

No.

**Siem Reap Province and APSARA Authority, the Royal
Government of Cambodia
Japan International Cooperation Agency**

**The Study on Integrated Master Plan for
Sustainable Development of
Siem Reap / Angkor Town
in the Kingdom of Cambodia**

FINAL REPORT

VOLUME II MAIN REPORT

March 2006

**International Development Center of Japan
Nippon Koei Co., Ltd.
Kokusai Kogyo Co., Ltd.**

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Currency Equivalents
(Official Exchange Rate in 2004)
US\$ 1 = 4,016Riel

Unless Specifically Noted

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).

JICA sent a study team headed by Dr. Jinichiro Yabuta of International Development Center of Japan to Cambodia from November 2004 to March 2006.

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/ Angkor Town 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.

March 2006

Takashi Kaneko
Vice President
Japan International Cooperation Agency



***The study on Integrated Master Plan for
Sustainable Development of Siem Reap / Angkor Town(SAT)***

March 2006

Mr. Takashi Kaneko
Vice President
Japan International Cooperation Agency
Tokyo, Japan

Dear Mr. Kaneko,

Letter of Transmittal

We are pleased to submit the final report of the Study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town in the Kingdom of Cambodia. The final report is comprised of three volumes, namely, Volume 1: Executive Summary; Volume 2: Main Report; and Volume 3: Sector Report.

Since the historic remains in Siem Reap/Angkor Town are not only the world's cultural heritage but also the symbol of Cambodia in terms of nation's identity, as well as her major source of foreign exchange, an attempt at transforming the Town into a model city with highly sustainable development is meaningful. However, the Town should not be sustainable only in itself by merely attracting tourists to a cluster of historic remains, but instead, to serve as a model city that represents an ideal image of sustainable development in the 21st Century. Repetitive adjustments and improvements will be necessary in the process, but insights into Angkorian wisdom and efforts toward creating environment-friendly atmosphere may help the Town achieve its goal of transforming into a model city with highly sustainable development.

To this end, the currently booming tourism should be transformed to more balanced and quality oriented with a smaller loads to the natural environment. It is highly advised that the Government of Cambodia seriously tackle with urban/environmental management, including water- and land-use control, which is considered indispensable in realizing a model city with truly sustainable development.

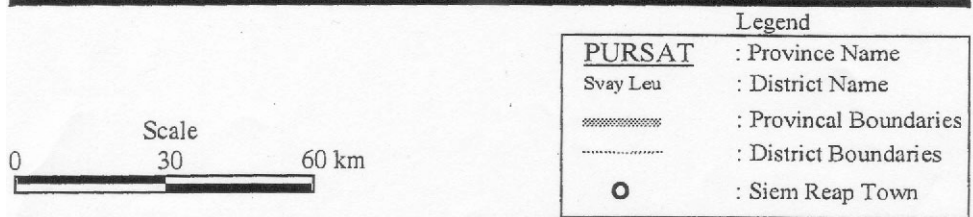
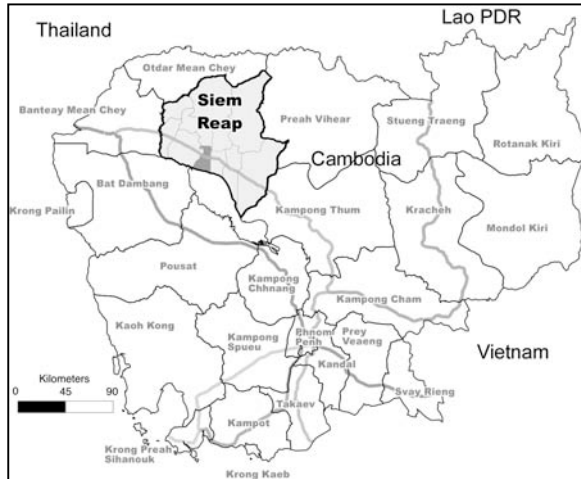
The long-term master plan suggested in the final report should not be regarded as fixed and definite. Therefore, revisions and adjustments are welcomed in accordance with the changing circumstances, whereas the proposed priority projects should fully and constantly be reviewed for timely preparation and implementation. On the other hand, the provincial government is advised to strengthen its capacity to monitor, plan and maintain projects, with the support from specialized national agencies, such as APSARA and related ministries.

We wish to take this opportunity to express our sincere gratitude to your Agency, Siem Reap Province, APSARA Authority, Council of the Development of Cambodia and other distinguished authorities of the Royal Government of Cambodia for their invaluable cooperation and assistance to the Study.

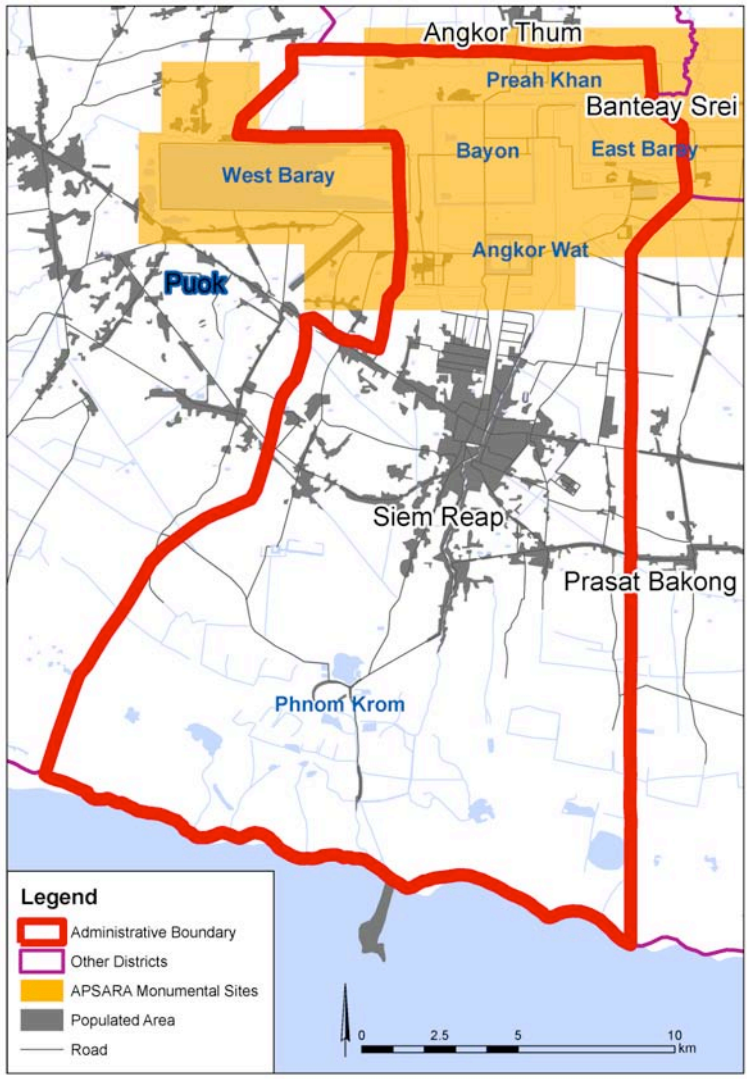
We do hope that this report will contribute to the sustainable development of Siem Reap/Angkor Town.

Very Truly Yours,

Jinichiro Yabuta
Leader
JICA Study Team and
Study Consortium by
International Development Center of Japan,
Nippon Koei Co., Ltd. and
Kokusai Kogyo Co., Ltd.



Location of Siem Reap Province and Siem Reap District



Siem Reap District

Central Area of Siem Reap District

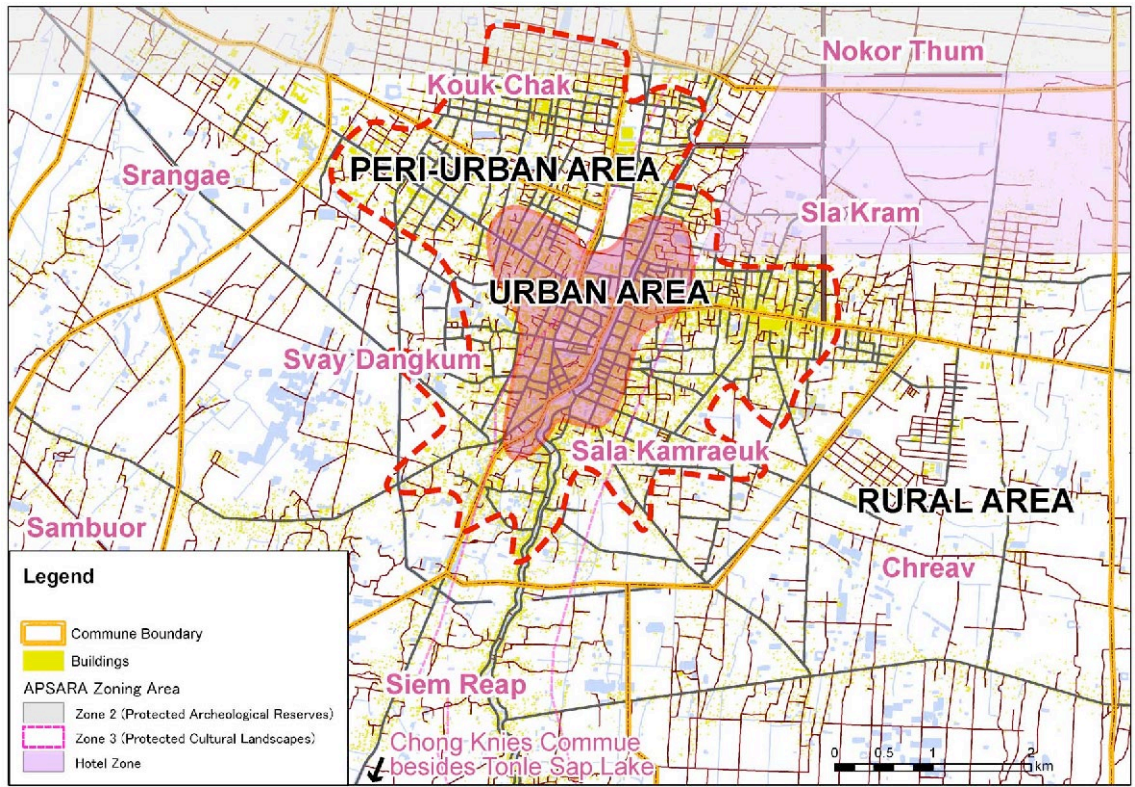


TABLE OF CONTENTS

Volume II Main Report

Location of Siem Reap Province and Siem Reap District	i
Map of Siem Reap District and Central Area of Siem Reap District.....	ii
Table of Contents.....	iii
List of Tables and Figures	v
Abbreviation List	ix
Summary.....	S-1
1 Background	II-1-1
1.1 The Objectives of the Study.....	II-1-2
1.2 The Study Area	II-1-2
1.3 Process of the Study	II-1-3
1.4 Structure of Final Report	II-1-6
2. Situation, Prospects and Issues	II-2-1
2.1 Situation.....	II-2-1
2.2 Prospects	II-2-3
2.3 Issues	II-2-4
3. Strategic Vision.....	II-3-1
3.1 Objectives	II-3-1
3.2 Scenarios.....	II-3-1
3.3 Siem Reap/ Angkor Town 2020.....	II-3-6
3.4 Strategies toward Siem Reap/ Angkor 2020.....	II-3-8
4. Area-wise Development Approach	II-4-1
4.1 Conceptual Zoning	II-4-1
4.2 Development Approach for Urban Area	II-4-3
4.3 Development Approach for Rural/ Heritage Area	II-4-5
4.4 Development Approach for Tonle Sap Lake Area.....	II-4-8
5. Sector Development Plan	II-5-1
5.1 Development Plan to Realize Strategies.....	II-5-1
5.2 Sector Development Plan	II-5-6
6. Projects and Programs.....	II-6-1
6.1 Long List of Project and Programs	II-6-1
6.2 Criteria and Phasing for Project Identification	II-6-3
6.3 Development Packages.....	II-6-6

7.	Financial and Institutional Arrangement	II-7-1
7.1	Development Administration.....	II-7-3
7.2	Local Financing.....	II-7-8
8	Environmental and Social Considerations	II-8-1
8.1	Necessity of Environmental and Social Conditions.....	II-8-1
8.2	Adverse Environmental and Social Impacts Predicted.....	II-8-2
8.3	Mitigation Plan of Predicted Impacts of MP.....	II-8-4
9.	Pilot Projects	II-9-1
9.1	Pilot Project: A More Beautiful Siem Reap.....	II-9-1
9.2	Pilot Project: Angkor Product Fair 2005.....	II-9-6
10.	Impact Assessment of Tourism on Local Economy	II-10-1
10.1	Present Economic Impacts of Tourists' Expenditure.....	II-10-1
10.2	Future Prospects.....	II-10-4
11.	Planning Framework	II-11-1
11.1	Socioeconomic Framework.....	II-11-1
11.2	Spatial Framework.....	II-11-7
11.3	Tourism Framework.....	II-11-13
12.	Recommendations	II-12-1

Appendix: Project Brief of Priority Projects and Programs

U-1	City Center Area Improvement.....	A-1
U-2	Urban Planning Capacity Building.....	A-2
E-2	Enhancing Environmental Awareness.....	A-3
TO-1	Khmer Heritage Tourism Network and Tourism Facility Development.....	A-4
TO-3	Public-Private Partnership Tourism Quality Improvement.....	A-5
A-1	Human Resource Development and Establishing Local Products Promotion Center.....	A-6
TR-1	French Bridge Improvement.....	A-7
TR-2	Sub-arterial Road Network (Phase 1).....	A-8
TR-3	Rural Heritage Road Network Rehabilitation.....	A-9
W-3	Replacement of Old Pipeline.....	A-10
W-4	The Strategic Study on Integrated Water Resources Management for Siem Reap River Basin and Roluos River Basin.....	A-11
SD-2	Urban Development Project in Siem Reap – Angkor.....	A-12
P-1	Project for Urgent Installation of Diesel Generators.....	A-13

List of Tables and Figures

Figures

Figure II.1	Zoning of Siem Reap	S-6
Figure II.1.1	Objectives of the Study	II-1-2
Figure II.1.2	Organizational Set-up	II-1-3
Figure II.1.3	Time frame of the Study	II-1-4
Figure II.1.4	Structure of the Reports (1)	II-1-6
Figure II.1.5	Structure of the Reports (2)	II-1-7
Figure II.2.1	Distribution of Built-up Areas and Villages in Siem Reap Province	II-2-1
Figure II.2.2	Siem Reap in a Bird's-eye View	II-2-3
Figure II.2.3	Share of Tourists by Hotel Price Range in 2004	II-2-4
Figure II.2.4	Angkor Monuments in and around Siem Reap District	II-2-5
Figure II.2.5	Estimated structure of Tourist Expenditure per Day per trip	II-2-7
Figure II.2.6	Surface Water Resource in Siem Reap	II-2-9
Figure II.2.7	Seasonal Fluctuation of Visitors to Siem Reap	II-2-10
Figure II.2.8	Water Quality in the Siem Reap River	II-2-11
Figure II.2.9	Traffic Congestion on Cross Roads of Route 6 and Sivatha Boulevard	II-2-11
Figure II.2.10	Relative Proportion of APSARA's Spending to Entry Fees Collected	II-2-12
Figure II.2.11	Problem Structure of Siem Reap	II-2-13
Figure II.3.1	Tourism Growth at Major Historical Destinations in Southeast Asia	II-3-2
Figure II.3.2	Population Projection	II-3-4
Figure II.3.3	Strategies to Siem Reap/ Angkor 2020	II-3-9
Figure II.4.1	Zoning of Siem Reap	II-4-1
Figure II.4.2	Area-wise Situation of Siem Reap at Present and in Future	II-4-2
Figure II.4.3	Expansion of Urban Area following Compact City Concept	II-4-4
Figure II.4.4	Conceptual Plan for Urban Area	II-4-5
Figure II.4.5	Conceptual Plan for Rural/ Heritage Area	II-4-7
Figure II.4.6	Conceptual Plan for Tonle Sap Lake Area	II-4-8
Figure II.5.1	A Flow of Diagram of Development	II-5-5
Figure II.5.2	Classification of Areas	II-5-6
Figure II.5.3	Overall Plan for Old Quarter Improvement Project	II-5-7
Figure II.5.4	Draft Land Use Plan	II-5-8
Figure II.5.5	Sector Objectives, Sector Approach and Program Sequence	II-5-9
Figure II.5.6	Sector Approach and the Environment Management Now and Future	II-5-10
Figure II.5.7	Distant Angkor Monument Areas and Networking	II-5-11
Figure II.5.8	Sector Objectives, Sector Approach, APPC and Projects/ Programs	II-5-12

Figure II.5.9	Evolving Market Segments (Conceptual Model)	II-5-13
Figure II.5.10	Principal Road Network	II-5-14
Figure II.5.11	TR-2 (Phase I)	II-5-14
Figure II.5.12	TR-3 (Phase II)	II-5-14
Figure II.5.13	TR-4 (Phase III)	II-5-15
Figure II.5.14	TR-5 (Phase IV)	II-5-15
Figure II.5.15	Rural Heritage Network (TR-7)	II-5-15
Figure II.5.16	Proposed Bus Route and Restricted Zone against Private Car Entry	II-5-16
Figure II.5.17	Preliminary demarcation on Utilization of Water Resources	II-5-17
Figure II.5.18	Proposed Time Schedule and Capacity of Stage Wise Development	II-5-17
Figure II.5.19	Programs/ Project Sequence	II-5-18
Figure II.5.20	Waste Generation amount targeted with 3Rs Measures	II-5-19
Figure II.5.21	Approach for the Expansion of Target Groups	II-5-20
Figure II.5.22	Concept of Proposed SWM system	II-5-21
Figure II.5.23	Existing Drainage System	II-5-22
Figure II.5.24	Objectives/ Intervention Matrix	II-5-23
Figure II.5.25	Proposed Drainage Improvements: West Sector	II-5-24
Figure II.5.26	Proposed Wastewater Management	II-5-25
Figure II.5.27	Proposed Wastewater System Layout	II-5-26
Figure II.5.28	Project Implementation Sequence	II-5-27
Figure II.5.29	Overall Scenario for Power Sector	II-5-28
Figure II.5.30	Power Supply and Demand Forecast	II-5-29
Figure II.5.31	Distribution Plan in 2004	II-5-29
Figure II.5.32	Distribution plan in 2012	II-5-29
Figure II.5.33	Distribution Plan in 2020	II-5-30
Figure II.5.34	Improvement Sequence up to 2020	II-5-31
Figure II.6.1	Four Phases of Development Towards 2020	II-6-3
Figure II.7.1	Problems and Causes on Local Administration at Provincial Level	II-7-3
Figure II.7.2	Proposed Organizational Structure for Provincial Development Committee	II-7-5
Figure II.8.1	Protected Cultural Zones in Siem Reap/Angkor Region	II-8-5
Figure II.8.2	Monitoring Plan during Pre-construction and Construction Phases	II-8-9
Figure II.9.1	Conceptual Image of the Pilot Project	II-9-2
Figure II.9.2	Number of Visitors to the Fair	II-9-8
Figure II.10.1	Structure of Retained Tourists' Expenditure within Siem Reap Province 2004	II-10-2
Figure II.10.2	Structure of Induced Economics Impacts by Retained Tourists' Expenditure within Siem Reap Province in 2004	II-10-3
Figure II.10.3	Share of Tourists by Hotel Price Range in 2004	II-10-5

Figure II.10.4	Assumed Distribution of Tourists by Hotel Price Range for "Alternative Case 2: Up-Market Composition" in 2020	II-11-7
Figure II.11.1	Twelve Districts and Population Distribution in Siem Reap Province	II-11-1
Figure II.11.2	Location of Built-up Areas and Villages in Siem Reap Province	II-11-2
Figure II.11.3	Population Growth in Siem Reap District	II-11-5
Figure II.11.4	Employment Growth in Siem Reap District	II-11-7
Figure II.11.5	Two Major Regions and Transportation Network in Cambodia	II-11-8
Figure II.11.6	Current Population Density (2004)	II-11-9
Figure II.11.7	Population Density (2012)	II-11-9
Figure II.11.8	Population Density (2020)	II-11-10
Figure II.11.9	Draft Land Use Plan	II-11-13
Figure II.11.10	Projected Tourist Population in Siem Reap: 2006 to 2020	II-11-14
Figure II.11.11	Requirements of Hotels and Guesthouses under Projection with Policy Intervention: 2005-2020	II-11-15

Tables

Table II.1	Scenarios Compared	S-3
Table II.2	Strategies and Sector Development Plan: An Overview	S-7
Table II.3	Sector Development Plan	S-8
Table II.4	Projects and Programs (1/2)	S-10
Table II.5	Projects and Programs (2/2)	S-11
Table II.1.1	Outline of the Stakeholder Meetings	II-1-4
Table II.1.2	Outline of the Master Plan	II-1-8
Table II.3.1	Scenarios Compared	II-3-4
Table II.3.2	Historical Tourist Destinations in Southeast Asia and Siem Reap	II-3-6
Table II.4.1	Planning Issues and Development Approaches	II-4-2
Table II.5.1	Strategies and Sector Development Plan: An Overview	II-5-4
Table II.5.2	Proposed Drainage Improvement-West	II-5-25
Table II.5.3	Proposed Servicing Arrangement	II-5-25
Table II.6.1	Long List of Projects and Programs (1/2)	II-6-1
Table II.6.2	Long List of Projects and (2/2)	II-6-2
Table II.6.3	Priority Projects and Programs (1/2)	II-6-4
Table II.6.4	Priority Projects and Programs (2/2)	II-6-5
Table II.6.5	Priority Projects and Programs and Initial Cost Estimate	II-6-6
Table II.6.6	Projects and Programs by Strategies and Areas	II-6-6
Table II.6.7	Development Packages	II-6-7

Table II.7.1	Recommended Training for Provincial Governmental Officials.....	II-7-7
Table II.7.2	Comparison of Alternative Revenue Sources.....	II-7-13
Table II.8.1	Summary of Impacts (For all Projects).....	II-8-2
Table II.8.2	Monitoring Plan during Pre-Construction and Construction Phases	II-8-9
Table II.9.1	List of Activities in Pilot Project.....	II-9-2
Table II.9.2	Description of Formulated Project "Angkor Products Fair 2005"	II-9-6
Table II.9.3	The Category of Target Buyers for the Fair Exhibitors (by Sellers Type).....	II-9-7
Table II.9.4	Summary of Exhibitors in "Angkor Products Fair 2005"	II-9-7
Table II.10.1	Present Economic Effects of Tourism Sector in Siem Reap 2004.....	II-10-3
Table II.10.2	Average Length of Stay and per Person Spending of International Tourists by Different price range of Hotels (US\$, 2004)	II-10-4
Table II.10.3	Comparison of Test Calculation of Economic Impacts of 1000 Persons of International Tourists by Different Category ..	II-10-5
Table II.10.4	Summary of Different Sets of Assumptions for Test Calculation.....	II-10-7
Table II.10.5	Results of Test Calculation of Economic Impacts of Different Compositions of International Tourists in 2020.....	II-10-8
Table II.11.1	Land Area Population Density by District (2004).....	II-11-2
Table II.11.2	Population by District in Siem Reap Province in 2001 and 2004.....	II-11-3
Table II.11.3	Baseline Population Projection by District	II-11-5
Table II.11.4	Population of Siem Reap District	II-11-5
Table II.11.5	Preliminary Calculation of Employment Structure in Siem Reap Province and District (Table is revised from original Table I.3.5)	II-11-6
Table II.11.6	Population Framework for Siem Reap District (1/2).....	II-11-11
Table II.11.6	Population Framework for Siem Reap District (2/2)	II-11-12
Table II.11.7	Number and Place of Hotels and Guesthouses in Siem Reap District	II-11-16

Abbreviation List

AFD	: Agence Française de Développement
APPC	: Angkor Products Promotion Center
ASEAN	: Association of Southeast Asean Nations
CDC	: Council for Development of Cambodia
DFR	: Draft Final Report
DICR	: Draft Inception Report
DLMUPC	: Department of Land Management, Urban Planning and Construction
DOE	: Department of Environment
DPWT	: Department of Public Works and Transport
EdC	: Elictricity du Cambodge
EIA	: Environmental Impact Assessment
FR	: Final Report
GRDP	: Gross Regional Domestic Product
HRD	: Human Resource Development
ICR	: Inception Report
IDCJ	: International Development Center of Japan
IEE	: Initial Examination of Environmental and Social Impact
ILO	: International Labour Organization
ITR	: Interim Report
JICA	: Japan International Cooperation Agency
JST	: JICA Study Team
KKC	: Kokusai Kogyo Co.,Ltd
MCFA	: Ministry of Culture and Fine Arts
MICC	: Multipule Investment Cooperation Company
MIME	: Ministry of Industry, Mines and Energy
MOT	: Ministry of Tourism
MOWRAM	: Ministry of Water Resource and Meteorology
MP	: Master Plan
NGOs	: Non-Governmental Organizations
NK	: Nippon Koei Co., Ltd
NOx	: Nitrogen Oxides
NR6	: National Road No.6
OVOP	: One Village One Product
OWO	: One Window Office
PDRD	: Provincial Department of Rural Development
PR1	: Progress Report 1
PR2	: Progress Report 2
RGC	: Royal Government of Cambodia
SAT	: Siem Reap-Angkor Town
SEC	: Sourthern Economics Corridor
SEC	: Southern Economic Corridor
SEILA	: Social Economic Improvement for Local Area
SFDDR	: Strategic Framework of Decentralization and De-concentration Reforms
SHM	: Stakeholder Meeting
SOx	: Sulfur Oxides
SWM	: Solid Waste Management

UNDP	:	United Nation Development Programme
UNESCO	:	United Nations Education, Scientific and Cultural Organization
WHO	:	World Health Organization
WTO	:	World Trade Organization

Summary

1. Background

The Royal Government of Cambodia (RGC) and Japan International Cooperation Agency (JICA) agreed on the Scope of Work for the Study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town in the Kingdom of Cambodia (the Study) on July 21, 2004, recognizing a great need for an integrated plan to develop the local economy, to build necessary infrastructures, and, to maintain the quality of the tourism resources and environment in Siem Reap/Angkor Town from a long-term viewpoint.

This Final Report (F/R), submitted in March 2006, compiles the results of the Study to propose the Master Plan.

1.1 The Objectives of the Study

The objectives of the Study have thus been set as:

- (1) To prepare an integrated master plan for sustainable development of Siem Reap/Angkor Town in a long run with a view to achieving a reasonable balance among tourism industry, urban environment, and institutional capacity;
- (2) To propose a package of measures with a view to promoting and diversifying local economy in connection with tourism development as part of the integrated master plan; and
- (3) To promote technical transfer to the Cambodian counterpart so as to strengthen the institutional capacity of local stakeholders such as government organizations and community.

1.2 The Study Area

The study area covers Siem Reap District with focus on urban area, while it is extended to the hinterland of Siem Reap District for the study of local economy.

1.3 Process of the Study

Time Frame of the Study: The Study Team undertakes the study during the period from November 2004 to March 2006

Organizational Set-up: The Siem Reap Province and APSARA Authority are the counterpart agencies for this JICA Study Team. Thirteen counterpart personnel from the Siem Reap Province and APSARA were nominated to participate in the Team to work closely with JICA Study Team members.

Coordination Mechanism for the Study: Inter-ministerial meeting at state level was set up for sharing information and coordination among ministries concerned. Steering committee at the provincial level was established for consultation with the Study Team, securing smooth implementation, and effective use of the Study results.

Participatory Process: This study adopted the people's participatory approach throughout the course of study. Among them, Stakeholder Meetings (SHMs) have been held four times for dissemination of information and exchanging views among various stakeholders such as citizens, public and private sectors, and NGO.

1.4 Structure of the Report

The Final Report comprises three volumes with the contents shown below.

Volume 1	Executive Summary
Volume 2	Main Report
Volume 3	Sector Report

2 Situation, Prospects and Issues of Siem Reap/ Angkor Town

2.1 Situation

Siem Reap had been an ancient capital of the Angkorian state for about 650 years since the beginning of 9th century and was prosperous with sophisticated irrigation systems that made use of a tidal range of Tonle Sap water. As such, Siem Reap represents history and culture of Khmer until today.

Increasingly many foreign tourists visit Siem Reap after the achievement of peace. Tourism is estimated to generate the employment about 55 thousand, which is important for the country as well.

2.2 Prospects

Siem Reap District has distinct strengths as compared with other parts of the country.

- The monuments of Angkor as the most important cultural heritage of the country as well as world heritage.
- Good accessibilities in air, land and water surface.
- Favorable policy support from the national government such as APSARA Authority as a strong arm to protect the monuments and provide technical support for the urban development.

2.3 Issues

Siem Reap District has face itself with the following six issues.

Issue 1: Heavy Dependence on Mass Tourism

The tourism in Siem Reap is featured by short-stay concentrated tourism, a typical mass tourism. Many tourists visit Siem Reap mostly in groups for a couple of days only rushing to Siem Reap during a limited period in the dry season for having a look at the monuments of Angkor. Most of them never visit here again. They do not visit wide spread excellent monuments away from Siem Reap. This feature brings about increasing environmental loads, limited local benefits and little cultural interaction.

Issue 2: Limited Local Economic Benefits

This characteristic of mass-tourism tends to provide limited local benefits. There are

potentials to augment local benefits by expanding tourists' expenditures through diversified tourism and by retaining tourists' expenditures in locally.

Issue 3: Poor Urban Environment and Amenities

Main streets are not perceived safe enough to walk around for ordinary individual tourists. Tourists tend to simply stay only at the hotels after the sightseeing. A large gap exists between magnificent Angkor monuments and shabby town. Quality tourism could not be sustained without quality urban space that shall not spoil the atmosphere of the Angkor.

Issue 4: Uncertain Environmental Sustainability

A central part of the city where hotels concentrate suffers from chronic flood, rubbish on the public space and wastewater. The sustainability of natural resources is uncertain; especially a heavy dependence of potable water on groundwater has an uncertain risk of land subsidence. These are major threats to sustainability of the tourism.

Issue 5: Insufficient Infrastructures

A rapid increase of tourists has been imposing heavy burdens on the existing local infrastructures. The tourists consume and discharge water and materials much more intensively than residents. Especially in peak periods, heavy pressures are given by the tourist demand on the existing capacity of infrastructures such as water supply, transportation and electricity.

Issue 6: Weak Local Capacity to Manage Development

The limited capacity for development lies in the lack of local coordination and local governance. Financial base is very weak at the local level. In addition, human resource base is also weak at the provincial and district levels especially in management and monitoring of public works, land management, information systems and budget accounting.

3. Strategic Vision

3.1 Scenarios

Keeping in mind that a hands-off tourism growth at present will somehow have to be adjusted to be more balanced and sustainable, the following two scenarios have been worked out with special reference to the scale and pattern of tourism. Under these scenarios, an attempt has been made to forecast the number of tourists, and population in 2012 and 2020.

- Scenario A: Trend Growth Scenario
- Scenario B: Moderate Growth Scenario

An attempt has been made to roughly estimate the water and power requirements of residents and tourists and environmental loads of them for assessing environmental implications of the two scenarios as shown in the table below.

A comparison from the viewpoint of national economy, local economy, environment and tourism shows that the moderate growth scenario is preferable.

Table II.1 Scenarios Compared

Indicators		Base Year	Scenario (A): Trend Growth Projection		Scenario (B): Moderate Growth Projection	
		2004	2012	2020	2012	2020
Residential Population (1000 persons)		139	171	211	171	211
Commuting Population (1000 person)		16	44	100	39	65
Number of Tourists (1000 persons/ year)	Total	858	2,324	4,331	2,220	2,802
	International	561	1,709	3,343	1,648	2,007
	Domestic	297	614	988	572	795
Demand for Infrastructure and Utilities	Water Consumption in Peak Period (1000m ³ /day)	9.0	20	34	19	28
	Power Demand Peak (MW)	33	72	117	61	74
Environmental Impact Projected	Wastewater (BOD: kg/day)	6,364	8,199	10,663	8,172	10,141
	Individual Groundwater intake (1000m ³ /day)	7.0	10	24	9	18
	Solid Waste Amount (ton/day)	99	177	323	176	295
	SOX (ton/year)	35	94	162	77	97
Economic Impact: Consumption Base (million US\$/year)		172		1,023		771 (1,243*)

* Figure in parenthesis indicates the economic impact by a tourists composition in favour of a greater number of individual and up- market tourists.

Source: JICA Study Team

3.2 Siem Reap/ Angkor 2020

We set a vision to encourage all the stakeholders to think and work together in long term.

A vision for Siem Reap/ Angkor Town in the year 2020 is proposed 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”.

Siem Reap/Angkor Town will be featured by the followings:

(1) A quality tourism city where tourists can fully feel a touch of the Khmer culture, the Khmer history and the Khmer arts.

Siem Reap will evolve into the place in which various tourists stay long and visit extensive historical spots all year round. In this manner, Siem Reap can reduce seasonal fluctuation of tourism and ensure sustainability. It will, in turn, be a center of regional economy. In this quality tourism city:

- About 2 million foreign tourists will visit and many of them stay for more than a few days every year.
- The tourists will not only be those in group tours and backpackers but also many individuals, families and those in up-market.
- Those who stay for more than a few days are likely to visit again with a wish for further touch on the history and the culture of Khmer.
- The tourists will enjoy the city itself for eating, shopping and relaxing. This will enable many local people to receive economic benefits from the tourism.

(2) A human scale city in the atmosphere of Angkor

The city is the base of Angkor tour in the green as well as in the atmosphere of Angkor. The whole city is safe, clean, convenient and comfortable for the tourists as well as the citizens. In this human scale city;

- 210 thousand people will live. In addition, 65 thousand people will commute from surrounding districts to work but not to cause expansion of undesirable settlements through migration.
- Urban activities will be compact for efficient public services and utilities.
- Built-up areas will be 4,241 hectares at the widest. They will be discouraged from encroaching historical, agricultural, green or food-prone space and encouraged to expand toward southeast.
- City center will be safe, clean and comfortable so that it is a major tourism space by itself.
- The afterglow of Angkorian experience and atmosphere will be maintained and fostered for the tourists and the people, with the breeze of the deep forests and in the panoramic sky of the dramatic sunset.

(3) An environment-friendly city

The city will be in harmony with Angkor heritage and nature, water and energy saving and waste recycling with effective control and the awareness of tourists and people. It shall be a model of Cambodia.

The city will thus be sustainable. It will:

- Offer implications of the Angkorian wisdom for sustainable development and cultural diversity and people participation in the 21st century.
- Be the source of universal spirit being conveyed to the rest of the world.
- Be a cultural magnet in Southeast Asia.

3.3 Strategies

Toward the Siem Reap/ Angkor Town 2020, we propose a set of six strategies. Strategies 1 and 2 are driving force of the economy. Strategies 3 and 4 are to prepare a basis for sustainable development. For those strategies to be effective, Siem Reap needs to reinforce physical and institutional infrastructures through strategies 5 and 6.

Strategy 1 Promoting Tourism Focused on Up-market

A fundamental approach to the Siem Reap/ Angkor Town 2020 is to maximize the positive economic impact of tourism on local economy and to control environmental load at a reasonable level. By “aiming at the up-market”, this approach associates itself with increasing unit consumption amount per tourist, reducing a relative weight of peak season tourists and extending the period of their stay.

Filling the gap between the expectation and what Siem Reap can offer is necessary to attract the tourists in up-market. They want not only to see monuments but also to expose themselves to local people, to enjoy traditional culture and the town itself. They are environmental conscious and feeling satisfied if their spending contributes to the improvement of local people livelihood and the preservation of Khmer culture.

Strategy 2 Maximizing Local Benefits from Tourism

A shift to a more balanced tourism will stimulate not only tourism industry but also other local economic activities. Particularly, individual tourists bring about greater economic benefits than group tourists. A viable approach is to promote a local brand: the Angkor brand to increase local products supply to tourism market. Local businesses and farmers could make greater efforts to upgrade and diversify their products for up-market tourists to standard tourists.

Strategy 3 Making Town More Attractive to Tourists

In view of making town more attractive to tourists, urbanization should be guided to

form a compact city. Hotels should be discouraged from being built at any place. The total requirement of hotels toward the year 2020 can well be accommodated within the existing areas of hotel location and the Cultural and Tourism Zone.

A city center area along the Siem Reap River should be improved intensively as a strategic corridor to vividly enhance tourism attractiveness of urban space. For all these undertakings, a fundamental task is to establish a consistent, transparent and strong city-planning framework.

Strategy 4 Making Town More Sustainable in Environment

For the city to be an internationally competitive tourist city, it should be clean in public space such as streets and the river. Good drainage, solid waste management and sewerage are essential. The city should be sustainable in natural environmental base, water in particular. We propose to cut possible escalation of the environmental loads by 10% in the coming 15 years through enhanced people’s awareness and stronger enforcement of regulations.

Siem Reap should protect Angkor heritage from negative impacts of tourism and keeps the heritages away from risk of damages.

Strategy 5 Strengthening Infrastructures for Tourists and People

Infrastructures should drastically be strengthened as a major basis of the integral set of tourism, economy and environment of Siem Reap, being an international tourist city. The infrastructures to be substantially strengthened include water supply, roads, drainage, sewerage, solid waste management and power.

Strategy 6 Strengthening Local Administration and Finance

Another important basis of the integral set of tourism, economy and environment is the local administration and finance. One should accelerate ongoing initiative of the provincial governor to strengthen development administration.

4. Area-wise Development Concept

To materialize the Strategic Vision 2020, we propose spatial approaches as area-wise development priorities.

Conceptual Zoning

Siem Reap area is divided into three areas by its attributes as follows:

- Urban Area
- Rural/ Heritage Area
- Tonle Sap Lake Area

The Urban Area is defined as the area which will be urbanized by 2020. For each area development concept is set as:

Development Concept for Urban Area:

This study prepares the development concepts for the urban area as “Siem Reap: Making an Attractive City.”

Development Concept for Rural/ Heritage

Area: Rural and heritage areas co-exist and are inseparable. The area development

concept is set as “Rural/Heritage Area: The Rural Communities Attractive for Tourists in Harmony with Heritages, Supporting the Tourism and Preservation.” Under the concept, two approaches for the area are provided as follows:

- Agricultural development in the western suburbs
- Promotion of village and eco tourism based on Khmer Culture.

Development Concept for Tonle Sap Lake

Area: The Tonle Sap Area is another indispensable area to consider Siem Reap and Angkor Heritages. This study prepares the development concept for the area as “Tonle Sap: The Eco-Tourism Area with Protection and Sustainable Use of Diverse Natural Environment providing Ideas what has nurtured Khmer Culture.”

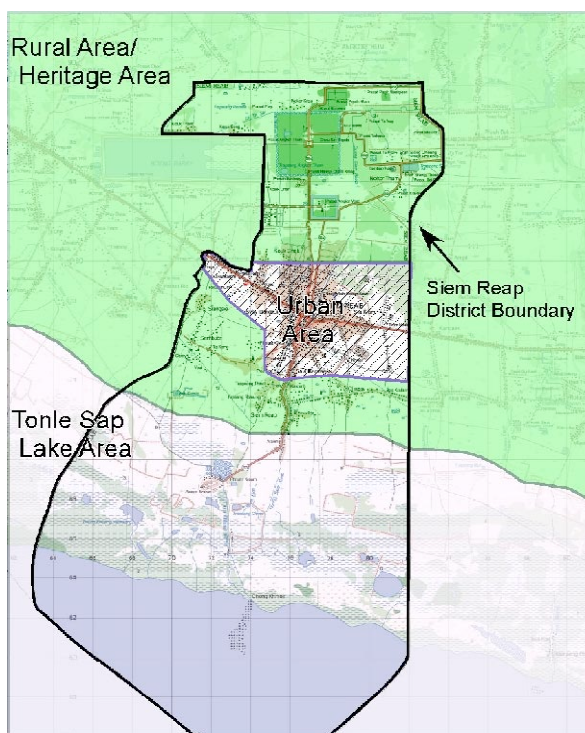


Figure II.1 Zoning of Siem Reap

5. Sector Development Plan

5.1 Development Plan to Realize Strategies

Under the proposed strategies, a series of measures have to be taken across the

individual sectors. The highlights of those measures proposed in the Sector Development Plan under each strategy are as shown in the table below.

Table II.2 Strategies and Sector Development Plan: An Overview

Strategies	Sector Development Plan		
	Economy, Urban Development and Environment	Infrastructure	Administration and Finance
[1] Promoting tourism focused on up-market	<p>Tourism Development</p> <ul style="list-style-type: none"> • Destination-wise development and routing - Angkor Heritage Park Area - Urban Amenity and Cultural Tourism Area - Tonle Sap Lake and Rural Area - Distant Angkor Monument Area • Promoting cultural appreciation • Service improvement • Strengthening marketing and promotion 	<p>Transportation</p> <ul style="list-style-type: none"> • Access to distant heritages • Transport in Angkor Heritage Park <p>Power</p> <ul style="list-style-type: none"> • Lighting for Angkor monuments 	<p>Development Administration</p> <ul style="list-style-type: none"> • Private-public partnership (PPP) for tourism marketing and promotion
[2] Maximizing local benefits from tourism	<p>Agricultural Diversification and Local Product Promotion</p> <ul style="list-style-type: none"> • Angkor Brand for larger local supply • Integration of rural economy into tourism <p>Tourism Development</p> <ul style="list-style-type: none"> • Night Market 		<p>Development Administration</p> <ul style="list-style-type: none"> • PPP for APPC
[3] Making town more attractive to tourists	<p>Urban Development</p> <ul style="list-style-type: none"> • Guiding urbanization to form a compact city • Center area improvement • Infrastructure development guiding urbanization 	<p>Transportation</p> <ul style="list-style-type: none"> • Road network guiding urbanization • Sidewalk and road amenity • Road safety <p>Sewerage and Drainage</p> <ul style="list-style-type: none"> • Drainage guiding urbanization <p>Power: Street light</p>	<p>Development Administration</p> <ul style="list-style-type: none"> • Development committee for checking the development from the urban planning viewpoints • Enforcement of land use plan; vehicle registration and law on road traffic. • HRD for information management
[4] Making town more sustainable in environment	<p>Environmental Management</p> <ul style="list-style-type: none"> • Institutional capacity of environmental management • Enhancing environmental awareness • Financing to environment conservation • Development planning with environmental consideration 	<p>Transportation</p> <ul style="list-style-type: none"> • Environmental transport in the Angkor Heritage Park <p>Water Resources and Water Supply</p> <ul style="list-style-type: none"> • Groundwater intake management • Environmental water <p>Drainage and Sewerage</p> <ul style="list-style-type: none"> • Wastewater treatment <p>Solid Waste Management</p> <ul style="list-style-type: none"> • Sanitary landfill and reducing solid waste <p>Power: Reducing individual generators</p>	<p>Development Administration</p> <ul style="list-style-type: none"> • Development committee for project appraisal from the environmental viewpoints • Enforced laws and regulations for environment: groundwater and diesel generator • Strengthening finance for environment • PPP for solid waste management • HRD for information management <p>Community Empowerment</p> <ul style="list-style-type: none"> • Co-exist with Angkor monuments
[5] Strengthening infrastructure for tourists and people		<p>Transportation: sufficient road network for tourists and residents</p> <p>Water Resources and Water Supply: sustainable water resource development and water supply</p> <p>Solid Waste Management: making the town lovely</p> <p>Drainage and Sewerage: sustainable drainage and sewerage systems for hygienic and beautiful town</p> <p>Power: reliable power for all with less environmental load</p>	<p>Development Administration</p> <ul style="list-style-type: none"> • Project planning, management and monitoring <p>Local Financing</p> <ul style="list-style-type: none"> • Siem Reap Development Fund
[6] Strengthening local administration and finance			<p>Development Administration</p> <ul style="list-style-type: none"> • Streamlined local administration with transparency and accountability • New partnership among business, peoples and government • Strengthening enforcement of rule and regulations • Local HRD for development <p>Local Financing</p> <ul style="list-style-type: none"> • Reinforcing local financial base <p>Community Empowerment: strengthening capacity of people</p>

5.2 Sector Development Plan

Sector Development Plans are proposed as shown in the table below.

Table II.3 Sector Development Plan

Sector	Sector Objectives	Sector Approach	Projects/Programs
1 Urban development	Making an attractive city	<ol style="list-style-type: none"> 1. Formation of a compact city with effective enforcement of urban plan 2. Urban redevelopment and integration of old quarter area 3. Urban roads and infrastructure development 	U-1 City center area improvement U-2 Urban planning capacity building U-3 Inventory of historical building U-4 Residential development promotion U-5 Planning and implementation of hotel, cultural and visitor zone
2 Environmental management	Making Siem Reap beautiful and sustainable in environment	<ol style="list-style-type: none"> 1. Strengthening institutional capacity of environmental management 2. Environmental considerations incorporated in development planning 3. Encouraging human behaviors to be environment-friendly 4. Creating a financial system for environmental conservation 	E-1 Institutional capacity development of environmental management E-2 Enhancing environmental awareness E-3 Joint fee collection system of public utilities
3 Tourism development	Creating a quality tourism destination in the context of Angkor history and culture	<ol style="list-style-type: none"> 1 Developing tourism destination and diversified routing 2 Giving tourist a taste of rich Khmer culture, history, art and the nature 	TO-1 Khmer heritage tourism network and tourism facility development TO-2 Night market development TO-3 Public-private partnership Tourism Quality Improvement TO-4 Development and promotion of community-based eco-/village tourism TO-5 Strengthen tour guide training and introduction of advanced tour guide system TO-6 Comprehensive study for carrying capacity and site management
5 Agricultural diversification and local product promotion	Creating Angkor Brand for expanding local products supply to increase local economic benefit	<ol style="list-style-type: none"> 1 Creating a support system 2 Targeting the tourism market as well as the growing mid-range market 3 Strengthening the linkage between tourism and rural economy 4 Improving infrastructure for local products promotion 	A-1 HRD and establishing APPC A-2 One village one product movement (OVOP) A-3 Production village development A-4 Organizing Angkor Products Fair
6 Transportation	<ol style="list-style-type: none"> 1. Providing the sufficient road network and function for smooth transportation 2. Satisfying tourists in visiting Angkor heritages and staying in Siem Rea 	<ol style="list-style-type: none"> 1 Improvement of bottlenecks and development of sub-arterial road network in the urban area 2 Improving the road condition and facility in the urban area 3 Road network development in the future urbanization area 4 Access improvement to Angkor heritages 5 Establishment of an efficient road maintenance system 	T-1 French bridge improvement T-2 Sub-arterial road parallel to the NR 6 (1) T-3 Upgrading of the Hun Sen Peace Road (2) T-4 Completion of sub-arterial road network up to 2012 (3) T-5 Completion of sub-arterial road network up to 2020 (4) T-6 Institutional improvement and campaign for road safety T-7 Rural heritage network rehabilitation T-8 Introduction of environmental public transport in the AAP T-9 Bicycle track construction project T-10 Institutional improvement for efficient road maintenance
7 Water resources and water supply	<ol style="list-style-type: none"> 1. Developing water resources for water supply, agriculture and environment 2. Increasing capacity and coverage ratio of public water supply service 3. Managing and conserving groundwater 	<u>Water resource dev. and management</u> <ol style="list-style-type: none"> 1 Water resources development in consideration of sustainability 2 Efficient water resources development plan 3 Improve river sanitation and water environment of Angkor heritage <u>Water Supply</u> <ol style="list-style-type: none"> 1 Provide sufficient water to people and businesses 2 Efficient water supply management and narrowing gap between peak and off-peak demands 3 Improve water supply services to enlarge cover ratio through customer satisfaction 	W-1 Provincial regulation on registration of commercial well W-2 Ministerial sub-decree on groundwater W-3 Replacement of old pipeline W-4 The strategic study on integrated water resources management for Siem Reap River Basin and Roluos River Basin W-5 Water supply system development of Siem Reap City (Stage 1) W-6 Water resources development of North East Baray W-7 Water supply system development of Siem Reap City (Stage 2)

8 Solid waste management	Making the town lovery	<ol style="list-style-type: none"> 1 Strengthening people's awareness of the environment 2 Establishment of a sound SWM system 3 Establishment of a sound financial system 4 Strengthening of public private partnership 	<p>SW-1 Sound SWM system development</p> <p>SW-2 Strengthening of the waste collection system</p> <p>SW-3 Sanitary landfill development</p>
9 Drainage and sewerage	Creating sustainable drainage and sewerage systems for hygienic and beautiful town	<ol style="list-style-type: none"> 1 Introducing integrated waste management 2 Stormwater management 3 Wastewater management 	<p>SD-1 Mekong Tourism Development Project Part A1: Drainage and sewerage improvement in West District Zone 1.</p> <p>SD-2 Urban Development Project Siem Reap-Angkor: Drainage in East District</p> <p>SD-3 Siem Reap Sewerage Project-Phase I: sewerage and drainage in West District Zone1</p> <p>SD-4 Siem Reap Sewerage Project-Phase II: Sewerage East District Zone 1</p> <p>SD-5 Siem Reap Town Center Stormwater Relief Project: Drainage West District</p> <p>SD-6 Siem Reap Septage Management Project-Phase I: Septic sludge disposal West District</p> <p>SD-7 Siem Reap Septage Management Project-Phase II: Septic sludge disposal East District</p> <p>SD-8 Siem Reap Septic Tank Effluent Disposal Project- Phase 1: Septic tank effluent disposal West District Zone 2</p> <p>SD-9 Siem Reap Septic Tank Effluent Disposal Project- Phase 1I: Septic tank effluent disposal East District Zone 2</p>
10 Power	Supplying reliable power for all with less environmental load	<ol style="list-style-type: none"> 1 Upgrading and expanding or power facility <ol style="list-style-type: none"> 1.1 Additional power source 1.2 Extension and improvement of networks 2 Reinforcement of EdC <ol style="list-style-type: none"> 2.1 Review of tariff and connection fee 2.2 Strengthening of EdC 3 Control under law, ordinance and decree for environmental load reduction 	<p>PO-1 Urgent installation of diesel generator</p> <p>PO-2 Expansion of existing diesel power station</p> <p>PO-3 Extension and expansion of distribution networking</p> <p>PO-4 Installation and repair of street light</p> <p>PO-5 Planning of effective use of the electricity for Angkor Wat and other temples</p> <p>PO-6 Planning for electrification for unelectrified area</p> <p>PO-8 Assistance to reviewing of power tariff rate</p> <p>PO-7 Assistance to capacity building for EdC</p> <p>PO-9 Revision and/or set up law, ordinance and decree on the electrical power supply to reduce environmental load</p> <p>PO-10 Find a sustainable power sources for the Siem Reap district</p>
11 Development administration	Establish autonomous and unified local administration for Siem Reap to ensure transparency and accountability	<ol style="list-style-type: none"> 1 Autonomous and unified administration 2 Strengthening provincial government 3 Ensuring adequate budget 4 Establishment of local assembly for transparency and accountability 5 Formation of legal framework 	<p>L-1 Development committee</p> <p>L-2 Organizational reform</p> <p>L-3 HRD for provincial government officers</p> <p>L-4 Development and efficient operation of laws and regulations</p> <p>L-5 Financial budget reform for unified administration</p>
12 Local financing	Providing adequate financial resources to sustain economic and social development of Siem Reap	<ol style="list-style-type: none"> 1 Increasing financial resources of the provincial government 2 Improving budget planning/ implementation and HR 3 Enhancing transparency 4 Establishing forum for financial transparency 	
13 Community empowerment	Strengthen self-help capacity of people, to participate and coordinate with government	<ol style="list-style-type: none"> 1 Strengthening the government capacity for facilitation and coordination for people 2 Encouraging the people and the private sector to participate in community level development 3 Launching community level program through a people-government partnership 	<p>C-1 Land use map preparation</p> <p>C-2 Community planning</p> <p>C-3 Establishing project based association</p> <p>C-4 Community application</p> <p>C-5 Detailed regulation study on co-existing zone</p> <p>C-6 Angkor management plan and community development</p> <p>C-7 People's needs collection</p>

6. Projects and Programs

69 projects and programs are proposed. Out of these, 13 priority projects and programs were selected according the two criteria to select priority projects as follows:

(1) Short-term Importance

A project should be given priority, because it meets pressing needs and can be effective in short-term.

(2) Long-term Importance

A project should be given priority because:

- It reflects a core concept of the master plan,
- It is essential to realizing the master plan in long-term, and
- It needs early undertaking in view of a long preparation period.

Table II.4 Projects and Programs (1/2)

NO	Corresponding Strategy	Sector	Proj. ID	Title	Brief Description	Implementing Agency	Priority	Cost (1000 US\$)	Schedule		
									2006	2012	2020
1	3,4,5	Urban	U-1	City center area improvement	Various urgent infrastructure and landscaping.	Province, with relevant ministerial departments.	Priority	7,600			
2	3,5,6		U-2	Urban planning capacity building	Capacity development of urban planning visions and land use plan.	DLMUPC, District, APSARA and Province.	Priority	500			
3	3		U-3	Inventory for historical architectures	Making an inventory of French colonial architectures.	APSARA / Siem Reap Province		200			
4	3,5		U-4	Residential development promotion	Provision of quality living environment for new residents.	DLMUPC, District, and Private Sector		n/a			
5	1,3,4,5		U-5	Cultural and Tourism Zone development	Development of the Zone for cultural attractions and high-graded hotels.	APSARA and Private Investors		n/a			
6	4,6	Environment	E-1	Institutional capacity development	Improvement of institutional capacity of public sector.	Province, DPWT, DOE and Residents		310			
7	3,4		E-2	Environmental awareness enhancement	Environmental campaign mainly targeted for school children.	Elementary Schools	Priority	330			
8	4,5,6		E-3	Joint fee collection on public services	Joint collection of service charges of water, waste water and solid waste.	Siem Reap Waterworks, DPWT, MICC		310			
9	1,2,3,5,6	Tourism	TO-1	Khmer heritage tourism network and tourism facility development	Promotion of new tourism destinations around Siem Reap.	MOT, SRTO, APSARA, MPWT and MOCFA	Priority	26,550			
10	2,3		TO-2	Night market development	Creation of attractions and optional tours at night.	private sector		260			
11	1,2,3		TO-3	Public-private partnership tourism quality improvement	Public and private partnership in marketing and promotion.	To be determined	Priority	n/a			
12	1,2,6		TO-4	Dev and promotion of community-based eco and village tourism	Field survey, F/S for pilot projects and selection of tourism products, etc.	NGO, APSARA		158			
13	1,2		TO-5	Tour guide training and advanced tour guide system	Strengthening of tour guide training programs and upgrade its license system.	SRTO, MOT, APSARA		211			
14	1,5		TO-6	Study for carrying capacity and site management	Survey/ analysis on tourists movement, capacity of sites and site management.	APSARA		163			
15	1,2,6	Agricultural Diversification and Local Product	A-1	HRD and local product promotion center	HRD of provincial staff and establishment of local products promotion center.	Province, APPC	Priority	80			
16	1,2,6		A-2	One Village and One Product Movement (OVOP)	Promotion of OVOP	Province, APPC		60			
17	1,2,6		A-3	Production village development	Collective village people activities and its linkage with tourism.	Province, APPC		36			
18	1,2,3		A-4	Angkor Products Fair	Hold the APF following the pilot project.	APPC		108			
19	3,5	Transportation	TR-1	French Bridge improvement	Construction of an additional bridge over the SR River.	MPWT	Priority	957			
20	3,5		TR-2	Sub-arterial road network (Phase 1)	Development of 3 routes in urban area.	DPWT, Province	Priority	10,839			
21	3,5		TR-3	Sub-arterial road network (Phase 2)	Completion of Southern Semicircular Road (Hun Sen Piece Road)	MPWT		6,817			
22	3,5		TR-4	Sub-arterial road network (Phase 3)	Development of inner semicircular road.	DPWT, Province		16,736			
23	3,5		TR-5	Sub-arterial road network (Phase 4)	Development of trunk roads in current peri-urban area.	Province		14,921			
24	3,6		TR-6	Institutional improvement for road safety	Traffic law enforcement in licensing, safety and helmet-wearing.	Police, DPWT and Province		7,000			
25	2,3,5		TR-7	Rural heritage road network rehabilitation	Improve roads to the remote Angkor monuments.	MPWT, MRD	Priority	33,150			
26	3,4,5		TR-8	Environmental public transport	Low emission bus system in Archaeological Park	APSARA		7,104			
27	3,4,5		TR-9	Bicycle track construction	Development of exclusive bike lanes in archaeological park.	APSARA		1,417			
28	3,5,6		TR-10	Institutional improvement for efficient road maintenance	Preparation of road inventory/ establishment of monitoring system on road condition.	DPWT, PDRD		1,800			

Table II.5 Projects and Programs (2/2)

NO	Corresponding Strategy	Sector	Proj. ID	Title	Brief Description	Implementing Agency	Priority	Cost (1000 US\$)	Schedule		
									2006	2012	2020
29	4,5,6	Water	W-1	Provincial regulation on registration of commercial Well	Registration of commercial users and installation of water meters.	Province		0			
30	5,6		W-2	Ministerial Sub-decree on groundwater charges for commercial well	Establishment of sub-decree on commercial well use.	Province		0			
31	4,5		W-3	Replacement of old pipeline	Replacement of obsolete pipeline (6.5km) in the city center	MIME	Priority	450			
32	4,5		W-4	Strategic study on integrated water resources management	Preparation of integrated water resources management.	MOWRAM	Priority	7,282			
33	4,5		W-5	Water supply system development of Siem Reap (stage-1)	Establishment of new water supply system.	MIME		13,716			
34	4,5		W-6	Water resources development of North East Baray	Improving North East Baray function as water resource.	MOWRAM		8,320			
35	4,5		W-7	Water supply system development of Siem Reap (stage-2)	Development of water treatment plant and distribution network system.	MIME		12,310			
36	3,4,5,6	Solid Waste	SW-1	Sound solid waste management system development	Institutional and financial system development for solid waste	MICC, Province		1,000			
37	3,4,5,6		SW-2	Strengthening of waste collection system	Improve solid waste collection up to 100% coverage	MICC, Province		300			
38	4,5,6		SW-3	Sanitary landfill	Improvement of current operation at landfill and plan of new landfills.	MICC, Province		2,000			
39	3,4,5	Sewerage/ Drainage	SD-1	Mekong Tourism Dev Proj (A1)	Improvement of town center drainage	MPWT, DPWT (ADB funded)		11,988			
40	3,4,5		SD-2	Urban Dev Proj SR	Drainage and sewerage pipe installation in city center area	Province, DPWT (AFD funded)	Priority	4,800			
41	3,4,5		SD-3	Sewerage (Phase I)	Wastewater collection system in City Center West (Zone 1)	DPWT, MPWT		18,326			
42	3,4,5		SD-4	Sewerage (Phase II)	Wastewater collection system in City Center East and treatment plant.	DPWT, MPWT		17,271			
43	3,4,5		SD-5	Stormwater relief	New western drain in town center.	DPWT, MPWT		10,935			
44	3,4,5		SD-6	Septage management (Phase I)	Septage collection vehicle and septage treatment facility for SD-1.	DPWT, MPWT		1,614			
45	3,4,5		SD-7	Septage management (Phase II)	Septage collection vehicle and septage treatment facility for SD-4.	DPWT, MPWT		1,027			
46	3,4,5		SD-8	Tank effluent disposal (Phase I)	Simplified pipe system for collecting and conveying septic tank by SD-3.	DPWT, MPWT		13,137			
47	3,4,5		SD-9	Tank effluent disposal (Phase II)	Simplified pipe system for collecting and conveying septic tank by SD-4.	DPWT, MPWT		7,634			
48	5,6	Power	P-1	Urgent installation of diesel generators	Installation of new diesel generators of 7MW on EdC site.	EdC	Priority	2,090			
49	5		P-2	Expansion of existing diesel power station	Increase of 10MW diesel power station.	EdC		20,800			
50	5		P-3	Extension and expansion of distribution networks	High and low voltage line extension, installation of new substations and watt-hour meter.	EdC		7,800			
51	3,5		P-4	Installation and repair of street light	Improvement of street light for tourists.	District		780			
52	1,3,6		P-5	Effective use of the electricity for Angkor Wat and other temples	Light-up of Angkor monuments by public power source.	APSARA and/or other relevant organization		330			
53	2,5		P-6	Planning for electrification for unelectrified area	Expansion of electrified area as city grows.	EdC		275			
54	5,6		P-7	Assistance to capacity building for EdC	Training of engineers of Siem Reap EdC.	EdC		550			
55	5,6		P-8	Assistance to reviewing of power tariff rate	Revision of tariff by user classification.	EdC/EAC		990			
56	5,6		P-9	Revision of law, ordinances and decree for power to reduce environmental load	Review, revision and setup to reduce environmental load by power sector.	Municipality, EAC, EdC		1,800			
57	5,6		P-10	Sustainable power source development	Alternative power sources exploration.	EdC, MIME		660			
58	6	Local Administration	(Recommendation)								
			L-1	Development committee for project approval	Establish of a committee for integrated operation in the Province.	Province,		0			
59	6		L-2	Human resources development of Province	Human resources development for provincial officers	Province		1,600			
60	6		L-3	Organizational reform of Provincial Government of Siem Reap	Streamlining of organizational structure of the Provincial Government.	Siem Reap Province					
61	6		L-4	Development and efficient operation of laws and regulations	Preparation of legal framework for unified administration.	Province, Ministry of Interior					
62	6	L-5	Financial budget reform for unified administration	Strengthening financial resources of Siem Reap province.	Ministry of Finance and National Assembly						
63	3,6	Community Empowerment	C-1	Land use mapping	Preparation of local maps by workshops	Province, Commune, Local stakeholders		10			
64	3,6		C-2	Community planning	Planning by workshops of local stakeholders	Province, Commune, Local stakeholders		10			
65	3,6		C-3	Community association	A community association to implement a project	Province, Commune, Local stakeholders		10			
66	2,3,6		C-4	Community application	Introduction of bottom-up approach for project planning.	Province, Commune, Local stakeholders		100			
67	2,3,6		C-5	Regulation on co-existing zone	Plan for APSARA Zone 1&2 for coexistence with heritages	APSARA, Commune, Local stakeholders		100			
68	2,3,6		C-6	Angkor management plan and community development	To promote people in poverty to live with heritages	APSARA, Commune, Local stakeholders		3,000			
69	3,6		C-7	People's needs collection	To incorporate people's voices by various medias	Province		1			

7. Institutional and Financial Arrangements

In order to realize the proposed plan that incorporate projects/ programs, a series of recommendations are made with reference to institutional and financial arrangements for the government organizations at the provincial level and for those at the national level.

7.1 Recommendations for the government organizations at the provincial level

(1) Securing common information and understanding among provincial hall, line departments and APSARA Authority regarding policies, plans, budget and projects in the district for smoother coordination and decision by provincial governor on the developmental activities for Siem Reap.

(2) Ensuring overriding authority to permit/prohibit private activities in such priority areas as land use and building control, environmental monitoring, and use of water resources, both underground and surface.

(3) Strengthen the functions of urban policy-making and urban management:

(4) Strengthen government initiative to ensure effective participation of private sector:

It is inevitable to make use of private participation with strengthened provincial institutional base.

1) Strengthen the provincial administration with special stress on:

- Human resources in technical and managerial aspect,
- Financial basis especially for recurrent

cost, and

- Database to facilitate effective monitoring of land use, environment, water use and public utility services

2) Improve private participation arrangements

Arrangements to be made on a more transparent and competitive basis for securing fairness, accountability and efficiency of the entrusted services in line with the planned sustainable development. Recommended fields of private participation are:

- Solid waste collection,
- Local product promotion,
- Awareness-building in environmental improvement and
- Tourism promotion.

7.2 Recommendations for the government organizations at the national level

(1) Establishing and elaborating the laws, regulations and procedures in the priority areas, including land use control and environmental monitoring, water management.

(2) Strengthening technical capacity of line ministries and departments to enable the provincial governor to effectively use its initiative and authority, with a stress on the management of land, environment and water.

(3) Tax reform should be expedited in favor of local developments including those in Siem Reap.

8 Environmental and Social Considerations

A mitigation plan needs to be established to mitigate negative social and environmental impacts caused by implementations of projects. The plan provides inspections and monitoring on environmental/ social conditions and mitigation measures during pre-construction, construction and operation periods. EIA or IEIA on each of the projects proposed in this master plan needs to be conducted during feasibility study and detailed design if environmental and social considerations is required by Cambodian legal framework.

(1) Pre-Construction Period

- Consultation with Stakeholders
- Careful Site Selection for Each Project
- Archaeological Investigation
- Securing Alternative Jobs for Landowners of the Project Sites
- Groundwater Quality Test
- Hydro-geological Survey
- Inter-Ministerial Coordination on Water Usage
- Geological Survey on Soil
- Atmospheric Survey

(2) Construction Period

1) Mitigation Measures for Impact from Construction Activities

- Appropriate Control of Construction Materials
- Sprinkling of Roads
- Appropriate Maintenance of Construction Equipment and Vehicles
- Turbid Water Control
- Establishment of Construction Waste Collection System
- Appropriate Construction Schedule/Planning/Management
- Installation of Acoustic Wall or Buffer Zone

2) Appropriate Procedures for Archaeological Discovery

The construction contractor needs to stop construction activities immediately if archaeological finding is reported. The findings need to be investigated by archaeologists if necessary, and an appropriate measure needs to be taken to recover it.

3) Return of Construction Affected Areas to Original Condition

All the areas affected by the project implementation needs to be recovered to original condition after the construction completion. All equipment, machinery and vehicles for construction should be removed, and construction waste, unused materials and contaminated earth need to be properly disposed.

(3) Operation Period

Various measures need to be considered and implemented during the operation period. These measures need to be studied at a sectoral master plan or a feasibility study level. The mitigation measures considered at this stage are described below.

- Landfill: removing landfill gas; covering soil daily to protect offensive odor and minimize the landfill fire occurrence; and treatment ponds for leachate treatment.
- Waste treatment ponds: periodical maintenance to protect offensive odor.
- Diesel generators: installation of equipment to reduce emission.
- Groundwater pumping: periodical monitoring on ground subsidence.

9. Recommendations

1. Siem Reap has so far experienced a tourism rush. The rush has taken place with few destinations and contents to enjoy other than Angkor Wat Complex. Basic public services cannot catch up with rapid hotel development. The city is still hardly safe, clean or convenient for individual family tourists. Policy makers should realize that the tourism and urban development in this pattern is not sustainable in the future. It should be shifted from quantity-oriented to quality-oriented and made compatible with natural environmental conditions. The government should seriously tackle with intensifying environmental and urban problems in Siem Reap. Otherwise, environmental degradation and possible damage to the image of the city may force tourists away from Siem Reap under fierce competition among tourist destinations in the world.

2. Among other things, the most critical element is the water for tourists, people and the agricultural lands as green belt. Individual pumping of groundwater for commercial purpose should be registered, monitored and charged when necessary. This is now possible with a full-scale urban water supply system being available. A province-wide plan should be prepared as soon as possible to manage existing and potential water resources and to coordinate different water uses in long term.

3. Land use control is another critical element. Urban development should be allowed only within the urbanization area as proposed. With this control, urban infrastructures can efficiently be provided. The historical sites and agricultural lands can be protected from uncontrolled urban spill over as well. For timely development of infrastructures, public space should be secured from unlawful building construction, settlements and land occupancy with full consideration of socially vulnerable people. Currently complicated administrative set-up for land use planning should be streamlined for the land use control to be effective.

4. This long-term master plan is a living document. It should be reviewed and revised in response to changing circumstances particularly by Siem Reap Province, APSARA Authority, Committee for the Development of Cambodia and Office of the Council of the Ministers. The proposed priority projects should fully be reviewed for their timely preparation and implementation. Together with these attempts, the provincial government should strengthen its function to monitor investments, land use, environment government projects and thus to revise the master plan.

5. Pilot projects entitled "A More Beautiful Siem Reap" and "Angkor Products Fair 2005" have been successful because of strong local initiative and wide-ranging national support. They should be a new step toward continued actions for upgrading urban environment and diversifying local economic benefits and local amenities. The local initiative taken by the provincial governor in particular, should keep being supported by concerned national ministries, private sector and the local people.

6. Capacity building of the government administration at the local level is the most crucial to sustainable development of Siem Reap. Of important is the provincial government. The provincial government should urgently strengthen its planning staff with wide technical knowledge. It should promote sharing of developmental information among different departments and authorities at the provincial level by organizing a provincial development committee. It will eventually be something like a provincial CDC or a governor's board. There should be a basket fund at the provincial level specifically for the maintenance of strategic public services such as streets, waste collection and drainage. A deserved and viable source of the fund would be a part of the entrance fees to the Angkor monuments.

7. Unlike most other provinces in Cambodia, the provincial of Siem Reap is dependent largely on tourism and urban sectors. The provincial government of Siem Reap should, therefore, substantially strengthen its authority and technical capacity to plan, monitor and maintain urban environment. The provincial authority and technical capacity should be made effective by technical and legislative support from relevant line ministries and departments as well as APSARA Authority.

8. The Angkor monuments are a symbol of the national identity, a world cultural heritage and a major source of foreign exchange. Siem Reap should thus be a model city of sustainable development in Cambodia. It will not just be sustainable in itself but will offer implications of the Angkorian wisdom for sustainable development and cultural diversity and people participation in the 21st century. It is not just the seat of physical monument either, but the source of universal spirit being conveyed to the rest of the world. It will also be a cultural magnet in Southeast Asia. Toward this end, all the ministries, authorities and councils of the national government should share a common understanding that it is worth to financially and technically support Siem Reap especially in urban and environmental improvement.