020. Commuting population to Siem Reap from neighboring districts, temporal stay peoples and illegal settlers on public land are excluded in population framework, which follows the condition of framework setting in the M/P in 2006.

The ownership of modified socioeconomic framework belongs to the provincial government. It has to be carefully up-dated, modified and utilized by the Provincial Government and the related departments and agencies.

Table 2.14 Modified Socioeconomic Framework

		2009	2012	2020
The Master Plan Frame	International Tourist		1,648,000	2,007,000
	Domestic Tourist		572,000	795,000
	Population (10 commune)		171,000	211,000
Modified Frame	International Tourist	998,000	1,650,000	2,000,000
	Domestic Tourist	1,300,000	1,620,000	2,500,000
	Population (13 commune)	183,000	200,000	251,000

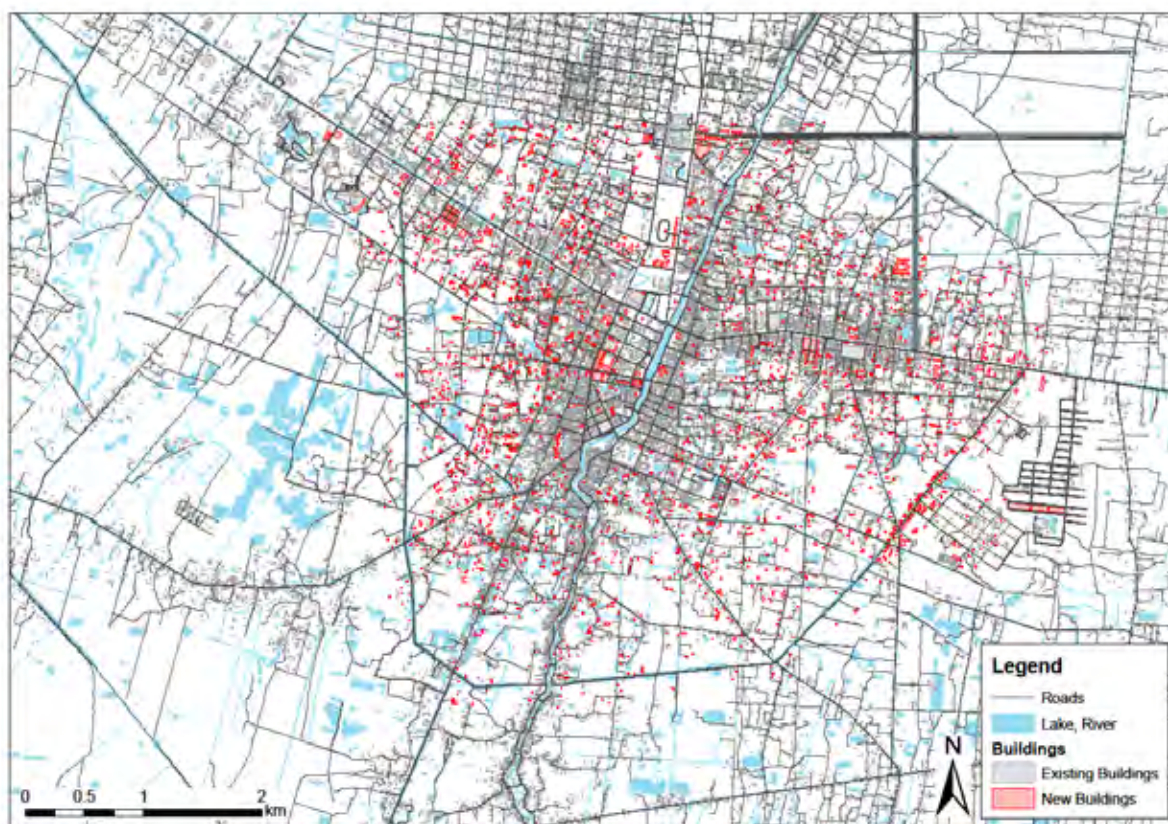
Source: The M/P Study and the Follow-up Study

2.2 Changes and Trend of Urban Structure and Areas

2.2.1 Trend of Urban Development

(1) Densification and Slightly Expanded Urbanized and Urbanizing Area

The following figure shows a comparison of buildings/structures between January 2005 and October 2008 in GIS map. The GIS map as of 2005 was prepared by the M/P Study. The GIS map as of 2008 has been prepared by the Follow-up Study by using a satellite photo shot in 2008. Urbanized area in 2005, where is dense area, is spread mainly along NR6 and in and surrounding the central business district (CBD), where is the center of the city. New buildings/structures constructed after 2005 until 2008 are located mainly the fringe of the dense area as of 2005. Most of the new buildings/structures are located inside the Ring Road and the northern part of NR6. Therefore it cannot be recognized there is noticeable expansion/sprawling of the urban area.



Source: The Follow-up Study

Figure 2.8 Comparison of Buildings/Structures between 2005 and 2008

(2) Large Scale Development

Although there is no noticeable expansion/sprawling of the urban area, there are some large scale development in and near Siem Reap City. The following table shows project status for large scale development given by DLMUPC.

Table 2.15 Project Status for Large Scale Development

No	Name of Project	Area (ha)	Location			Development Plan		
			City/District	Sangkat/Commune	Village	Target Year to be completed	Existing Population	Key Facilities
1	Borey PremPrey Town	4	Siem Reap	Korchok	Strapaingses	2009	295 Families	Market, School, Housing
2	Borey SokLeap Town	17	Siem Reap	Sandek	Koktaun	2010		Shopping, Housing
3	Borey Akor Town	5	Siem Reap	Svaydongkum	Krous	2010		Shopping, Housing
4	Borey Nagara Town	5.3	Siem Reap	Svaydongkum	Salakangseng	2010-2011	500 families	Shopping, Housing
5	Borey Seannam Town	52	Siem Reap	Chreav	Phum Kna	2008-2010		University, Market, Hotel, Guest house,
6	Golf Course (KTC Hotel)	200	Prasat Bakong	Bakong	Loley	2010	30 Group Members	Motel, Resort, Hotel, Restaurant
7	Golf Course (Phokeatra)	150	Puok	Lavia	Dontror	2009	25 Group	Resort, Restaurant
8	Golf Course (Angkor Holiday)	170	Siem Reap	Srogeay	Roka	2009	30 Group	Resort, Restaurant

Source: DLMUPC

Apart from above developments, there is a development of new provincial hall. The provincial government and departments were relocated in April 2010 to the new site, where is located in sangkat Ampil, and also in Zone 2 of AAP. The access road from NR6 to the new provincial hall is located in Zone 1 and 3 of AAP.

(3) Tourism Service Facilities

1) Tourism Accommodation Development

After the M/P, hotels and guesthouses have been continuously and rapidly developed. Around 30 hotels, which is around quarter of the existing 120 hotels accumulation, were newly developed mainly along NR6 and Zone 3 in between the City Center area and AAP. Around 55 guesthouses, which are also a quarter of the existing 227 guesthouses accumulation, were newly developed and concentrated in the fringe area of CBD within the City Center area.

Under the circumstances, residential area in the City Center area is rapidly changing to tourism and residential mixed use, which are requiring more appropriate service levels of road and infrastructure. Especially unpaved access roads in the area are causing dusty road environment. It will be crucial for deterioration of the tourism environment.

2) Restaurant and Shopping Facilities

After the M/P, restaurants are increasing from 90 to 120, of which additional increment are counted a quarter of the exiting accumulation. Those restaurants and renovated shopping facilities are mainly accumulated in Old Market area, and along Sivatha Street and NR6. Parts of pedestrian and road pavement are improved on some road sections and area but the existing condition of those tourism spots could not be said enough and on-street parking of cars and tuk-tuk are generating un-comfortable and unsafety condition.

Distribution of restaurants and shopping facilities are steadily dispersed and following guesthouse development in the City Center area.

3) Tourist Attractions

Surrounding the old market, new night shopping spots of Moon Night Market and Angkor Night Market have been developed and visited by lot of tourists. However the access to the spots is congested by tourists, cars and tuk-tuk.

2.2.2 Land Use Plan and Urban Growth Management

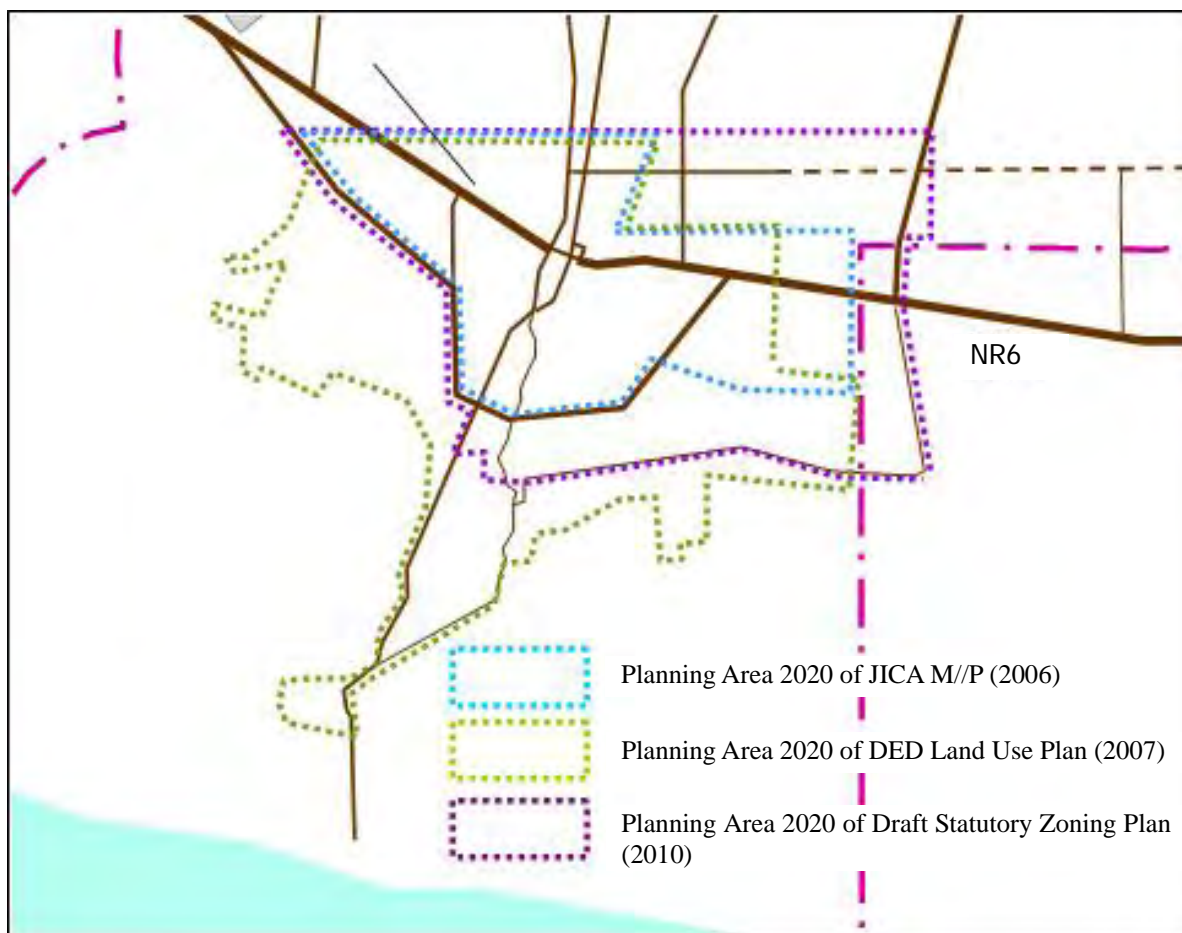
(1) Three Plans

There are three (3) plans related to land use, i.e. i) Land Use Plan in 2020 under the JICA M/P (2006), ii) Final Draft Land Use Plan supported by DED (2007), and iii) Draft Statutory Zoning Plan (2010).

The Final Draft Land Use Plan (2007) was formulated by Siem Reap District Government in cooperation with DED. It was conducted in the frame of the Asia Urbs Project in order to promote decentralization and strengthen district authorities. Because Siem Reap District Government is under Ministry of Interior (MOI), the Final Draft Land Use Plan is now under approval process in MOI. It will be submitted to MLMUPC for the final approval after the approval by the MOI.

The Draft Statutory Zoning Plan was formulated by DLMUPC Siem Reap in cooperation with APSARA Authority in order to manage appropriate urban growth, which has been accelerated and expanded.

The following figure shows urban areas in 2020 of above three (3) plans. Compared among three (3) areas, the urban area of DED Land Use Plan stretched to the southwest. However, other two (2) areas stretch to the southeast. The Draft Statutory Zoning plan is seemed to follow the concept of the M/P. Due to the higher increase of population and tourists than ones expected in the M/P, the Draft Statutory Zoning plan expanded the urban area in 2020 rather than ones in the M/P.



Source: The Follow-up Study

Figure 2.9 Comparison among three Planning Areas

According to the interview from DLMUPC, DED Land Use Plan will be required time for coordination with MLMUPC because the concept for the urban area in 2020 differs from ones of the M/P.

So far the Draft Statutory Zoning Plan can be considered as the most effective plan because it is the latest and statutory enforcement in the future.

(2) Urban Growth Management

The M/P introduced a concept of “Compact City.” However some difficulties are laid. The administrative boundary of Siem Reap District has been enlarged by upgrading to a city with incorporated three (3) communes. The population has been increased rapidly. The urban area is expanding and some large scale developments including relocation of Provincial Government Offices were appeared outside of the Ring Road and even beyond the municipal boundary. To maintain appropriate urban growth against rapid disordered urbanization, capacity building for local authorities and urban growth management are required.

(3) Relocation of Provincial Government Offices

Provincial Government offices have been relocated from the city center to the outside. Siem Reap District Office was relocated to near the Siem Reap International Airport in 2008. Provincial Government Offices relocated from the CBD to the outside of three (3) urban areas mentioned above. New relocation site is within the City and inside of Zone 2.

Therefore it is required to urgently formulate a development and conservation plan around the new

relocation site of Provincial Government and a plan for the vacant land after the relocation. Especially the development plan for the vacant land must be properly managed as an attractive City Center area.

(4) Draft Statutory Zoning Plan

The Draft Statutory Zoning Plan is now under approval process by MLMUPC. The plan seems to be a morphological rule, such as setback, floor area ratio, and building coverage ratio, according to the limited information regarding the Draft Statutory Zoning Plan because the plan is not disclosed so far. Therefore it is required to formulate zoning plan, which stipulate land use control, and detailed development guideline for appropriate urban management. It is also required to build a capacity of government officers in charge of land use control.

2.2.3 Other Development Plans and Projects

(1) Resettlement Project for Families on Public Land

Provincial Government and APSARA Authority formulated the project “RUN TA-EK Eco-Village for Sustainable Development” for illegal settlement relocation from Zone 1, 2, 3 of AAP. The project site is located on the eastern adjacent area of Zone 2. The planned capacity of settlement is 5,000 inhabitants. Implementation of the project has been initiated on the site.

(2) AFD Grant Aid Project for City Center Area

AFD is undertaking the committed EUR 5.5 million grant aid project packages, which are composed of the Improvement of Storm Water Drainage for the Eastern Side Siem Reap from the River (5 million) and 5 small project packages for the City Center Improvement (half million) as follows,

- Urban Heritage Conservation (investigation, database creation, restoration/renovation/utilization plans formulation)
- Siem Reap Riverside Improvement (landscaping, pedestrian bridge on Siem Reap River to connect Old Market and Urban Heritage, tourist information board)
- Improvement of Old Market Area (tree planting and others)
- Eco-Village Development along branch channel of Siem Reap River in and surrounding the City Center
- Road Improvement to Urban Heritage and new Siem Reap Riverside Road on the eastern bank

(3) Preah Vihear Temple

The Preah Vihear Temple is a Khmer temple situated atop of the Dangrek Mountain near the Thai border. In July 2008, it was listed as a UNESCO World Heritage Site. The roads from Siem Reap to the Preah Vihear Temple are now under construction so that two (2) UNESCO World Heritage Sites in Cambodia will be easily accessible.

The following table shows the number of visitors to Preah Vihear. Previously, it was very difficult to climb the mountain to the temple, however now a mountain road to the temple is developed and paved. Therefore the number of visitors had been increasing. In 2009, the number was declined due to the conflict between Cambodia and Thailand.

The M/P proposed “Khmer Heritage Tourism Network and Tourism Facility Development Project,” so that tourists staying in Siem Reap can visit distant heritage sites and then they stay longer and spend more. The Preah Vihear Temple has a potential to accelerate “up-market strategy.”

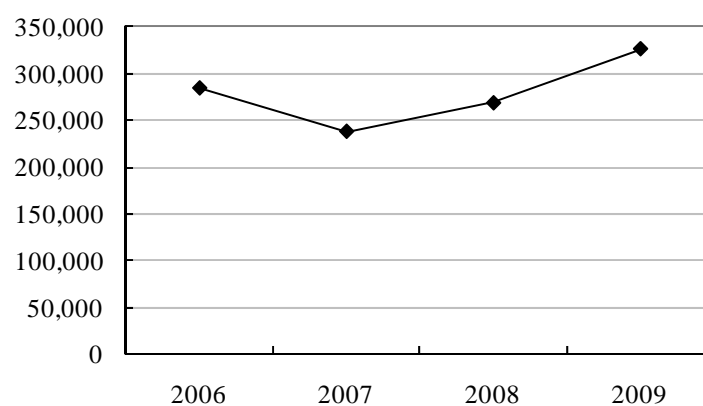
Table 2.16 Number of Visitors to Preah Vihear

	2002	2003	2004	2005	2006	2007	2008	2009
International	168	48,297	67,843	88,615	108,691	90,693	62,258	8,452
Domestic	728	2,800	5,504	18,876	20,326	37,530	65,182	40,525
Sub-total	896	51,097	73,347	107,491	129,017	128,223	127,440	48,977

Source: Tourism Statistics Annual Report, MOT

(4) Poipet – Siem Reap Road

The road section from Poipet to Siem Reap (145,4 km) (NR5 (Poipet – Serei Sophon) and NR6 (Serie Sophon – Siem Reap)) has been improved with asphalt concrete pavement with fund of ADB loan.



Source: Tourism Statistics Annual Report, MOT

Figure 2.10 Visitor Arrivals to Cambodia through Poipet

3 Progress of the Proposed Projects/Programs in the Master Plan

3.1 Overall Progress of the Proposed Projects/Programs

In the M/P, 69 projects/programs were proposed in 11 sectors. The overall progress of the 69 projects/programs was confirmed based on the survey done by the JICA Urban Management Advisor. Status of the progress for the projects/programs in eleven (11) sectors is summarized in the table below.

Table 3.1 Progress of Proposed Projects/Programs

No.	Sector	Number of Projects/Programs			
		Total	Completed	Progressing	No Progress
1.	Urban	5	0 0.0%	5 100.0%	0 0.0%
		See 3.2			
2.	Environment	3	0 0.0%	2 66.7%	1 33.3%
		UDTC requested a technical cooperation from the Japanese Government in 2008. However, there is no progress so far.			
3.	Tourism	6	1 16.7%	4 66.7%	1 16.7%
		All project except for public-private partnership tourism quality improvement project are completed or in progress.			
4.	Agricultural Diversification and Local Product Promotion	4	0 0.0%	0 0.0%	4 100.0%
		All proposed projects are not in progress because Angkor Product Promotion Center has not been established yet.			
5.	Transportation	10	2 20.0%	6 60.0%	2 20.0%
		See 3.3			
6.	Water	7	0 0.0%	6 85.7%	1 14.3%
		Most of the projects are in progress. Especially "The Preparatory Study on the Siem Reap Water Supply Expansion Project" is ongoing and the draft final report of this project was submitted.			
7.	Solid Waste	3	0 0.0%	0 0.0%	3 100.0%
		All projects are not in progress.			
8.	Sewerage / Drainage	9	0 0.0%	5 55.6%	4 44.4%
		Five (5) projects are in progress and the remaining four (4) projects are not in progress. However these four (4) projects are planned to be started after 2012.			
9.	Power	10	0 0.0%	5 50.0%	5 50.0%
		Transmission line from Thailand has been established.			
10.	Local Administration	5	0 0.0%	5 100.0%	0 0.0%
		All projects are in progress. Decentralization and De-concentration Reform (D&D Reform) program is ongoing.			
11.	Community Empowerment	7	0 0.0%	4 57.1%	3 42.9%
		Some projects are in progress.			
	Total	69	3 4.3%	42 60.9%	24 34.8%

Source: The Follow-up Study

More than half of the projects/programs are in some progress (60.9%). However, there is no progress in 34.8% of them. Some of the reasons are that some projects/programs are not yet ready to start, and are proposed as a long term plan (2020).

The most critical reason of no progress is that most of staffs in responsible departments/organizations did not know about the M/P. Changes of executive officers of the Provincial Government affected the causes.

3.2 Progress of the Proposed Projects/Programs in Urban Sector

There are five (5) proposed projects/programs in urban sector. The progress of each project/program is as follows.

Table 3.2 Progress of Proposed Projects/Programs in Urban Sector

Project ID	Title	Implementing Agency	Progress / Remark	Progress Status
U-1	City Center area improvement	SRPG, APSARA with relevant ministerial departments	<ul style="list-style-type: none"> - UDTC discussed the improvement of the City Center area. - APSARA Authority has some plans supported by AFD. (pedestrian bridge, street tree planting etc.) - Most part of the sidewalk on Sivatha Street has been improved. 	△
U-2	Urban planning capacity building	DLMUPC, District, APSARA and SRPG	<ul style="list-style-type: none"> - Land Use Plan of Siem Reap District had already completed by Siem Reap District with support from DED. - A JICA urban management advisor has been dispatched for Siem Reap Province. - A JICA senior volunteer in urban planning has been dispatched for APSARA Authority. - A JICA volunteer in GIS has been dispatched for APSARA Authority. 	△
U-3	Inventory for historical architectures	APSARA/SRPG	<ul style="list-style-type: none"> - APSARA Authority will conduct an inventory survey for historical architectures with support form AFD. 	△
U-4	Residential development promotion	DLMUPC, District, and Private Sector	<ul style="list-style-type: none"> - Some housing estates have been developed. However they are not affordable for local people. 	△
U-5	Cultural and Tourism Zone development	APSARA and Private investors	<ul style="list-style-type: none"> - Some tourist spots, such as convention center, Sihanouk Museum (AEON), etc., have been developed. - Land acquisition has been progressing by APSARA Authority. - However no hotel development is in progress. 	△

△: There are some progress.

Source: The Follow-up Study

The detailed progress of “U-1 City Center Area Improvement Project” is described hereunder.

U-1 City Center Area Improvement Project

There are eight (8) components as follows.

(1) Improvement of Sidewalk: about 3 km (Sivatha Street and streets within Old Quarter Area)
Sidewalks proposed in the M/P have been improved already as shown in the following figure. In addition, there are some more improved sidewalks in the City Center area. However some of them are unpaved and/or very narrow.

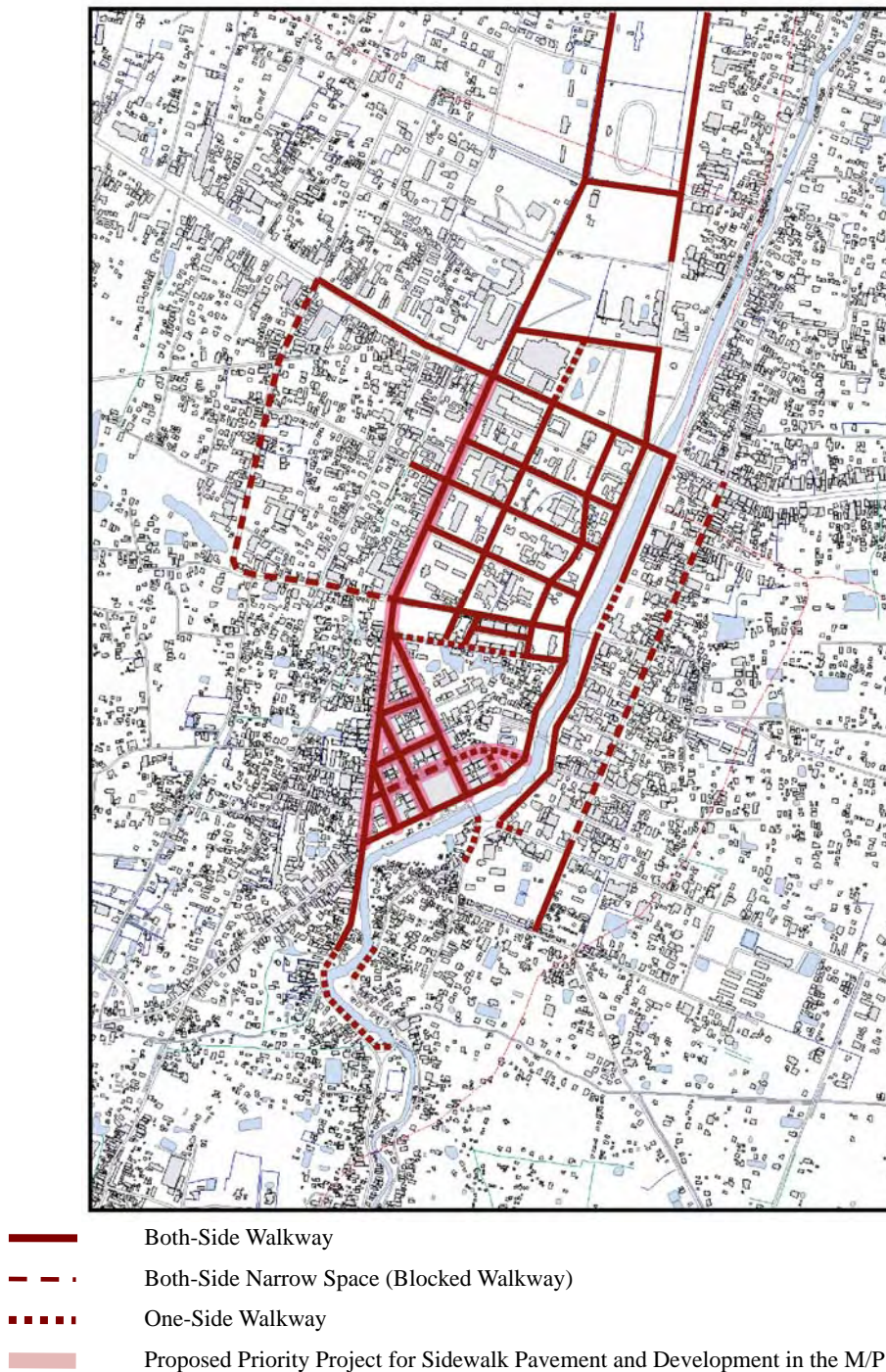


Figure 3.1 Improvement of Sidewalk

(2) Tree lining in Old Market area: about 2 km (Sivatha Street and streets within Old Market)
More than half of proposed parts of tree lining have been completed in addition to other streets not proposed in the M/P. The current situation of tree lining is shown in the following figure.

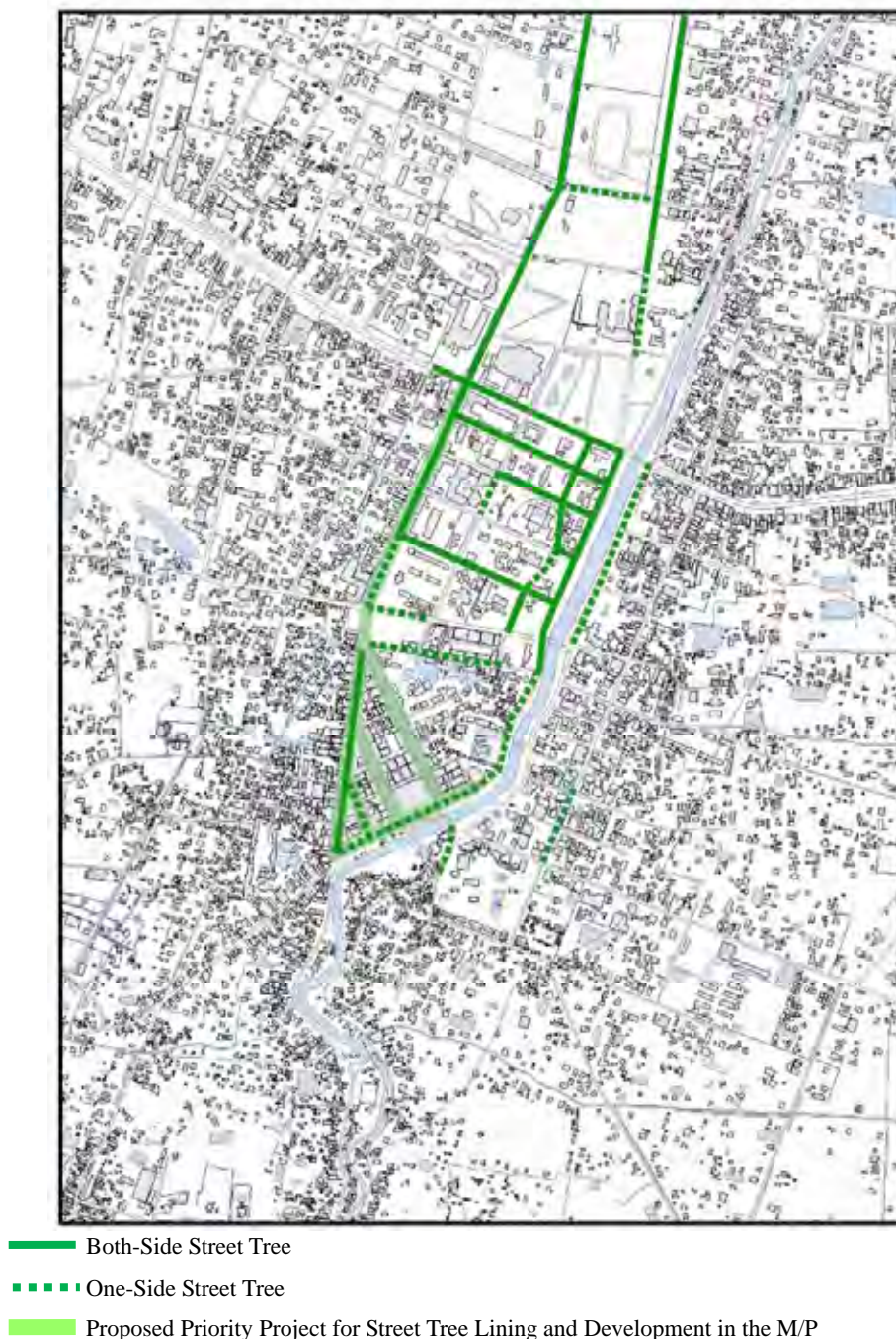


Figure 3.2 Tree Lining

(3) Improvement of street lighting: to be determined (mostly along the Siem Reap River)
Street lightning along all streets proposed in the M/P has been achieved except for one (1) street. In addition, street lightning along other streets is installed as shown in the following figure.

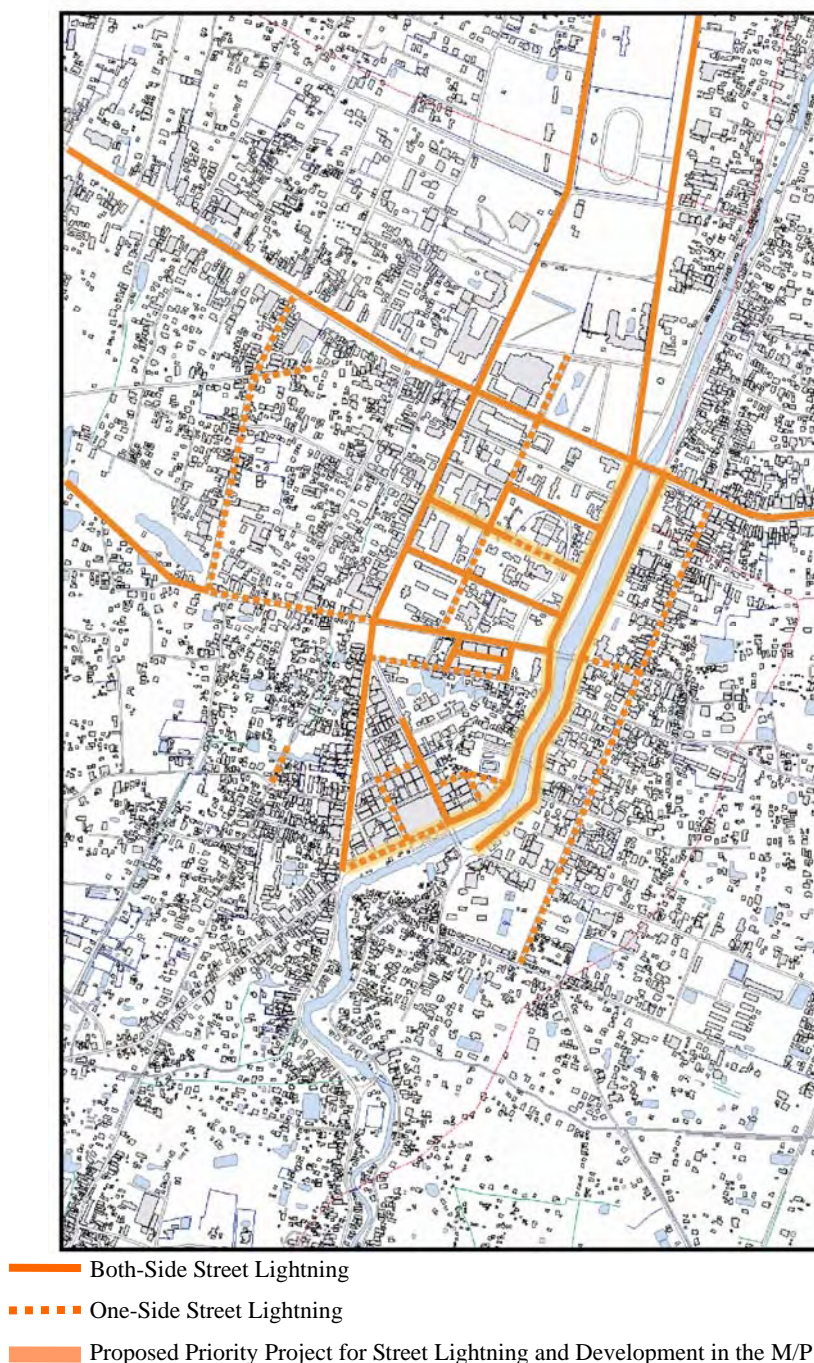


Figure 3.3 Street Lighting

(4) Construction of an urban park
(5) Redevelopment of the Provincial Hospital Area
(6) Redevelopment of the crowded area in city center
There is no progress in the three (3) components above.

(7) Improvement of pavement of urban roads: about 10.5km (mostly in peri-urban area)

About 80% of the proposed urban roads have been improved as shown in the following figure.

(8) New construction of roads: about 1.1km (for east and south boundary of peri-urban area)
New road construction proposed in the M/P has not been implemented yet as shown in the following figure.

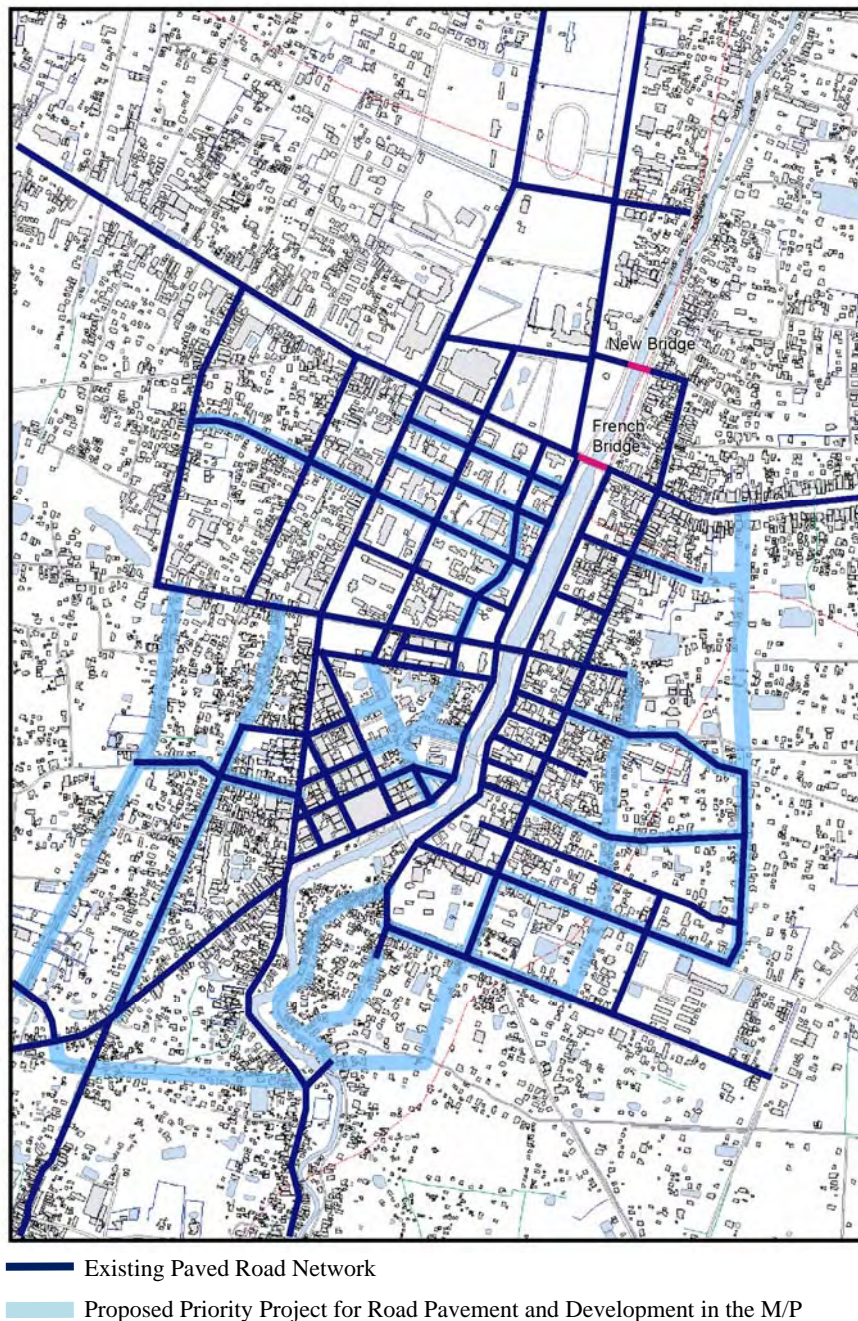


Figure 3.4 Road Improvement and Development

3.3 Progress of the Proposed Projects/Programs in Transportation Sector

There are ten (10) proposed projects/programs in Transportation sector. The progress of each project/program is summarized as follows.

Table 3.3 Progress of Proposed Projects/Programs in Transportation Sector

Project ID	Title	Implementing Agency	Progress / Remark	Progress Status
TR-1	French Bridge improvement	MPWT	- A new bridge has been constructed at about 270m upstream from the French Bridge and used as one way route from west to east. The French Bridge is also used as one way route from east to west.	○
TR-2	Sub-arterial road network (Phase 1)	DPWT, SRPG	- Only a little parts of proposed roads have been paved. - However, most of the parts are not in progress.	△
TR-3	Sub-arterial road network (Phase 2)	MPWT	- Hun Sen Peace Road has been upgraded in Jan. 2010. - The road is assigned as “Siem Reap Bypass Road,” and heavy vehicles are requested to pass the bypass road instead of entering into the city center via NR-6. - The bypass road is a toll road, charging a toll to heavy vehicles only and operated by APSARA Authority.	○
TR-4	Sub-arterial road network (Phase 3)	DPWT, SRPG	- Some parts of roads network have been completed. - However, most parts have not been completed yet.	△
TR-5	Sub-arterial road network (Phase 4)	SRPG	- Some parts of roads network have been completed. - However, most parts have not been completed yet.	△
TR-6	Institutional improvement for road safety	Police, DPWT and SRPG	- There are eight (8) action plans. - There is no remarkable attainment.	△
TR-7	Rural heritage road network rehabilitation	MPWT, MRD	- Majority of the rural heritage road network have already been improved. - Some sections are now under construction.	△
TR-8	Environmental public transport	APSARA	- 50 electric cars are in operation in AAP. - Increase of electric cars is planned by Tourism Department of APSARA Authority.	△
TR-9	Bicycle track construction	APSARA	- There is no progress.	×
TR-10	Institutional improvement for efficient road maintenance	DPWT, DRD	- There are three (3) action plans. - These are not implemented.	×

○: completed, △: There are some progress, ×: There is no progress.

Source: The Follow-up Study

The progress of each project/program is described hereunder.

TR-1 French Bridge improvement project

The second French Bridge was built at around 270m upstream of the original bridge as shown in

Figure 3.5 Both bridges are operated as one-way operation.



Source: Japan Space Imaging, shot on 10th October 2008

Figure 3.5 Location of Second French Bridge

TR-2 Sub-arterial road parallel to the NR6 (Phase I)

Red lines in the left map of Figure 3.6 shows the arterial road parallel to NR6 proposed by the M/P. Black lines in the right map shows the AC/DBST/Macadam paved roads as of April 2010. As seen in Figure 3.6, the parallel road to NR6 has not been completed yet.



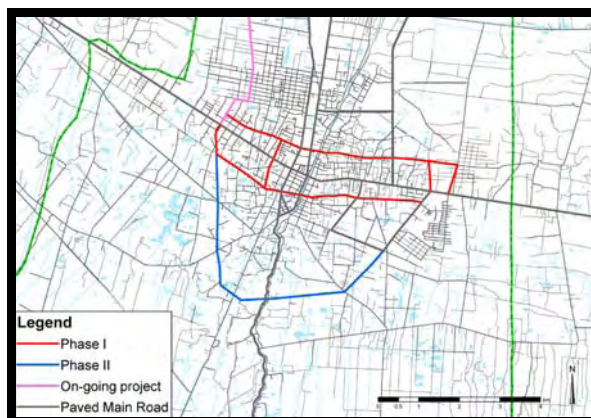
Source: The M/P Study

Source: The Follow-up Study

Figure 3.6 Proposed Phase I Road and Present Condition of Bituminous Paved Road

TR-3 Upgrading the Hun Sen Peace Road (Phase II)

The blue colored road in Figure 3.7 is the Hun Sen Peace Road (Ring Road). The road was constructed in 2002, and it was laterite road at the time of the M/P. Furthermore, the bridge over the Siem Reap River was not constructed, and consequently formed a missing link.



Source: The M/P Study

Figure 3.7 Phase II Road - Hun Sen Peace Road



Photo 3-1 Side View of Ring Road Bridge over Siem Reap River

At present, the Ring Road has been already surfaced by asphalt concrete, and the bridge over Siem Reap River was completed. At the time of the Follow-Up Study commencement, February 2010, the bridge was already opened to the public traffic.

The Ring Road along with the approach road is assigned as “Siem Reap Bypass Road”, and heavy vehicles are required to pass the bypass road instead of entering into Siem Reap City via NR6. The bypass road is a toll road, charging a toll to heavy vehicle only. The bypass is operated by APSARA Authority. Photo 3-3 shows the guide sign of “Siem Reap Bypass Road” installed on NR6 around 2.7 km west from the airport access road. Photo 3-4 shows the tollgate on approach road to the Ring Road. There is one more tollgate located at the eastern side of the Ring Road.



Photo 3-2 The bridge was opened to the public



Photo 3-3 Guide Sign of “Siem Reap Bypass Road” on NR6



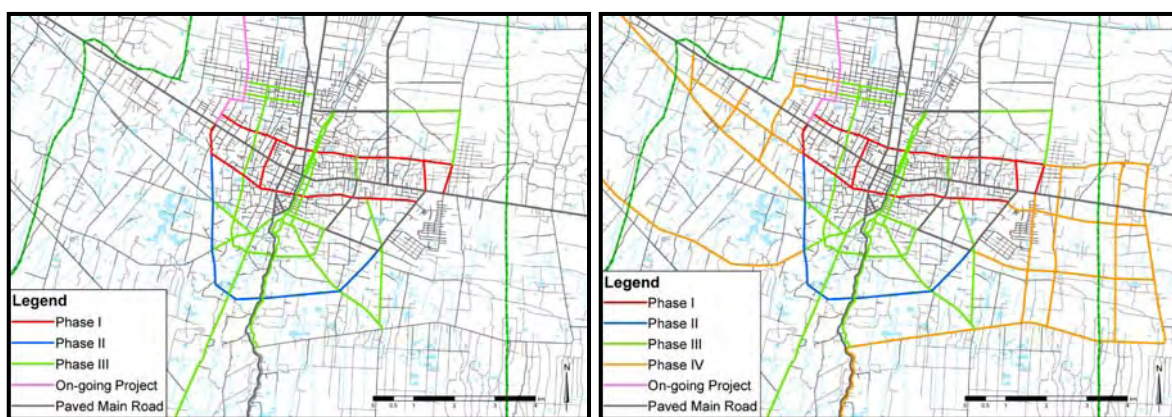
Photo 3-4 Tollgate and Tollgate Guide Sign

TR-4 Completion of sub-arterial road network in the urban area up to 2012 (Phase III)

TR-5 Completion of sub-arterial road network in the urban area up to 2020 (Phase IV)

The proposed sub-arterial road network for Phase III and Phase IV is given by light green color and orange color in Figure 3.8, respectively. When compared with the present condition of road network shown in Figure 3.6, it is observed that a certain achievement of road improvement has been done which was proposed/included in Phase III and Phase IV.

It is noted that the road improvement plan in the M/P was established under the socioeconomic framework set in the M/P. It is understood that the proposed projects of TR-1 to TR-3 were expected to be implemented urgently, and TR-4 and TR-5 were expected to be realized by 2012 and 2020, respectively.



Source: The M/P Study

Source: The M/P Study

Figure 3.8 Proposed Road Network of Phase III (Left) and Phase IV (Right)

TR-6 Institutional improvement and campaigns for road safety

The M/P identified the following eight (8) action plans in the TR-6 program.

- (i) Publication of Road Safety Audit and Hazardous Locations
- (ii) Improvement of Roads Environment and Road Design
- (iii) Road Safety Education for Children
- (iv) Law Enforcement
- (v) Vehicle Technical Inspection
- (vi) Drivers Training

- (vii) Emergency Assistance to Traffic Victims
- (viii) Road Safety Public Campaigns

There is no remarkable attainment.

TR-7 Rural heritage network rehabilitation project

In order to promote the longer stay of tourists or attract up-market tourists to Siem Reap, it is essential to improve the regional road network to access rural heritages. Majority of rural roads listed in the M/P have already been improved and some sections are now under construction.

TR-8 Introduction of environmental public transport in the Angkor Archeological Park (AAP)

The M/P proposed to provide the pleasant transportation by environmental busses in the AAP area, and restrict the entry of private cars, including tourist busses into the AAP area. APSARA Authority has already introduced electric busses and commenced its operation in Angkor Thom area. From the view point of preservation of Angkor archeological heritages, and also from the view point of prevention of global warming, the deployment of electric car in and out of AAP shall be continuously encouraged.

The entry restriction of private cars and tourist busses operated by travel agencies into AAP is not implemented. This issue - the entry restriction of private cars/buses into AAP - would have many problems to be solved, related to private sector's interest, such as the income restoration for Tuk-Tuk drivers to keep their livelihood and/or profit changes of travel agencies. It is expected for APSARA Authority to make a road map with getting consensus of stakeholders.



Photo 3-5 Electric Bus deployed in Angkor Thom Area

TR-9 Bicycle track construction in the Angkor Archeological Park

The M/P proposed to construct bicycle tracks along existing roads in AAP area, in order to achieve the safety and comfortable cycling tourism by separating bicycle traffic from vehicle traffic. Until now, bicycle tracks are not constructed.

TR-10 Institutional improvement for efficient road maintenance

In order to maximize the efficiency of road maintenance, the M/P proposed to implement the following three (3) programs:

- (i) Preparation of Road Inventory
- (ii) Monitoring of Road Condition
- (iii) Coordination on Road Maintenance Policy between DPWT and PDRD

The proposed programs are expected for DPWT to implement. However, due to the limitation of DPWT budget, those are not implemented.

4 Development Plan of the Selected Sector

4.1 City Center Improvement Plan

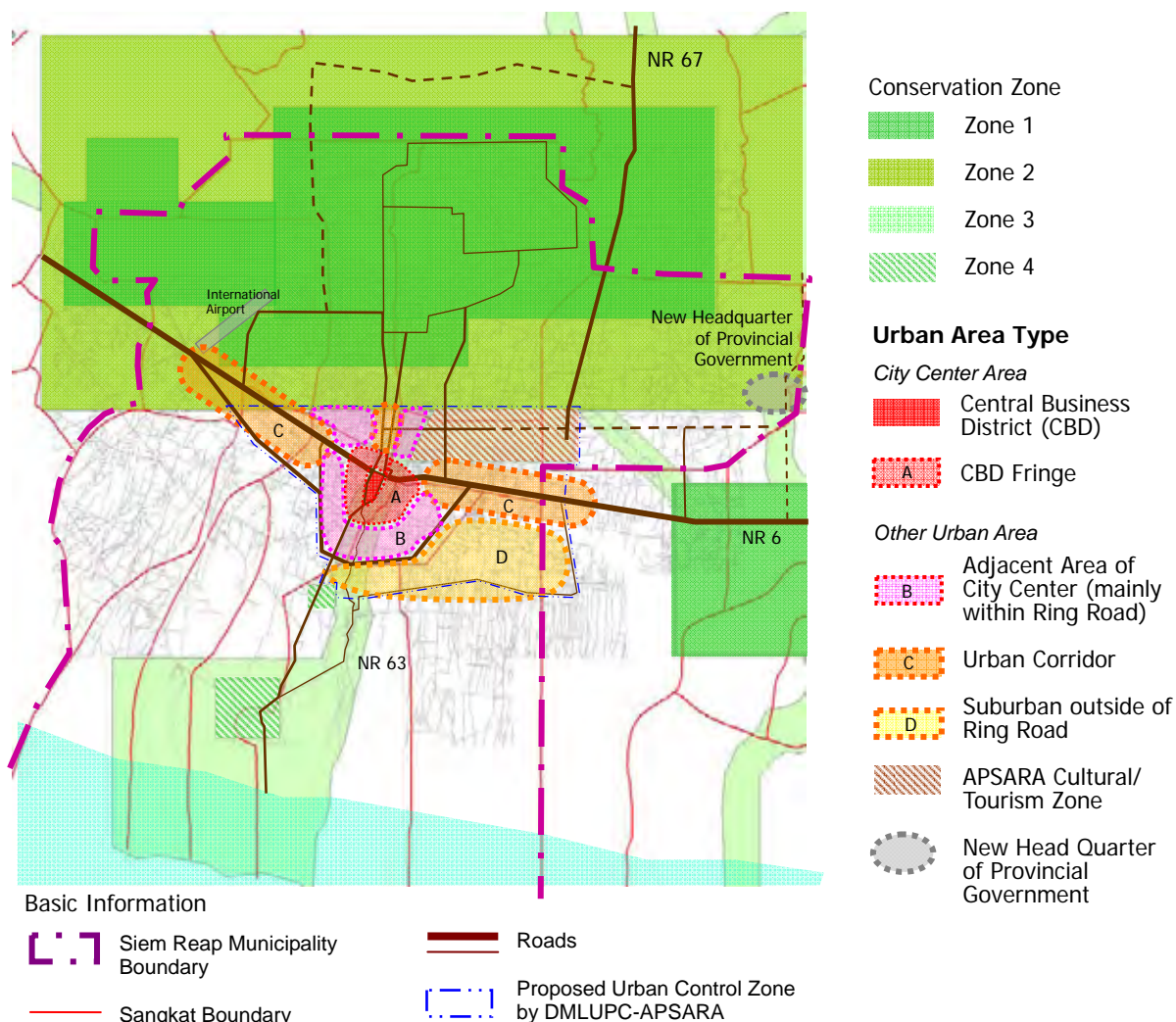
4.1.1 Review of City Center Improvement Plan

(1) Spatial Structure of Siem Reap Urban Settlement

Urban settlement including areas urbanized densely and areas under urbanizing in Siem Reap Municipality are categorized mainly into seven (7) types based on the characters by land use, development density, and their locations as following items and Figure 4.1.

- **Central Business District (CBD):** This type is defined as the center of the city where commercial and business center with dense land use including government offices are located in this area. Although the Provincial Hall has been relocated to the eastern end of the municipality area, there will require key urban services such as banks, commodity shops, post office, hospitals in this area.
- **CBD Fringe:** This type is defined as a part of City Center and the adjacent area of the CBD where commercial and business facilities including tourism facilities has been scattered as mixed land use with residential.
- **Adjacent Area of City Center within the Ring Road:** This type is located in adjacent area of the City Center where residential land use is dominant by low dense and scattered settlement except mixed dense area by residential and commercial-business use along roads.
- **Urban Corridor (Commercial & Business):** The areas have been formulated along arterial roads of NR6 and Provincial Road (PR) No.23, 24 where commercial and business including large hotels, restaurants and shops are located intensively.
- **Suburban outside of Ring Road:** This type is defined as low dense suburban area outside of the Ring Road where are mainly scattered agricultural settlements and small scale residential settlement along new roads including factories and educational facilities, restaurants and shops.
- **APSARA Cultural and Tourist Zone:** This area is designated by the government for tourism development including hotels and other tourism facilities in future, although development has not been implemented except Sianouk (AEON) museum.
- **New Head Quarter of Provincial Government:** This area has been newly developed recently (2010) for the office complex area of the Provincial Government and department offices within Zone 2 of AAP.

The City Center area as the planning area for the Follow-up Study is located in the pivotal place among those areas of the Siem Reap Municipality where many tourists visit and enjoy shopping, eating and being attracted by tourism products as an urban tourism destination.



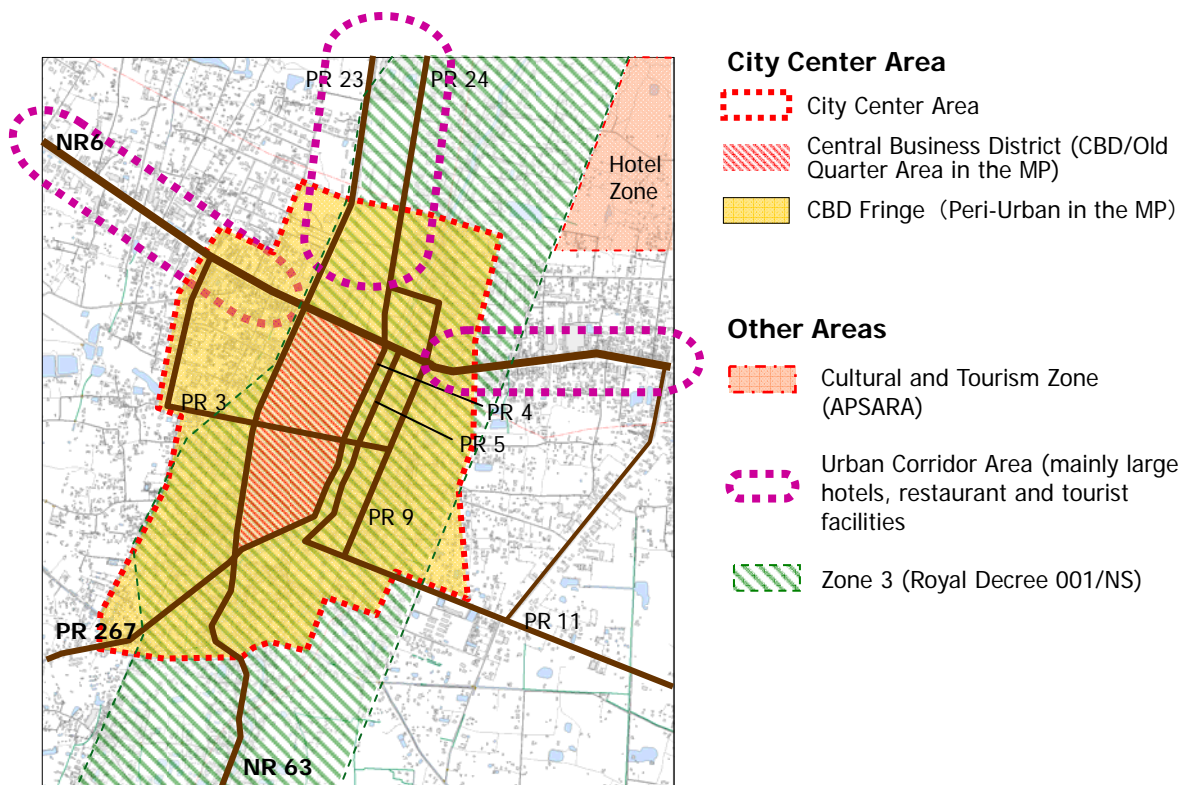
Source: The Follow-up Study

Figure 4.1 Type of Urban Area in Siem Reap Municipality

(2) City Center Area in Siem Reap Municipality

According to the previous type of urban areas, the entity of the City Center area consists of Central Business District (CBD) area and CBD Fringe area as illustrated in the above figure. Therefore the areas named by CBD/Old Market area and Peri-urban area in the M/P are proposed to be redefined as CBD area from CBD/Old Market area and CBD Fringe from Peri-urban area.

The CBD area is demarcated by three (3) main streets of Sivatha, Pokambor and NR6, where several large 4-3 star hotels along Sivatha Street, Royal Residence, two large hospitals, Old Market area with restaurant, bar, café, and Central Market. The CBD Fringe area is demarcated by local roads where many guesthouse, restaurants and bars are developing in residential area.



Source: The Follow-up Study

Figure 4.2 Location of City Center Area

(3) Approach for City Center Area Improvement

1) Urban Sector Vision in the Master Plan to be maintained

The development vision for Siem Reap / Angkor Town in the M/P has been set as “A Beautiful and Unique Tourist City based on a harmony of history, arts and nature of Khmer”. Although current development has brought some changes in terms of urban structure and socioeconomic conditions, this vision to guide functions and roles of Siem Reap Municipality as the international tourism city with the world heritage are still effective and should be maintained as an essential direction of development.

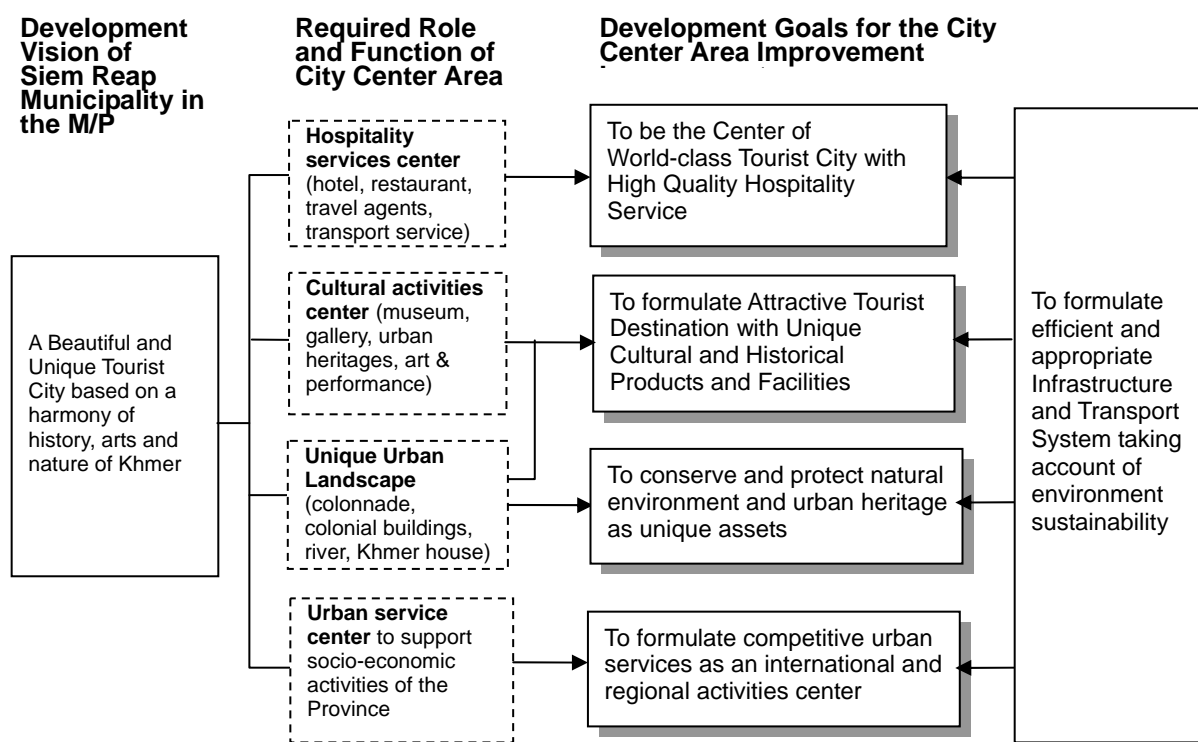
2) Goals for the City Center Area Improvement to Achieve the Vision

The City Center area as a core of Siem Reap Municipality plays an important role in embodying the development vision abovementioned. However it is necessary for the City Center area to establish more concrete goals to be achieved by clear and common views for relevant stakeholders, taking into account of characters and specific conditions.

The City Center area is characterized as multi-function urban area where tourists stay and enjoy places as sub-destinations of the world heritage tourism, and there are socioeconomic activities of citizen for working and living as places of urban service center. And also the City Center area has been involved in the cultural landscape protected zone (Zone 3¹) for the World Heritage to be protected.

The improvement goals for the City Center area to embody the vision of Siem Reap Municipality taking into account of its roles and functions are set as follows.

¹ Royal Decree 001/NS, Protected Cultural Zones in the Siem Reap/Angkor Region and Guidelines for their Management (Landscape to be protected for traditional appearance, land use practices, varied habitats, historic building, or man-made features from the past or of recent origin)



Source: The Follow-up Study

Figure 4.3 Development Vision and Goals for City Center Area Improvement

(4) Current Urban Sector Issues and City Center Area Improvement Programs

1) Current Urban Sector Development Issues

As mentioned in the previous section for current development and changes in the Siem Reap Municipality area, urban development issues have shifted toward the next stage of attractive urban tourism products for further increase of tourist arrivals, while basic infrastructure development has been progressing or under provision such as water supply and drainage system.

On the other hand, local roads including small access roads in a residential area in association with drainage system are still poor in CBD Fringe and other urban settlement areas, although the LMAP as cadastral project including small roads expropriation has been implemented to contribute to local road improvement gradually.

The City Center area where tourists and local people enjoy urban services and tourism attractions as one of the most important spots for urban tourism is required to be improved and diversified more effective and attractive urban services through sufficient infrastructure, transportation system and its management with challengeable issues for urban development under restrictions of Zone 3 (cultural landscape protected area).

Table 4.1 Current Urban Sector Development Issues

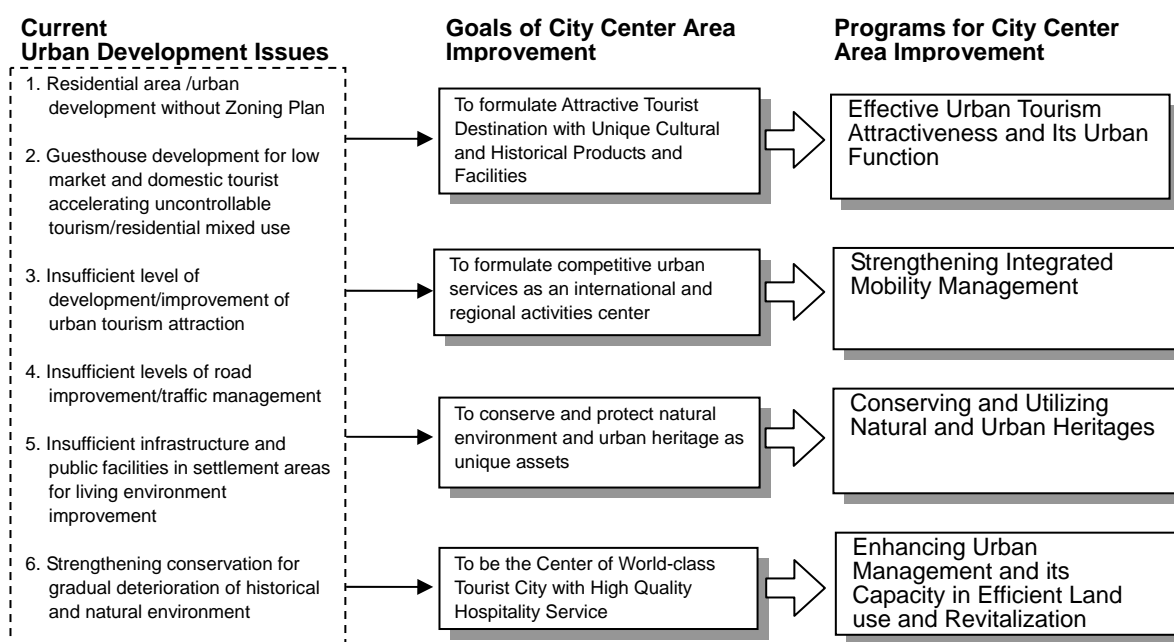
Current Urban Development Issues	City Center Area		Urban Corridor (Commercial & Business)	APSARA Hotel Zone (Cultural and Tourist City)	Adjacent Area of City Center (Suburban mainly within Ring Road)	Suburban outside of Ring Road	New Provincial Government Center
	Central Business District	CBD Fringe					
1. Residential area /urban development without Zoning Plan	--	●	●	○	●	○	--
2. Guesthouse development for low market and domestic tourist accelerating uncontrollable tourism/residential mixed use	--	●	○	--	△	--	--
3. Insufficient level of development/improvement of urban tourism attraction	●	●	●	●	△	△	--
4. Insufficient levels of road improvement/traffic management	●	●	○	--	△	--	--
5. Insufficient infrastructure and public facilities in settlement areas for living environment improvement	△	●	○	--	○	○	○
6. Strengthening conservation for gradual deterioration of historical and natural environment	●	●	○	○	○	○	●

Legend: ● = critical and urgent issue, ○ = considerable but not urgent, △ = negligible or minor, -- = not affected or not correspondent
Source: The Follow-up Study

2) Issues, Goals and Programs for City Center Area Improvement

According to three (3) urban sector approaches of the previous M/P which stated by 1) formation of compact city, 2) urban redevelopment and integration of Old Market Quarter, and 3) urban roads and infrastructure development, improvement of the City Center area requires roles and functions to fit with desirable characters and functions of the City Center area, taking into account of current urban development issues, especially issues on transportation and traffic, and conservation of urban heritages. The followings describe the improvement goals and programs for the city center.

The following Figure 4.4 shows issues for Urban Development sector and goals and programs for the City Center area improvement in the Siem Reap Municipality.



Source: The Follow-up Study

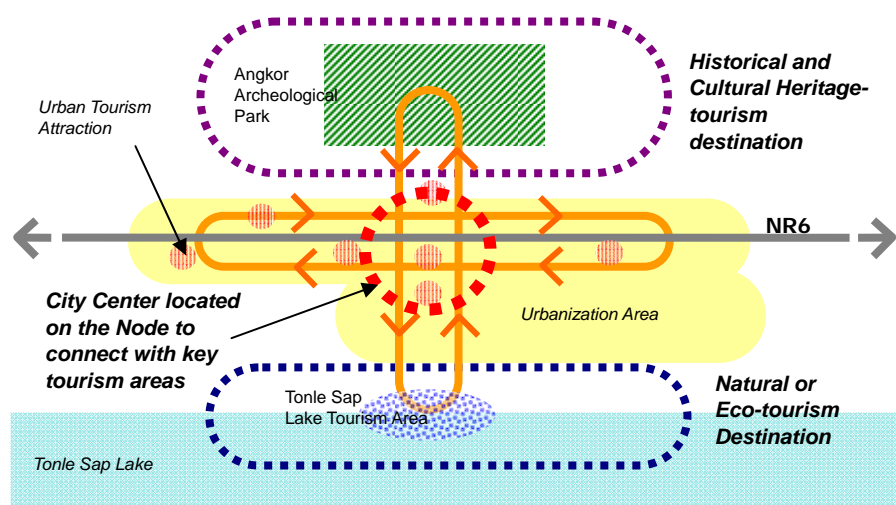
Figure 4.4 Issues and Goals Refined for Programs of City Center Area Improvement

4.1.2 Improvement Plan for City Center Area

(1) Spatial Development Concept for City Center Area Improvement

The City Center area plays a pivotal role in formulating urban structure as a service town of the world heritage and also a tourist destination which connects to every fundamental tourist destination of the Angkor World Heritage site, Tonle Sap Lake area and other urban tourist facilities along NR6.

In this context of spatial function, the City Center area should be enhanced by its connectivity to every significant destination efficiently and effectively. The word of “connectivity” can be interpreted not only by physical access such as road and transportation system, but also non-physical connection such as communication and information, social and cultural activities to connect with the entire country of Cambodia and other world. The following shows conceptual diagram of spatial relationship of the City Center area.



Source: The Follow-up Study

Figure 4.5 Conceptual Spatial Function for City Center Area Improvement

(2) Programs for City Center Area Improvement

In order to achieve the goals for the City Center area improvement, four (4) improvement programs are formulated based on the current issues. Each program is composed of several projects and sub-components. The followings are briefs of the programs. Table 4.2 shows list of proposed projects by each program for improvement of the City Center area.

Program 1: Enhancing Urban Tourism Attractiveness and its Urban Function

The City Center area as one of most important tourism spot of urban tourism activities and tourist circulation plays a considerable role in diversifying tourism activities apart from the historical tourism product of the Angkor World Heritage site. Taking account of carrying capacity of the world heritage, it is inevitable for Siem Reap to enhance attractiveness of urban tourism by facility improvements through promotion of public and private partnership. And also, it will contribute to enhance local industries and economy.

Program 2: Strengthening Integrated Mobility Management

Convenient/comfortable/safety access and transportation service is inevitable for not only tourists but also local residents, taking account of not only quality of tourist transportation services but also efficient transportation services for local socioeconomic activities. Accordingly, every traffic mode of tourist bus, mini-ban, motor taxi, tuk-tuk and bicycle is required to manage and control their mobility in integrated manner in order to operate efficiently and mitigate negative impact on urban environment and transportation system.

Program3: Conserving and Utilizing Natural and Urban Heritages

The colonial style buildings, temples, Siem Reap River and large street tree colonnades are unique and valuable townscape element of the City Center area. It is essential for the city center to characterize and appeal an image of the town that plays important roles in formulating town identification with pride. Local government should conserve those urban heritages, historical and traditional urban landscape, and at the same time, utilize their potentials.

Program 4: Enhancing Urban Management and its Capacity in Efficient Land Use and Revitalization

The most of City Center area is involved in Zone 3 (cultural protected area) which requires

well-organized and careful revitalization by high-dense land use in order not to deteriorate historical environment with the World Heritage site of Angkor. In this specific condition, urban management skill and sufficient capacity of the government staff with necessary guideline are inevitable to secure descent improvement or redevelopment of the City Center area.

Table 4.2 Proposed Improvement Projects by Each Programs

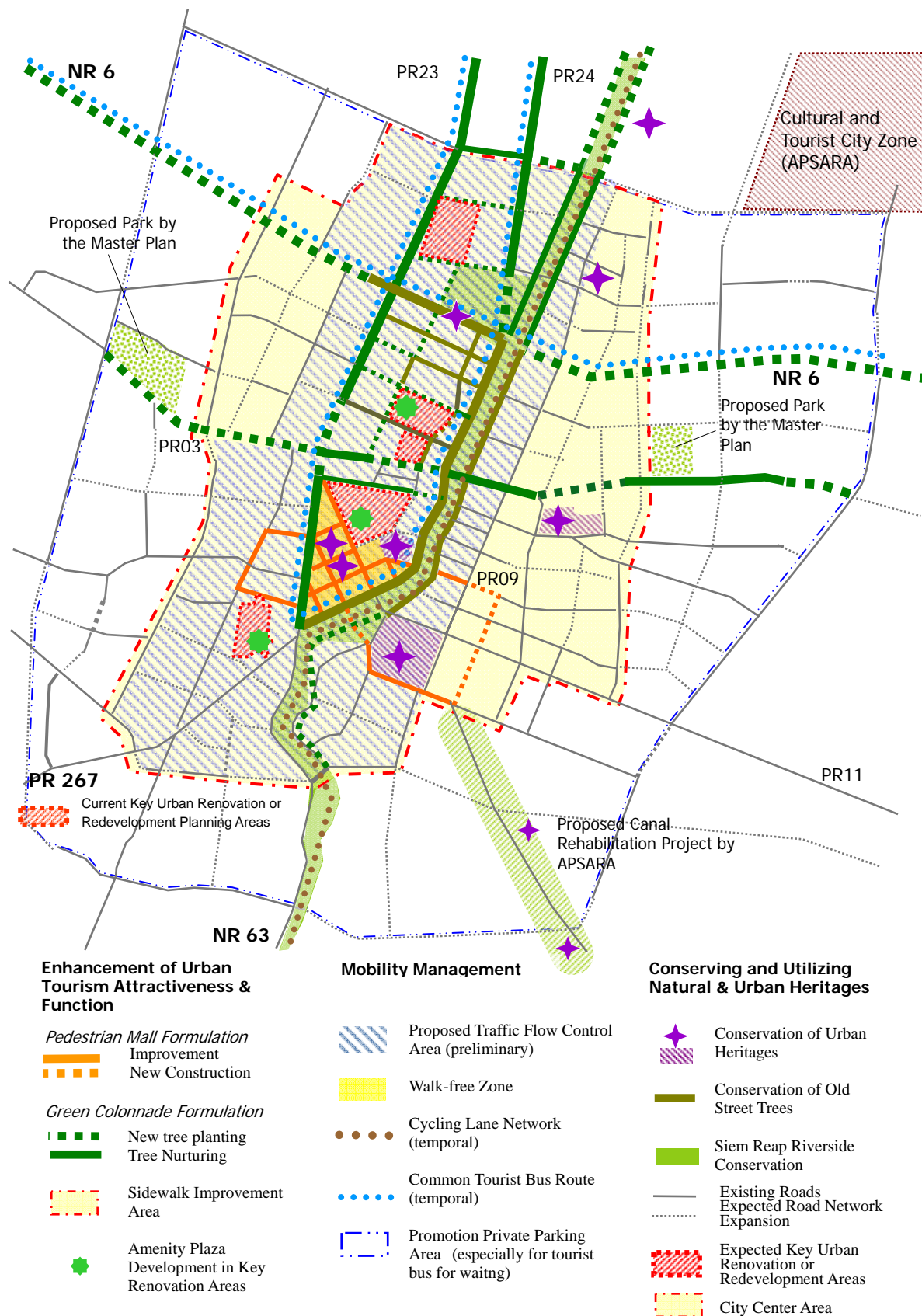
Proposed Program	Proposed Project	Short Term (within 3 years)	Mid Term (within 5 years)	Long Term (within 10 years)	Responsible Agency
1. Enhancing Urban Tourism Attractiveness and its Urban Function	1-1 Improvement Streets in Old Market Area				-
	1-1-1 Pedestrian Mall Development				DPWT
	1-1-2 Pilot Project				DPWT/MG
	1-2 Development of Small Corner Parks in Old Market Area				-
	1-2-1 Gate Park Redevelopment in Kindergarden Area				DTC
	1-2-2 Pocket Plaza Development				DPWT
	1-3 Organizing Taskforce for Old Market Area Improvement with Organized Local				-
	1-3-1 Establishment Task Force for Old Market Area Improvement				PG / MG
	1-3-2 Management and Operation of Development Committee				PG / MG
	1-4 Establishing Green Colonnade Network				DPWT
	1-5 Establishing Sidewalk Network				-
	1-5-1 Both-side Sidewalk pavement				DPWT/DLMJPC
	1-5-2 Underground wires construction				Electricity Company
	1-6 Amenity Plaza Development				DPWT
2. Strengthening Mobility Management	2-1 Integrated Traffic Management (public parking, walk-free zone, one-way control,				-
	2-1-1 Traffic Management Study				DPWT / PPO
	2-1-2 Tourist Transit Station Projects				DPWT
	2-1-3 Execution of Traffic Management and Operation				DPWT / PPO
	2-2 Common Tourist Bus System (circulation service)				-
	2-2-1 Feasibility Study for Shuttle or Circulation Tourist Bus Formulation				Private Sector
	2-2-2 Common Bus Management and Operation				Private Sector
	2-3 Establishing Environment-friendly Cycling Lane Network				DPWT
2-4 Promotion of private parking business				DPWT / PPO	
3. Conserving and Utilizing Natural and Urban Heritages	3-1 Conservation of Urban Heritage & Old Street Tree				PG / APSARA
	3-2 Improvement of Urban Heritage Information Board				DCA / APSARA
	3-3 Conservation and Improvement of Riverside Area				APSARA
4. Enhancing Urban Management and its Capacity in Efficient Land Use and Revitalization	4-1 Capacity Development for Urban Planning and its implementation (control and guide)				-
	4-1-1 Zoning Control Implementation Capacity Development				DLMJPC / MG
	4-1-2 Urban Planning Skill Development				DLMJPC / MG
	4-2 Strengthening Coordination and Cooperation Mechanism among Urban Planning/Development Authorities regarding Siem Reap City				PG
	4-3 Establishing City Center Area Development and Design Guideline				PG

Source: The Follow-up Study

(3) Spatial Improvement Plan for City Center Area

Proposed projects in each program are set on physically as the long-term improvement plan into the City Center area in combination with cores or nodes development such as a transit station and an amenity plaza, and liner or network development of sidewalk, green colonnade and area-wise development of traffic control zone or walk-free zone designation.

Figure 4.6 illustrates proposed future improvement plan of the City Center area based on each program proposed in the previous section except non-physical improvement program of the program 4 (Enhancing Urban Management and its Capacity in Efficient Land Use and Revitalization). However, it should be noted that more detailed study will be required for further implementation, as physical plan shows just conceptual scheme.



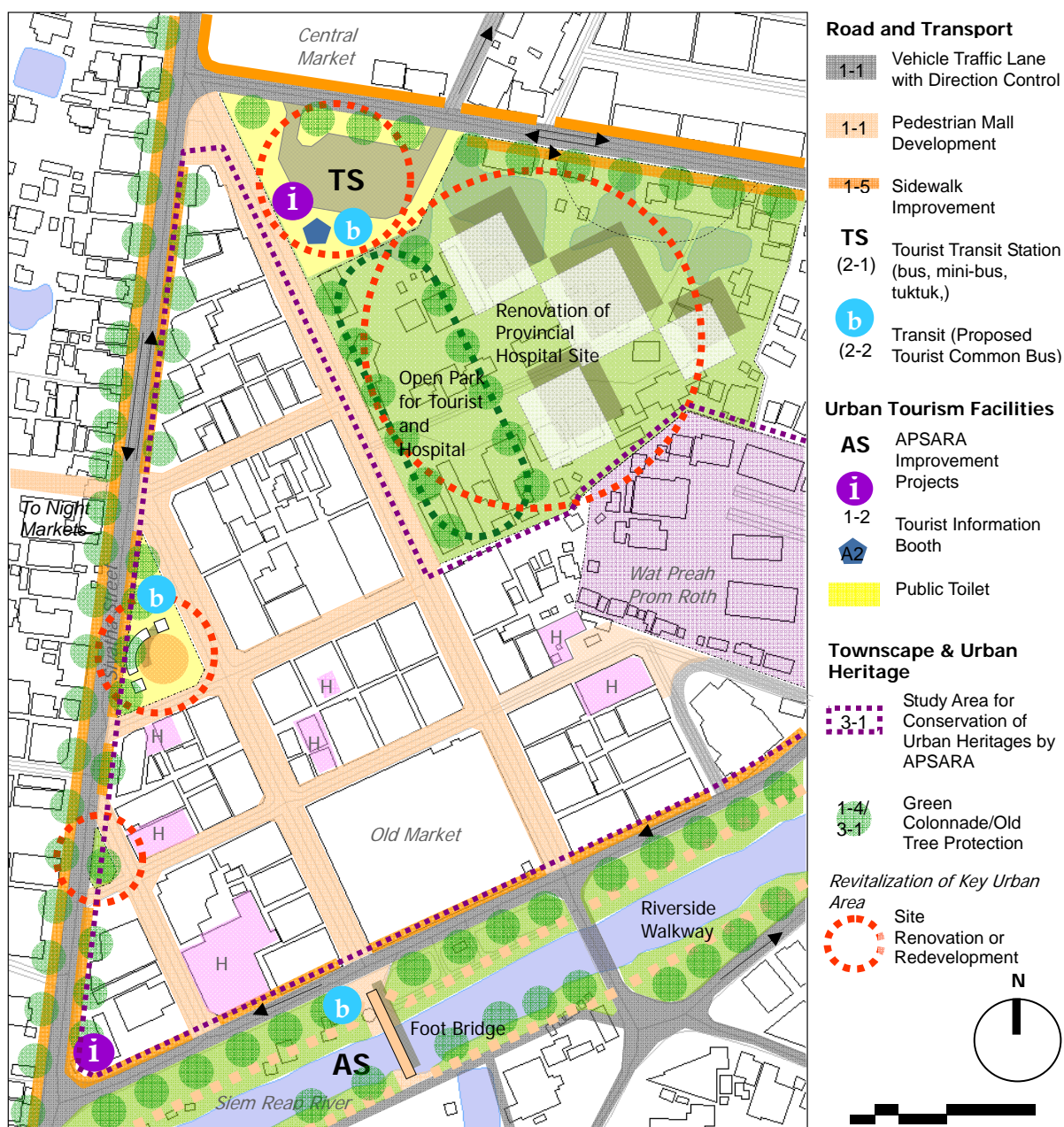
Source: The Follow-up Study

Figure 4.6 Conceptual Scheme of City Center Improvement for Long-term

(4) Spatial Improvement Plan for Old Market Area

According to key projects crossing various programs for Old Market area, spatial improvement plan is proposed in Figure 4.7. The spatial plan illustrates locations of relevant project components of;

- 1-1 project: Improvement Streets in Old Market Area with Trigger Pilot Projects: The aim of the project is focusing to establish a safety walk-free zone for the center of urban-type tourist activities as the international tourism gateway. It will contribute to enhancement of tourist activities and it may create positive influences for local industries and economy.
- 1-2 project: Development Small Corner Parks in Old Market Area: The aim of the project is providing pocket parks in the Old Market area and to equip street furniture for rest place and transit station in association with tourist common bus service.
- a part of 1-4 project: Establishing Green Colonnade Network and a part of 1-5 project: Establishing Sidewalk Network: The aim of the project is not only providing unique colonial landscape, but also providing safety and green shaded walkway to enjoy townscape.
- a part of 2-1 project: Integrated Traffic Management and a part of 2-2 project: Common Tourist Bus System: The aim of the project is focusing to establish ordered tourist transportation services, which has to avoid un-safety conditions of on-street parking and side-walk parking and also noisy tout of tuk-tuk.
- a part of 3-1 project: Conservation of Urban Heritage & Old Street Tree, a part of 3-2 project: Improvement of Urban Heritage Information Board and a part of 3-3 project: Conservation and Improvement of Riverside area: The aim of the project is focusing to diversify urban tourism product.



Source: The Follow-up Study

Figure 4.7 Old Market Area Improvement Spatial Plan (Long-term)

4.1.3 Priority Project in City Center Area Improvement

(1) Proposed Projects and Programs for the City Center Area Improvement

1) Listing Proposed Projects and Programs

Based on the improvement approaches aforementioned, proposed projects and programs are formulated taking into account of their implementation plan including improvement phasing (short, medium, long term), necessary support measures or schemes such as technical assistance, government funding or external funding (private or international support), public-private partnership (PPP). Related proposed projects and programs for City Center area are also indicated for consideration of multi-effect or synergy-effect among projects.

(2) Selection of Priority Projects and Programs

Proposed projects and programs are necessary to be prioritized strategically in order to achieve the improvement goals, as well as viabilities of economic, financial, institutional and environmental aspects, taking into account of maximization of multi-effects impact due to limited inputs. Especially financial and institutional capability of projects and programs are essential elements to govern their implement ability of projects and programs.

1) Selection criteria of priority projects and programs

Proposed projects and programs in urban sector tend to be involved by various stakeholders requiring sufficient time for consensus building. Therefore they are often taken by step by step approach for implementation from short-term to mid-long term projects. However among proposed projects and programs, priority should be given to considerable projects by every short, medium and long-term phase projects based on the following criteria for selection.

- **Urgency:** proposed projects and programs should be considered by urgency to take action immediately in order to solve critical issues in the City Center area.
- **Preparedness:** projects and programs are needed to consider their viability in terms of level of recognition of issues among relevant stakeholders, clear responsible body and funding including international supports for implementation
- **Investment effectiveness (synergy effect):** economic impacts on tourism or other industrial sectors and multi-relationship among projects are also important criteria for selection in order to maximize positive impacts or effects on wider beneficiary by limited funding
- **Social and environmental impact:** projects and programs requires careful consideration for their selection whether they have negative or positive impacts on social or natural environment or not.

2) Proposed priority projects and programs

Priority projects and programs are selected through an assessment by criteria abovementioned. Table 4.3 showing the result of assessment of each projects and programs, the six (6) priority projects and programs are selected and proposed as follows.

- 1-1: Street Improvement in Old Market Area with Trigger Pilot Project
- 1-2: Development of Small Corner Parks in Old Market Area
- 1-3: Organizing Task Force for Old Market Area Improvement with Organized Local Community
- 2-1: Integrated Traffic Management for City Center including study and execution ((public parking, walk-free zone, one-way control, etc)
- 3-1: Conservation of Urban Heritage and Old Street Tree (investigation, database creation, rehabilitation/restoration/utilization plan)
- 3-2: Improvement of Urban Heritage Information Board
- 3-3: Conservation and Improvement of Riverside Area
- 4-1: Capacity Development for Urban Planning and its Implementation (Municipality, DLMUPC)
- 4-2: Strengthening Coordination and Cooperation Mechanism among Urban Planning and Development Authorities regarding Siem Reap City

Table 4.3 Priority Proposed Projects and Programs for City Center Area Development

Program	Project	Assessment by Criteria				
		Urgency	Preparedness	Synergy effects	Negative Impact	Overall Assess
1. Enhancing Urban Tourism Attractiveness and its Urban Function	1-1 Improvement Streets in Old Market Area with Trigger Pilot Project	●	○	●	--	●*
	1-2 Development of Small Corner Parks in Old Market Area	●	○	●	--	●
	1-3 Organizing Task Force for Old Market Area Improvement with Organized Local Community	●	○	●	--	●
	1-4 Establishing Green Colonnade Network	○	--	○	--	○
	1-5 Establishing Sidewalk Network	○	○	○	--	○
	1-6 Amenity Plaza Development	○	--	--	○	○
2. Strengthening Mobility Management	2-1 Integrated Traffic Management (public parking, walk-free zone, one-way control, etc)	●	○	●	○	●
	2-2 Common Tourist Bus System (circulation service)	○	--	○	--	○
	2-3 Establishing Environment-friendly Cycling Lane Network	--	○	--	--	--
	2-4 Promotion of private parking business	○	--	--	--	--
3. Conserving and Utilizing Natural and Urban Heritages	3-1 Conservation of Urban Heritage & Old Street Tree	●	●	○	--	●*
	3-2 Improvement of Urban Heritage Information Board	●	--	●	--	●*
	3-3 Conservation and Improvement of Riverside Area	●	●	--	--	●*
4. Enhancing Urban Management and its Capacity in Efficient Land Use and Revitalization	4-1 Capacity Development for Urban Planning and its implementation (control and guide)	●	○	●	--	●
	4-2 Strengthening Coordination and Cooperation Mechanism among Urban Planning/Development Authorities regarding Siem Reap City	●	●	●	--	●
	4-3 Establishing City Center Area Development and Design Guideline	○	--	○	--	○

Legend: ● = Higher value, ○ =Medium value, -- = Low value or less impact, * = Provincial Government Project financed by AFD (technical support by APSARA)

Source: The Follow-up Study

(3) Proposed Priority Projects and Programs

1) Short and Middle-Term Projects

1-1 Streets Improvement in Old Market Area with Trigger Pilot Project

The core component of the 1-1 project is to improve streets in the Old Market area to secure safety and comfortableness and to achieve attractiveness through pedestrian oriented walkway construction by controlled vehicle access.

Range of improvement for streets shall cover all streets in the Old Market area, which step by step improvement is required in terms of funding availability and necessary coordination among relevant sectors such as traffic management, related private transport sector (tuk-tuk association) and other tourism service industry (restaurants, bars, markets, souvenir shops, etc).

The 1-1 project targeting long-term achievement requires phasing implementation through short-term and medium-term stage to achieve final goals of street improvement. In short-term stage, therefore, it is recommended to implement a pilot project to foster appropriate local community environment in terms of collaboration, coordination and stimulation of the project through private and public partnership formulation toward future desirable achievement of the project. This pilot project is

expected to be foundation of the proposed “Taskforce for Old Market Area Improvement” (see 1-3 project) through providing opportunities of discussions and consensus building among related stakeholders including public and private sector. Ideas of pilot projects are described in Chapter 5.1.

In mid-term stage, a pedestrian mall construction by a pilot project can be extended toward all streets in the Old Market area in order to complete all streets with pedestrian mall construction after monitoring and evaluation of the pilot project in terms of positive impact on the Old Market area.

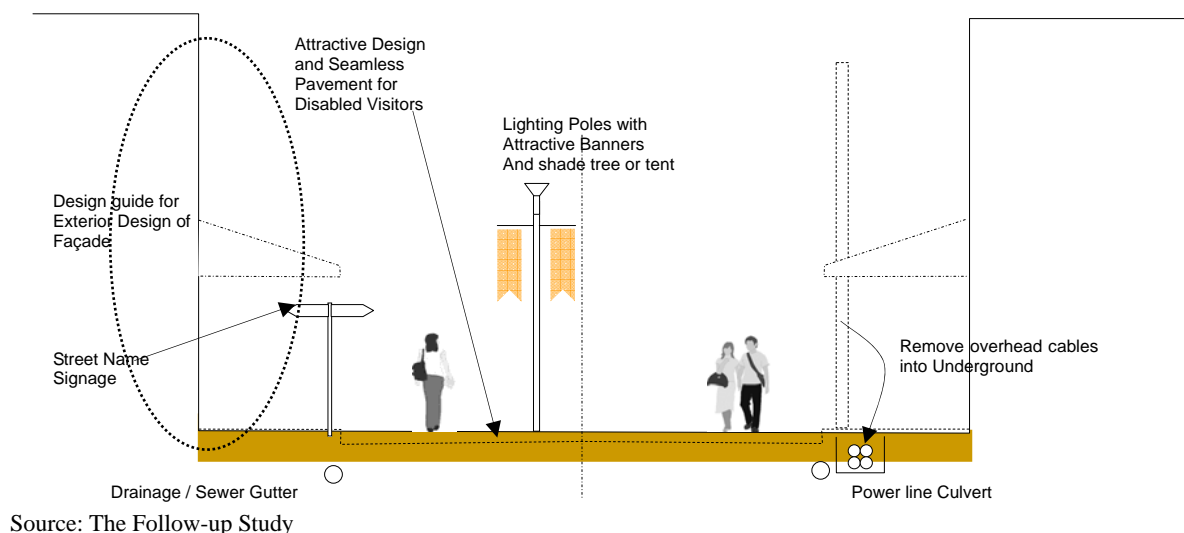


Figure 4.8 Improvement Image: Typical Section of Pedestrian Mall in Old Market Area

1-2 Development of Small Corner Parks in Old Market Area

The Old Market area embraces two potential sites for pocket park development where a larger site used by kindergarten and small public site located beside Sivatha Street on the edge of the Old Market area. Pocket park is expected to play a key role in function of gate to the Old Market area with some rest place for tourists and other visitors. Especially the site of the kindergarten supported by Department of Trade and Commerce (DTC) requires vigorous efforts and certain time on relocation program to more a suitable place with safe and quiet environment. 1) Construction of Gateway Plaza (earthwork and pavement, street furniture, public toilet), 2) Construction of Rest Pocket Park (earthwork and pavement, street furniture) are proposed as the short-mid term projects.

1-3 Organizing Taskforce for Old Market Area Improvement with Organized Local Community

It is expected that the pilot project (see Chapter 5.1) could initiate organization for the street improvement involving relevant stakeholders of public and private sectors. If this place and opportunity is successfully organized, an official organization for continuous activities to promote improvement of Old Market area is proposed to establish.

Objectives of Organization

The proposed organization aims;

- To achieve attractive town environment and high quality of services for visitors including tourists and residents through cooperative activities by establishing public and private partnership
- To foster and promote a competitive urban tourism destination the Old Market area through attractive and unique activities (e.g. annual events, campaigns) to induce visitors continuously
- To encourage and stimulate better tourist business among relevant stakeholders to contribute

to visitors and citizen through appropriate sharing of responsibility

- To coordinate role and responsibility between private and public sectors activities for improvement of the Old Quarter area focusing on streetscape, traffic and other public and semi-public space and facilities
- To build consensus and implement activities for better improvement of the Old Market area among relevant stakeholders

Proposed Organization

The proposed organization of “Task Force for Old Market Area Improvement (TFOMAI)” consists of public and private sectors shown in Figure 4.9. This organization is also proposed to be set under the proposed “Technical Committee for Urban and Tourism Development” for specific tasks for coordination of urban development and tourism development (see Chapter 5).

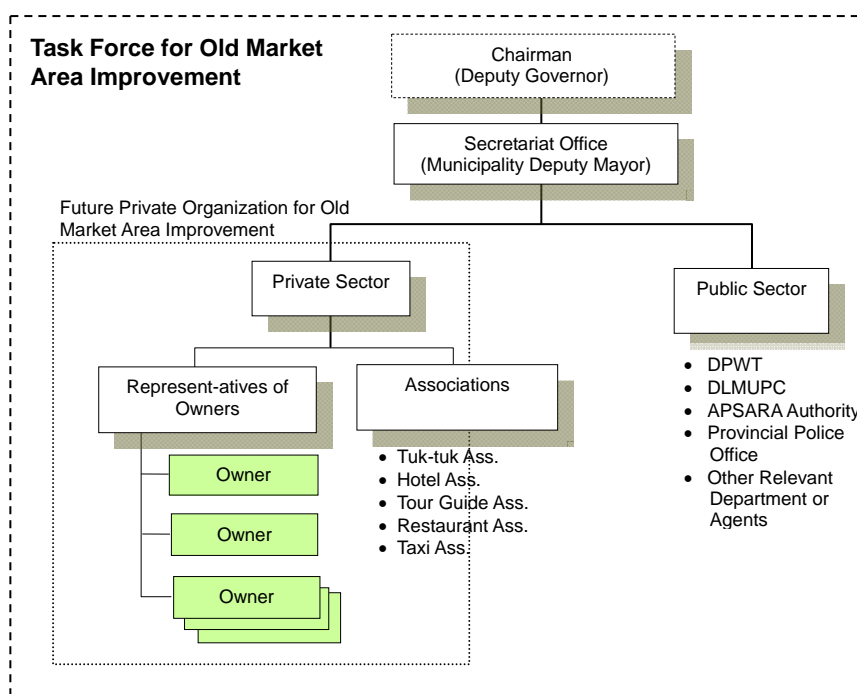


Figure 4.9 Proposed Task Force for Old Market Area Improvement

2-1 Integrated Traffic Management (public parking, walk-free zone, one-way control, etc)

The projects aims to guide and manage appropriate traffic condition for both mobility of tourists and local community in the City Center area to cope with current traffic increase and its issues of unsafe and inefficient transportation environment. The project consists of three components of 1) Traffic Management Study, 2) Tourist Transit Station Projects and 3) Traffic Management and Operation as execution of traffic management program.

The following figure illustrates a preliminary proposal for traffic management scheme in case of the Old Market area, where “Walk-free zone” is proposed to be applied to the Old Market area. Vehicle access including private cars and tourist transportation into the area are secured by the fringe arterial roads of Sivatha Street, Pokambour Avenue and NR6. Especially Sivatha Street and NR6 are proposed to be installed on-street parking system for private cars access area, meanwhile access by tourist transport to the area is proposed to utilize Tourist Transit Station.

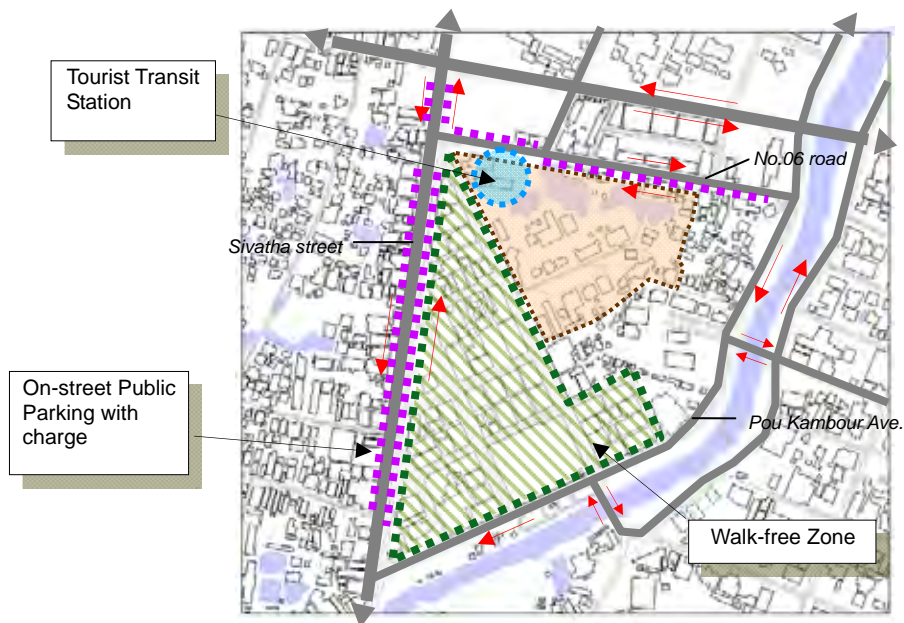
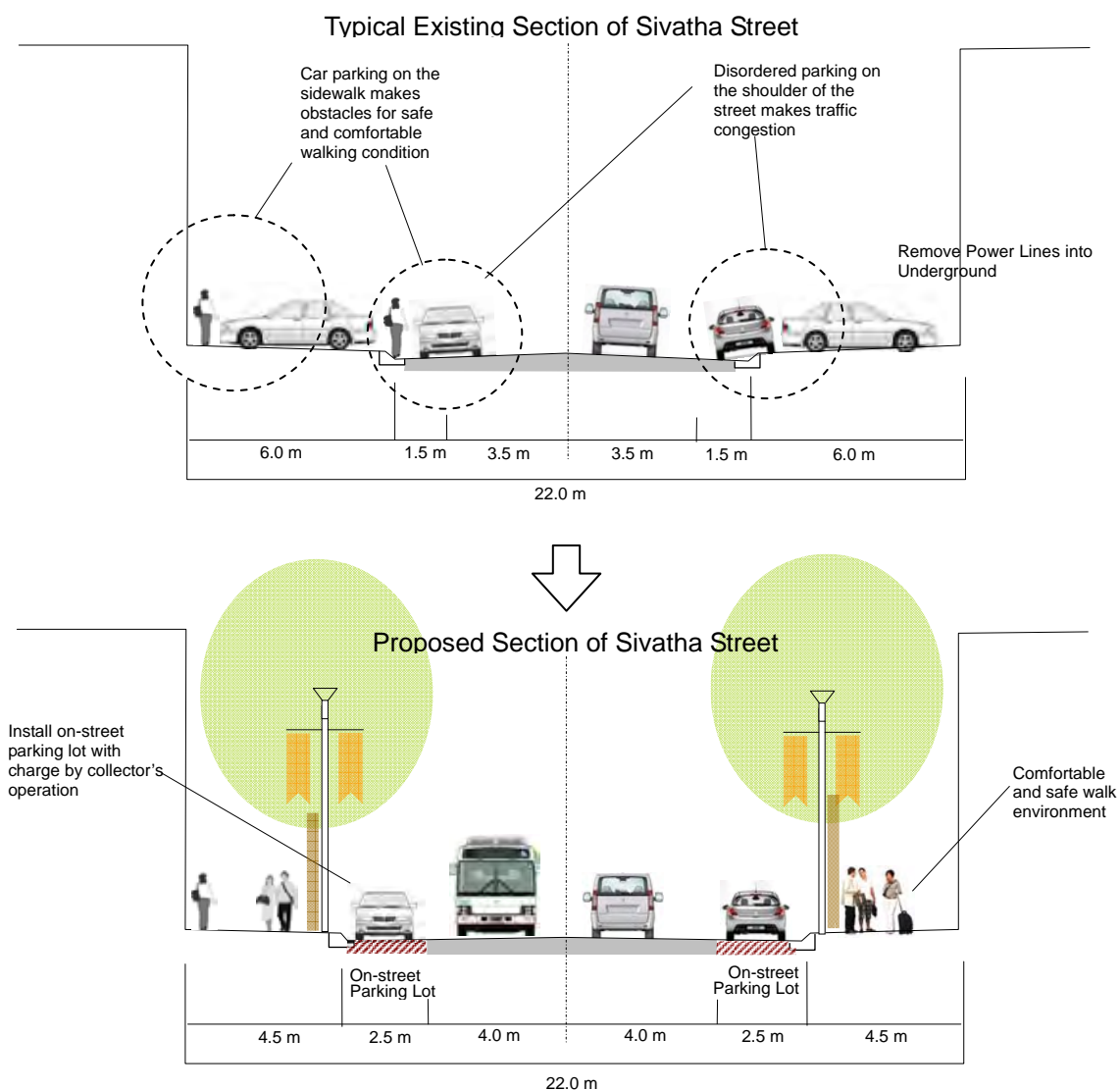


Figure 4.10 Preliminary Proposal for Traffic Management in Old Market Area

Sivatha Street with wide right of way (22 m) could be one of the most suitable roads to utilize shoulder for parking lot installation. Currently wide sidewalks are utilized as temporal parking area where vehicles parking on the sidewalk become obstacle for tourists and visitors. It is proposed that existing width (6.0m) of sidewalks can be reduced for securing safe parking lot space on the shoulder lane. Figure 4.11 illustrates its way of improvement to install the on-street parking lot.



Source: The Follow-up Study

Figure 4.11 Proposal for On-street Parking System at Sivatha Street

3-1 Conservation of Urban Heritage & Old Street Tree

The project aims to follow-up the priority projects of the M/P in order to conserve and protect urban heritages through establishment of their inventories and registration as natural and cultural heritages under relevant laws and regulations. The project will be implemented by the Provincial Government funded by AFD, and APSARA Authority will organize the study. However it is proposed to be added by conservation project for old street trees in the City Center area by similar methodology of implementation (identification, inventory, designation and protection by certain measures).

3-2 Improvement of Urban Heritage Information Board

In conjunction with the 3-1 project, 3-2 project as a supporting project is proposed to provide attractive and useful information of urban heritages for visitors by putting information board with necessary description and illustrations based on fruits of the 3-1 project.

3-3 Conservation and Improvement of Riverside Area

This project aims to improve riverside environment of Siem Reap River by landscaping and walkway

provision with necessary street furniture including the new pedestrian bridge construction. The project partially focusing on the Old Market area has been funded by AFD, and APSARA Authority would organize the study and its implementation on behalf of the Provincial Government.

4-1 Capacity Development for Urban Planning and its implementation (control and guide)

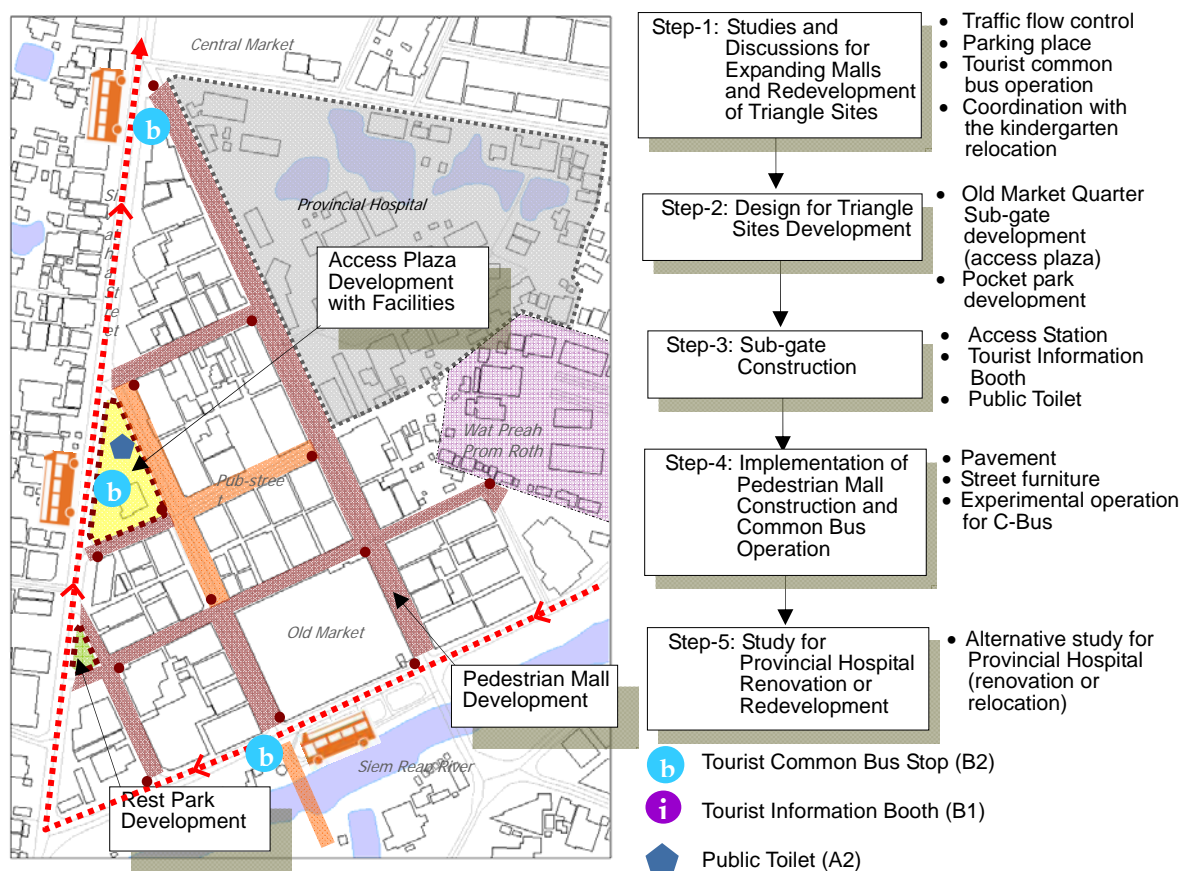
It is an important opportunity for urban management administration for relevant authorities of the Province and Municipality Government to be strengthened by appropriate implementation measures and their management, while the statutory zoning are currently submitted to the MLMUPC after public hearing and waiting for approval. 1) Zoning Control Implementation Capacity Development and 2) Urban Planning Skill Development are proposed as the capacity development projects.

4-2 Strengthening Coordination and Cooperation Mechanism among Urban Planning/Development Authorities regarding Siem Reap City

This project aims to establish effective and well-organized coordination mechanism of urban development among relevant authorities and agencies such as DLMUPC, Urban Development Department of Siem Reap Municipality (UDD) and APSARA Authority, Provincial Government (Governor) to cope with current urban management and development in integrated and collaborative implementation manner.

In this section, it is proposed that “Urban and Tourism Development Committee” should be established under the existing Development Committee, as details of coordination mechanism are described in Chapter 5 (Implementation Organization).

The below figure illustrates the step by step approach for the Old Market area improvement in middle term.

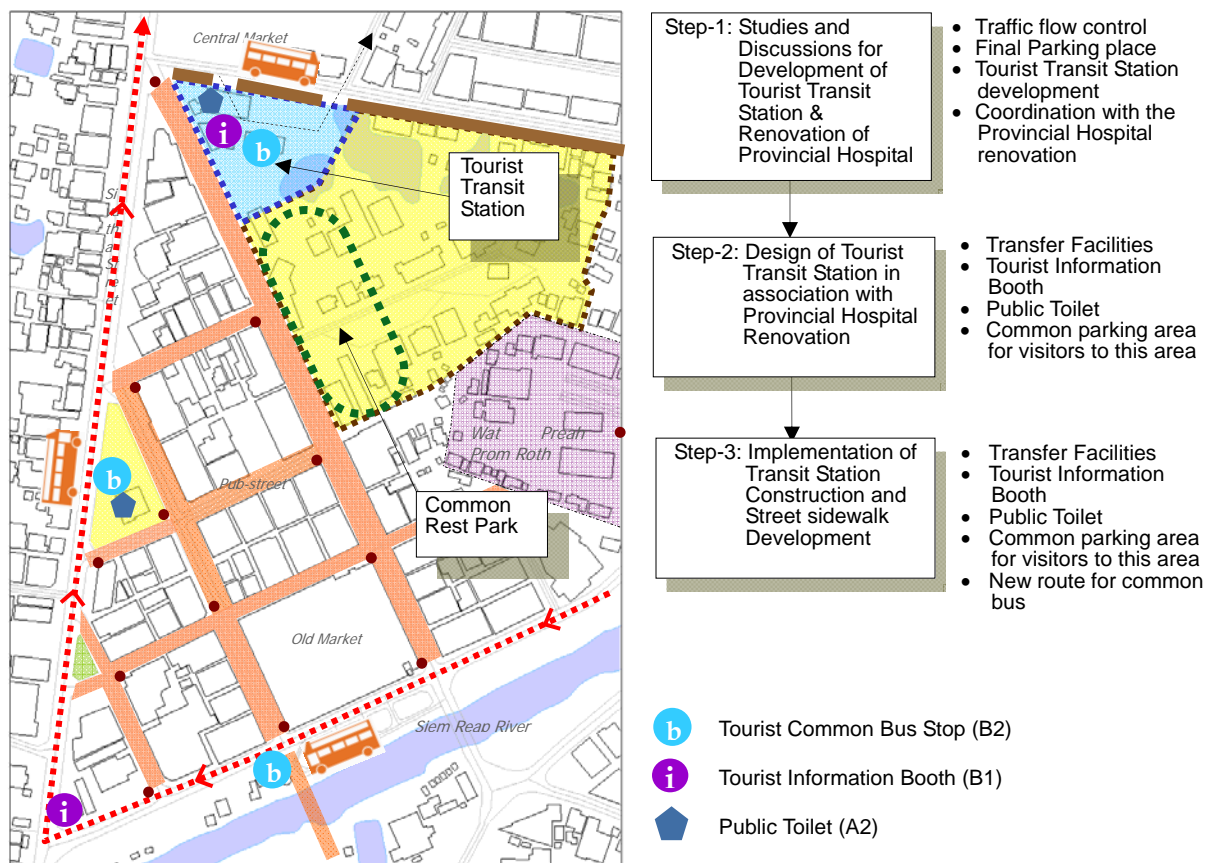


Source: The Follow-up Study

Figure 4.12 Mid-term Components in Old Market Area

2) Long-Term Projects

In long-term stage as the final phase, the tourist transit station (2-1 project) within the property of the provincial hospital is proposed to develop after completion of the pedestrian mall (1-1 project) and the small corner parks (1-2) development in order to create the transportation node to the Old Market area and other tourist destinations in the city center. On the other hand there are two (2) consecutive projects of 1) 3-1 Project for urban heritages conservation in the proposed program of “3: Conserving and Utilizing Natural and Urban Heritages”, 2) 4-3 Project for formulation of historical townscape conservation guideline in other proposed program of “4: Enhancing Urban Management and its Capacity”.



Source: The Follow-up Study

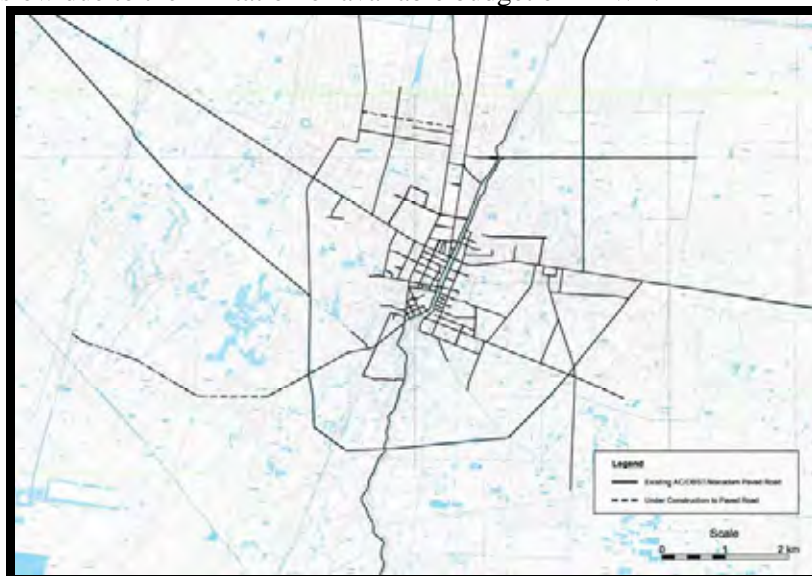
Figure 4.13 Long-term Components in Old Market Area

4.2 Road Development Plan

4.2.1 Review of Road Development

(1) Road Development in Siem Reap

Figure 4.14 shows the current AC/DBST/Macadam paved roads in Siem Reap area as of April 2010. Figure 4.15 shows the proposed road development plan in the M/P. Red lines in Figure 4.15 shows already existing paved roads at the time of the M/P. Compared the current paved roads with the existed paved road at the M/P, progress of road improvement, from unpaved/laterite roads to AC/DBST/Macadam paved roads, were recognized. However, it can be said that the pace of road improvement is slow due to the limitation of available budget of DPWT.



Source: The Follow-up Study

Figure 4.14 AC/DBST/Macadam Paved Roads as of April 2010



Source: The M/P Study

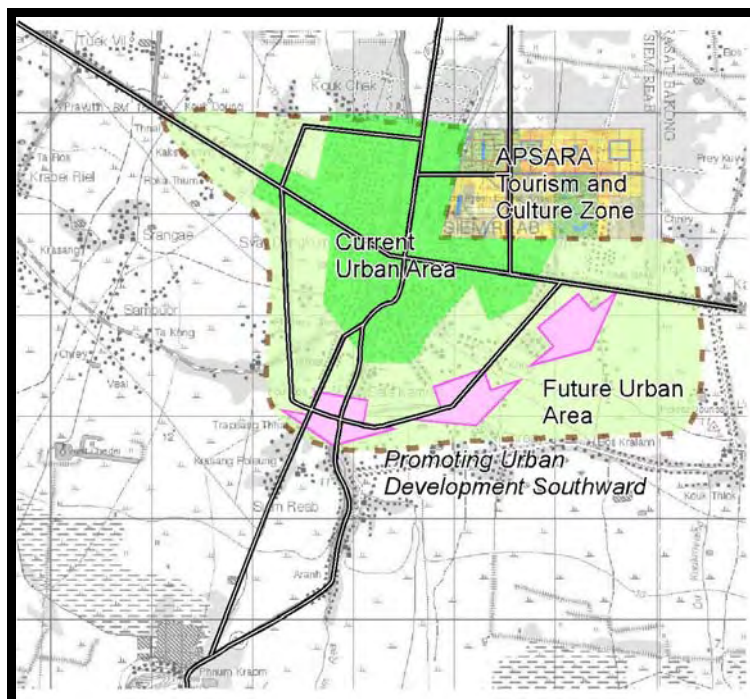
Figure 4.15 Road Network 2020 proposed by the M/P

Figure 4.16 shows the future expansion direction of Siem Reap urbanization proposed by the M/P. This direction indicates the southeast area of Siem Reap as urban area, and the western area as

agricultural land to be preserved from the view point as follows;

- Conservation of historical irrigation channel networks in the area
- Unsuitable lowland for urban development to avoid flood disaster damage

In addition, urbanized area has not been expanded so much and still within the Ring Road except for several large scale developments out of the urbanized area.



Source: The M/P Study

Figure 4.16 Expansion of Urban Area following Compact City Concept

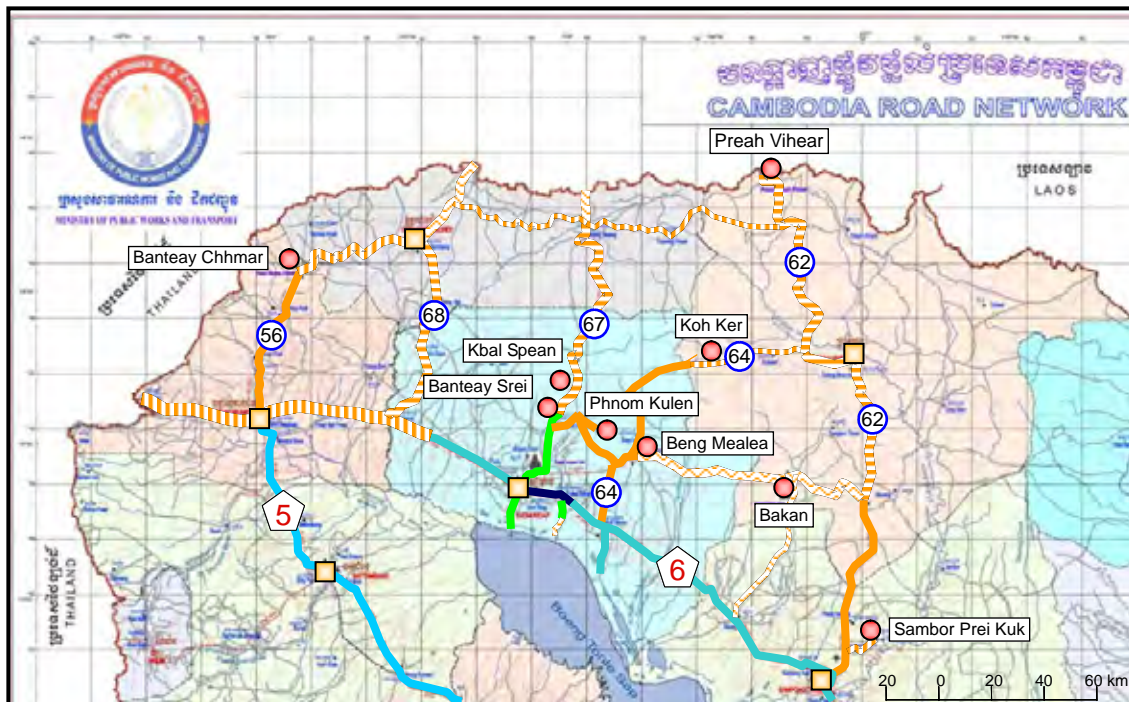
(2) Regional Road Development

Siem Reap Province is surrounded by five (5) provinces of Khampong Thom, Preah Vihear, Oddar Meanchey, Banteay Meanchey and Battambang. The main road network in this region consists of National Road (hereinafter NR) No. 6, NR5 and six (6) two-digit national roads, i.e. NR56, NR62, NR63, NR64, NR67 and NR68. Provincial roads complement this network as the connection route between provincial capitals and major district centers.

Figure 4.17 shows the surface condition of this main road network at the time of the M/P.

Figure 4.18 shows the latest information prepared by DPWT Siem Reap regarding the condition of provincial road rehabilitation within the Province, which the JICA Follow-Up Study Team received in February 2010.

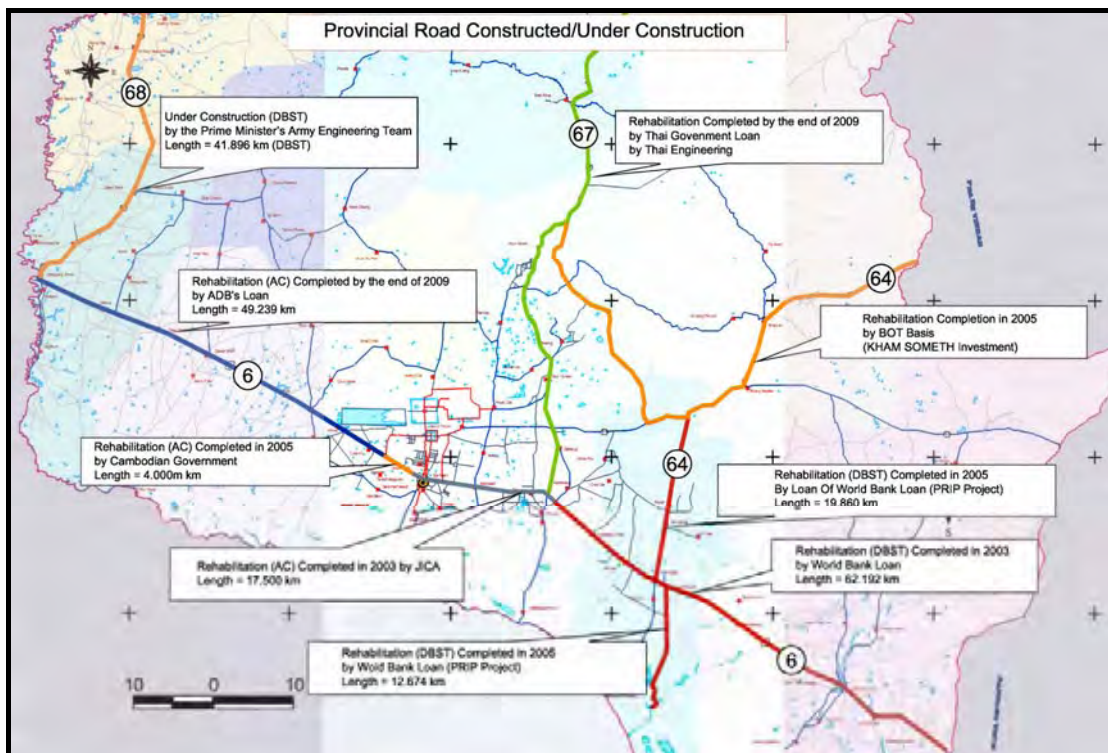
The improvement of main road network is very essential to secure the stable accessibility to remote heritages all year round. The main road network improvement will enhance the importance of Siem Reap City as a tourism center. Furthermore, this improvement will grade up the living conditions of rural area, and, indirectly, will ease the people's concentration into Siem Reap City.



- Legend:
- | | | |
|------------------|----------------------|-----------------------|
| Paved Road | Laterite/Gravel Road | Archaeological Temple |
| Asphalt Concrete | Good/Fair Condition | Province Capital |
| DBST | Bad Condition | |
| Macadam | Terrible Condition | |

Source: The M/P Study

Figure 4.17 Regional Road Network Condition as of July 2005



Source: DPWT Siem Reap

Figure 4.18 Situation of Provincial Road Rehabilitation as of February 2010

The M/P proposed to improve the access routes to five (5) rural heritage sites. Previous status as of the M/P and the current one of the routes are shown in Table 4.4.

Table 4.4 List of Rural Heritage Network Rehabilitation Project

Rural Heritage	Road Number	Approx. Length (km)	Previous Status as of the M/P	Current Status
Kbal Spean	NR67	10	Laterite	Paved
Bakan	NR64	30	Earth	Paved
	PR2644	65	Earth	Earth
Preah Viher	NR67	105	Laterite	Paved
	PR274	95	Laterite	Paved
	NR62	20	Laterite/Earth	Paved
Koh Ker	NR64	60	Laterite	Paved
	PR2641D	10	Laterite	Laterite
Phnom Kulen	PR2641	25	Laterite/Earth	Laterite/Earth

Remarks: Paved means AC/DBST/Macadam

Source: The M/P Study

The majority of regional roads listed in Table 4.4 have already been improved. In addition, the road linked to Preah Vihear is now under construction, from around 10 km away from Anlong Veang to the foot (starting point for a climb) of Preah Vihear.

The roads not improved yet among the list in Table 4.4 are PR2644 to Bakan, PR2641D to Koh Ker, and PR2641 to Phnom Kulen.

It is noted that the BOT Road by Kham Someth Investment shown in Figure 4.18 is AC paved road from Trapeang Prei, the link point between BOT Road and NR64 to the east. However, the section from the west end of BOT Road to Trapeang Prei is left as laterite road, as shown in Photo 4-1. The main toll traffic is tourism one from Siem Reap to Beng Mealea/Koh Ker which is using NR6-NR64-BOT Road (NR64) route. Due to the no significant toll traffic in the western section of the BOT Road, the road investor have not implemented bituminous pavement in this section.



Photo 4-1 View of Tollgate at the West End of BOT Road

(3) Issues on Transportation Sector

1) Not Sufficient Urban Environment and Infrastructure

The M/P stated that “Particularly, up-market tourists are unsatisfactory about safety and cleanliness of the town, according to our tourist survey”. Although several sub-arterial roads have been improved to all-weather type pavement since the M/P was conducted, still Siem Reap City has many laterite roads. In the dry season, laterite roads generate fine powder dust of laterite, and in the rainy season, vehicles entering into the city center bring in laterite mud with its wheels in the city center. In order to realize the clean city, it is required to eliminate laterite roads in the city area.

2) Problems on Road Management

Roads in and around Siem Reap City are under the responsibility of DPWT, Department of Rural Development (DRD), Provincial Government and APSARA Authority. The demarcation of responsible roads of each organization is as follows;

Table 4.5 List of Organization and its Responsible Roads

Organization	Kind of Road
DPWT	<ul style="list-style-type: none"> - National Roads - Provincial Roads - Rural Roads of more than 50 AADT - Management of City Roads
DRD	<ul style="list-style-type: none"> - Rural Roads of less than 50 AADT - Tertiary Road: Connects District to District Advise for: <ul style="list-style-type: none"> - Sub-Tertiary1: Connects District to Commune - Sub-Tertiary2: Connects Commune to Commune - Sub-Tertiary3: Connects Commune to Village, and Village to Village
APSARA	<ul style="list-style-type: none"> - Road Network in AAP area - APSARA Road in Siem Reap

Remarks, AADT: Annual Average Daily Traffic
Source: The Follow-up Study

Based on the list of responsible road given in Table 4.5, the roads to be studied by this Follow-Up Study are the roads to which DPWT is responsible.

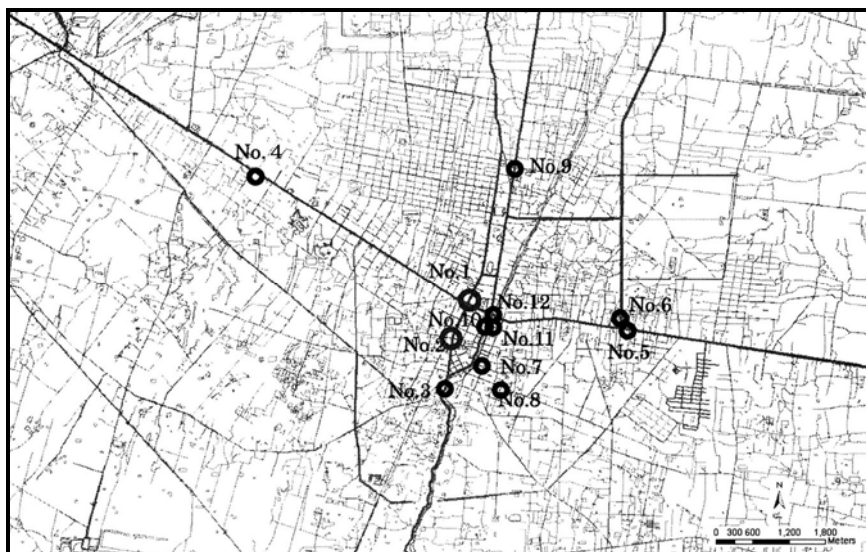
DPWT is required to carry out the appropriate periodic road maintenance and upgrading of sub-arterial roads in Siem Reap City, and improvement of rural road network, which will ease the difficulty of access to the remote heritages. However, DPWT is not able to implement such expected tasks due to the shortage of available budget and human and equipment resources.

In order to realize the efficient road maintenance activities, it is necessary to carry out routine monitoring of road/structural condition, continuous updating of inventory data by monitoring activities, and establishing the priority program for maintenance and improvement. DPWT recognizes the importance of road asset inventory database. However, due to the restrictions of budget and resources mentioned above, DPWT is not able to commence the activities to establish the road asset inventory. The road asset inventory shall be the very basic data for making road management program including programs for maintenance, improvement and new construction.

3) Analysis of Highway Capacity

Traffic Count Survey 2010

In January 2010, the Secretariat of Urban Development Technical Committee conducted a traffic count survey under supervision of the JICA Urban Management Advisor. The survey was carried out on 16th and 19th January 2010 at the 12 Survey Stations as shown in Figure 4.19.



Source: Traffic Survey Report, Siem Reap, February 2010

Figure 4.19 Location Map of Survey Station of 2010

Vehicle classification applied to the traffic survey was three (3) classes as follows:

- H : Heavy Vehicle : Bus, Truck, Trailer, and Special Vehicle
- L : Light Vehicle : Tuk-Tuk, Sedan, Mini Bus, Pick-Up, and Motor trailer
- M : Motorcycle

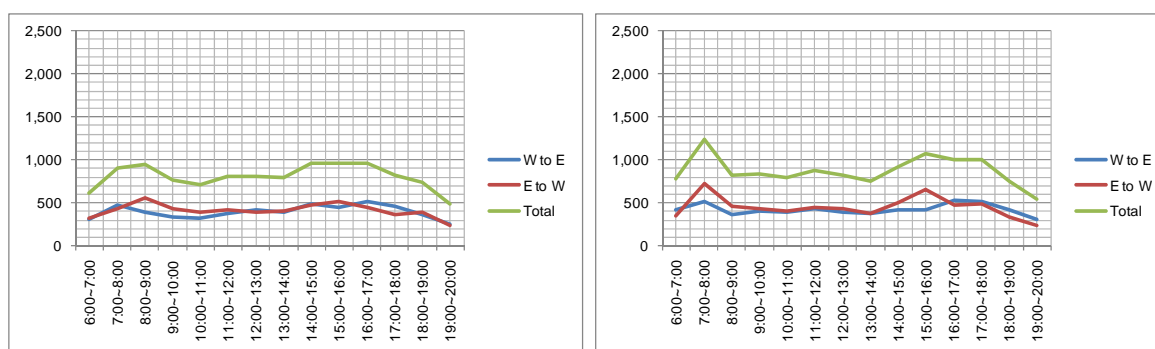
In order to analyze the highway capacity, the number of vehicles was converted to PCU (Passenger Car Unit) applying the following Passenger-car equivalents:

Table 4.6 PCU Conversion by Vehicle Class

Vehicle Class	Passenger-car Equivalents
Heavy Vehicle	2.5
Light Vehicle	1.0
Motorcycle	0.3

Source: Page III-6-13, Volume III Sector Report, the M/P Study

The traffic volume on NR6 is given by the traffic count data of Survey Station No. 4, No. 1 and No.5. The traffic volume in PCU at each survey station from 6:00 to 20:00 is given below. The source surveyed vehicle number and the PCU calculation of each survey station is detailed in Appendix D-1.



Survey Date: 16/01/2010

Survey Date: 19/01/2010

Remarks, "W to E" represents eastbound traffic, from west to east
"E to W" represents westbound traffic, from east to west
Total shows the traffic volume of both directions
Unit of vertical axis is PCU

Figure 4.20 Traffic Volume in PCU at Survey Station No. 4

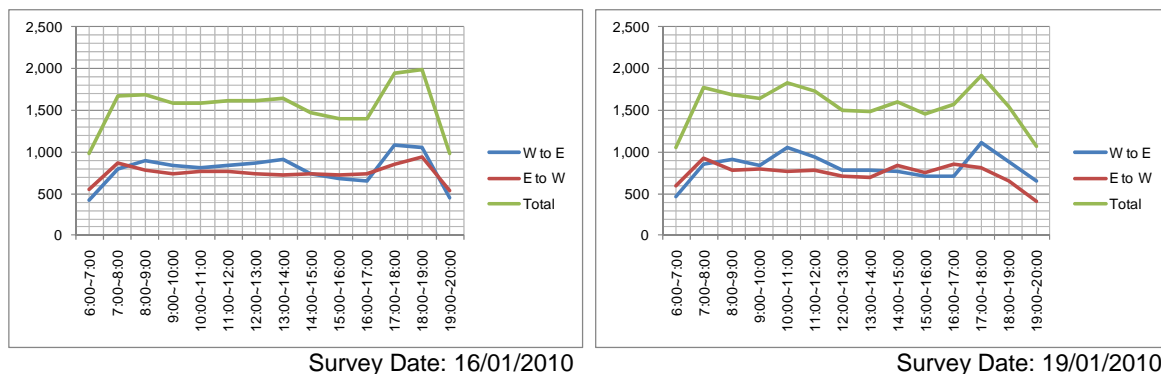


Figure 4.21 Traffic Volume in PCU at Survey Station No. 5

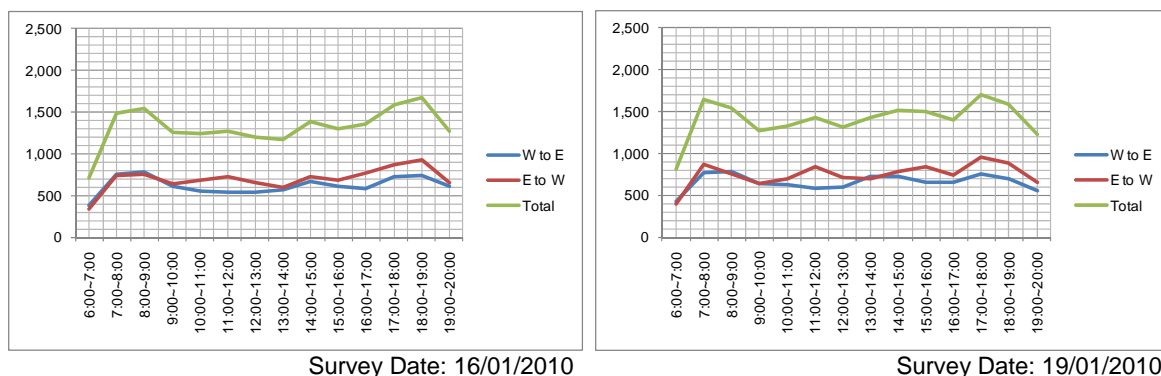


Figure 4.22 Traffic Volume in PCU at Survey Station No. 1

It is noted that the Survey Station No. 1 is located at the intersection between NR6 and Sivatha Street, and traffic counts were conducted for three (3) directions (left turn, through traffic, and right turn) for each leg. For the comparison purpose, the traffic volume on NR6 at the west side of intersection was extracted from the original data as follows:

$$\text{Traffic Volume from West to East} = W1+W2+W3$$

$$\text{Traffic Volume from East to West} = N1+E2+S3$$

The Survey Station No. 4 is located in between the international airport and the City Center area of Siem Reap City. Therefore the traffic shall include the tourist to/from the airport, and, possibly, land transport tourist from Poi Pet, the national boarder between Cambodia and Thailand. The traffic volume at the west side of Survey Station No. 1 (intersection between NR6 and Sivatha Street) shows almost two times higher volume than that of Survey Station No. 4. The reason of higher traffic volume at intersection area will be attributed to the high frequency of inner-city traffic.

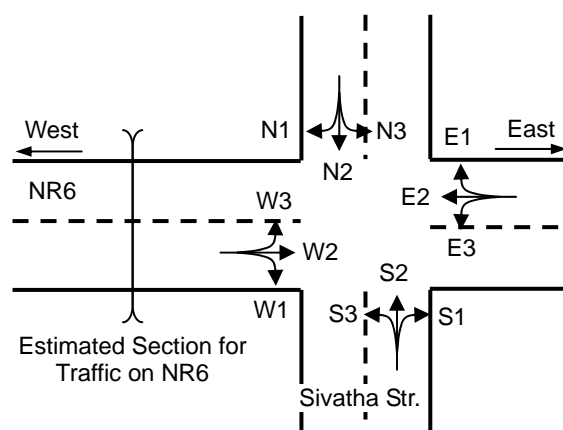


Figure 4.23 Schematic Illustration of Original Traffic Count Data at Survey Station No. 1

Traffic counts at Survey Station No. 5 also show higher volume than that at Survey Station No. 4. Survey Station No. 5 is located near Phsar Leu Market. The traffic to/from the market, domestic and Vietnamese tourist traffic (mainly land transport) and active inner-city traffic would be the main reason of this high traffic volume.

“Highway Capacity” published by Japan Road Association defines the Base Highway Capacity as

listed in Table 4.7 with the following conditions:

- Lane width ≥ 3.5 m
- Lateral side clearance from the carriageway edge ≥ 1.75 m
- Geometrics of highway do not form the cause of highway capacity reduction
- Traffic is composed from passenger-car only
- No speed limit which may reduce the highway capacity

Table 4.7 Base Highway Capacity

Highway Type	Maximum Capacity
Multilane Highways	2,200 pcu/hour/lane
Two-Way, Two-Lane Highways	2,500 pcu/hour/both directions
One Lane Highways	2,200 pcu/hour

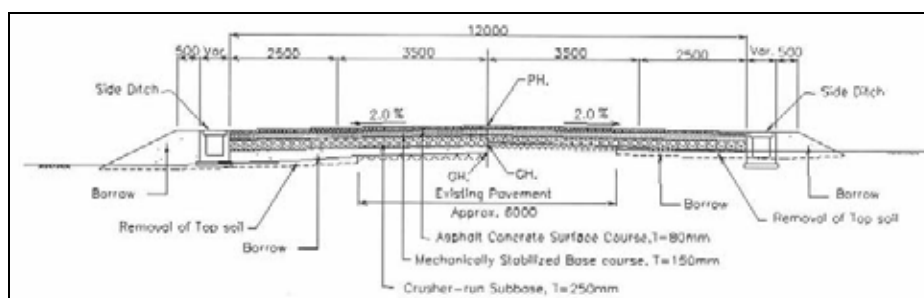
The maximum highway capacity of each highway is lower than the base capacity, and estimated by the following formula:

$$C_M = C_B \times \gamma_L \times \gamma_C \times \gamma_I \dots$$

Where,

- C_M : Maximum highway capacity (pcu/hour)
- C_B : Base highway capacity (pcu/hour)
- γ_L : Adjustment factor by lane width
- γ_C : Adjustment factor by lateral side clearance
- γ_I : Adjustment factor by roadside environment

Typical Cross Section of NR6 is illustrated in Figure 4.24. NR6 is categorized as the two-way, two-lane highways.



Source: The M/P Study

Figure 4.24 Typical Cross Section of NR6

Based on the typical cross section shown in Figure 4.24, the adjustment by lane width and lateral side clearance will not be required. “Highway Capacity” of Japan Road Association proposes the Adjustment factor by roadside environment as follows:

Table 4.8 Adjustment factor by roadside environment

Roadside Environment	Adjustment Factor
• Roadside parking does not affect the traffic capacity	
Rural Area	0.95~1.00
Suburban area	0.90~0.95
Urbanized Area	0.85~0.90
• Roadside parking does affect the traffic capacity	
Rural Area	0.90~1.00
Suburban area	0.80~0.90
Urbanized Area	0.70~0.80

Assuming the roadside environment of NR6 as the suburban area having affections of roadside parking, then the maximum highway capacity is estimated as below:

Maximum Capacity of NR6 = $2,500 \times 0.80\sim 0.90 = 2,000\sim 2,250$ pcu/hour/both directions

The current traffic volume on NR6 is almost the half of maximum highway capacity of NR6.

The traffic count survey at French Bridge (one lane, one-way operation) was conducted as the Survey Station No. 12. It is noted that the second French Bridge was already completed and under the operation at the time of traffic survey. The surveyed traffic volume in PCU is given in Figure 4.25. Comparing to the base highway capacity of 2,200 pcu/h for one lane highways, the observed traffic shows around 50% volume against the capacity. When the city road network is developed/improved as proposed by this Follow-Up Study and the traffic volume at the French Bridge is dispersed, and then it is considered that the (old) French Bridge will not form a bottle neck of the traffic.

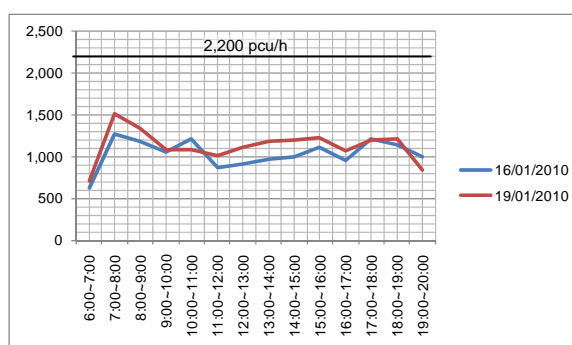


Figure 4.25 Traffic Volume in PCU at Survey Station No. 12

Traffic Survey 2004 by the M/P

The traffic count survey was conducted along NR6 on December 12 and 13 in 2004 at two major intersections in Siem Reap urban area and two points at suburbs. The location of survey points is shown in Figure 4.26.



Source: The M/P Study

Figure 4.26 Traffic Survey Point at Master Plan

The M/P reported the traffic count survey results as shown in Table 4.9. It is noted that the traffic count survey was carried out from 05:00 to 21:00 and the daily traffic was estimated by adding 10% of counted traffic volume. Furthermore, the reported traffic volume was the total traffic volume of each survey point, i.e., the total of four-leg traffic at the four-leg intersection, and the total traffic of both directions at survey points on suburbs.

Table 4.9 Traffic Volume on NR6

Vehicle Class	PCU Rate	(PCU/day)			
		Urban		Suburbs	
		Survey Point 1	Survey Point 2	Survey Point 3	Survey Point 4
Motorcycle	0.3	9,896	7,342	3,260	2,625
Light Vehicle	1.0	11,598	5,670	3,167	2,126
Heavy Vehicle	2.5	7,018	3,328	2,618	923
Total		28,512	16,340	9,045	5,674

Source: The M/P Study

The Survey Point 4 on NR6 was located at the west side of airport access, while the Survey Station No. 4 was located in between the International Airport and the city center of Siem Reap City. Therefore, the comparison of the traffic data of the M/P's Survey Point 4 and Survey Station No. 4 of 2010 is not meaningful. In order to check the traffic increase/decrease tendency on NR6, the surveyed traffic count data at the Survey Point 1 and Survey Point 3 were analyzed.

The Survey Point 1 is the intersection between NR6 and Sivatha Street. Therefore, in order to get the sectional traffic volume at the west side of intersection, the same data adjustment with Survey Station No. 1 treatment was applied. Although it is not clear, the location of Survey Point 3 would be near the intersection between NR6 and the Ring Road, the east side of Survey Station No. 5.

Figure 4.27 and Figure 4.28 show the traffic volume on NR6 at the Survey Point 1 and 3 in PCU.

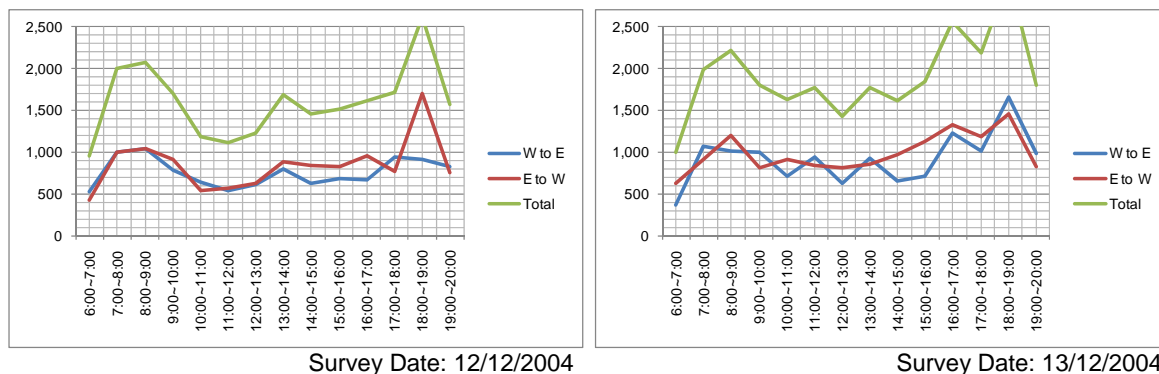


Figure 4.27 Traffic Volume in PCU at Survey Point 1

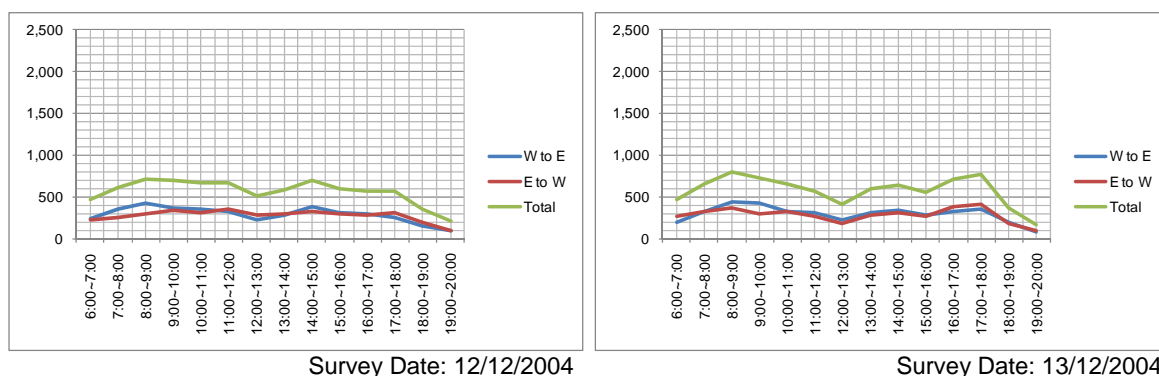


Figure 4.28 Traffic Volume in PCU at Survey Point 3

The traffic volume of Survey Point 1 of 2004 shows the higher volume than that of Survey Station No. 1, 2010. On the other hand, the Survey Station No. 5 of 2010 shows around 2 times as traffic volume at Survey Point 3 of 2004.

Although the M/P estimated the future traffic demand on NR6 as given in Table 4.10, the steady traffic growth rate during 2004 and 2010 is not able to estimate.

Table 4.10 Future Traffic Demand on the NR6

Year	Growth Rate (% per year)		Traffic Volume (vehicle/day)			
	Urban	Suburbs	Urban		Suburbs	
			Survey Point 1	Survey Point 2	Survey Point 3	Survey Point 4
2005	13.5%	9.8%	52,811	35,736	16,563	12,352
2012	4.1%	8.1%	91,887	61,023	30,800	22,968
2020	3.1%	8.2%	118,180	78,484	57,568	42,930

Year	(PCU/day)			
	Urban		Suburbs	
	Survey Point 1	Survey Point 2	Survey Point 3	Survey Point 4
2005	32,373	18,552	9,933	6,232
2012	55,278	31,679	18,471	11,588
2020	71,096	40,774	34,524	21,659

Source: The M/P Study

Considering the physical receiving capacity of tourist in AAP area, and scheduled road network developments/improvements in and around Siem Reap City, it is judged that the traffic demand growth in the area will be not excessive, and the scheduled road network developments/improvements will be able to cope with the future traffic demand.