



The Kingdom of Cambodia
Siem Reap Province



Data Collection Survey on Urban Improvement in Siem Reap City in the Kingdom of Cambodia

The Basic Survey for Smart City in Siem Reap

January 2022
Final Report



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Siem Reap Province

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Urban Improvement
in Siem Reap City
in the Kingdom of Cambodia**

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January 2022

Japan International Cooperation Agency

**Nippon Koei Co., Ltd.
ALMEC Corporation**

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Abbreviations are as follows.

Abbreviation	Official Name
AAP	Angkor Archaeological Park
AC	Asphalt Concrete
ADB	Asian Development Bank
AFD	Agence Française de Développement (French) The French Development Agency (English)
AI	Artificial Intelligence
AODP	Asia Open Data Partnership
APSARA National Authority	The Authority for the Protection of the Site and the Management of the Region of Angkor
AR	Augmented Reality
ASCN	ASEAN Smart Cities Network
ASEAN	Association of Southeast Asian Nations
BLT	Build-Lease-Transfer
BOD	Biochemical Oxygen Demand
BOO	Build-Own-Operate
BOOT	Build-Own-Operate-Transfer
BOT	Build-Own-Transfer
CCTV	Closed-Circuit Television
CDC	The Council for the Development of Cambodia
CDIA	Cities Development Initiative for Asia
CIC	Cambodia Investors Club
CJCC	Cambodia-Japan Cooperation Center
CLMV	Cambodia, Laos, Myanmar, and Vietnam
CMAC	Cambodian Mine Action Center
CMS	Central Management System
CNG	Compressed Natural Gas
COD	Chemical Oxygen Demand
COVID-19	Coronavirus Disease 2019
CPTED	Crime Prevention Through Environmental Design
CPU	Central Processing Unit
CWEA	Cambodia Women Entrepreneurs Association
DBST	Double Bituminous Surface Treatment
DLMUPC	Siem Reap Provincial Department of Land Management, Urban Planning and Construction
DoE	Siem Reap Provincial Department of Environment
DoT	Siem Reap Provincial Department of Tourism

Abbreviation	Official Name
DoP	Siem Reap Provincial Department of Planning
DPI	Department of Planning and Investment, Siem Reap Provincial Administration
DPT	Siem Reap Provincial Department of Post and Telecommunication
DPWT	Siem Reap Provincial Department of Public Works and Transport
DRD	Siem Reap Provincial Department of Rural Development
DX	Digital Transformation
EDC	Electricite du Cambodge
ESG	Environmental Social Governance
EV	Electric Vehicle
EWS	Early Warning System
FDI	Foreign Direct Investment
GAEA	Global Action for Environment Awareness Waste Management Company
GDP	Gross Domestic Production
GPS	Global Positioning System
HGV	Heavy Goods Vehicle
ICT	Information and Communications Technology
IDP	Cambodia Industrial Development Policy
IKTT	Institute of Khmer Traditional Textiles
IoT	Internet of Things
ISP	Internet Service Provider
IT	Information Technology
ITS	Intelligent Transport System
JCM	Joint Credit Mechanism
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JOCV	Japan Overseas Cooperation Volunteer
JPT	Japan Parking Technology Co., Ltd
JSA	Japanese Government Team for Safeguarding Angkor
KHR	Cambodian Riel
Korean MP Study	Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia
LED	Light Emitting Diode
LPG	Liquefied Petroleum Gas
MaaS	Mobility as a Service
MCFA	Ministry of Culture and Fine Arts, the Kingdom of Cambodia
MEF	Ministry of Economy and Finance, the Kingdom of Cambodia

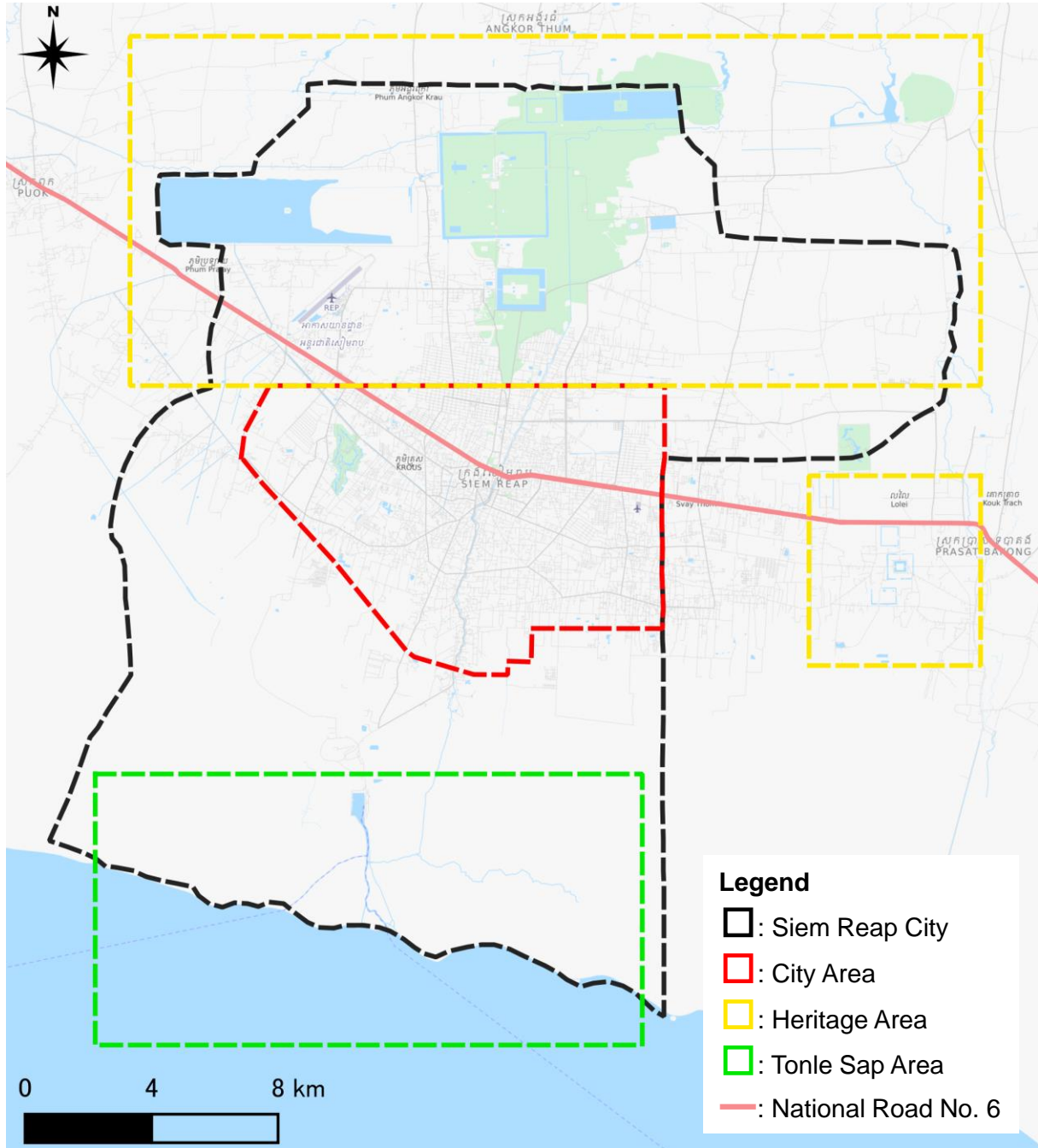
Abbreviation	Official Name
MFAIC	Ministry of Foreign Affairs and International Cooperation, the Kingdom of Cambodia
MISTI	Ministry of Industry, Science, Technology and Innovation, the Kingdom of Cambodia
MLMUPC	Ministry of Land Management, Urban Planning and Construction, the Kingdom of Cambodia
MLVT	Ministry of Labor and Vocational Training, the Kingdom of Cambodia
MoE	Ministry of Environment, the Kingdom of Cambodia
MoH	Ministry of Health, the Kingdom of Cambodia
MoI	Ministry of Interior, the Kingdom of Cambodia
MLIT	Ministry of Land, Infrastructure, Transport and Tourism of Japan
MoLIT	Ministry of Land, Infrastructure and Transport, the Republic of Korea
MoT	Ministry of Tourism, the Kingdom of Cambodia
MOU	Memorandum of Understanding
MPT	Ministry of Posts and Telecommunications, the Kingdom of Cambodia
MPWT	Ministry of Public Works and Transport, the Kingdom of Cambodia
MSW	Municipal Solid Waste
NAP-DRR	The National Action Plan for Disaster Risk Reduction
NCDM	National Committee for Disaster Management in Cambodia
NGO	Non-Governmental Organization
NPRD	The National Program to Rehabilitate and Develop Cambodia
NR6	National Road No. 6
NSDP	National Strategic Development Plan of Cambodia
ODA	Official Development Assistance
ODC	Open Development Cambodia
OS	Operating System
OSAC	Overseas Security Advisory Council
PCU	Passenger Car Unit
PDCA Cycle	Plan-Do-Check-Action Cycle
PID	Planning and Investment Division, Siem Reap Provincial Administration Office
PIN	People in Need
PIP	Public Investment Program
PoC	Proof of Concept
PPP	Public Private Partnership
QoL	Quality of Life
RC	Reinforced Concrete
SATREPS	Science and Technology Research Partnership for Sustainable Development
SCC	Smart City Committee

Abbreviation	Official Name
SEDP	Socio-Economic Development Plan
SDGs	Sustainable Development Goals
SMMR	Sustainable Design of Urban Mobility in Middle-Sized Metropolitan Regions
SWM	Solid Waste Management
SWTPU	Sewerage and Wastewater Treatment Plant Unit
TMC	Traffic Management Center
UNESCO	The United Nations Educational, Scientific and Cultural Organization
USD	United States Dollars
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
UXO	Unexploded Ordinance
VMS	Video Management Software/System
VR	Virtual Reality
WB	World Bank
WWTP	Wastewater Treatment Plant
YEAC	Young Entrepreneurs Association of Cambodia
ZEMP	Zoning and Environmental Management Plan for the Angkor Site

Currency Exchange Rate

1 KHR = 0.02850 JPY	1 JPY = 35.0877 KHR
1 USD = 114.674 JPY	1 JPY = 0.00872037 USD

Source: JICA Web Page (January 2022 monthly exchange rate)



Source: JICA Survey Team (the base map of all the maps in this report is from OpenStreetMap and OpenStreetMap Foundation, unless noted otherwise. The administrative border data is from Humanitarian Data Exchange.)

Figure: Siem Reap (Survey Target Area)

<Executive Summary>

Chapter 1 Introduction

1.1 Objectives

The objectives of the “Data Collection Survey on Urban Improvement in Siem Reap City” are to collect information on urban issues in Siem Reap City, to propose a roadmap for smart city in Siem Reap, and to launch pilot actions of the roadmap including business contests and pilot projects.

1.2 Contents of the Survey

The contents of this survey are as follows, and the survey will be conducted on the five main items of reviewing, envisioning, planning, action launching, and networking.

Table A: Contents of the Survey

Survey Contents	Corresponding Chapter	
Reviewing	1. Understanding upper-level / related plans, etc.	Chapter 2 Current Condition and Issues
	2. Understanding the legal framework (organization, laws, rules, procedures)	
	3. Understanding the current status and issues of the target sectors (Tourism / Mobility / Security / Waste)	
	4. Understanding the urban issues	
Envisioning	5. Proposal of the smart city vision	Chapter 3 The Smart City Roadmap
Planning	6. Proposal of basic policies	
	7. Proposal of development programs (including priority projects)	
Networking	8. Consensus building and interviewing	Chapter 4 Survey Activities and Pilot Project
	9. Conducting a business contest	
	10. Holding seminars	
Action Launching	11. Selecting pilot projects	
	12. Conducting pilot projects (PoC)	

Source: JICA Survey team

1.3 Main Target Sectors

Referring to the interest of Siem Reap Provincial Administration, the main target sectors of this survey are set as “tourism”, “mobility”, “waste”, and “security and safety”.

1.4 Target Area

Referring to the concerns addressed from Siem Reap Provincial Administration, the survey area mainly covers city center of Siem Reap City (hereinafter referred to as City Area), in additional to heritage area (hereinafter referred to as Heritage Area), and the boat stand area of Lake Tonle Sap (hereinafter referred to as Tonle Sap Area).

1.5 Survey Implementation Structure

The Survey Team will carry out the survey with the Siem Reap Provincial Administration as the main counterpart organization and conduct discussions at the Steering Committee and Working Group to be organized and led by the Provincial Administration.

1.6 Consensus Building in Steering Committees

The Steering Committee has been or will be held as follows to share the results of this survey and build consensus of the outputs. The table below shows the schedule of Steering Committee.

Table B: Steering Committees

	Date	Venue	Subject
1st	March 2nd 2020	On-site	• Outline of the project
2nd	October 16th 2020	Online	• Current conditions, issues, and the smart city roadmap

	Date	Venue	Subject
3rd	February 16th 2021	Online / On-site (hybrid)	<ul style="list-style-type: none"> The smart city roadmap and pilot projects
4th	August 30th 2021	Online	<ul style="list-style-type: none"> Results of the business contest The COVID-19 recovery roadmap
5th	November 10th 2021	Online / On-site (hybrid)	<ul style="list-style-type: none"> The smart city roadmap and its administrative approach
6th	December 27th 2021	Online / On-site (hybrid)	<ul style="list-style-type: none"> PoC implementation report Final approval on the smart city roadmap

Source: JICA Survey Team

Chapter 2 Current Condition and Issues

2.1 Issues related to General Administrative Operation

Referring to the current situation of general administrative operation in Siem Reap, issues related to this topic are listed as below.

Table C: General Administrative Operation Issues in Siem Reap

Sector	Specific Issues	Generalized Issue
Administrative Organizations	<ul style="list-style-type: none"> Since the current smart city committee does not include APSARA National Authority, DoT, and the provincial police, it is difficult for the committee to deal with multi-sectoral issues, especially those related to tourism. There are no detailed discussions on specific smart city projects yet in the smart city committee. The committee is yet to play its role to drive the smart city projects forward. Officers of Siem Reap Provincial Administration cannot handle works that require technical knowledge. 	1. Needs for administrative organization structures for cross-sectoral collaboration
	<ul style="list-style-type: none"> The Siem Reap Provincial Administration does not have the organizational taskforce to promote smart city related measures. 	2. Needs for a smart city promotion unit
	<ul style="list-style-type: none"> There has not been discussion between private companies and the smart city committee. There are no fundamental basis or the public sector and the private sector to collaborate on multi-sectoral projects or projects in new disciplines. Academic research or academic projects with an active participation from the public sector is seldom seen in Siem Reap. 	3. Needs for an organizational basis for multi-stakeholder collaboration
Legal Systems and Business Support	<ul style="list-style-type: none"> Although there are various law to refer and legal procedures to follow in terms of business operation, information regarding these are not collected. This makes private business to hesitate its business launch in Siem Reap. procedures for launching multi-sectoral business or businesses in new disciplines are not clear, making private businesses to hesitate its business launch in Siem Reap. 	4. Needs to clarify and ease the complex legal procedures
	<ul style="list-style-type: none"> There has not been discussion between private companies and the smart city committee. The public sector has not been successful in inviting public initiatives to provide public services as part of private companies' business. 	5. Needs for active promotion of private smart city business
Data Management	<ul style="list-style-type: none"> Lack of software (such as GIS) Insufficient infrastructure for data storing and sharing (such as the construction of data centers) 	6. Needs for improvement of hardware and ICT circumstances
	<ul style="list-style-type: none"> Data is not stored in formats that is easily utilized in individual departments. Due to lack of experience, capacity of individual governmental officers to appropriately deal with data is not enough. 	7. Needs for multi-sectoral data sharing and utilizing
	<ul style="list-style-type: none"> Decision making process of information disclosure is redundant, leading to slow information disclosure. 	8. Needs for open data system, data security, and regulations

Source: JICA Survey Team

2.2 Issues related to Target Sectors

Referring to the current situation of target sectors in Siem Reap, issues related to this topic are listed below.

Table D: Issues of the Target Sectors in Siem Reap

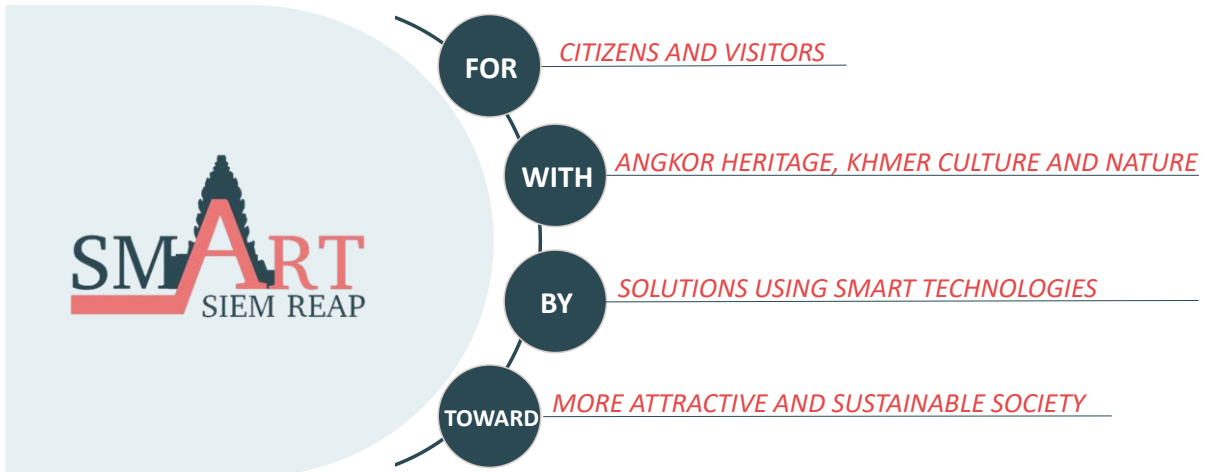
Sector	Specific Issues	Generalized Issue
Tourism	<ul style="list-style-type: none"> • Although AAP has been visited by huge number of visitors both international and domestic, other resources remain unknown or even undiscovered. This strong but limited image results to one time visit to the site. • Tourist information is not centralized, making it difficult for individuals to consider combinations of tourist services that suit their preferences. As a result, the city has not become an attractive tourist destination for individual tourists. • Failure to capture demand from non-tourist visitors, such as MICE. 	9. Needs to strengthen promotion as a tourist city
	<ul style="list-style-type: none"> • Mobility available to tourists are limited to tourism buses, Tuk Tuk, and rental cars. In particular, there is lack of short-distance mobility, which undermines the convenience of tourist behavior. • Since information of various transportation is not centralized, tourists are not able to compare and select multiple transportation on-site. It is not possible to optimize the choice of transportation for individual tourists according to the situation. • In many cases, only cash payment is accepted. It is not convenient for purchasing. 	10. Needs to improve the convenience of tourist behavior
	<ul style="list-style-type: none"> • In heritage area, additional information (history, etc.) to improve the attractiveness is not visually provided. • Tourism services with added value (educational aspects of tourism services, community-based tourism, etc.) have not been sufficiently developed. • Although some parts of the city, such as the streetscape of Pub Street, have potential as tourist attractions, they are not fully utilized. 	11. Needs to improve the attractiveness of local experiences at tourist attractions
Mobility	<ul style="list-style-type: none"> • Traffic congestion has been caused and the risk of traffic accident has been increased by inappropriate traffic signals and intersection configuration • Comfortability and safety of pedestrians has been impaired by on-street parking on sidewalks and roadside 	12. Needs for comfort against traffic congestion and on-street parking
	<ul style="list-style-type: none"> • Road maintenance plan is existing but the budget for the maintenance is not enough • Road maintenance system considering Life Cycle Cost is not practiced because adequate road management system is not introduced 	13. Needs for optimized road maintenance
	<ul style="list-style-type: none"> • A lot of gas emission from old vehicles has caused air pollution and decreased comfortability of tourists and QOL of residents 	14. Needs for clean air and environmental-friendly mobility
Security	<ul style="list-style-type: none"> • Crime rate is relatively low (compared to Phnom Penh), but international tourists are recommended to take sensible precautions against crime. • Upgrade of crime prevention and crime detection is needed. • <u>Upgrade of prevention and detection of dangerous driving is needed.</u> 	15. Needs for more safety against risks of traffic accidents and crimes
	<ul style="list-style-type: none"> • Facilities and systems for early fire detection and initial fire extinguishing by local residents and workers prior the firefighting by the public sector is needed. • Upgrade of warning system to citizens and tourists is needed. 	16. Needs for more safety against disasters (fire, flood, etc.)
Waste	<ul style="list-style-type: none"> • Citizens' and tourists' behavior towards garbage disposal and wastewater is damaging the environment. [Solid waste, Sewage] 	17. Needs for enlightenment towards environmentally friendly actions
	<ul style="list-style-type: none"> • Responsible demarcation among related organizations is unclear. As a result, private companies' waste management operation (including basic data, such as collected garbage amount and number of contracted households) is not fully monitored by the public sector. [Solid waste] • The capacity of the public sector to manage and control waste management operation is lacking. [Solid waste] • The toll collection system is not efficiently established, and the operation is not sustainable. [Solid waste, Sewage] 	18. Needs for enforcement of the public initiative
	<ul style="list-style-type: none"> • The environment of the landfill is unsanitary. [Solid waste] • The capacity of the wastewater treatment plant is not enough for future wastewater. [Sewage] 	19. Needs for engineering of infrastructure

Source: JICA Survey Team

Chapter 3 Roadmap for Smart City

3.1 The Smart City Vision and Roadmap

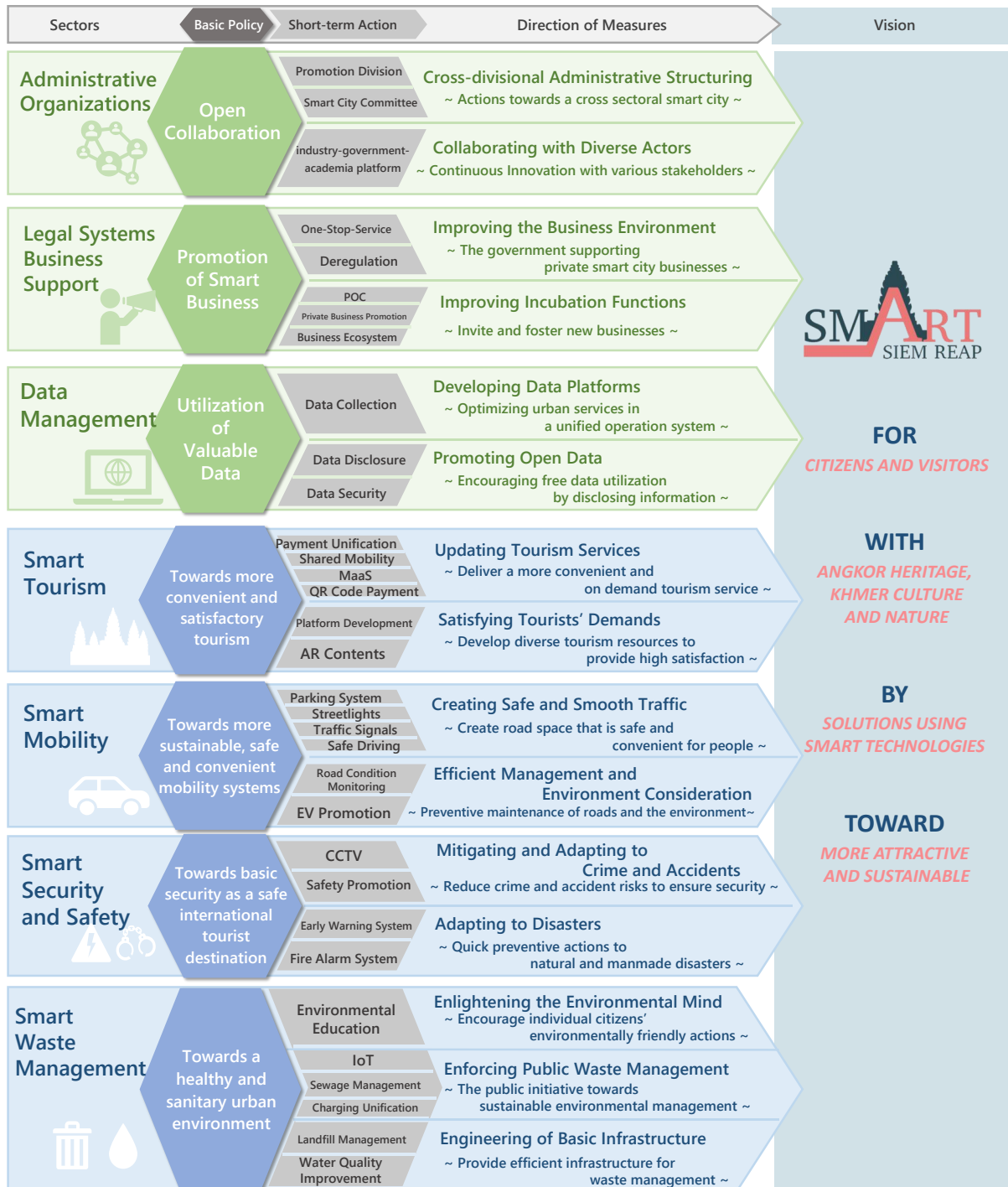
With 2035 as the target year, the vision "SIEM REAP SMART" is set up for the realization of Siem Reap's smart city.



Source: JICA Survey Team

Figure A: The Vision for SIEM REAP SMART

The next page shows the overall roadmap to realize the vision and concept of SIEM REAP SMART.



Source: JICA Survey Team

Figure B: The Overall Roadmap for SIEM REAM SMART

3.2 Development Programs

3.2.1 Development Programs in the Administrative Approach

In the “administrative organizations” sector, the goal is to create an organizational structure that facilitates interaction across public, private, and the academic sector, as well as information sharing and collaboration across sectoral departments within the public sector. At the same time, in order to strengthen the administrative organizational structure to facilitate information sharing and coordination across sectoral departments, the enhancement of the cross-departmental Smart City Committee and the establishment of a promotion division to play a central role in the committee are required. In the “legal

systems and business support” sector, the public sector shall promote business support for the private sector in order to promote and support the creation of new smart businesses and smart industries related to smart technologies and solutions.

Table E: Short term Actions in “Administrative Organizations” and “Legal Systems and Business Support”

Actions	Overview
Enhancement and Operation of the Smart City Committee	Adding new members in the existing Smart City Committee and launching actual activities of the committee
Establishment of the Smart City Promotion Division	Newly establishment of a division inside the Siem Reap Provincial Administration to promote smart city related activities.
Establishment of the Industry- Academia- Government - Community Platform	Establishment and operation of a platform including private companies, universities and research institutes, civic organizations, and public agencies to work together to implement the smart city roadmap.
Business Environment Improvement	Discuss on improvement of rules in the field of business approval, data management, etc.
Incubation Function Improvement	Trigger emergent ideas from the private sector, which would be difficult for the public sector to come up with on its own, and attract projects that have the prospect of securing sustainable profitability from the perspective of the private sector.

Source: JICA Survey Team

3.2.2 Development Programs in the Sectoral Approach

(1) Smart Tourism

In the tourism development programs, six project groups were set up. First of all, “Tourism Promotion Platform Development (T-01)” will be carried out to effectively and widely disseminate the attractions of Siem Reap, and “Centralized Reservation and Payment System (T-02)” will be proposed to enable reservation and payment for each tourism content on a centralized platform. Furthermore, we will propose “Shared Mobility Development (T-03)” and “MaaS Introduction (T-04)” to enable tourists to choose the most appropriate means of personal transportation in the local area. In the local area, we propose “Contactless Payment Development with QR Codes (T-05)” to promote the convenience of tourists’ purchasing behavior, and “Enhancement of Local Tourism Experience using AR (T-06)” to provide tourists with a more advanced sightseeing experience. It is assumed that each of these projects will be developed separately, but the ultimate goal is to be able to provide tourists with an integrated e-tourism platform from information acquisition to on-site experience.

Table F: Priority Projects of Smart Tourism

Project	Overview
T-01 Tourism Promotion Platform Development	Development of a platform to promote various tourism experiences offered in Siem Reap.
T-02 Centralized Reservation and Payment System	Development and implementation of a system that integrates reservations and payment for various tourism contents
T-03 Shared Mobility Development	Introduction of a shared mobility service (including bike rental service) to make it more convenient for individual tourists.
T-04 MaaS Introduction	Development of MaaS that allows individual tourists to choose the most appropriate transportation method according to personal preferences.
T-05 Contactless Payment Development with QR Codes	Introduction of a contactless electronic payment system to facilitate local payment procedures.
T-06 Enhancement of Local Tourism Experience using AR	Planning and creation of AR content to make the local tourism experience more attractive.

Source: JICA Survey Team

(2) Smart Mobility

In the mobility development programs, six project groups were set up. In addition, two mobility service projects proposed by smart tourism sector are also closely related to this sector. The six project groups can be broadly divided into road management, traffic management, and vehicle management. In road management, we will implement "Official Parking System Introduction (M-01)", "Road Condition Monitoring (M-02)" and "Street Lighting Improvement (M-03)" to improve the comfort and safety of the road environment. In traffic management, "Traffic Signal System Improvement (M-04)" and "Safety Drive Improvement (M-05)" will be implemented to improve traffic comfort by alleviating traffic congestion. In the final vehicle management, "EV Promotion (M-06)" will be implemented to promote the expansion of environment-friendly transportation methods. These projects will contribute to improving the satisfaction of both citizens and tourists.

Table G: Priority Projects of Smart Mobility

Project	Overview
M-01 Official Parking System Introduction	Installation of smart parking system in the City Area.
M-02 Road Condition Monitoring	Introduction of an application for checking road conditions, and use of collected data on road surface damage and evaluation for road maintenance and repair planning
M-03 Street Lightening Improvement	Multi-functionalization of street lightning in target areas through integrated operation with cameras, environmental sensors, parking sensors, etc.
M-04 Traffic signal System Improvement	Procurement, installation, and operation of equipment for traffic signal coordination, signal control, traffic control, and other systems.
M-05 Safety Drive Improvement	Introduction of an application service for understanding driving behavior and disclosure of collected data and implementation of safety training for drivers.
M-06 EV Promotion	Formulate policies to promote the introduction of electronic vehicles and promote the development and introduction of electric Tuk-Tuk and other electric vehicles

Source: JICA Survey Team

(3) Smart Security and Safety

In the safety and security development programs, four project groups were set up. These projects can be broadly divided into three categories: crime prevention, disaster prevention, and information. The crime prevention system is "CCTV System introduction (S-01)", which aims to ensure safety as a tourist city, improve the degree of security of tourists, and improve the status as a tourism city. The disaster prevention system is "Flood Warning System Enhancement (S-02)" and "Fire Alarm System Installation (S-03)", which aims to ensure safety in the event of an unforeseen situation. The final information system is "Public Relations Improvement (S-04)", which actively publicizes safety information to citizens and tourists in cooperation with security authorities. These projects will contribute to improving the satisfaction of both citizens and tourists.

Table H: Priority Projects of Smart Security and Safety

Project	Overview
S-01 CCTV System Introduction	Centralized management, analysis, and disclosure of CCTV data in integrated system
S-02 Flood Warning System Enhancement	Broad Announcement of disaster warning information to residents and international tourists
S-03 Fire Alarm System Installation	Installation of fire alarms in areas with high risk of fire.
S-04 Public Relations Improvement	Establish a system for centralized collection and management of daily crime and traffic accident information in the state police, and announcement information through the state police and government web pages and tourism apps.

Source: JICA Survey Team

(4) Smart Waste Management

In the smart environment management development programs, six project groups were set up. These projects can be broadly divided into three categories: solid waste management, wastewater management, and management related to infrastructure services in general. In the solid waste management, there are "Solid Waste Management System Improvement (W-01)", "Garbage Collection IoT Installation (W-02)", and "Landfill Management (W-03)". In the wastewater management, there are "Water Quality Improvement System (W-04)" and "Water Facility System Improvement (W-05)". In general management, there is "Public Utilities Charging Unification (W-06)". Although these projects are related to the satisfaction of tourists, they are mainly aimed at contributing to the improvement of living environment and the satisfaction of citizens.

Table I: Priority Projects of Smart Waste Management

Project	Overview
W-01 Solid Waste Management System Improvement	Collecting, disposing, and charging for waste using a waste management system in model districts and reduction of the amount of waste generated in the city through the enhancement of environmental education.
W-02 Garbage Collection IoT Installation	Installation of trash cans with sensors that show the amount of waste for separate waste collection and accumulation and disclosure of collected data on a platform
W-03 Landfill Management	Construction of sanitary landfills that meet environmental standards and conduct appropriate operation and management of landfills
W-04 Water Quality Improvement System	Improving the water quality of Siem Reap River using a monitoring system and improving of the riverfront landscape
W-05 Water Facility System Improvement	Accumulation of data on existing drainage pipes and monitoring drainage capacity and enhancement of sewage lines and treatment facilities through expansion on construction of new sewage treatment plants.
W-06 Public Utilities Charging Unification	Monitoring through the establishment and operation of a centralized collection system of utility charges that integrates water, wastewater, and waste utilities.

Source: JICA Survey Team

Chapter 4 Survey Activities and Pilot Project

4.1 Business Contest and the Selection of the Pilot Project

The business contest was held to award business ideas using smart technologies and solutions that contribute to the realization of smart city of Siem Reap and the solution of urban problems.

Table J: The Business Contest Implementation Guidelines

Organizer	Siem Reap Provincial Administration, JICA Survey Team
Invited Contents	Business ideas using smart technologies and solutions that contribute to the realization of smart city of Siem Reap and the solution of urban problems
Type and Number of Awards	Project awards: Business ideas that match the above recruitment PoC Awards: Among them, business ideas for which pilot project (PoC) implementation is preferable
Measure of Selection	Judgement by the Working Group and JICA Survey Team Approval of results at the 4 th Steering Committee
Schedule	February 2021: Start inviting applications End of March 2021: End of application From April to June 2021: Evaluation August 2021: Approval of evaluation results (at the 4th Steering Committee) From November to December 2021: Implementation of the PoC

Source: JICA Survey Team

A total of 13 business ideas will be proposed, and 2 projects were awarded for both the project award and the PoC award.

Table K: Awarded Business Ideas

No.	Sector	Team Name	Outline	Remarks
3	Mobility	Japan Parking Technology (JPT)	Smart parking system	Wins the seed money for PoC as first prize
6	Mobility	Asian Gateway	Smart scooter sharing service	Conducts PoC without monetary incentives as runners up

Source: JICA Survey Team

4.2 Seminars

Seminars have been held to inform private companies of urban issues in Siem Reap and the concept of smart cities.

Table L: List of Seminars

	Date	Venue	Type	Material
Period 1	February 10th, 2021	Phnom Penh	On-site/ Online (hybrid)	1. Introduction of urban issues and the smart city roadmap 2. The Business Contest
Period 2	November 24th, 2021	Tokyo	Online	3. Introduction of urban issues and the smart city roadmap 4. Results of the Business Contest
	November 29th, 2021	Siem Reap	Online	

Source: JICA Survey Team

4.3 Pilot Project (Smart Parking)

4.3.1 Outline of the Business Idea

According to JPT, this business aims to reduce illegal parking and mitigate traffic congestion by installing on-street smart parking system using smart technologies such as surveillance cameras and communication technology in the center of Siem Reap City. This business also contributes to produce safe, secure attractive area and sustainable job opportunities. The smart parking system will be built up to one-smart system by utilizing the existing smart devices and know-how. The main smart technologies applied are surveillance cameras, handy terminals, fare adjustment machine and communication network.

4.3.2 Outline of the Pilot Project

The PoC will conduct a pilot project on the parking operation and maintenance methods (surveillance cameras, operations maintenance methods, cleaning activities by parking staffs) that are part of the smart parking system. Through the implementation of the PoC, the Siem Reap Provincial Administration is expected to deepen its awareness of the merits of the operation and maintenance method of the smart parking system. The parking users and local shoppers are also expected to understand the merit of on-street public parking. Specifically, the PoC checks the following items.

- Confirmation of surveillance camera performance
- Acquisition of teacher data required for car plate number recognition AI system
- Confirmation of the business performance of the parking manager
- Understanding the acceptability of parking lot users for paid parking lots
- Understanding the acceptability of government agencies, traffic police, and local residents for the development of street parking lots

The target area of the PoC is on 2 Thnou Street, from the intersection with Sivutha Street to the main entrance of Siem Reap Provincial Referral Hospital.

4.3.3 Implementation of the Pilot Project

The overall flow of preparation and implementation of the PoC is as follows.

Table M: Overall Flow of Preparation and Implementation of the PoC

Date	Items	Notes
August 30th	Approval of the business contest results	<ul style="list-style-type: none"> • Approved by the governor in the 4th steering committee
September	Detailed discussion of the PoC plan	<ul style="list-style-type: none"> • Discussion and revision with JPT and JICA survey team
October 13th	PoC working group	<ul style="list-style-type: none"> • Presentation of the PoC plan from JPT
October 21st	1st site inspection and meetings	<ul style="list-style-type: none"> • Site inspection with Siem Reap Provincial Administration and relative provincial departments • Individual meetings with Siem Reap Provincial Administration and relative provincial departments
November 22nd - 25th	2nd site inspection and meetings	<ul style="list-style-type: none"> • Site inspection with Siem Reap Provincial Administration and relative provincial departments • Individual meetings with Siem Reap Provincial Administration and relative provincial departments • Negotiation with surrounding business operators
November 26th - 27th	Construction	<ul style="list-style-type: none"> • Installation of cameras and marking for the car parking lots
November 28th - December 4th	Implementation	<ul style="list-style-type: none"> • Management of the parking space by JPT

Source: JICA Survey Team

4.3.4 Results

As for the number of cars using the parking space per day, 243 vehicles were used in total over the seven days, an average of 34.7 vehicles per day. The average parking time was 2 hours and 16 minutes. Since there were 17 parking squares, the average turnover rate was 2.04.

As for the distribution of parking time, 31% parked for less than 30 minutes, 15% parked for 30 minutes to 1 hour, and 46% parked for a relatively short time. On the other hand, 12% of the vehicles parked for more than 5 hours were the vehicles of the owners and employees of the stores along the road.

A questionnaire survey of parking facility users was conducted to understand their intentions regarding parking management systems. Parking lot users were generally positive about the introduction of surveillance cameras, management by parking supervisors, and paid street parking. The parking fees considered reasonable were 2000 KHR/hour (35%) and 1000 KHR/hour (47%).

The same questionnaire was also conducted to 8 shops along the road. 6 shops agreed on the introduction of surveillance cameras, but 7 stores disagreed on the introduction of parking by a parking manager or toll parking, and all stores denied setting a fee of 2,000 KHR/hour.

Chapter 5 Conclusion

The purpose of this study, “Data Collection Survey on Urban Improvement in Siem Reap City in the Kingdom of Cambodia” is to review the existing plans for urban development in Siem Reap City, identify the current situation, analyze and sort out the problems, and study the solutions to these urban issues, including advanced methods and technologies symbolized by smart cities. The study started in February 2020 and was scheduled to be completed in January 2021 according to the original contract, but due to the interruption of about three months caused by COVID-19, it ended up taking about two years until February 2022. This study consisted of five main tasks: “Reviewing”, “Envisioning”, “Planning”, “Networking”, and “Action Launching”.

This study was carried out with the Siem Reap Provincial Administration as the main counterpart, and a steering committee chaired by the provincial governor was formed as the decision-making body to build consensus. The steering committee held a kick-off meeting in March 2020, and the 6th and final meeting was held in December 2021. The committee reached a basic agreement on the proposed roadmap and reported the results of the project launch (pilot project). An additional contract was agreed in October 2020 to conduct the COVID-19 impact assessment survey and propose a roadmap for recovery in response to the severe impact of COVID-19 in Siem Reap.

JICA is planning to start a technical cooperation project “Project for Implementation of the Smart City Approach to Solve Urban Issues in Siem Reap ” from March 2022, where the finalization of the roadmap and the launch of activities with the goal of “Implementing a smart city approach to solve urban issues in Siem Reap” is expected. From now on, it is important that the provincial administration, with the cooperation of the JICA project team, takes ownership of the implementation of the roadmap, and that the system, infrastructure, and mechanisms are in place.

<Main Part>

Chapter 1 Introduction

1.1 Background

Since it recorded an annual gross domestic production (hereinafter referred to as GDP) growth of 7.3% in 2012, the Kingdom of Cambodia's economy has been steadily growing at an annual rate of 7%, and was listed under "Low and Middle Income Countries" in July 2016. With the strong trend of private investment, the nation is working on a higher level of infrastructure development and human resource development of the next generation, to become a member of the "Upper Middle Income Countries" by 2030. However, the economic structure is still vulnerable, and hence the income inequity between urban and rural areas is increasing, disordered urban development is often seen, and environment issues related to groundwater, solid waste, and air pollution are becoming more serious.

Siem Reap City, being the capital city of Siem Reap Province, is a city with the famous Angkor World Heritage Site, and regional development based on the tourism industry is needed. Compared to its population of 245,494 people (as of 2019), the number of tourists was 2.8 million per year as of 2011, 4.26 million as of 2019, and although the number of tourists decreased in 2020 due to the Coronavirus Disease 2019 (hereinafter referred to as COVID-19), it is expected to recover and increase in the near future. Mainly due to the rapid increase of tourists, urban problems such as the increase of vehicles, environmental issues related to solid waste and sewerage, traffic jams, and the increase of crime are becoming apparent. Since reactions to the increase of tourists, such as infrastructure development and improvement of tourism services, are not enough, from the point of view of heritage conservation and environmental preservation, there are urgent needs of sustainable development of tourism resources inside the World Heritage Area and inside the province, and the improvement of the quality of life (hereinafter referred to as QoL) of citizens. Also, new tourism services for the post COVID-19 era are also in need.

The Japan International Cooperation Agency (hereinafter referred to as JICA) conducted "The Study on Integrated Master Plan for Sustainable Development of Siem Reap / Angkor Town in the Kingdom of Cambodia" in 2006, that formulated a masterplan that consists of visions of Siem Reap targeting 2020 and strategies to realize the visions. However, due to the increased urbanization, rapid change in socio-economic conditions, advance of technology, increase of private investment, and COVID-19, the environment that surrounds Siem Reap has been drastically changing. When attempting to solve the urban problems in Siem Reap City, guiding sustainable urban development, industrial promotion and improvement of the QoL and tourist satisfaction by taking into account of the change of conditions and introducing high-tech solutions need to be considered.

In this trend, the leaders of the Association of Southeast Asian Nations (hereinafter referred to as ASEAN) established the ASEAN Smart Cities Network (hereinafter referred to as ASCN) in 2018. It aims to improve QoL of citizens and create new business opportunities by solving urban problems through cooperation among ASEAN cities and exploitation of advanced technology. In Cambodia, Phnom Penh, Battambang, and Siem Reap were chosen as pilot cities. Especially from the Siem Reap Provincial Administration, the solution of urban problems through advanced smart technologies is strongly requested.

1.2 Objectives

Under abovementioned situation, the objectives of the "Data Collection Survey on Urban Improvement in Siem Reap City" are to collect information on urban issues in Siem Reap City, to propose a roadmap for smart city in Siem Reap, and to launch pilot actions of the roadmap including business contests and pilot projects.

1.3 Contents of Survey

The contents of this survey are as follows. The survey was conducted on the five main items of reviewing, envisioning, planning, action launching, and networking. In this survey, in consideration of the impact of COVID-19, additional surveys to assess the impact of COVID-19 and propose a roadmap for the recovery from the negative impacts of COVID-19.

Table 1.1: Contents of the Survey

Survey Contents		Corresponding Chapter
Reviewing	1. Understanding upper-level / related plans, etc.	Chapter 2 Current Condition and Issues
	2. Understanding the legal framework (organization, laws, rules, procedures)	
	3. Understanding the current status and issues of the target sectors (Tourism / Mobility / Security / Waste)	
	4. Understanding the urban issues	
Envisioning	5. Proposal of the smart city vision	Chapter 3 Roadmap for Smart City
Planning	6. Proposal of basic policies	
	7. Proposal of development programs (including priority projects)	
Networking	8. Consensus building and interviewing	Chapter 4 Survey Activities and the Implementation of the Pilot Project
	9. Conducting a business contest	
	10. Holding seminars	
Action Launching	11. Selecting pilot projects	
	12. Conducting pilot projects (PoC)	

Source : JICA Survey Team

1.4 Main Target Sectors

Referring to the interest of the Siem Reap Provincial Administration, the main target sectors of this survey are set as “tourism”, “mobility”, “waste”, and “security and safety” (Figure 1.1).

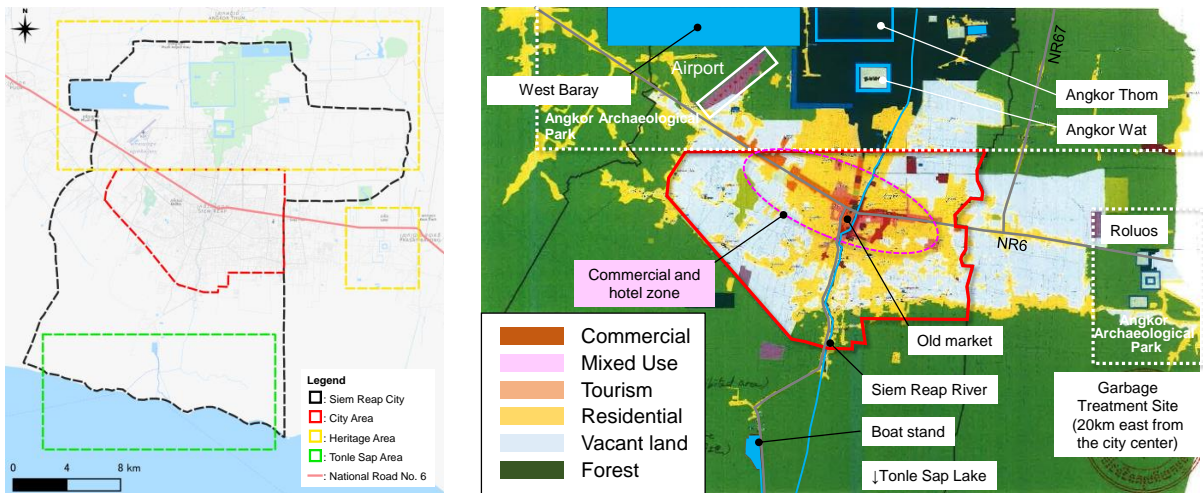


Source: JICA Survey Team

Figure 1.1: Main Target Sectors

1.5 Target Area

Referring to the concerns addressed from the Siem Reap Provincial Administration, the survey area mainly covers the city center of Siem Reap City (hereinafter referred to as City Area), in addition to the Angkor archaeological area (hereinafter referred to as Heritage Area), and the boat stand area of Lake Tonle Sap (hereinafter referred to as Tonle Sap Area). The city center in this survey is set as the City Area demarcated in the “Land Use Master Plan of Siem Reap City 2035 Vision”, which was drafted by the Ministry of Land Management, Urban Planning and Construction (hereinafter referred to as MLMUPC) in 2018 (Figure 1.2).

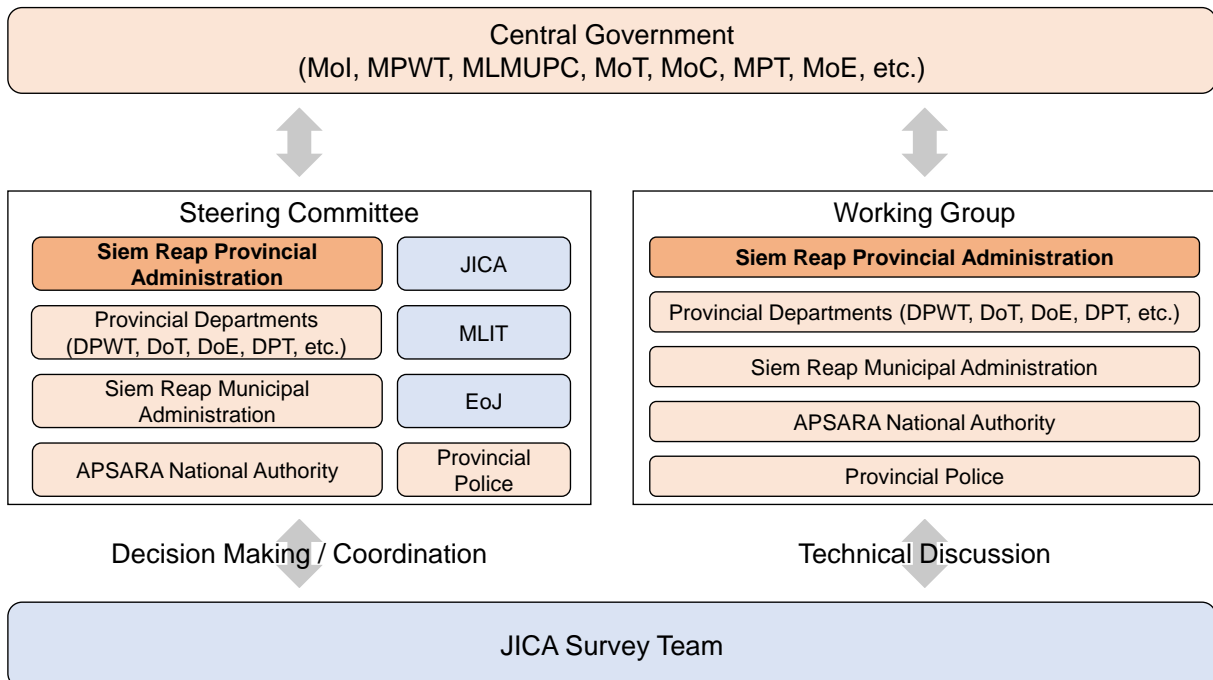


Source: JICA Survey Team based on the “Land Use Master Plan of Siem Reap, 2035 vision”, MLMUPC, 2018

Figure 1.2: Survey Area (left) and Current Land Use in the City Center of Siem Reap (right)

1.6 Survey Implementation Structure

The JICA Survey Team carried out the survey with the Siem Reap Provincial Administration as the main counterpart organization and conducted discussions with the steering committee and working group organized and led by the provincial administration. The survey implementation structure is shown in Figure 1.3, and the results and schedule of steering committees are summarized in section 1.7. Since the Japanese survey team members could not travel to Siem Reap due to the COVID-19 pandemic, local consultants were utilized in this survey. Also, for the working groups, sectoral discussions with individual sectoral departments were conducted besides the overall meeting.



Notes: Orange shows organizations from Cambodia, blue shows organizations from Japan

Source: JICA Survey Team

Figure 1.3: Implementation Structure of the Survey

1.7 Consensus Building in Steering Committees

The Steering Committee was held as follows to share the results of this survey and build consensus of the outputs.

Table 1.2: Steering Committees

	Date	Venue	Subject
1st	March 2nd 2020	On-site	• Outline of the project
2nd	October 16th 2020	Online	• Current conditions, issues, and the smart city roadmap
3rd	February 16th 2021	Online / On-site (hybrid)	• The smart city roadmap and pilot projects
4th	August 30th 2021	Online	• Results of the business contest • The COVID-19 recovery roadmap
5th	November 10th 2021	Online / On-site (hybrid)	• The smart city roadmap and its administrative approach
6th	December 27th 2021	Online / On-site (hybrid)	• PoC implementation report • Final approval on the smart city roadmap

Source: JICA Survey Team

1.8 Deliverables

The table below shows the deliverables of the survey. This report is the Final Report which was delivered in January 2022.

Table 1.3: Deliverables of the Survey

Name of Report	Submission Period	Language
Inception Report	Within 10 days after conclusion of contract	English and Khmer
Interim Report	August 2020	Japanese, English and Khmer
COVID-19 Impact Assessment Survey Quick Report	November 2020	English and Khmer
Interim Report 2	December 2020	Japanese, English and Khmer
COVID-19 Impact Assessment Survey Full Report	February 2021	English and Khmer
Interim Report 3	June 2021	Japanese, English and Khmer
Draft Final Report	December 2021	Japanese, English and Khmer
Final Report	January 2022	Japanese, English and Khmer

Source: JICA Survey Team

Chapter 2 Current Situations and Issues

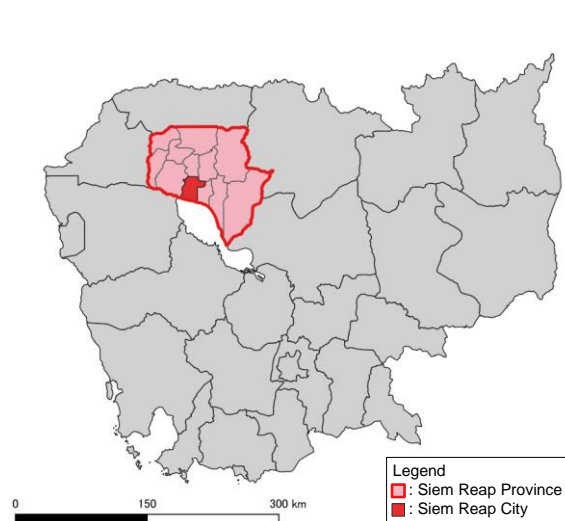
The Kingdom of Cambodia is a country located in the southern portion of the Indochina peninsula. It is 181,035 km² in area, bordered by Thailand to the northwest, Laos to the northeast, Vietnam to the east and the Gulf of Thailand to the southwest. Its capital city, Phnom Penh, is located in the southern part of the nation, while Siem Reap is located in the north part. The total population is 15,552,211¹, and its official language is Khmer. While per capita income remains low compared to most neighboring countries, Cambodia has one of the fastest growing economies in Asia, with growth recording above 7% since 2011 to 2018. The primary industry remains the dominant economic sector, with strong growth in textiles, construction, garments, and tourism leading to increased foreign investment and international trade. The United Nations designates Cambodia as “Low and Middle Income Countries”.

Siem Reap City is the capital city of Siem Reap Province, located in the northwest part of Cambodia, on the north periphery of Tonle Sap Lake. Its population was 245,494 as of 2019² and is expected to rise to 400,099 by 2035³. The city is famous for the Angkor Archaeological Park (hereinafter referred to as AAP), which was designated as World Cultural Heritage by the United Nations Educational, Scientific and Cultural Organization (hereinafter referred to as UNESCO) in 1992. It currently attracts 4,262,306 tourists per year and the number is expected to increase up to 11,352,590 people per year by 2035⁴. The target areas for this survey are all included in Siem Reap City.

Table 2.1: Basic Information of Siem Reap Province and Siem Reap City

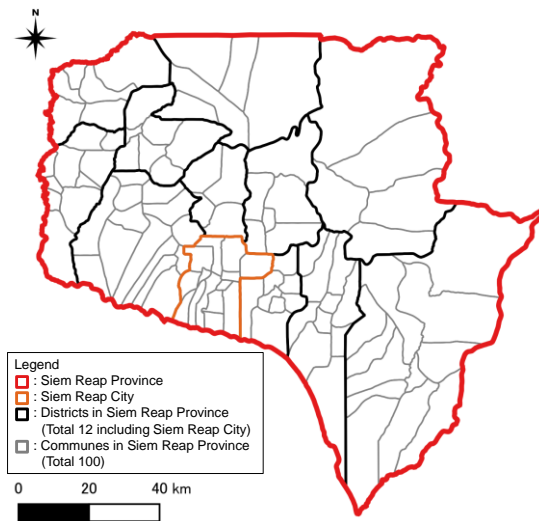
	Area	Population	Population Density
Siem Reap Province	10,229 km ²	994,540	97.2 people/km ²
Siem Reap City	424.7 km ²	245,494	578.0 people/km ²

Source: JICA Survey Team, based on General Population Census of the Kingdom of Cambodia 2019, ASCN documents, CDC documents



Source: JICA Survey Team

Figure 2.1: Location of Siem Reap



Source: JICA Survey Team

Figure 2.2: Districts and Communes in Siem Reap Province

¹ General Population Census of the Kingdom of Cambodia 2019

² General Population Census of the Kingdom of Cambodia 2019

³ Land Use Master Plan of Siem Reap City 2035

⁴ Tourism Development Master Plan Siem Reap (2021-2035)

2.1 Relevant Plans and Activities of International Organizations

2.1.1 Upper and Relevant Plans

(1) Overall Relevant Plans

Relevant plans related to urban environment improvement are categorized into spatial planning, socio-economic planning and other sectors, including national, regional/ provincial, municipal/ district, and commune/sangkat levels (see Among them, 1) Cambodia Industrial Development Policy, 2) 3-Year Rolling Public Investment Program 2020-2022, 3) Municipal Land Use Plan are reviewed as basis for urban planning and development including strategies and action plans. Sectoral plans such as “Master Plan of Tourism Development in Siem Reap Province” and “Green Urban Transport & Road Network Improvement Master Plan in Siem Reap” are reviewed in “2.5 Current Condition and Issues of Target Sectors in Siem Reap” of this report.

Table 2.2).

Among them, 1) Cambodia Industrial Development Policy, 2) 3-Year Rolling Public Investment Program 2020-2022, 3) Municipal Land Use Plan are reviewed as basis for urban planning and development including strategies and action plans. Sectoral plans such as “Master Plan of Tourism Development in Siem Reap Province” and “Green Urban Transport & Road Network Improvement Master Plan in Siem Reap” are reviewed in “2.5 Current Condition and Issues of Target Sectors in Siem Reap” of this report.

Table 2.2: Overall Relevant Plans

Plan Level (Organization)	Spatial Planning (MLMUPC)	Socio-economic Development Planning (MoP)
National (government level)	<ul style="list-style-type: none"> • Rectangular Strategy • Cambodia Industrial Development Policy 	<ul style="list-style-type: none"> • Cambodia Industrial Development Policy
National (ministry level)	<ul style="list-style-type: none"> • National Spatial Planning 	<ul style="list-style-type: none"> • National Strategic Development Plan
Regional/ Provincial	<ul style="list-style-type: none"> • Regional Spatial Planning • Provincial Spatial Plan 	<ul style="list-style-type: none"> • 5 years development plan • 3-Year Rolling Public Investment Program 2020-2022 • 1 year development plan
Municipal/ District	<ul style="list-style-type: none"> • Land Use Master Plan of Siem Reap City 2035 	<ul style="list-style-type: none"> • 5 years development plan • 3 years rolling plan • 1 year development plan
Commune/ Sangkat	<ul style="list-style-type: none"> • Commune/ Sangkat Land Use Planning 	<ul style="list-style-type: none"> • 5 years development plan • 3 years rolling plan • 1 year development plan

Source: JICA Survey Team

(2) Cambodia Industrial Development Policy 2015-2025 [National Level]

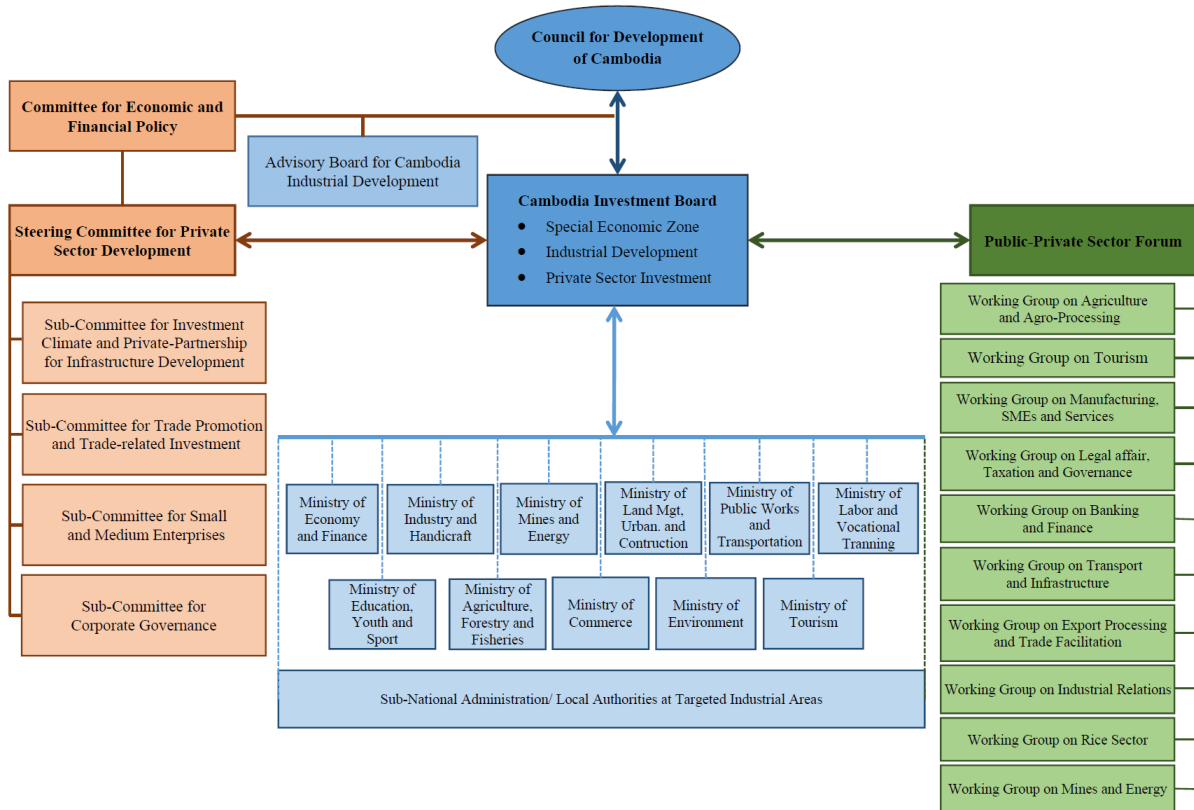
The Cambodia Industrial Development Policy (hereinafter referred to as IDP) 2015-2025 was approved by the Council of Ministries in 2015. Among the six scopes of IDP, the following scopes are related to industrial development in Siem Reap:

- Reorienting the development of industrial zones and industrial corridors including Siem Reap for handicraft production to support the tourism sector
- Focusing on providing support to social enterprises that promote development of cultural heritage, etc.
- Supporting knowledge and modern technology-based industries

Among the priority sectors are various types of supporting industries for the agriculture, tourism, and textile sectors as well as for industries serving regional production chains linked with either global markets or global value chains.

One of the action plans is to continue expanding and maintaining major road networks that service the transport of goods such as widening the national roads to improve connection to Thailand and Vietnam, the Phnom Penh–Siem Reap corridor and the Phnom Penh– Sihanoukville corridor, which are mid-long-term plans executed by the Ministry of Public Works and Transport (hereinafter referred to as MPWT) and the Ministry of Economy and Finance (hereinafter referred to as MEF).

In summary, support industries for tourism, knowledge-tech based industries are prioritized in the IDP. Furthermore, the IDP stakeholder system (Figure 2.3) is proposed including private sector development.



Source: Cambodia Industrial Development Policy 2015-2025

Figure 2.3: Diagram of IDP Stakeholders System

(3) 3-year Rolling Public Investment Program 2020-2022 [National Level]

(4) 3-year Rolling Public Investment Program 2020-2022 [National Level]

The action plans in the 3-year rolling Public Investment Program (hereinafter referred to as PIP) 2020-2022 was approved by the Council of Ministries in 2019. In the 3-year PIP, conservation-related (monuments outside Angkor Park), water-related (water supply and resource, river improvement), and transport-related (railway, new airport) actions are prioritized.

Table 2.3: Plans related to Siem Reap mentioned in the 3-Years PIP

Action Plans	Status and Budget	Organization
Conservation and Enhancement of Monuments Located Outside Angkor Park of Siem Reap Province	Planned, USD 2,200,000	Ministry of Culture and Fine Arts
Water Supply Extension Project	JICA, ongoing, USD 93,200,000	Ministry of Industry and Handicrafts
Improvement of Siem Reap River Phase II	The Royal Government of Cambodia/ Republic of Korea, USD 20,300,000	MPWT
Construction of Railway (Sri Sophorn-Siem Reap-Phnom Penh, length 430 km)	Planned, USD 2,000,000,000	MPWT

Action Plans	Status and Budget	Organization
Steung Chykreng Water Resources Development (Phase 2) in Siem Reap	Unknown	MPWT
Steung Siem Reap Irrigation System Development to Flood Protection	Unknown	MPWT
Establishment of New International Siem Reap Airport (4C)	Ongoing, USD 900,000,000	State Secretariat of Civil Aviation

Source: Action Plans in 3-year Rolling Public Investment Program 2020-2022

(5) Land Use Master Plan of Siem Reap City 2035 [Subnational Level]

The Land Use Master Plan of Siem Reap City 2035 Vision has been drafted, but not approved yet. The Land Use Master Plan includes vision, objectives, goals, development and preservation strategies, financial resources, and strategies by sector (Table 2.4).

Table 2.4: Land Use Master Plan of Siem Reap City 2035

Vision	<p>“Siem Reap City into the pole of heritage, culture, history and world’s tourism” through:</p> <ul style="list-style-type: none"> • Promoting the protection and conservation of heritage, culture, history, and nature, • Diversifying businesses, services, and tourism products with quality, through which tourists feel close to the history, Khmer culture and nature, • Transforming it into an international heritage city with good environment and a lot of municipal infrastructures and services and a population density that allows for maintaining the cultural, historical and natural heritages.
Objectives	The objective of the Land Use Master Plan of Siem Reap City is to ensure the effective management and governance of Siem Reap City through integration, development, and conservation with quality, balance, equity, and sustainability.
Development and Preservation Strategies	<ul style="list-style-type: none"> • Strategy for effective and sustainable land management, land use and urbanization • Siem Reap Tourism Development Strategy • Infrastructure, technique and service development strategy • Strategy for agricultural development and local production promotion • Social development strategy • Environmental and natural resource protection strategy • Disaster prevention strategy • Strategy for strengthening local management and finance management
Financial Resource	<ul style="list-style-type: none"> • National budget • Development and investment budget of private sector • Investment budget between the public and private sectors • Budget financed by development partners international cooperation • Budget contributed by the people, community and generous individuals

Source: Land Use Master Plan of Siem Reap City 2035

1) Strategy 1: Siem Reap City Development and Conservation Strategy

44,147 ha of Siem Reap City was designated as follows: 35,995 ha or 81.53% is land where construction is restricted, and 8,152 ha or 18.47% is building land.

Among various strategies and proposed actions, the following actions shall be prioritized by applying smart technologies.

- Digitalization of various maps including land use map and dissemination through websites.
- Monitoring system of development control of construction restricted area (Zone 1, 2, 3) and inventory development of heritage properties.
- Improvement of riverbank of Siem Reap River.

Table 2.5: Land for Construction Restriction and Land for Construction

Category	Land Types
Land where construction is restricted (35,995 ha, 81.53%)	<ul style="list-style-type: none"> • Cultural resort protection zone (Controlled by APSARA National Authority) including Zone 1: Resorts with temples, Zone 2: Ancient object parks to be protected • Natural resource and biodiversity protection zone: Tonle Sap Lake, Zone 3: Tonle Sap Lake’s inundated forest protection zone (10,898 ha)

Category	Land Types
	<ul style="list-style-type: none"> • Natural protection zone: affluent, lake, stream, canal, pond • Agricultural irrigation system • 1,033 ancient site protection zones: 394 ancient temple sites, 79 ancient bridge sites, and 560 ancient dam, hill, and pond sites, and other ancient sites in Siem Reap • Agricultural area
Building land area (8,152 ha, 18.47 %)	<ul style="list-style-type: none"> • Zone 3: protected cultural landscape • Zone 4: areas with significant features of archaeology, anthropology, or history • Zone 5: social, economic, and cultural development zone of Angkor Siem Reap

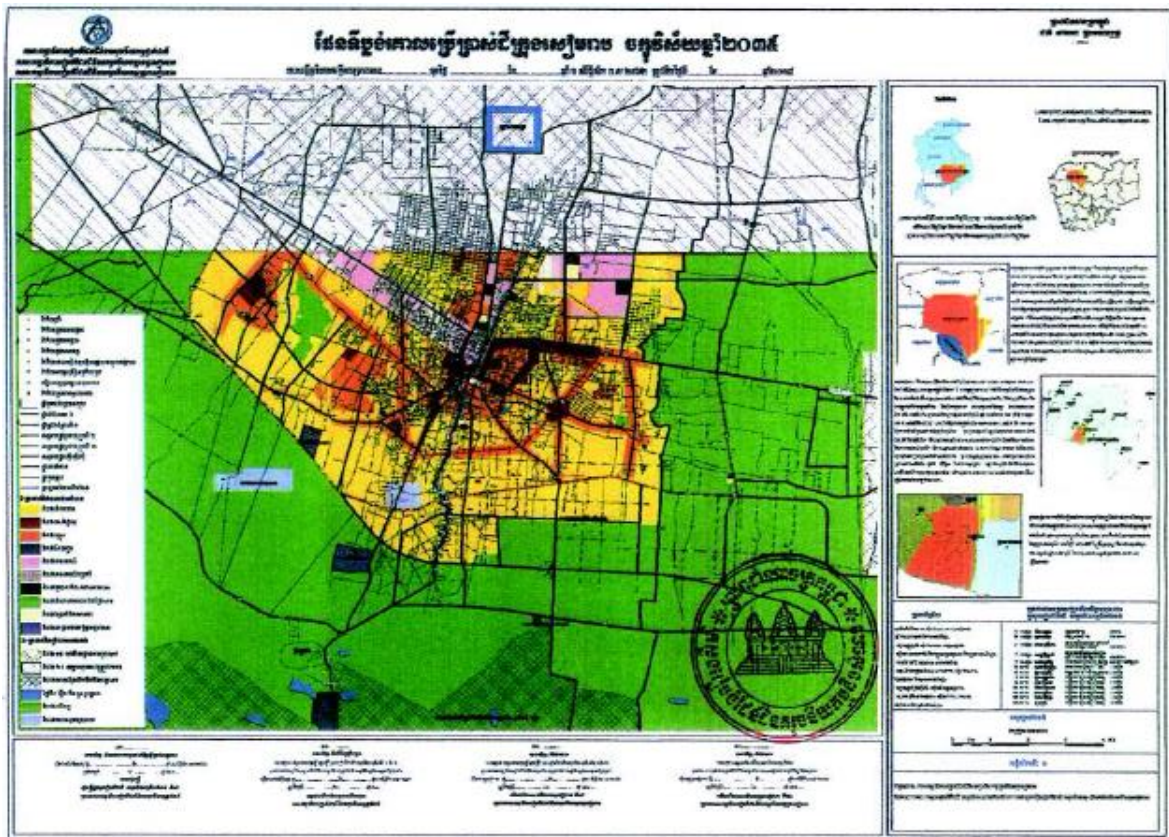
Source: Land Use Master Plan of Siem Reap City 2035 Vision

Table 2.6: Strategies and Actions for Effective and Sustainable Urbanization and Urban Planning

Strategies	Actions
<p>4.1.3 Effective and sustainable urbanization and urban planning</p> <p>A) Current municipal area</p> <ul style="list-style-type: none"> • Promote the demarcation of municipal and sangkat administrative boundaries in accordance with the guideline of the Ministry of Interior; • Improve and restore Siem Reap River, parks on the riverbank, street and lightings to ensure good aesthetics and environment and liveliness during both daytime and nighttime, for the area should deserve to be called “the land of wonderful heritages”; • Renovate and restore National Road No. 6 and the city belt road and sidewalks, determine the tree types, organize parks along the road, lightings, advertisement banners, ensuring aesthetics, public order, and good environment, which deserve to be the gate and main axis of the tourism city; • Improve and develop the boulevards, avenues, sub-avenues, pedestrian-only streets, the entire road network, public open space; determine tree types and plant trees; organize public parks, playgrounds, sport fields, entertainment and green development areas in Siem Reap in accordance with the land use area, ensuring lively aesthetics, good order and healthy environment for all people; • Control the development and conservation of heritage buildings in the city center, night markets, and Phsar Chas (old market), which are the popular entertainment zones of the city, with effectiveness, sustainability, safety, aesthetics, and good order and environment; • Improve and restore infrastructures, including roads, clean water, electricity, the proper and quality collection of solid and liquid waste to improve the living quality and the city aesthetics; • Organize and determine the building style and color and advertisement banners on the streets in each zone to ensure good order and aesthetics in accordance with the geographical location that deserves to be the city of cultural and historical heritage; • Develop a land use plan by setting out the provisions on land use, development, and construction as well as a comprehensive urbanization plan in each area in accordance with the geographical location that deserves to be the city of cultural and historical heritage. <p>B) Urban planning goal</p> <ul style="list-style-type: none"> • The trend of urbanization and urban planning is that it is possible to extend to the east and the south of the current city and must be outside the heritage area and the agricultural land with irrigation system in the west and a proper density must be maintained to deserve to be the city of cultural and historical heritage; • Control the effective and sustainable development and integration of infrastructural development in accordance with the urban planning technical standards and physical development, in particular the roads, drainage system, and treatment plants. Constructions before infrastructural development must be avoided; • Develop the capacity of officials in charge of preparing the development plan and controlling the development, in particular the effectiveness of the provincial and municipal committee for land management and urban planning, with the department of land management, urban planning, construction, and cadastre, and the land management, urban planning, construction and land bureau as executive bodies in the management and implementation of land management and urban planning. 	<p>5.1 Development of urban planning regulations</p> <ul style="list-style-type: none"> • Map for determining the height of municipal buildings and servicing of airplane’s flying height • Map of heritage buildings in Siem Reap City • Map for determining the public spaces, such as rivers, lakes, canals, roads, airport, port, and green space, etc. • Map for prioritizing development areas • Southern and eastern development plan • Western development plan <p>5.2 Dissemination of Land Use Master Plan through websites or social media of Siem Reap Provincial Administration</p> <p>5.3.1 Municipal development plan</p> <ul style="list-style-type: none"> • Improve the aesthetics and infrastructures of the central part of the city. • Build the municipal plan development capacity. • Create an inventory of historical architectures worthy of conservation in Siem Reap City. • Develop residential areas. • Plan and develop cultural areas, tourist attractions, hotels and tourist residence areas, and other tourism entertainment areas.

Strategies	Actions
<p>C) Urbanization area</p> <ul style="list-style-type: none"> Residential area (4,767 ha, 58.48%) Commercial area (305 ha, 3.7%) Mixed area (1,716 ha, 21.05%) Handicraft area Transport area (Phnom Krom Port, parking area, 83 ha, 1.02%) Tourism area (845 ha, 10.60%) Administrative and public service area (74 ha, 0.91%) Public open space and green area (74 ha, 0.91%) Cultural and religious area (42 ha, 0.52%) Technical infrastructure area (105 ha, 1.29%) 	

Source: Land Use Master Plan of Siem Reap City 2035 Vision



Source: Land Use Master Plan of Siem Reap City 2035 Vision

Figure 2.4: Land Use Map

2) Strategy 2: Siem Reap Tourism Development Strategy

Tourism development is the main industry of the province to promote economic development and job opportunities. Not only preserving Angkor Heritage Site, but also developing and improving tourism-related facilities, services, and human resources are required. In addition to the heritage site, Tonle Sap Lake is also a significant tourism resource while the quality of infrastructure and service is not sufficient.

Among various strategies and proposed actions, the following actions shall be prioritized by applying smart technologies.

- Traffic management system and car parking development
- Safety and emergency system
- Digitalization of tourism map and information dissemination

- Tourism infrastructure and network development
- Digitalization of various maps including land use map (see Figure 2.4) and dissemination through websites

Table 2.7: Siem Reap Tourism Development Strategies and Actions

	Strategies	Actions
4.2.1 Heritage and historical tourist attractions	<ul style="list-style-type: none"> • Promote the development of heritage and historical tourist attractions and artificial tourism, in particular on the temple roads and premises. • Promote the effectiveness of temple conservation and protection, the surrounding cultural and ecological landscapes. • Organize traffic order/system, parking lots, traffic signboards, and safety protection system. • Encourage tourism marketing and promotion in cooperation with the private sector companies producing promotion materials and activities both inside and outside the country. • Organize tourism promotion and information centers and a tourism website, which must be linked to the websites of the governmental ministries/institutions, regions and sub-regions. • Promote cooperation with film producers and commercial advertisement companies to organize tourism events in the province. • Promote and attract more direct flights and travel by tourism boats toward Siem Reap Province. • Pay attention to and strengthen safety and emergency systems or means, in particular the training of emergency or first aid specialists and security guards at the resorts, and ensure the availability of rescue kits. 	5.3.2 Tourism development <ul style="list-style-type: none"> • Develop Angkor heritage tourism infrastructures and networks. • Develop night market. • Improve the tourism quality through public-private sector partnership. • Improve the tourism community and enhance ecological and natural tourism. • Develop and promote tourism through potential principles, such as in villages or sangkats. • Train human resources in tourism and grant licenses. • Comprehensively study the tourist reception capacity and resort management.
4.2.2 Cultural tourist attraction and municipal aesthetics	<ul style="list-style-type: none"> • Promote and make it easy for the private sector to establish tourism facilities, such as resorts, hotels, restaurants, tourism entertainment services, business tourism, premises for meetings, incentives, conferences and exhibitions (MICE) and other necessary types of tourism. • Organize and zone the hotels, restaurants, resorts, night markets, and tourist residences. • Renovate and organize the boulevards, avenues, sub-avenues; designate the roads for vehicles, bicycles, pedestrians, and green networks; ensure the aesthetics, cultural offerings, security, order, safety and good environmental quality. • Improve and organize the markets, souvenir shops, tourism service and information centers. • Integrate the tourism development plan into the municipal development plan to ensure sustainable development. • Ensure the public security, order and safety to eliminate theft, snatching, and the loss of visitors' properties at the resorts or tourist residences. • Food safety should also be taken into account through the promotion of sanitation, standard checking system and the prevention of food-borne diseases. 	
4.2.3 Ecological tourist attractions and Tonle Sap Lake	<ul style="list-style-type: none"> • Promote the development of ecological and artificial tourism products on Tonle Sap Lake with care and responsibility. • Establish community network and introduce tourism activities to communities with tourism potential. • Promote the processing and sale of local products to tourists. • Promote the effectiveness of resource conservation and protection of Tonle Sap Lake biodiversity. • Organize the traffic order/system, boat docks, tourism road signboards and safety protection system. 	

Strategies		Actions
	<ul style="list-style-type: none"> Pay attention to and strengthen the safety, emergency systems or means, in particular the training of emergency or first aid specialists and security guards at the resorts and ensure the availability of rescue kits. 	
4.2.4 Entertainment line, tourism products, infrastructures, and services	<ul style="list-style-type: none"> Organizing and establishing tourism lines. Improving and establishing tourism products. Building and improving tourism infrastructure and services. 	
4.2.5 Human resource development	<ul style="list-style-type: none"> Promote capacity building for tourism employees in compliance with tourism standards. Establish a tourism research and development center in Siem Reap Province. Establish a tourism skill training institution in the province. Improve the capacity of Siem Reap Province's public officials in charge of tourism. Stimulate members of the private sector to attend the training at the business locations. 	

Source: Land Use Master Plan of Siem Reap City 2035 Vision

3) Strategy 3: Infrastructure, Technique, and Service Development Strategy

The infrastructures must be promoted and improved to the top level for the tourism, economic, and environmental sectors in Siem Reap City, including: (i) tourism development axis of National Road No. 6 (hereinafter referred to as NR6) connecting Thailand, Siem Reap, and Phnom Penh, (ii) roads, (iii) waterway, (iv) airways, (v) power, electricity, telecommunication, and information technology, (vi) social and cultural infrastructures, and (vii) clean water supply.

Among various strategies and proposed actions, the following actions shall be prioritized by applying smart technologies.

- Traffic management system and car parking development
- Information improvement and sharing of road traffic safety
- Effective road and infrastructure maintenance and management

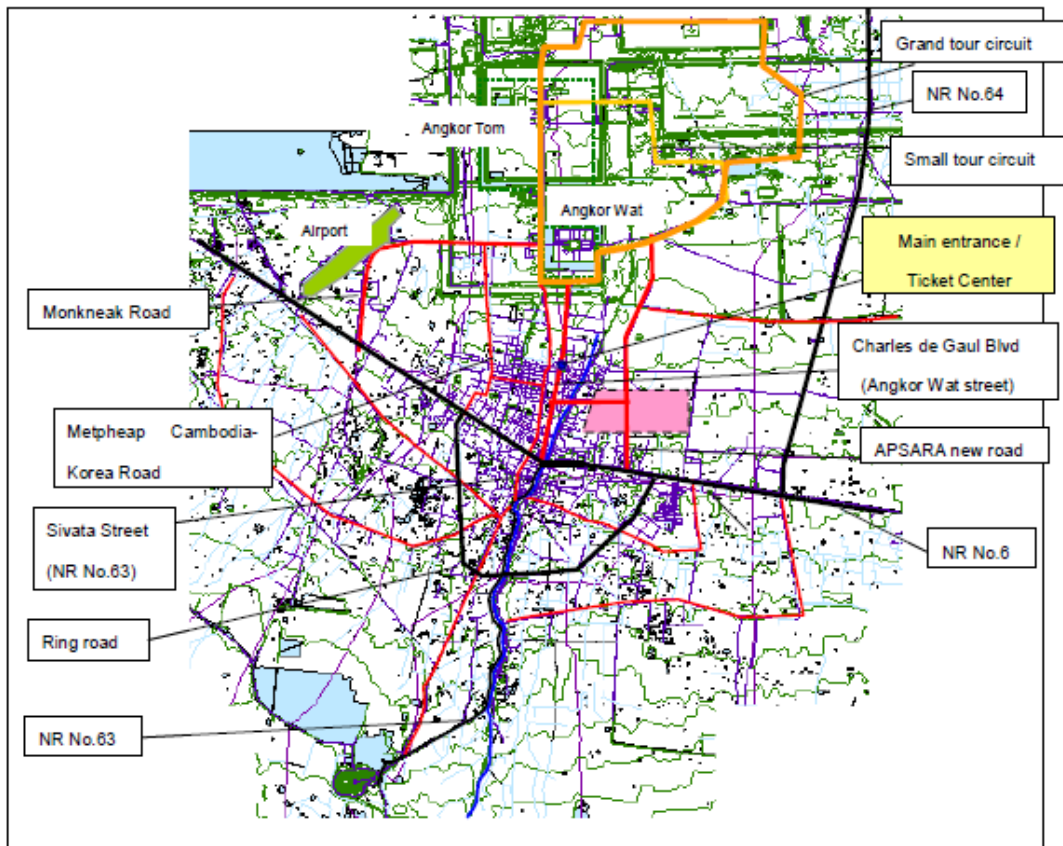
Table 2.8: Infrastructure, Technique and Service Development Strategies and Actions

Strategies		Actions
4.3.1 Tourism development axis	<ul style="list-style-type: none"> Widening of the existing roads' width for trading on national roads connecting Thailand, Siem Reap, and Phnom Penh. Construction of additional roads in between the southern part of the city that will not affect the heritage areas in response to the transport and traffic needs. 	
4.3.2 Roads	<ul style="list-style-type: none"> Organize and improve the trading and tourism roads, designating NR6 as tourism and light traffic road. Organize and improve the 1st and 2nd city belt roads for general transport, in particular the traffic related to Siem Reap City. 	<p>5.3.3 Transport</p> <ul style="list-style-type: none"> Restore old bridges built in the previous regimes and construct additional bridges across Siem Reap River. Construct and renovate city belt roads. Construct a detour in the south of the city. Improve the roads in the municipal area until 2020. Construct roads in the municipal areas until 2025.

Strategies		Actions
	<ul style="list-style-type: none"> • Build and improve the 3rd city belt road connecting the roads between the cities, connecting NR6 other than Puok District town, passing Siem Reap City in the south to NR6 other than Prasat Bakong district town which is a road for transportation, trading, and tourism. • Build and improve the quality and aesthetics of the road along Siem Reap River in accordance with the green development principle and to become an ecological tourism area. • Organize and improve the public road parking areas to meet the global heritage city standard. • Build and improve the bridges, public parking areas, city belt road system, roads in the city and heritage areas. • Improve and share information about road traffic safety. 	<ul style="list-style-type: none"> • Construct roads in the municipal areas until 2035. • Promote relevant institutions and the road safety campaign. • Restore and repair the road toward the rural heritage area. • Repair public transportation means that do not pollute the environment in Angkor Resort. • Improve institutional capacity to effectively maintain the road.
4.3.3 Waterway	<ul style="list-style-type: none"> • Restore, develop, and modernize Phnom Krom Port and several other ports that support the tourist attraction and the municipal and provincial development. • Set up and build a tourism port and passenger transportation means on Siem Reap River. • Set up the transport systems and means as needed. 	
4.3.4 Airway	<ul style="list-style-type: none"> • Restore, extend, and develop Siem Reap provincial international airport in response to the economic growth and the increased number of tourists. 	
4.3.5 Power, electricity, telecommunication, and information technology	<ul style="list-style-type: none"> • Promote, restore, and develop the power, electricity, telecommunication, and information technology sectors to support the tourism, economic, and trading development. 	<p>5.3.9 Electricity supply and telecommunication</p> <ul style="list-style-type: none"> • Install diesel generators. • Extend the diesel-operated station. • Expand electricity supply and telecommunication system. • Install and repair the street electricity network. • Develop a plan on the effective use of electricity for Angkor Wat and other temples. • Develop a plan on the use of electricity in the inaccessible area. • Improve EDC's capacity. • Review the electricity rate. • Review or set up a law or regulation on the electricity supply to reduce environmental burden. • Search for sustainable power sources for Siem Reap City.
4.3.6 Social and cultural infrastructures	<ul style="list-style-type: none"> • Promote, restore, and set up open space, green areas, public parks, cultural and religious centers for people of all ages, including children, young people, women, men, elderly people and people with disabilities, so that they will be able to have equal access to the services. • Set up paths for pedestrians and people with disabilities, public toilets for people with disabilities at public areas, public buildings and other service centers. 	

Strategies		Actions
	<ul style="list-style-type: none"> • Set up schools, vocational training centers of all kinds in the villages and sangkats of Siem Reap City in accordance with the sub-decree on the urbanization of the capital, other cities and provincial towns, and the technical standard of the Ministry of Education, Youth and Sport, and the Ministry of Labor and Vocational Training. • Organize and improve the extent of health services at all levels, including health posts, emergency rooms, health centers, referral hospitals, hospitals, and drug stores in sangkats in the city in accordance with the technical standard of the Ministry of Health. 	
4.3.7 Clean water supply	<p>A) Clean water supply in the urban area</p> <ul style="list-style-type: none"> • Study hydrology and observe the situation to ensure availability of clean water. • Study available water sources to supply clean water to the city, avoiding the use of underground water. • Develop regulations and take action to protect the water sources that may be damaged due to the urbanization. • Restore and replace old pipes to reduce leakage and improve the water quality. • Extend the water distribution network to make water more available to the people and increase the revenue. • Protect, extend, construct water tanks and a distribution system to ensure that the supply meets the increased demand. • Continue building capacity and controlling the maintenance, repair, and protection of the water distribution system in accordance with the technical standard. <p>B) Clean water supply in the suburb</p> <ul style="list-style-type: none"> • Protect the natural water sources. • Restore and improve water tanks and the distribution system to develop and supply clean water. • Study and construct additional water tanks and distribution systems. 	<p>5.3.6 Water resources and clean water supply</p> <ul style="list-style-type: none"> • Check the water supply system users. • Develop a sub-decree on the fee of underground water. • Replace old pipes with new ones. • Study the strategy for integrating Siem Reap River water resource management. • Develop a new water supply system in Siem Reap City until 2035. • Develop water resources in Northeast Baray. • Develop a water filtration station and water supply system in Siem Reap City until 2035.

Source: Land Use Master Plan of Siem Reap City 2035 Vision



Source: Land Use Master Plan of Siem Reap City 2035 Vision

Figure 2.5: Existing Transport Network Map

4) Strategy 4: Strategy for Agricultural Development and Local Production Promotion

Agricultural promotion depends on tourism promotion, so the main strategies for agricultural development and local production promotion aim to be linked with the tourism sector, in terms of quality improvement, market promotion, human resource development, etc.

Among various strategies and proposed actions, the following actions shall be prioritized by applying smart technologies.

- Traffic management system and car parking development
- Information improvement and sharing of road traffic safety
- Effective road and infrastructure maintenance and management

Table 2.9: Agricultural Development and Local Production Promotion Strategies and Actions

Strategies	Action Plans
4.4 Strategy for agricultural development and local production promotion <ul style="list-style-type: none"> • Protect agricultural land. • Improve the product quality and promote the products made by local farmers or traders under the geographical indication “Angkor” through partnership between the public and private sectors, and sell those products to tourists and improve and extend the night market. • Integrate rural economy into the tourism sector to improve the community products through One Village, One Product and establish the One Village, One Product to serve tourists and organize entertainment tracks. • Develop agricultural products to meet the tourism market demand. 	5.3.4 Agricultural sector improvement and product promotion <ul style="list-style-type: none"> • Develop human resources and set up a center for promoting Angkor products. • One Village, One Product movement. • Develop One Village, One Product. • Exhibit Angkor products.

Strategies	Action Plans
<ul style="list-style-type: none"> Review the possibility of determining the location, preparing and developing village agricultural areas for tourism. Study the market and promote quality agricultural products locally made. Set up a promotion and information center informing about the agricultural technical standards. Cooperate with relevant institutions and entities to eliminate agricultural activities that destroy natural resources, and the use of chemical fertilizers and pesticides that do not conform to the technical standard. Develop human resources, providing the people with vocational training in compliance with the agricultural technical standard, and stimulate the people to attend the local vocational training. 	

Source: Land Use Master Plan of Siem Reap City 2035 Vision

5) Strategies of Other Sectors

The other strategies out of the main scopes of the JICA project are as follows:

- Strategy 5: Social development strategy
- Strategy 6: Environmental and natural resource protection strategy
- Strategy 7: Disaster prevention strategy
- Strategy 8: Strategy for strengthening local management and finance management

Table 2.10: Strategies and Actions of Other Sectors

Category	Strategies	Action Plans
4.5 Social development strategy	<ul style="list-style-type: none"> Resolve slums on the state's public and private land, in particular in the Siem Reap River neighborhood and temple protection area. Study the feasibility and organize social land concession for poor people in the urban area and people living in the slums, in particular in the temple protection area. 	None
4.6 Environmental and natural resource protection strategy	<ul style="list-style-type: none"> Establish a mechanism and infrastructure for managing solid waste in Siem Reap City and Siem Reap Province Establish solid waste management means and set up a landfill for solid waste in accordance with the technical and clean city standard. Develop advanced technology for solid waste management. 	5.3.7 Solid waste collection <ul style="list-style-type: none"> Develop solid waste management system. Improve the solid waste management system. Develop a sanitary landfill.
4.6.1 Solid waste management	<ul style="list-style-type: none"> Encourage the development of a policy for reducing, recycling, and renovating the solid waste management. Encourage the people's participation and public and private investment. 	
4.6.2 Liquid waste management	<ul style="list-style-type: none"> Set up and separate the rainwater drainage from sewage drainage to be connected with a treatment plant in accordance with the geographical location and ensure that the water is properly filtered in accordance with sanitation technical standards before being discharged into the public drainage. Instruct the owners of residential, industrial, commercial, tourism service, and public buildings to set up their treatment plants and toilets in accordance with the technical standard. Disseminate information on the environmental and sanitation principles to ensure the sustainability of the world heritage area. 	5.3.8 Rainwater discharge system and solid waste management <ul style="list-style-type: none"> Improve drainage system in the city. Develop water and solid waste discharge system in the central part of the city. Develop water and liquid waste drainage in the west of the central part of the city. Develop water and liquid waste drainage in the east of the central part of the city. Develop a new water drainage system in the western part of the city. Manage the liquid waste and wastewater treatment in the city.

Category	Strategies	Action Plans
		<ul style="list-style-type: none"> Discharge liquid waste after the treatment in the central-western part of the city. Discharge liquid waste after the treatment in the central-eastern part of the city.
4.6.3 Classification of land use areas for environmental protection	<ul style="list-style-type: none"> Temple resorts Protected ancient object parks Protected cultural landscape area The areas with significant features of archaeology, anthropology, or history The social, economic and cultural development zones of Angkor Siem Reap area Protected Tonle Sap Lake inundated forests Siem Reap River neighborhood and Roluos River Community area 	
4.6.4 Necessary measures for protecting key protected areas	<ul style="list-style-type: none"> Protect and maintain the temple resorts and protected ancient object parks, cultural landscapes, forests, lakes, canals, and waterways in accordance with the regulations in force. Protect and maintain Tonle Sap Lake inundated forests to ensure that the ecological system of inundated forests provides high productivity and is significant for the sustainability of Tole Sap Lake's biodiversity, such as hatching or feeding places for aquatic species and fishes. Protect and maintain forests in Siem Reap River neighborhood and inundated forests in sloping areas to ensure sustainable management of the environment. Reduce air pollution from machines through the provision of public electricity as much as possible in the urban area and heritage sites. Encourage the use of transportation means that do not pollute the heritage resorts. Reduce the extraction of underground water by the private sector through the extension and encouragement of the use of the city's new water supply system. Set up an effective committee for effectively controlling the environment at the provincial level and raise the people's awareness for environmental protection. Set up a fund for environmental maintenance and encourage public and private investment. 	5.3.5 Environmental management <ul style="list-style-type: none"> Improve the institutional capacity. Raise awareness for environmental health. Collect fees from public services.
4.7 Disaster prevention strategy	<ul style="list-style-type: none"> Improve the effectiveness of temple conservation and protection, cultural landscapes and surrounding nature by studying and developing a plan on underground water use and land use. Set up, restore, and extend the supply of clean water system of Siem Reap Water Supply Authority to make it accessible to all urban people to stop the private sector from pumping underground water that may reduce the quantity of underground water and lead to temple collapse. Study the clean water source from Tonle Sap Lake River to balance the height of western Baray water to support the temples and tourism sector. Conduct a study and plan the relocation of the current Siem Reap Airport to a new site and integrate infrastructures connecting the new airport with Siem Reap City and its neighborhood. Re-arrange the traffic order and system and parking areas away from the temple area to prevent vibration caused by all types of vehicles that may affect the temples. 	none

Category	Strategies	Action Plans
	<ul style="list-style-type: none"> Protect natural resources and biodiversity in Angkor Park, Tonle Sap Lake, and surrounding areas to maintain environmental health and the ecological system. 	
4.8 Strategy for strengthening local management and finance management	<ul style="list-style-type: none"> The local management and finance management are key factor and core for tourism, economy, municipal development, and environment. Therefore, the following measures must be taken: Coordinate relevant institutions to share information on the projects to be implemented and proposed in the province. Improve human resource base at both provincial and municipal levels, in particular for the management, development, and review of public projects, land management, and tax collection. Strengthen the enforcement of applicable laws and legal instruments related to the use of public land, provision of building permits, vehicle registration, underground water pumping by the public and private sector, and environmental management. Strengthen local finance through the collection of local revenues, allocation of state revenues from tourism and other sources for local administrations to be used for public interests, in particular for the repair and maintenance of public infrastructures and the enhancement of the municipal aesthetics and environment. 	

Source: Land Use Master Plan of Siem Reap City 2035 Vision

6) Proposed Priority Action Plans with Smart Technologies

Among the various strategies and actions in the Land Use Master Plan, actions in which smart technologies can be applied are proposed as priority actions.

Table 2.11: Proposal on Priority Actions in the Land Use Master Plan related to Smart City Technologies

Strategies of Land Use Master Plan	Proposal on Priority Actions Applying Smart Technologies (Preliminary)
1. Siem Reap City development and conservation strategy	<ul style="list-style-type: none"> Digitalization of various maps including land use map and dissemination through websites Monitoring system of development control of construction restricted area (Zone 1, 2, 3) and inventory development of heritage properties Improvement of riverbank of Siem Reap River
2. Siem Reap Tourism Development Strategy	<ul style="list-style-type: none"> Traffic management system and car parking development Safety and emergency system Digitalization of tourism map and information dissemination Tourism infrastructure and network development Digitalization of various maps including land use map and dissemination through websites
3. Infrastructure, technique, and service development strategy	<ul style="list-style-type: none"> Traffic management system and car parking development Information improvement and sharing of road traffic safety Effective road and infrastructure maintenance and management
4. Strategy for agricultural development and local production promotion	<ul style="list-style-type: none"> Promotion of local products through websites Support for market access and feedback system Food safety / Exhibition at JICA seminar

Source: JICA Survey Team based on Land Use Master Plan of Siem Reap City 2035 Vision

(6) Tourism Development Master Plan Siem Reap (2021-2035) [Subnational Level]

On March 30, 2021, the “Tourism Development Master Plan Siem Reap (2021-2035)” was approved. The master plan was scheduled to be approved in early 2020, but the procedure was delayed due to the COVID-19 epidemic. The table below shows the outline of the master plan.

Table 2.12: Outline of the Tourism Development Master Plan Siem Reap (2021-2035)

Made by	MoT
Signed by	H.E. Mr. Hun Sen (prime minister)
Objective	To transform the province into a major and attractive tourist destination in the region and the world based on the foundation of the cultural, natural and historical heritage, religion, and Cambodianess. To ensure sustainable and inclusive manner in tourism development, Siem Reap shall follow good practices from all eras, especially the Angkor Empire era, as well as take into account “Clean, Green and Smart” in this modern setting and the path to building a digital economy.
Goals to achieve	<ul style="list-style-type: none"> • Developing priority tourism zone in Siem Reap • Developing new tourism products • Promoting tourism and attracting tourists • Strengthening quality and sustainability of tourism development in Siem Reap • Managing Siem Reap’s environment • Developing infrastructure and enhancing connectivity to support tourism in Siem Reap • Reinforcing governance for supporting Siem Reap tourism development based on the participatory approach
Target year	Short-term (2021-2023), mid-term (2023-2030), long-term (2030-2035)

Source: Tourism Development Master Plan Siem Reap (2021-2035)

The Siem Reap Tourism Development Master Plan consists of strategies for tourism development with six pillars and a project list with 19 projects.

1) Strategy for Tourism Development

i) Strategy for Developing Priority Tourism Zones

To achieve the vision of tourism development in Siem Reap 2021-2035, the master plan sets out recommendations for the establishment and development of six priority tourism zones as below.

- Kulen Mountain
- Banteay Srei
- Angkor Archaeological Park
- Siem Reap City
- Tonle Sap
- New Development Site (Grand Siem Reap)

ii) Strategy for Developing New Tourism Products

Responding to the 2035 tourism development scenario and to meet the abovementioned needs, the following tourism products are proposed:

- Culture, Heritage, Religious, and Belief Tourism Products
- Green Tourism Products
- MICE Tourism Products
- Rural Tourism and Agro-Tourism Products
- Senior Tourism-Health Tourism and Second Home Tourism Products

iii) Strategy for Promoting Tourism and Attracting Tourists

Currently, the promotion of Siem Reap tourism is limited, in both abroad and local platforms, and tourism products have not yet been diversified and designed to be attractive, despite the fact that tourism services have received a certain level of satisfaction from tourists. In order to promote the tourism in Siem Reap to be a “Quality Tourist Destination”, this master plan sets the following strategies:

- Stimulating the promotion of Siem Reap destination to be number one in the region and the world
- Attracting international tourists through priority and targeted markets, as well as capturing more quality individual, family, and group tourists who spend more money and stay longer in Siem Reap
- Encouraging and attracting domestic tourists to travel to Siem Reap more frequently based on the “Patriotism, Knowing the Territory” concept
- Using digital technology for an effective tourism promotion
- Strengthening organizational and financial mechanisms for tourism promotion in Siem Reap

iv) Strategy for Strengthening Quality and Sustainability of Tourism Development

To strengthen the quality and sustainability of tourism development in Siem Reap, this master plan sets out the following three strategies:

- Strengthening the Quality of Tourism (hotel/accommodation, restaurants, entertainment centers, travel agencies, tour guides, etc.)
- Human resource development in tourism
- Strengthening the local economy through tourism development

v) Strategy for Managing Environment

After the rapid growth of economic activities through the growth of tourists and residents, Siem Reap currently is facing solid/liquid waste problems. This master plan also considers the issue of solid waste as a priority and addresses the growth of waste and green space in Siem Reap. In line with this forecast, it also requires the consideration of understanding and implementation of “4R” principles among “residents and tourists” on solid waste discharge. In addition to solid waste management, promotion of green areas and protection of natural ecosystem are set as strategies.

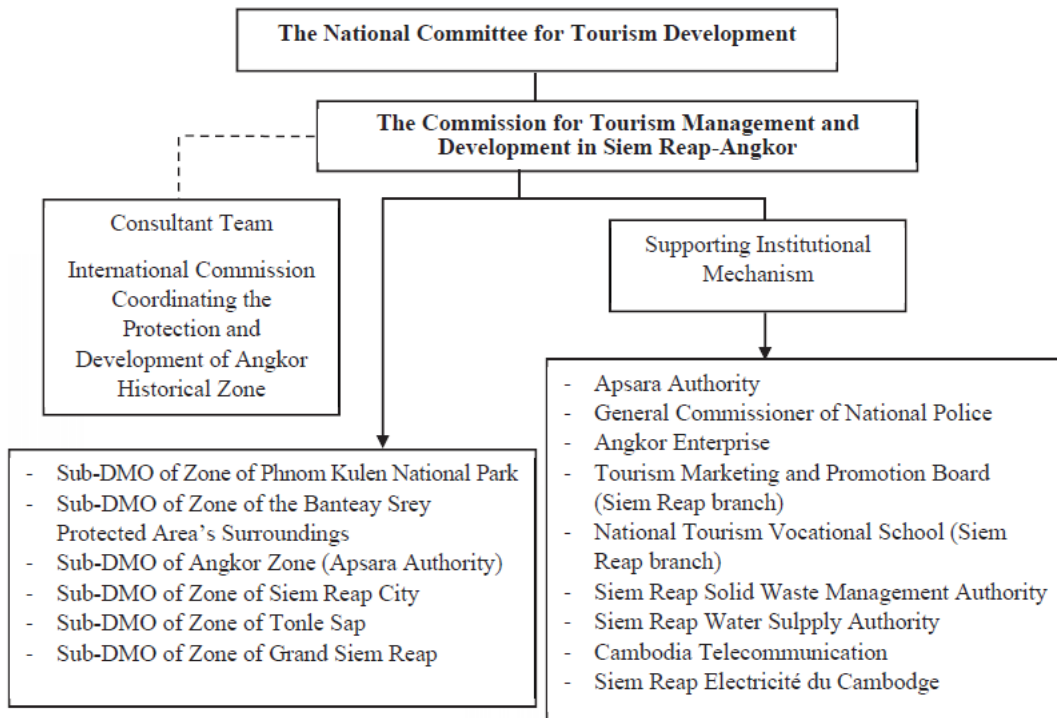
vi) Strategy for Developing Infrastructure and Enhancing Tourism Support Connectivity

Tourism development in Siem Reap (towards 2035) needs to be linked with infrastructure development and strengthening connectivity. Presently, Siem Reap is very favorable for attracting tourists and investment due to its existing connected infrastructure by water, land, and air. The following are strategies for infrastructure development and strengthening connectivity in Siem Reap:

- Promote internal and international connectivity
- Maximize the improvement of tourism supporting infrastructure

2) Action Plan and Governance Supporting Tourism Development in Siem Reap

This Tourism Master Plan presents priority actions, governance, financing, and management arrangements to implement the plan in line with the proposed strategy. It indicates the need to establish partnerships and action plans with public, private and development partners and their priorities for the development of tourism in Siem Reap. The implementation structure is shown in the figure below, and it is proposed that DMOs be established in each of the priority tourism zones mentioned above.



Source: Tourism Development Master Plan Siem Reap (2021-2035)

Figure 2.6: Structure of Siem Reap-Angkor Tourism Destination Management

In addition, a total of 20 priority actions are proposed in the Tourism Master Plan as follows:

- Economic Leakage Reduction from the Tourism Development in Siem Reap
- Domestic and International Tourist Management Flow in the Angkor Heritage Site
- Development of Technology Supporting the Digital Tourism Development in Siem Reap
- Development of Mahendraparvata Tourist Route in Phnom Kulen National Park
- Establishment of Khmer Heritage Tourist Route
- Improvement of the Siem Reap River as a Green Tourism River
- Infrastructure Improvement in Siem Reap City to Support Tourism Sector
- Development of Buffer Zone (Siem Reap East)
- Development of Tourist Port and Facilities at Phnom Krom (Chong Kkneas)
- Development of Entertainment Center Zone in Siem Reap
- Development of New Siem Reap Tourism Zone
- Development of a New Airport in Siem Reap “Siem Reap Angkor International Airport”
- Development of “Self-Driving Tour”
- Improvement and Strengthening the Development of the Tourism Products at Tonle Sap Area
- Development of Siem Reap Pass
- Enhancement of the Tourism Promotion Capacity in Siem Reap
- Development of National School for Tourism Professionals, Siem Reap Branch
- Improvement of the Environment and Clean City in Siem Reap
- Development of Museum of Khmer Civilization
- Improving the Quality of Tourism Services in Siem Reap

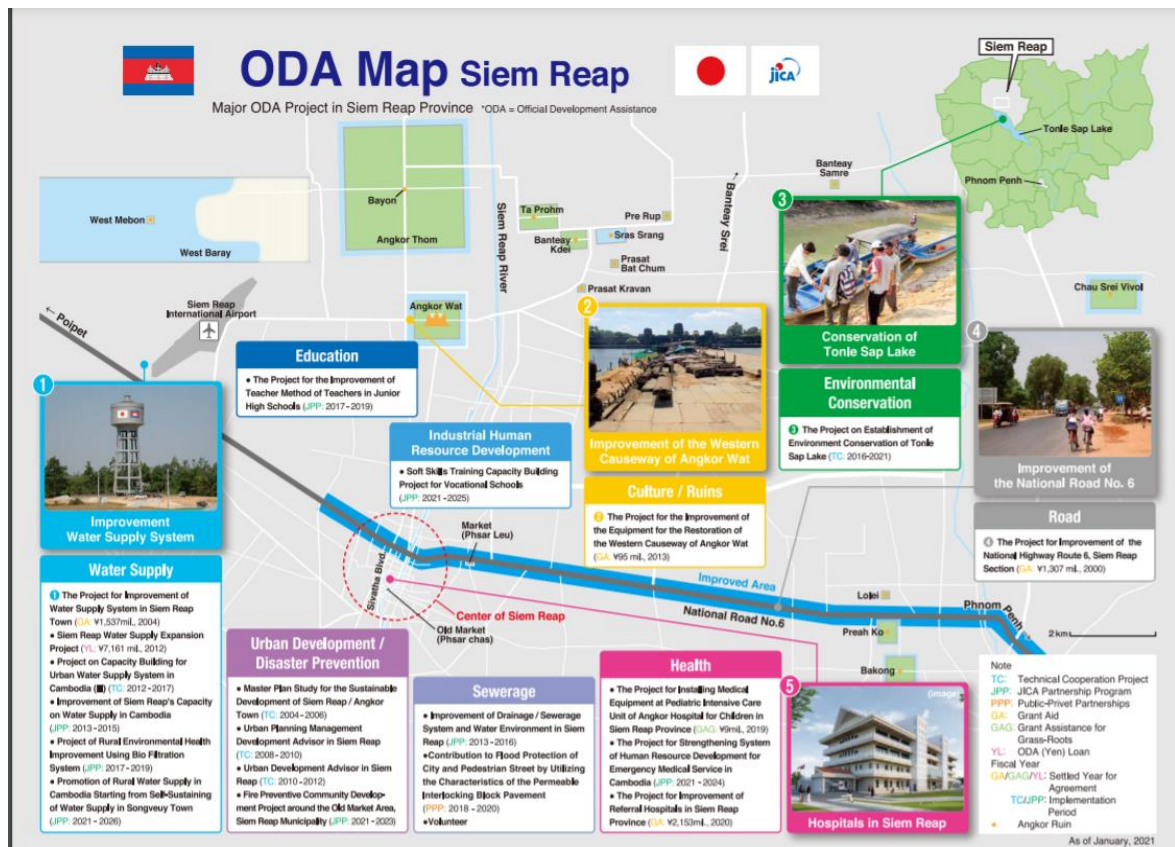
2.1.2 Activities by International Organizations

(1) The Japanese Government

1) JICA

JICA conducted various projects as official development assistance (hereinafter referred to as ODA) in Siem Reap including heritage preservation, water supply, agriculture, environmental conservation, and others.

- Water supply: Project for Improvement of Water Supply System in Siem Reap (Grant Aid (hereinafter referred to as GA), 2004), Siem Reap Water Supply Expansion Project (Loan, 2012), Project on Capacity Building for Urban Water Supply System in Cambodia (Phase 3) (Technical Cooperation (hereinafter referred to as TC), 2012-2017)
- Sewerage: Improvement of Drainage/Sewerage System and Water Environment in Siem Reap (Grant Assistance for Grass-Roots (GAG), 2013-2015), Verification Survey with the Private Sector for Disseminating Japanese Technologies for Project for Contribution to Flood Protection of City and Pedestrian Street by Utilizing the Characteristics of the Permeable Interlocking Block Pavement (PPP, 2018-2020)
- Urban development/ disaster prevention: Master Plan Study for the Sustainable Development of Siem Reap/ Angkor Town (TC, 2004-2006), Urban Development Advisor in Siem Reap (TC, 2008-2010), Fire Preventive Community Development Project around the Old Market Area, Siem Reap Municipality (JICA Partnership Program (hereinafter referred to as JPP), 2021-2023)
- Road: Project for Improvement of NR6, Siem Reap Section (GA, 2000)
- Environmental conservation: Project on Establishment of Environmental Conservation Platform of Tonle Sap Lake (Science and Technology Research Partnership for Sustainable Development (hereinafter referred to as SATREPS), 2016-2021)
- Culture: Project for the Improvement of the Equipment for the Restoration of the Western Causeway of Angkor Wat (Cultural Grant Aid, 2013)



Source: JICA

Figure 2.7: Map of Japan's Major ODA Projects in Siem Reap

2) Ministry of Land, Infrastructure, Transport and Tourism of Japan

i) Japan-Cambodia Urban Development / Real Estate Development Platform

Regarding urban development, a memorandum of understanding regarding the establishment of the "Japan-Cambodia Urban Development and Real Estate Development Platform" was signed between the Ministry of Land, Infrastructure, Transport and Tourism of Japan (hereinafter referred to as MLIT) and MLMUPC in February 2019. The meeting in Phnom Penh was attended by the governments of both countries and many private companies, discussing the potential for business opportunities in a wide range of areas related to urban development such as smart cities, housing development, and sewage treatment.

- 1st Meeting: Held in Phnom Penh on February 27, 2019, with about 250 participants. The purpose of establishing the platform and examples of Japanese urban development were introduced from the Japanese side, and from the Cambodian side, three cities, Phnom Penh, Siem Reap, and Battambang, were selected as smart cities, and issues and legal systems related to the urban development field were presented. It was stated that Japan should expect support for maintenance support. Business matching was held in the afternoon.
- 2nd Meeting: Held online on February 16, 2020. The Japanese side confirmed the progress of each initiative such as the investigation and examination of the feasibility of urban development, and the Cambodian side explained the efforts for smart cities and requested support in the following fields. Therefore, the 2017 Memorandum of Cooperation was updated and concluded in the following areas:
 - Housing Sector: Housing policy, planning and execution system for housing maintenance and production, as well as methods and organizational structure for housing supply, quality assurance and maintenance; Technical standards, construction techniques and methods for housing maintenance; Standards/standards for buildings; Housing monetary policy; Statistical survey of housing.
 - Construction Sector: Legal system, policy making and implementation related to the construction sector.
 - City Planning Sector: Legal system, planning procedure/method, implementation, capacity building related to city planning/real estate development.
 - National Land Planning Factor: Legal system, organizational structure, planning procedures/methods, capacity building related to the formulation and implementation of national land planning and wide-area regional planning.
 - Map Creation/Survey Factor: Topographic map creation and survey, geospatial information maintenance, geodetic network; Development and use of hygienic positioning applications; Development and implementation of National Spatial Data Infrastructure (NSDI).

In this way, support and cooperation for Siem Reap's smart city by Japan have already begun, and for the realization of smart city, business development by Japanese companies with high interest, and infrastructure developed by Japanese ODA business, etc. There are possibilities such as utilization of smart technology for maintenance, repair, etc., utilization of human resources who have received technical guidance, etc.

ii) Smart JAMP

At the 2nd Japan-ASCN High-Level Meeting in December 2020, MLIT announced overseas smart city support measures (hereinafter referred to as Smart JAMP) through mutual cooperation between Japan and ASEAN, and promoted the formation of concrete projects for smart cities in ASEAN. In early 2021, the Siem Reap Provincial Government issued a request to MLIT for pre-feasibility studies (hereinafter referred to as pre-FS) on the following eight projects:

- Smart City Data Collection & Analysis

- CCTV System Introduction
- Official Parking System Introduction
- Traffic Signal System Improvement
- QR Code Development
- Rental Cycling Service
- Landfill Management System Introduction
- Garbage Collection IoT Installation

In response to this request, MLIT has launched the “Pre-feasibility Study for Smart City in Siem Reap (Smart JAMP 2021) with the survey period starting in July 2021 and finishing in March 2022. Of the requested projects, pre-FS surveys of “Smart City Data Collection & Analysis” and “CCTV System Introduction” and implementation structure survey for “Official Parking System Introduction”, “Traffic Signal System Improvement”, “QR Code Development”, and “Rental Cycling Service” will be conducted.

3) Other Organizations of Japan

“The Project for Developing a Smart Community in Angkor Park, Cambodia” (Ministry of Economy, Trade and Industry of Japan, 2012) aimed to propose environmentally-considered cultural tourism urban development in Angkor Park. A comprehensive urban development project named Mekong Culture and Heritage Park including eco-mobility, smart energy, water supply and sewerage, water recycle, and solid waste management was proposed.

After this, “the Project on Developing Environmentally and Culturally Sustainable Cities through the Joint Crediting Mechanism in Siem Reap” (Ministry of Environment of Japan, 2014) was conducted by applying Joint Crediting Mechanism (hereinafter referred to as JCM) to promote low carbon and low emission technologies.

The Japan External Trade Organization (hereinafter referred to as JETRO) is developing the “Asia DX Promotion Project in Japan-ASEAN” with the aim of promoting social implementation of digital innovation and solution of economic and social issues in ASEAN through a demonstration project that utilizes digital technology in collaboration with Japanese companies and local companies, and they are subsidizing projects that meet this objective. In response to the first open call for participants in 2020, the joint proposal "Development and Demonstration of a MaaS Digital Platform for Tourism in Angkor (Cambodia)" was adopted in the tourism and mobility sector, with Toyota Tsusho as the representative company. The demonstration project in Siem Reap is scheduled to be carried out by January 2022. Also, the “Introduction of COVID-19-FREE Digital Assessment Tool for the Tourism Industry in Bagan, Myanmar” by Nippon Koei changed its target area to Siem Reap because of the political situation in Myanmar. The PoC of this project is also expected to be conducted by January 2022.

(2) Other Donors

Support from other donors includes the World Bank (hereinafter referred to as WB), Asian Development Bank (hereinafter referred to as ADB), and France Development Agency (hereinafter referred to as AFD), and covers other fields such as infrastructure development (waste, water, and sewage), transportation, tourism, and archaeological conservation. The Korea Cultural Heritage Fund, Korea International Cooperation Agency (hereinafter referred to as KOICA), The Global Green Growth Institute (hereinafter referred to as GGGI), etc. are also implementing some projects. There is no project specializing in smart cities, but for projects that may be related to smart businesses, such as improving waste management capacity and introducing electric buses, necessary adjustments will be made at the project review stage.

Table 2.13: List of Projects by Donors in Siem Reap

Sector	Donor	Name of Project	Period	Counter Part	Objective/Activities
Infrastructure	AFD	Siem Reap / Angkor Urban	2006-2012	MPWT, APSARA National Authority	1) Improving drainage infrastructure and

Sector	Donor	Name of Project	Period	Counter Part	Objective/Activities
		Development Project			strengthening capacity for urban service management 2) Organizational improvement of APSARA mechanism for the development of Siem Reap / Angkor
	UNIDO ⁵	Creation of employment opportunities in Cambodia and effective e-waste management project	2012-2015	MLVT, MoE, Subnational Government	Promoting economic and environmental sustainability of Cambodia's electronics industry 1) Strengthening the youth sector's capacity to support increased employment and business opportunities in the electronics industry 2) Improving electronic waste management skills, knowledge, and implementation capabilities
	WB	Construction of sewage collection network in Siem Reap, rehabilitation and sewage treatment facility improvement project for sewage pumping station	2nd quarter of 2021-2024	MISTI, MPWT	Access to water supply pipes, improvement of sanitary services, strengthening of service providers 1) Expansion of water supply service / development of small-scale water supply pipe system 2) Improvement of sanitary services by construction of secondary and tertiary sewer pipes to existing sewer pipes • Direct connection to the city's sewer system
	ADB	Siem Reap City Obstruction Pipe Construction Project	2017-2019	MPWT, APSARA National Authority	Improving traffic and environmental safety by renewing existing sewage shield pipes that have deteriorated or been damaged in the city
	WB	Solid waste / plastic management improvement project	2020-	MPWT, MoE MoI	Improvement of management ability of solid waste and plastic waste
Mobility	ADB	Road network improvement project (loan)	2018-	MPWT	Construction of National Highway No. 6 Overall length 5,800m, width 29m (6 lanes on the road, motorcycle leased line, sidewalk including 3m width and green space)
	GGGI	Pre-feasibility study for the introduction of electric buses	2021-	DPWT	Pre-FS for introducing electric buses on 3 routes in the city
	WB	Fostering Walkable, Green and Non-Motorized	2020-2021	MPWT	Surveys and policy recommendations for non-motorized transport

⁵ United Nations Industrial Development Organization

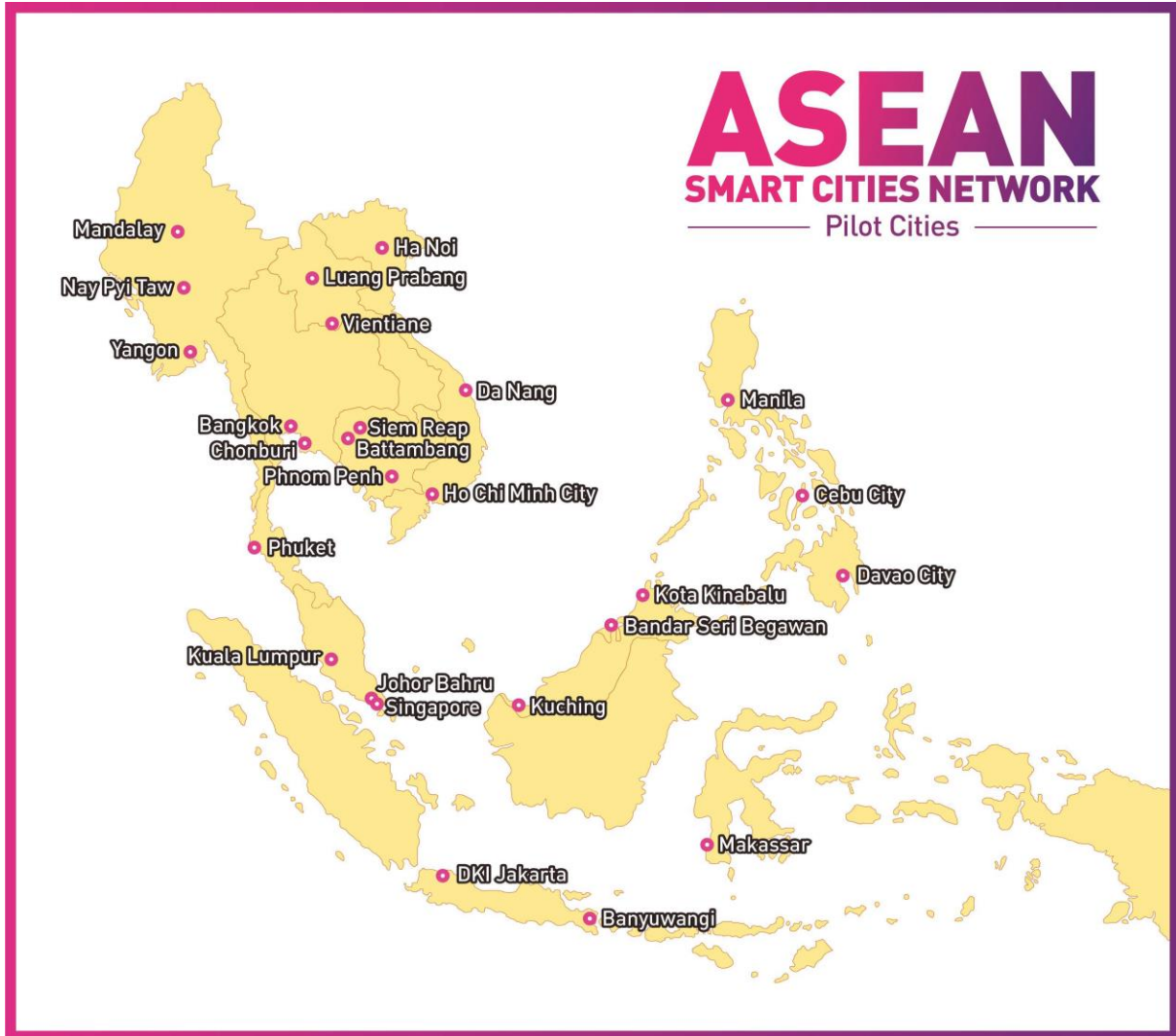
Sector	Donor	Name of Project	Period	Counter Part	Objective/Activities
		Transport (NMT)-Oriented Cities Strategy for Luang Prabang and Siem Reap			
Tourism	AFD	Tourism sector development	2020-	MoT	Support for tourism industry development and capacity building in the public and private sectors
Ruins Conservation	KOICA	Conservation and restoration project of Pre-Apitu Temple in Angkor archaeological site	2015-2019	APSARA National Authority	Support for the conservation and restoration of five temples in Preapitu Temple Basic research / research Conservation of Corsork Temple Strengthening Laboratory construction
	KOICA	Pre-Apitu Temple and Terrace of the Elephants Conservation and Regeneration Project	2019-2023	APSARA National Authority	Detailed investigation, stone diagnosis, excavation and dismantling investigation for conservation and restoration of Chome Temple and Terrace of the Elephants

Source: JICA Survey Team

2.1.3 Smart City Trends and Activities

(1) ASEAN Smart City Network (ASCN)

At the 32nd ASEAN Summit on April 28, 2018, the ASEAN leaders established ASCN. ASCN is a collaborative platform where cities from the ten ASEAN member states work towards the common goal of smart and sustainable urban development. 26 pilot cities were selected, including Phnom Penh, Battambang, and Siem Reap from Cambodia (Figure 2.8).



Source: ASEAN

Figure 2.8: 26 Pilot Cities of ASCN

(2) Smart City related Activities in Siem Reap mentioned in ASCN

Siem Reap, as one of the 26 pilot cities of ASCN, has announced its smart city action plans and projects as below.

Table 2.14: Action Plans and Status of Progress of Siem Reap in ASCN

Vision	To improve Siem Reap as a beautiful, unique and ideal tourist destination, characterized by the harmony of Khmer history, arts and nature.
Focus Areas	Civic and Social, Security, Quality Environment

Projects	<ul style="list-style-type: none"> • Smart Tourist Management System Siem Reap’s vision is to be a livable, smart, clean, safe and sustainable city for both local residents and tourists alike, through the use of security enhancement systems such as CCTVs and traffic sensors. • Solid Waste and Wastewater Management This project seeks to develop infrastructure for solid waste and wastewater management, to ensure a high-quality environment. This can be done by capitalizing on technology and data management systems, which would allow for feedback loops to improve planning and implementation
Status of Progress (as of October 2019)	<ul style="list-style-type: none"> • Hiring private companies to collect the waste from households and public areas and transport it to landfills • Promote the city clean program and urge people to participate in it • Deploy security guards in public areas to ensure safety and public order • Build a waste recycle station and to purify wastewater into clean water • There is a lack of technology finances, technicians etc.
Chief Smart City Officer	Ly Samrith (Deputy Governor)

Source: Siem Reap Provincial Administration (ASCN documents)

(3) Smart City-related Activities in Cambodia

1) The Project for Development of Traffic Management System in Phnom Penh (Smart Traffic Management)

This project installed traffic signals at 100 intersections (including replacements of 64 of the 69 existing traffic signals) and a traffic control center, and held traffic control training for police officers and traffic safety seminars for residents in the hope of improving urban traffic congestion and traffic safety, and building an urban environment that is safe and secure.

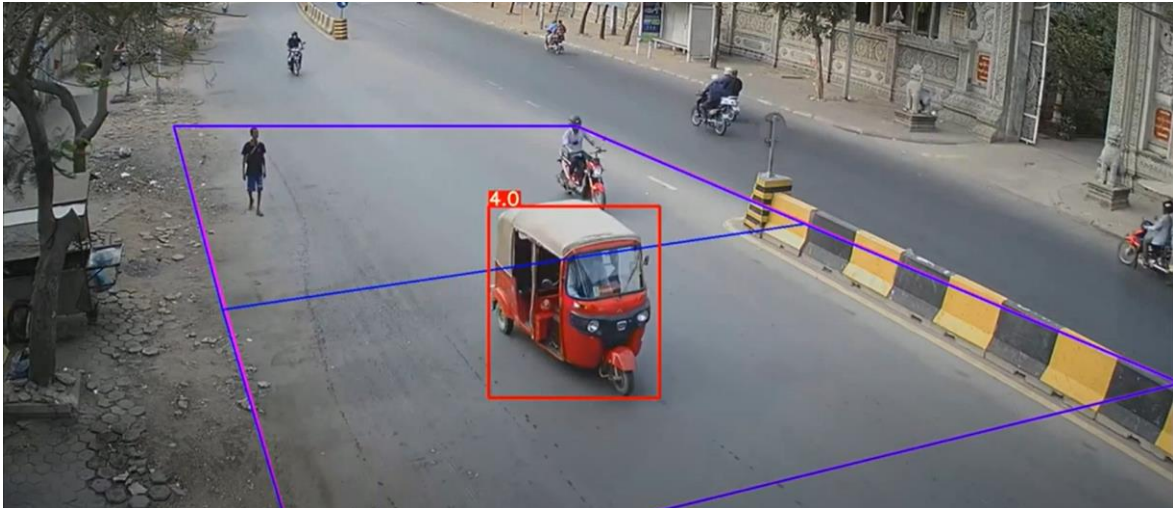


Source: JICA

Figure 2.9: Outputs and Map of the Traffic Management System Project in Phnom Penh

2) SMMR (Machine-learning Traffic Analysis)

In the project for “Sustainable Design of Urban Mobility in Middle-Sized Metropolitan Regions” (hereinafter referred to as “SMMR”), funded by the German government, with official permission given by the Phnom Penh Capital Administration (PPCA), two solar-powered CCTV cameras have been installed at different locations along National Road 2 (between Kbal Thnal and Ta Khmau). The cameras will capture footage, to be used for training the model further and validate the findings that ensure the accuracy and reliability of the traffic analysis technology under local traffic conditions.



Source: SMMR

Figure 2.10: Captions of Machine-learning Traffic Analysis

3) Sonatra Carling (Smart Parking)

Sonatra Carling has been introducing mechanical toll car park systems in Phnom Penh since 2015. However, the Phnom Penh City Hall suspended the company from collecting tolls from citizens for the car parking space near Wat Phnom since 2018, due to complaints from citizens.



Source: Sonatra Group

Figure 2.11: Installed Smart Parking Facilities

4) Bakong (Blockchain-based Digital Currency)

Bakong, a collaboration between Soramitsu and NBC, is a Real-Time Gross Payments System that allows for real-time gross domestic and cross-border payments between any account holders on a single platform.

It has been officially released on October 28, 2020.

2.2 Current Situation of Administrative Operation (Organization, Legal, Data Management)

2.2.1 Organizations

(1) The Central Government

1) Ministries

The central government formulate policies and national plans, and allocates funds. There are 25 ministries and 2 agencies under the Council of Ministers in Cambodia. Table 2.15 summarizes the main roles and authorities of each ministry and agency because it is necessary to apply to and secure permit from each ministry and agency to implement the project.

Table 2.15: List of Central Governments of Cambodia

Council of Ministers	A collegial body in charge of administrative authority. Organized by the Prime Minister and other ministers, it enforces the law and carries out national affairs. Dealing with diplomatic relations and concluding treaties. Budgeting, enactment of government ordinances, etc.
Ministry of Commerce	Support for corporate development and private development. Import, export restrictions, domestic and foreign trade restrictions. Management of intellectual property issues. Business support for small and medium-sized enterprises in local cities.
Ministry of Interior	National defense, policy presentation, and implementation. Local administration. Procurement, management, and operation of equipment and facilities. Cooperation with the military of each country, international cooperation, etc.
Ministry of Culture and Fine Arts	Cultural development, fostering creativity and innovation in Khmer art. Heritage protection, research, and awareness activities. Encourage the development and development of new culture. Training of specialists in sports, arts, music, architecture, archeology, and others.
Ministry of Foreign Affairs and International Cooperation	Diplomatic mission with other countries. Collaboration with other countries and strengthening of communication. Visa issuance service, etc.
Ministry of Economy and Finance	Organize and monitor financial policies. Structural reform management and coordination of economic and financial organizations. Management of general economy and national finance. Adjusting the balance of public expenses. Reassignment of national treasury income to each sector. Budget management of local government. Establishment of financial system, etc.
Ministry of Agriculture Forestry and Fisheries	Organizing development policies in agriculture. Land reform and utilization policy. Agricultural sector development plan instructions. Monitoring and management of natural resources in the agricultural sector.
Ministry of Education Youth and Sports	Improving the level of education. Enlightenment of sports and other cultural activities. Holding sporting events, etc.
Ministry of Environment	Creation of environmental legal documents. Implementation of environmental policy. Promotion and coordination of environmental assessment. Conservation, development, management, and utilization of natural resources. Control of environmental pollution, etc.
Ministry of Labor and Vocational Training	General and professional professions and education and training. Labor dispute problem solving, etc.
Ministry of Health	Enlightenment and promotion activities for a fair, safe, and healthy living environment. Providing basic public health care. Opening of a hospital with special expertise. Prevention and control of infectious diseases, non-communicable diseases, etc.
Ministry of Land Management, Urban Planning and Construction	Formulate guidelines for urban development. Monitoring. Design of land development at the city, state, and local levels. Issuance of business permits and construction permits. Evaluation of land and collection of land tax.
Ministry of Industry Mines and Energy	Power supply control and management. Energy policy, power strategy, power development. Technical and safe power supply environment standards, and other operations. Development and protection of mineral resources and energies. Support from each country, advice on private sector development, etc.
Ministry of Planning	Socio-economic development planning, government statistical function management. Work that strives for national development in cooperation with other ministries and agencies from planning and statistics.
Ministry of Information	Development of regulations for media and publications. Includes control over media censorship and information sharing. Acceptance of media from overseas, regulation, etc.

Ministry of Post and Telecom	Popularization of the postal system. Construction and management of information communication systems.
Ministry of Justice	Judge's independence protection. Organize and monitor the court administration process. Legal development for the Ministry of Justice to be able to operate functionally. Law enlightenment activities. Inspection of detention centers and prisons. International legislation, establishment of domestic law, etc.
Ministry of Public Works and Transport	Construction of new transportation methods and infrastructure. Transport management. Public works construction. Building public transportation for all citizens. Improvement of transportation services and safety of each organization. Development of domestic infrastructure. Information disclosure regarding development and transportation.
Ministry of Cults and Religions	Coordination and advice for all religions. Sharing laws and establishing rules with pagoda management, mosques, churches, religious centers, etc. Supervision, educational guidance and integration of each religious group. Creation of Buddhist education programs, etc.
Ministry of Water Resources and Meteorology	Development, research, and maintenance of water resource utilization. Science and technology education. Water resources, atmospheric research, development and protection. Disaster prevention. Creation and management of laws related to water resources. Technical guidance and advice for people involved in the improvement and development of water resources.
Ministry of Rural Development	Development of promotion projects in rural and mountain villages, proposal and promotion of programs. Relief of poor rural areas, subsidy projects, etc.
Ministry of Women's Affairs	Support and guidance for social services. Assisting elderly and disabled women, children, and women who are victims of sexual exploitation. Promote women's rights by advancing women into society and politics. Enforcement of various services and financial independence support for women. Equality between women and men.
Ministry of Social Affairs Veteran and Youth Rehabilitation	Relief and assistance for vulnerable groups such as the elderly and disabled. Relief of young people involved in drugs, prostitution, theft, etc., and implementation of legal measures. Orphans of civil servants, social security for families, enactment of law. Implementation of rehabilitation programs for minor criminals.
Ministry of National Assembly-Senate Relations and Inspection	Corruption of parliamentarians and their staff. Auditing whether business is being conducted fairly.
Ministry of Tourism	Promotion and management of the tourism industry. Investment promotion and encouragement. Issuance of licenses to vocational schools, universities, and other tourism departments. Introduction of tourism resources. Attracting tourists. Issuance of licenses from travel agencies, provision of business licenses for tourism such as hotels, casinos, and guides.
Secretariat of Public Service	Maintaining the labor rights of civil servants and establishing their status. Make decisions on appropriate salaries and compensation, and improve the morale of civil servants. Anti-corruption etc.
Secretariat of Civil Aviation	Attracting, permitting, and examining commercial airlines. Development of airport and airspace traffic management systems. Promotion of passenger and freight transportation. Indirect trade, tourism, raising national and regional incomes, strengthening social networks, etc.
APSARA National Authority	Conservation, management, and restoration of archaeological sites scattered around Siem Reap. Collaboration with restoration organizations visiting from UNESCO and other countries. Approval of new business in the archaeological area. Development in the area. Media, permission to shoot, etc.

Source: JICA Survey Team from various sources

2) Provincial Departments of Ministries

The ministries have departments as branch offices at the provincial level, which carry out state-level plans in accordance with the central government policy.

The numbers of officers in provincial departments that are related to the target sectors of this survey (tourism, mobility, security, waste) and data management are as follows:

- DPT : 14 officers, 4 divisions (data management)
- DoT : 68 officers, 7 divisions (tourism)
- DPWT : 58 officers, 10 divisions (mobility, sewage)
- Provincial police : 1,011 officers, 24 divisions (security)
- DoE : 38 officers, 8 divisions (solid waste)

These departments work in cooperation with the central government, and the governor assigned by MoI coordinates the affairs of each province.

3) Smart City Coordination Commission

The “Sub-Decree on Establishment of a Smart City Coordination Commission” was approved by the Prime Minister in February 2021.

- Chairman: The Secretary of the Ministry of Interior (hereinafter referred to as MoI)
- Vice-chairman: The Secretary of MLMUPT and the Secretary of MEF
- Members: The Secretary of the Ministry of the Environment (hereinafter referred to as MoE), the Secretary of the Ministry of Industrial Science and Technology Innovation (hereinafter referred to as MISTI), the Deputy Minister of Civil Affairs, the Director of the ASEAN Bureau of the Ministry of Foreign Affairs and International Cooperation (hereinafter referred to as MFAIC), the Director of the Transportation Bureau of MPWT, the Director of the Technical Information Bureau of the Ministry of Post and Telecommunications (hereinafter referred to as MPT), and the Secretariat is the Secretary General of MoI.

This commission has the roles and responsibilities of informing the government and steering the national visions and policies on smart city for the medium and long terms. This commission will prepare policies and strategies for medium- to long-term smart city development, annual action plan and budget for smart city development, and coordinate with private companies and international organizations, etc.

It has just been established and there are no concrete activities yet. Since Siem Reap is one of the model cities of smart cities in Cambodia, the proposed smart city vision and action plan are by this committee. It is expected that this will be discussed and lead to business promotion.

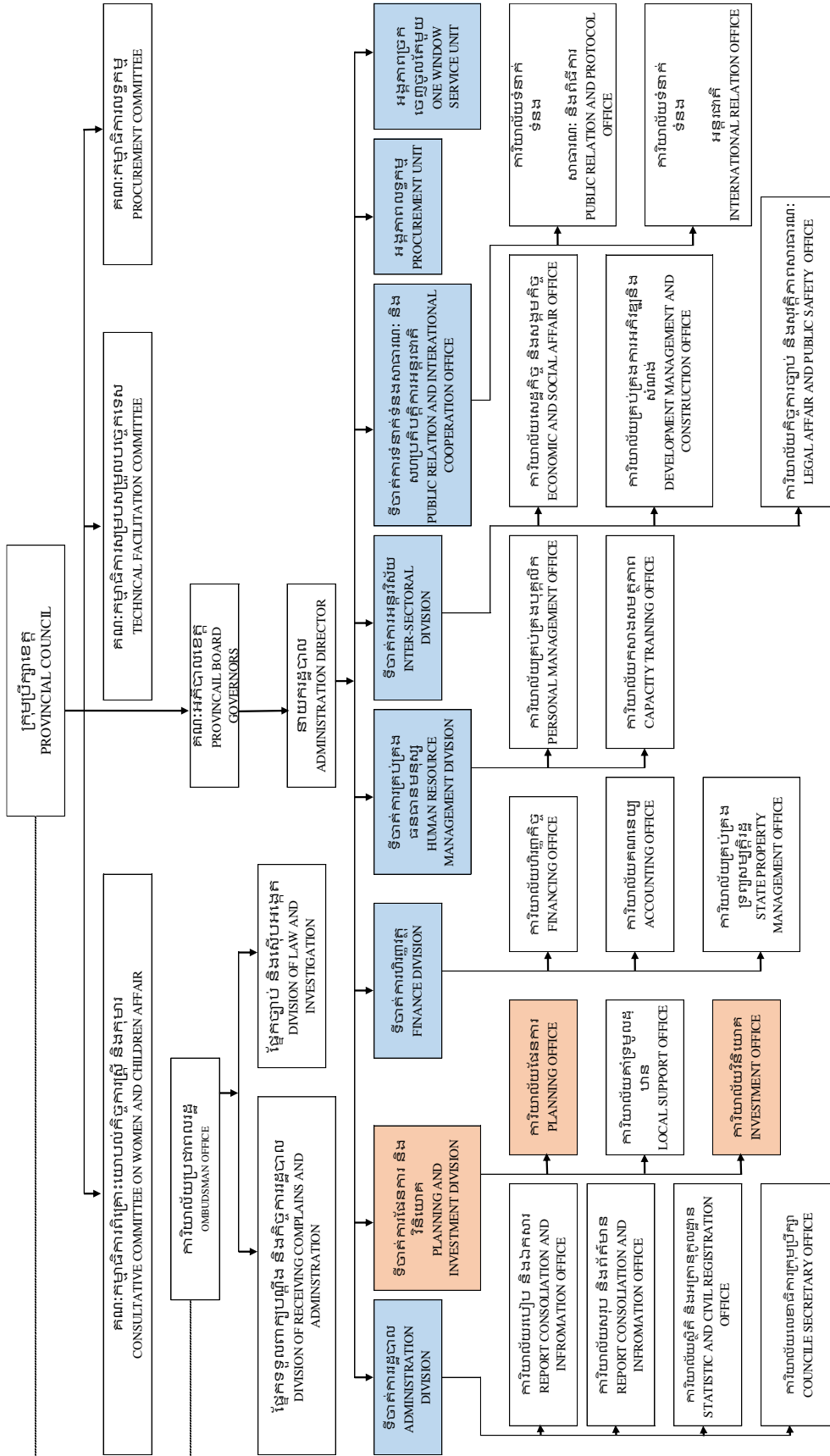
(2) Siem Reap Provincial Administration

1) Duties of the Provincial Administration

The provincial administration is supervised by the MoI, and the personnel are determined by the MoI. MEF allocates budget to the Provincial Administration Office. The staff members of the provincial administration are local civil servants, while the governor and the vice governor are national civil servants.

The Siem Reap Provincial Administration consists of eight divisions (divisions, offices). The following table shows the duties and number of people in each department, and the following figure shows the organizational chart.

Of these, the Planning and Investment Division oversees planning and investment. Among them, the Planning Office oversees investment planning, socio-economic development-related data and information management, and coordination with related departments. The Investment Office oversees the investment and business stages such as incentives for project implementation and private investment promotion policies. For this, although discussions on new departments are being held, for the moment, the Planning and Investment Division shall be in charge of business promotion through public-private partnerships related to smart cities.



Source: Siem Reap Provincial Administration

Figure 2.12: Organizational Chart of Siem Reap Provincial Administration

Table 2.16: Divisions of Siem Reap Provincial Administration

Division	Staff	Main Tasks and Offices
Administration Division	27	<ul style="list-style-type: none"> Working for administrative tasks 4 offices including: Protocol and Document Office, Report Consolidation and Information Office, Statistic and Civil Registration Office, Council Secretary Office
Planning and Investment Division	18	<ul style="list-style-type: none"> Planning Office: coordinate in planning the annual budget, public investment plan and program Local Support Office: coordinate and support municipal, district, commune and sangkat levels for planning and investment Investment Office: Collaborate with relevant departments and other organizations to review and advise on all types of investment incentives, examine and advise on investment proposals and development projects of the private sector and other stakeholders in the province
Finance Division	19	<ul style="list-style-type: none"> Finance Office: budget and financial management Accounting Office: account management Property State Management Office: property management
Human Resource Management Division	21	<ul style="list-style-type: none"> Personal Management Office: staff management Capacity Training Office: capacity building programs for officers
Inter-Sectoral Division	28	<ul style="list-style-type: none"> Economic and Social Affairs Office: manage data of local business, promote education, public healthcare, protect cultural properties and natural resources, poverty alleviation Development Management and Construction Office: urban planning, consultation of urban development projects, land tenure, resettlement, land management Legal Affair and Public Safety Office: transport policies, traffic safety, security
Public Relation and International Cooperation Division	15	<ul style="list-style-type: none"> Public Relation and Protocol Office International Relation Office
Procurement Unit	7	<ul style="list-style-type: none"> Procurement procedure
One Window Service Procurement Office	6	<ul style="list-style-type: none"> One window to provide transparent administrative procedures for citizens

Source: Siem Reap Provincial Administration

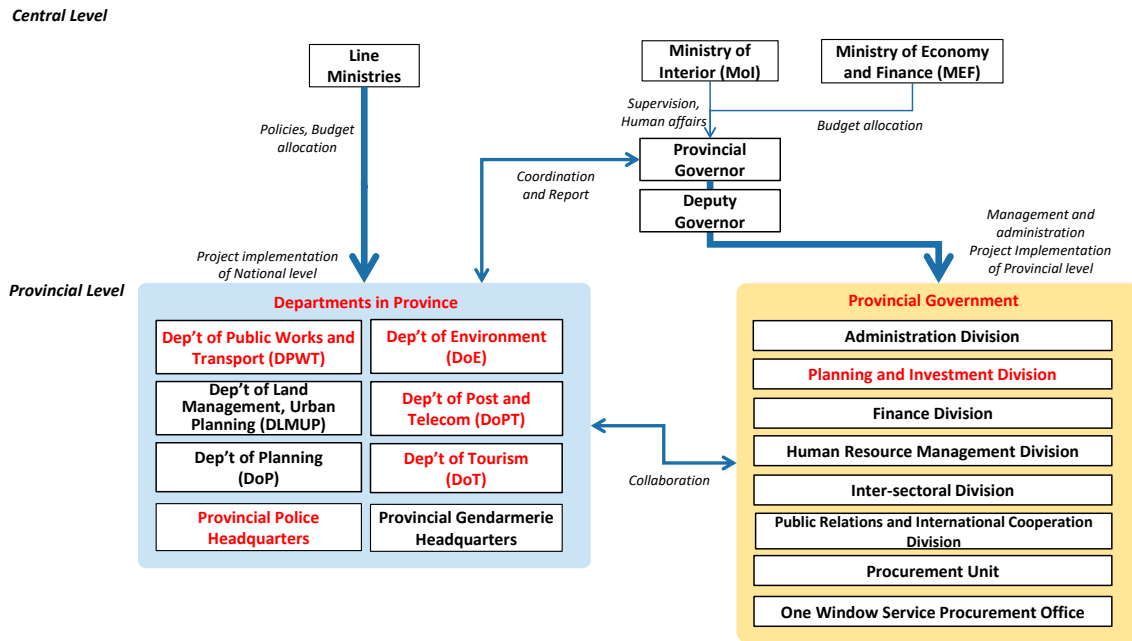
2) Coordination between Ministries and the Provincial Administration

The involvement and cooperation of the ministries, departments in the province, and the Provincial Administration in the project implementation process are summarized as follows.

- The ministries make proposals and obtain approvals from the departments (approval by Department of Land Management, Urban Development and Construction for land use permit, approval by DPWT for road maintenance, etc.)
- The Governor submits a proposal to MoI and MEF.
- The MoI submits the budget plan of the province and the Ministry of Planning (hereinafter referred to as MoP) compiles it.
- With the approval of MoP, the MEF allocates the budget to the Provincial Administration.

Role sharing between the Provincial Administration and the departments under the ministries depends on types of projects, either national level or provincial level. It is said that they coordinate and share roles effectively, for example:

- If DPWT faces difficulties with national road project in terms of land acquisition of private properties, the Provincial Administration deals with the coordination and consultation with citizens. The Governor will report to the MoI.
- The sanitation campaign for COVID-19 is conducted for local communities in rural areas jointly by the Department of Health and the Provincial Administration.



Source: JICA Survey Team

Figure 2.13: Organizational Structure of Departments under the Ministries and Provincial Administration

3) Tasks and Roles of Local Governments

Siem Reap Province consists of 12 districts (including Siem Reap City), 100 communes, and 907 villages.

Officials of provincial, city, and district offices are appointed as MoI officials, and the Siem Reap Municipal Administration consists of 66 people and 12 departments. Communes and sangkats are positioned as local government under the Commune Sangkat Administrative Administration Law, and provide office services for citizens.

Table 2.17 shows the operations of national, province, district, commune, and sangkat levels. Various licenses, land registration, environmental administration, cultural heritage protection, etc. related to project implementation are the roles of the provincial administration. Public services and social affairs are mainly handled by the governments of city, commune, or Sangkat.

Table 2.17: Main Tasks of Local Governments

Province	City, District	Commune, Sangkat
<ul style="list-style-type: none"> • Issuance and management of family register • Permits (business, construction permit, bus taxi business permit, etc.) • Vehicle registration • Electoral list management • Police administration • Land registration • Environmental administration • Price monitoring • Private weapons control • Protection of cultural heritage • Child welfare, etc. 	<ul style="list-style-type: none"> • Issuance and management of family register • Maintaining a livestock inventory • Maintaining a vehicle inventory • Report the status of the district to provincial/ municipal government, etc. 	<ul style="list-style-type: none"> • Safety, security, public order • Providing necessary public services • Improvement of welfare of residents • Promotion of socio-economic development and improvement of living standards of residents • Conservation of environment and natural resources • Coordination to promote mutual understanding among residents • General work to meet the needs of residents

Source: Ordinance of MoI 1994, Commune and Sangkat Administrative Management Law

4) Local Administrative Budget

The local government budget is stipulated in the "Financial Regime and Property Management for Subnational Administrations". Commune and sangkat are not subject to the law. Article 44 of the "Administrative Management Act on Capitals, Provinces, Cities, Districts and Communes" stipulates that local councils have their own budgets. The budget is formulated annually and must be approved by the council. Local governments must obtain prior consent to raise grants from the Minister of MEF.

5) Smart City Committee (Siem Reap Level)

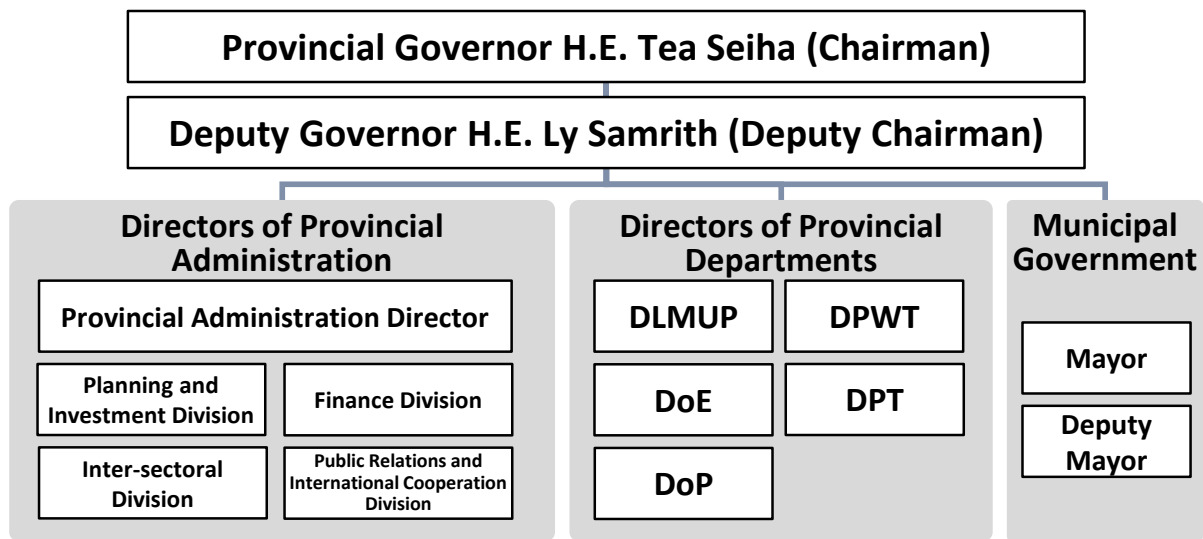
In 2019, the Smart City Committee (hereinafter referred to as SCC) was established aiming to achieve the following:

- Review and raise smart city projects to include 5-year/ 3-year development plan
- Share ideas among public and private sectors
- Develop a work plan to implement projects
- Report to relevant ministries, national institutions, provincial councils
- Integrate plans and projects into inter-ministerial committee toward the goal of the development of the tourism industry
- Evaluate plans and projects
- Report to technical coordinating committee meeting of provincial council

SCC is led by the Provincial Governor, and the Provincial Administration Office facilitates the Committee (including 14 members) and the Secretariat (including 11 members).

This includes major departments such as Department of Planning, Siem Reap Province (hereinafter referred to as DoP), Department of Land Management, Urban Planning and Construction (hereinafter referred to as DLMUPC), Department of Public Works and Highways (hereinafter referred to as DPWH), Department of Environment, Siem Reap Province (hereinafter referred to as DoE), Department of Post and Telecommunication, Siem Reap Province (hereinafter referred to as DPT) for the promotion of smart city, but the Department of Tourism, Siem Reap Province (hereinafter referred to as DoT), which is responsible for tourism promotion, and the Siem Reap Police, which is responsible for security and data management, are not included. It also does not include the Authority for the Protection of the Site and the Management of the Region of Angkor (hereinafter referred to as APSARA National Authority) in charge of heritage conservation and management.

So far, several meetings were held to discuss the policies of smart city. The Tourism Development Plan will be integrated as a part of the smart city policy. On the contrary, specific smart city projects and coordination between private sectors have not been discussed yet.



Source: Decision on Establishing a Smart City Committee of Siem Reap Provincial Administration, No. 114/SSR-19, 2019

Figure 2.14: Organizational Structure of the Smart City Committee in Siem Reap

(3) APSARA National Authority

The APSARA National Authority is an organization that conducts business and management related to development and conservation of heritage area, natural environment conservation, and living environment improvement of the Angkor Heritage Area, and has about 3,000 staff. Formerly under the supervision of the Ministry of Tourism (hereinafter referred to as MoT), it is now under the supervision of the Ministry of Culture and Fine Arts (hereinafter referred to as MCFA). The organization will be restructured in 2021, and the policy is to unify the organizations inside and outside the heritage area. Although many donors carry out conservation activities, the APSARA National Authority does not directly control donor funds.

Angkor Enterprise is the organization that collects admission fees to heritage areas, under the supervision of MoT, MCFA, MEF, and APSARA National Authority. The admission fees of the heritage area are transferred to MEF, and allocated as national budgets.

(4) Academic Organizations

Among the universities in Cambodia, the universities related to the smart city of Siem Reap are mainly as follows.

- Royal University of Phnom Penh: Founded in 1960, Cambodia's largest university. The Faculty of Engineering has the Department of Information and Medical Engineering, the Department of Communication and Electronics Engineering, and the Faculty of Development has the Department of Community Development. In December 2019, a symposium named “Conversion to Achieve Eco-society through the Industry-Government-Academia Collaboration (Toward Sustainability & Quality of Life)” was held jointly by the Honda Foundation and the Royal University of Phnom Penh, and the issues and interests of smart city development were widely discussed.
- Institute of Technology of Cambodia: It is an engineering college located in Phnom Penh, and has a Department of Computer Science.
- National University of Management: Located in Phnom Penh, it is a university specializing in the business field, with a Faculty of Tourism, a Faculty of Business IT, and a Faculty of Information Engineering, and is active in the field of open innovation. Dr. Runsinarith Phim of this university led a workshop on Smart City Planning Management (online seminar) on January 21, 2022.
- National Institution of Posts, Telecoms and ICT: A college of information and communications located in Phnom Penh; Mr. Chantra Be, the Public Relation Director, is an entrepreneur and is also active in promoting digital startups in Cambodia.

- Royal Academy of Cambodia: A university located in Phnom Penh, consisting of five institutions, including the Institute of Humanities and Social Sciences and the Institute of Science and Technology. Among them, the Graduate School of Humanities and Social Sciences issued a paper called "Smart City: Framework, Experience and Lesson Learned for Cambodia".
- University of Southeast Asia: Among the universities located in Siem Reap, it is the only university in the Cambodian University Rankings⁶ that ranks within the 30th place. There are Faculty of Economics / Business / Tourism, Faculty of Human Sciences / Education, Faculty of Science and Technology, and Faculty of Sociology / Law.
- Cambodian Institute of Urban Studies: Although it is an NPO located in Phnom Penh, it has been conducting research and education activities related to city planning in collaboration with overseas university institutions such as the University of Hamburg. The founder, Dr. Tep Makathy, gave a presentation on the overview of smart city related initiatives in Cambodia at the Phnom Penh seminar of this study (described in detail in Chapter 4).

In terms of universities in Japan, the following universities have cooperated with the projects in Siem Reap:

- Sophia University: The Sophia Asia Center for Research and Human Development supports preservation, restoration of Angkor heritages to contribute to cultural restoration and peacebuilding.
- Waseda University: Japanese Government Team for Safeguarding Angkor (hereinafter referred to as JSA) was established in 1994, headed by Professor Takeshi Nakagawa of Waseda University. JSA and The Authority for the Protection of the Site and APSARA National Authority have cooperated to conserve and restore heritages of the Angkor Heritage Site.
- Tokyo Institute of Technology: The institute has implemented "The Project on Establishment of Environmental Conservation Platform of Tonle Sap Lake" (SATREPS) funded by JICA.

Since many academic institutions are located in Cambodia and several Japanese universities are conducting research in Siem Reap, such domestic and Japanese academics are being promoted for the realization of smart cities. Cooperation with these universities and institutions is significant for smart city promotion.

(5) Other Organizations

Some organizations have conducted programs and activities to promote public-private-academia cooperation and smart city promotion.

- Cambodia-Japan Cooperation Center (hereinafter referred to as CJCC): CJCC Accelerator Program (1 time/year, 3-year program) is a competition of project proposals to promote networking and business promotion.
- Khmer Enterprise: Khmer Enterprise operates according to the following principles to achieve its mission: synergistically support entrepreneurship ecosystem building, provide financial and non-financial support to startups and SMEs, encourage and stimulate growth in prioritized sectors, and encourage local and international VCs/investors to invest in Cambodia entrepreneurship ecosystem. As financial support by central governments, Khmer Enterprise provides financial supports (49% of total investment cost) to private projects. The fund is approximately USD 4,000,000.
- Young Entrepreneurs Association of Cambodia (hereinafter referred to as YEAC), Cambodia Investors Club (hereinafter referred to as CIC), Cambodia Women Entrepreneurs Association (hereinafter referred to as CWEA): These associations support activities and provide services for entrepreneurs.

Human resources, organizations, private companies, etc. participating in the programs implemented by such organizations have high potential as players of smart-related businesses. So, it is important to support the businesses through PoC, business contest, etc.

⁶ uniRank (2020)

2.2.2 Legal Framework (Laws, Regulations, and Procedures)

(1) Relevant Laws and Regulations

Relevant laws of urban planning and development, transport and infrastructure, investment, administration, etc. are summarized below. Among them, articles related to development permission, heritage preservation, and investment are further reviewed.

Table 2.18: List of Laws Related to Urban Planning and Development, Transport and Infrastructure, Investment, Administration

Law	Outline
Law on Land Management, Urban Planning and Construction	MLMUPC is in charge of drafting the “spatial plan”. The National Land Management and Urban Planning Subcommittee, where local-level lawmakers play a role of spatial planning, receives technical support for national spatial planning and urban land use planning from relevant central governments. Development / construction permit permission is designated in Article 4 (refer to (2)).
Land Law	The Land Law was enacted in 1992 and amended in August 2001 (including establishment of a modern land registration system to guarantee the right of citizens to own land, etc.). The Land Law gives MLMUPC the authority to issue real estate titles and the authority to manage public maps of state-owned real estate. Foreigners are prohibited from owning land in Cambodia. It is stipulated that land expropriation should be carried out in the form and procedure stipulated by law after paying appropriate compensation in advance.
Law on Environmental Protection and Natural Resource Management	The Law on Environmental Protection and Natural Resource Management was enacted in 1996. It stipulates environmental protection, environmental impact assessment, etc. Based on this law, the Ministry of the Environment protects and manages the environment and natural resources (mainly in charge of water pollution related work), and the Ministry of Water Resources and Meteorology engages in water environment management and carries out water quality monitoring (mainly in charge of water quality related work). The environmental department of the province and city is in charge of domestic waste management. In case the private sector will collect, transport, and dispose of domestic waste as a business for profits, it is necessary for the private company to adopt it.
Road Traffic Law	The 2016 amendment has strengthened crackdowns on traffic violations such as wearing helmets and seatbelts and drunk driving, and has tightened fines.
Royal Decree Establishing Protected Cultural Zones in the Siem Reap/ Angkor Region and Guidelines for their Management	In addition to the Law on Protection of Cultural Properties of Cambodia, the Angkor area and other environmental conservation areas in Siem Reap Province are designated as conservation areas of approximately 10 km ² , and are stipulated by zoning laws that divide them into five zones (refer to (3)).
Electric Commerce Law	The Electric Commerce Law was enacted in 2019. Based on this, the "E-Commerce Strategy" was formulated in 2020 to promote a digital business model toward the government's goal of aiming for the Fourth Industrial Revolution and digital economy.
Investment Law	The Investment Law of Cambodia is not a "foreign investment law" but a "common investment law" that does not discriminate against domestic and foreign investment. It was enacted in 1994, and after amendment in 2005, "Government Ordinance No. 111 on the Revised Investment Law" was promulgated, and investment benefits, incentive fields, etc. were clarified by detailed regulations. On October 15, 2021, the new Investment Law was promulgated, which aims to provide a comprehensive, transparent, and predictable legal framework to attract both domestic and foreign investment. The following sectors and activities are entitled to investment incentives: <ol style="list-style-type: none"> 1. High-tech industries involving innovation or research and development 2. Innovative or highly competitive new industries or manufacturing with high added value 3. Industries supplying regional and global production chains 4. Industries supporting agriculture, tourism, manufacturing, regional and global production chains and supply chains 5. Electrical and electronic industries 6. Spare parts, assembly and installation industries 7. Mechanical and machinery industries 8. Agriculture, agro-industry, agro-processing industry and food processing industries serving the domestic market or exports 9. Small and medium-sized enterprises in priority sectors and small and medium-sized enterprise cluster development, industrial parks, and science, technology and innovation

Law	Outline
	<p>parks</p> <p>10. Tourism and tourism-related activities</p> <p>11. Special economic zones</p> <p>12. Digital industries</p> <p>13. Education, vocational training and productivity promotion</p> <p>14. Health</p> <p>15. Physical infrastructure</p> <p>16. Logistics</p> <p>17. Environmental management and protection, and biodiversity conservation and the circular economy</p> <p>18. Green energy, technology contributing to climate change adaptation and mitigation</p>
Concession Law	<p>The Concession Law was established in 2007 with the aim of promoting private investment and public-private partnership (PPP) in public infrastructure development.</p> <p>The Ministry of Economy and Finance (MEF) aims to create an environment in which the involvement of the private sector and financial institutions in public infrastructure investment, economic productivity improvement and other priority areas can continue to be promoted and encouraged in a comprehensive and international manner; The "PPP Policy 2016-2020 for Public Investment Project Management" was prepared in 2016. The policy sets out policy measures to develop effective, efficient, transparent, accountable, consistent and interconnected systems for managing public investment through PPP by the end of 2020. It identifies priority areas for public investment projects through PPP.</p>
Local Administration Law	<p>During the French-governed period, the local government was appointed by the Ministry of Interior, but in 2008, the local government was approved under the Local Administration Law to establish the local administrative management of the municipality, province, city, district, commune, and sangkat.</p> <p>The relationship between government agencies in the central and local administration has the characteristics of centralization and decentralization. Province, city, district, commune, and sangkat are all coordinated by the central government (MoI)-appointed representatives called governors.</p>

Source: JICA Survey Team

(2) Development and Construction Permission

Development and construction permission in Cambodia is stipulated by the "Law on Land Management, Urban Planning and Construction" enforced in 1994. The law was enacted based on the Land Law that came into effect in 1992, and is currently being revised to comply with the Land Law revised in 2003.

Table 2.19: Articles of Development and Construction Permission

Article	Contents
Chapter 4 Article 12	<p>Individuals, private institutions, and public institutions are prohibited from conducting construction activities on the following public land:</p> <p>"Reservoirs, dams, planned resource mining sites, forest areas, archaeological / historic resorts, gardens, parks, development areas, dirt roads for road construction, or land for roadside zone construction, land for railway construction, rivers, seas, streams and dams"</p>
Chapter 4 Article 16	<p>The construction permission application is made by the landowner or a person delegated by the landowner, and the land title is enclosed in the application form.</p>
Chapter 4 Article 17	<p>If the building does not comply with the master plan and land use / construction plan, no construction permission will be issued.</p> <p>Construction permissions are not granted if buildings or assets that are valuable in terms of public safety, environment, public health, and archeology, history, culture, aesthetics, technology or natural resources are affected by construction.</p> <p>A construction permission will not be granted if there is no suitable infrastructure or public equipment for the building.</p>
Chapter 4 Article 20	<p>Buildings built on state-owned land by investors in accordance with a contract are transferred to the state at the end of the contract period.</p>

Source: Law on Land Management, Urban Planning and Construction of Cambodia

(3) Laws and Regulations on Heritage Conservation

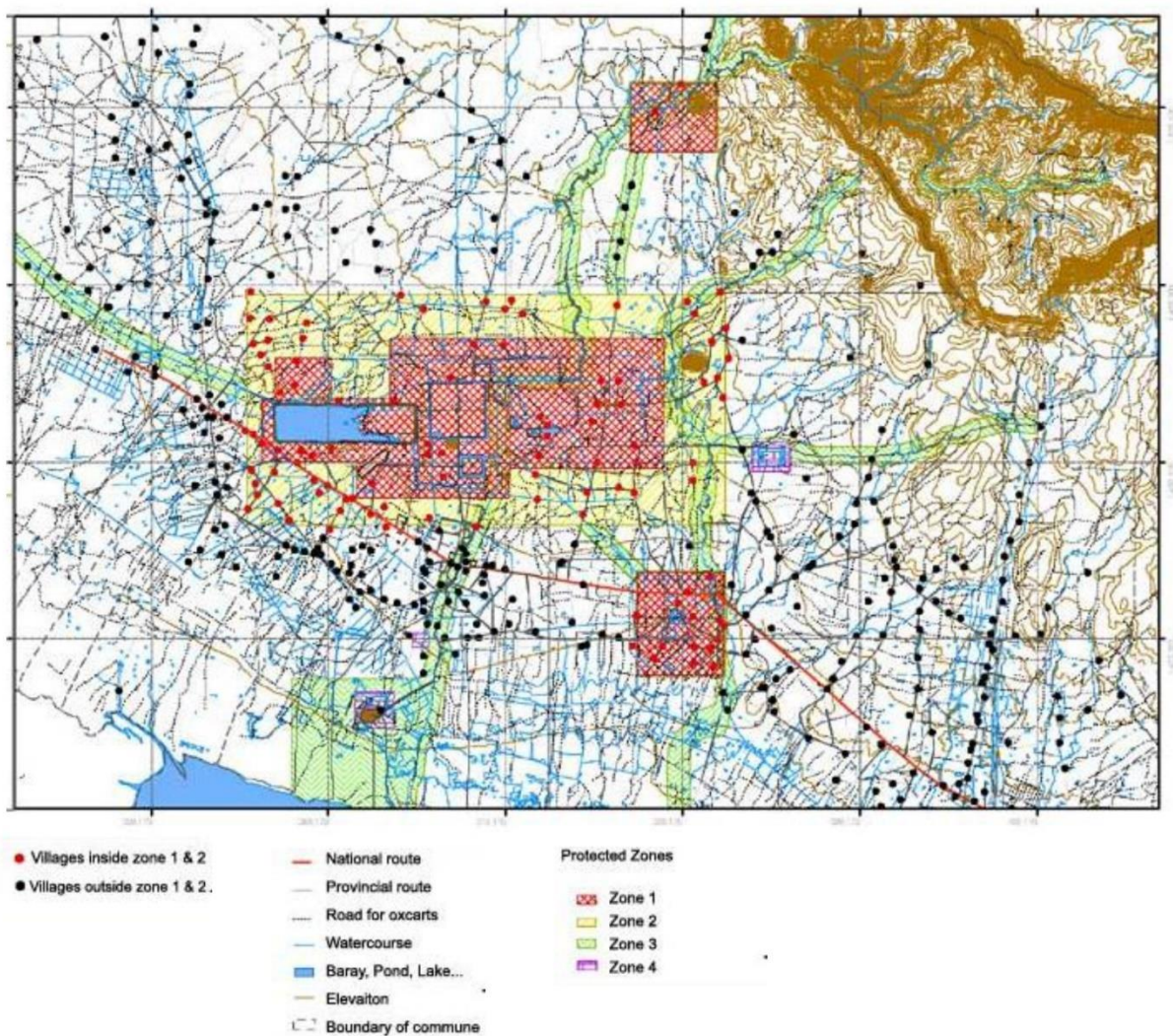
"Ordinance No. 21 in the Management of Cultural and Historical Heritage and Historic Sites and Natural Monuments" was promulgated and enforced in 1985 as a domestic law concerning the preservation of cultural properties. Then, in 1995, a new "Law on the Protection of Cultural Heritage" was enacted.

As for the Angkor area, UNESCO has taken the initiative since 1992, with the aim of wide-area conservation including the surrounding environment of the Angkor area, through the "Zoning and Environmental Management Plan for the Angkor Site (hereinafter referred to as ZEMP)". In response to this, the Cambodian government has formulated the "Law on Land Development, Urban Planning and Construction" and the "Royal Decree Establishing Protected Cultural Zones in the Siem Reap / Angkor Region and Guidelines for their Management" was promulgated and enforced in 1994.

The decree expanded the conservation area to 100,000 m² and added the Roluos area, the area around Banteay Srei, the Phnom Kulen mountain area, the water sources of rivers and the downstream area, in addition to the Angkor area.

In addition, protected cultural zones and their management guidelines have been established in Siem Reap and Angkor areas as a zoning regulation. Based on ZEMP, this zoning law defines five protected zones in the Angkor Conservation Area and Siem Reap Province.

- Zone 1: Monumental site (core zone)
- Zone 2: Protected Archaeological Reserve (buffer zone)
- Zone 3: Protected cultural landscape (along the river)
- Zone 4: Sites of archaeological, anthropological, or historical interest (sites not included in Zone 1 or 2)
- Zone 5: Socio-economic and cultural development zone in Siem Reap area (area outside the park)



Source: "Angkor Heritage Management Framework"

Figure 2.15: Five Protection Zones of Angkor Conservation Areas and Siem Reap Province

(4) Laws and Regulations on Investment

1) Investment Procedures

Private investors apply to the Provincial Administration at first. After evaluation and feasibility study, the investment plan is approved by the Provincial Administration if the investment cost is less than 5,000,000 USD.

In case if the investment cost is more than 5,000,000 USD, the private investor needs to apply to The Council for the Development of Cambodia (hereinafter referred to as CDC) with recommendation by the Provincial Government. After evaluation by CDC and a feasibility study, CDC shall approve the project.

- CDC is the only one-stop service provider responsible for overseeing reconstruction, development and investment activities, and for the evaluation and decision-making regarding the following project Investment of over USD 50,000,000.
- Including cases that have political influence.
- Exploration and development of mineral and natural resources.
- When there is concern about adverse effects on the environment.
- If it needs a long-term development strategy.
- BOT, BOOT, BOO, BLT infrastructure projects

The Cambodia Investment Commission and the Cambodian Economic Development Zone Board within the CDC screen investment applications in accordance with the Foreign Investment Law and grant incentives to investment projects.

To qualify for a Qualified Investment Project, an investor must register the investment project with the CDC or Provincial-Municipal Investment Sub-Committee and receive a “final registration certificate” under the amended Investment Act (Articles 2 and 6).

Under the new investment law promulgated in 2021, investment in 18 incentive areas (shown in Table 2.18) can choose incentives such as the right to be exempt from business income tax for 3 to 9 years from the time it first earns income, or the right to deduct capital expenditure by special amortization stipulated by the current tax system.

Foreign direct investment inflows to Cambodia have grown exponentially in the last few years due to sound macroeconomic policies, political stability, regional economic growth, and an open investment market. According to the 2020 World Investment Report by the United Nations Conference on Trade and Development (hereinafter referred to as UNCTAD), Cambodia recorded its highest ever foreign direct investment in 2019 at USD 3,700,000,000, which is a rise of 16% compared to USD 3,200,000,000 in 2018, mainly due to robust investments in manufacturing and services.

Cambodia has a generally open and liberal foreign investment regime. Incentives for investors include: 100% foreign ownership of companies, corporate tax holidays of up to eight years, a 20% corporate tax rate after the incentive period ends, duty-free import of capital goods, and no restrictions on capital repatriation.

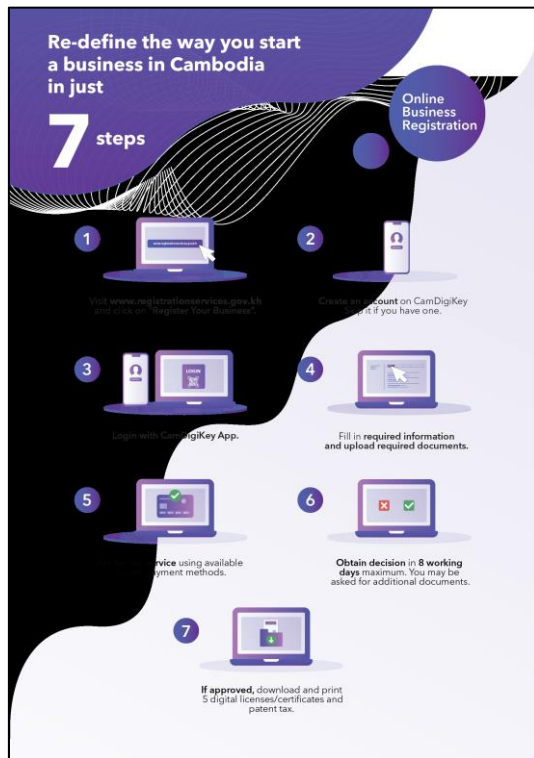
2) Online Business Registration System

From June 2020, the website of “Single Window Service” was launched to provide support for online business registration equipped with a data exchange platform connecting to relevant ministries (Figure 2.16, Figure 2.17).

At this stage, business entities may register their business with the Ministry of Commerce, General Department of Taxation, Ministry of Labor and Vocational Training (hereinafter referred to as MLVT), and the Council for the Development of Cambodia via the platform. Other relevant ministries and institutions will be involved in later stages.

Submission of application form, incorporation certificate, tax registration certificate, and all other documents is processed online, eliminating the need for hard copies. This system will contribute to support investors who cannot visit Cambodia due to COVID-19.

As of October 16, 2020, 1,618 businesses have been registered and 513 businesses are awaiting approval. The average number of days required for business registration is 8 days.



Source: Website of Online Business Registration Service (<https://www.registrationservices.gov.kh/en/home/>)

Figure 2.16: 7 Steps for Online Business Registration



Source: Website of Online Business Registration Service (<https://www.registrationservices.gov.kh/en/home/>)

Figure 2.17: Fee and Tax for Business Registration

(5) Permissions and Approvals for New Businesses

In addition to business licenses, when conducting new businesses related to each sector, there are cases where each ministry and agency requires approval procedures, using the following as an example.

- Concession contract: Concession contract procedure for infrastructure development for providing citizen services (selection of concession agencies by bidding or negotiation, issuance of grant notice, etc.)
- Commercial-related: Commercial registration certificate by MoC, trademark registration, consultation on commercial transactions, etc.
- Industry/energy-related: Factory operation notification by MoI, MoE, registration of patents/designs, manufacturing business license, electric power business investment license, etc.
- Land management/city planning/construction-related: MLMUPC operation certificate, building permit, etc.
- Tourism-related: Tourism business license by MoT, road transportation service business license for tourists, etc.
- Environment-related: Environmental protection contract by MoE, waste transportation permit, environmental impact assessment report approval letter, etc.
- Public works transport-related: Freight/passenger transport business permit and operation permit, vehicle registration, road use permit by MPWT

- Agricultural and fishery-related: MAFF's commercial transaction permit for agricultural raw materials, agricultural raw material registration certificate, etc.
- Education-related: Permission to set up an educational institution, etc. by MoEYS

(6) Summary

As mentioned above, various legal systems and procedures are involved in promoting smart cities, and the organized legal framework is a typical example. Each individual project may require related legislation and additional institutional procedures in addition to the above. In general, the information mentioned above are often only published in PDF in Khmer language on the websites and Facebook pages of each relevant ministry, and the lists of laws, regulations, and institutional procedures are not consolidated according to the business type. In Siem Reap, the complex and untransparent procedures related to the implementation of such projects are considered to be hurdles in order to improve the urban environment and improve the satisfaction of residents and tourists through active private projects.

2.2.3 Data Management and Telecommunication

(1) Current Condition and Issues

1) Telecommunication Environment

In Cambodia, six companies are delivering mobile network services, in which three mobile operators (Metfone, Smart Axiata, CellCard) account for around 90% of the market. These three mobile operators deliver services in Siem Reap as well, and offer 4G mobile network in the city center and along NR6.

Table 2.20: Major Mobile Operators in Siem Reap

Name	Description
Metfone	Operated by Viettel, a major telecom company in Vietnam
Smart Axiata	Operated by AXIATA group of Malaysia and Mitsui group of Japan
CellCard	Operated by CamGSM, a Cambodian backed mobile operator

Source: JICA Survey Team

However, the mobile networks near the Angkor Heritage Site were relatively weak. To tackle this issue, with the permission from APSARA National Authority, Camtowerlink has introduced 18 network towers around the Angkor Heritage Site. As of October 2020, all 18 towers are already constructed, and the network is gradually being provided. The contract between Camtowerlink and the three mobile operators is already completed, and the mobile network of these three operators will be transmitted.

2) Data Management of Public Organizations

At present, there is no comprehensive data management system that covers multiple governmental organizations, and data management operation is conducted by individual departments. DPT is in charge of telecommunication environment improvement of the province and internet connection of governmental organizations, but is not in charge of data management systems of the public sector. As a custom, official documents are shared among public officers by paper or via social media (individual accounts of Telegram, WhatsApp, etc.).

Information sharing of official documents are still often conducted by paper documents. As for statistical data, information is also shared by paper documents, or scan data (pdf) of the paper document. Information is rarely shared in data format that can be easily utilized, such as csv. As for information disclosure to external organizations, usually, departments cannot decide whether they can disclose information without consultation with their line ministry. Hence, in general, information disclosure takes time.

In order to clear the issues above and develop a cross-sectoral data-oriented decision making scheme, infrastructure development for data storing and sharing (such as the construction of data centers), simplification of the decision making process of information disclosure, and the capacity development of individual governmental officers for them to be able to appropriately deal with data are necessary.

As for data management of public organizations, DPT has the following opinions:

- Disclosure of information that is obtained in smart city activities shall be executed after careful discussion with relevant stakeholders.
- On the other hand, data shall not only be disclosed to citizens and tourists, but also shared among different departments, so that it can contribute to the improvement of infrastructure and public services.
- It is important to develop a cross-sectoral integrated data management system as a first step.
- DPT lacks knowledge in data management, so not only development, but also capacity development for the operation of the data management system is needed.

3) Related Laws and Regulations

Currently in Cambodia, there are no laws that fully cover data management and information privacy matters.

The E-Commerce Law, which was established in November 2019, regulates the obligations of business operators regarding the privacy of customer information in e-commerce. The Sub-Decree on National Internet Gateway, which was established in February 2021, regulates all internet information communication to go through a gateway managed by the national government.

Other matters pertaining to data protection typically fall under the right to privacy, which is protected in broad terms under the Constitution of the Kingdom of Cambodia 2010, the Civil Code of Cambodia 2007, and the Criminal Code of the Kingdom of Cambodia 2009.

According to DPT, other than the above, laws such as “Cyber Security Law”, “Cyber Crime Law”, “Data Privacy Law”, “Personal Data Protection Law” are drafted by MPT, but the detailed schedule of establishment is unclear.

(2) Existing Plans

In the 38 Road Construction Project, led by DPT, installment of underground fiber optic cables is conducted. Also, according to DPT, DPT is planning to introduce public Wi-Fi in the city center area in 2021.

On the other hand, according to documents in ASCN⁷, the vice governor declares a plan to develop integrated data system linking waste management with drainage, pedestrian, vehicle traffic, and security data by 2025.

In an interview with an internet media⁸, the mayor of Siem Reap City showed intentions to collect data on tourist experiences in the city and integrate on a large scale to help tourists and local residents access infrastructure and services.

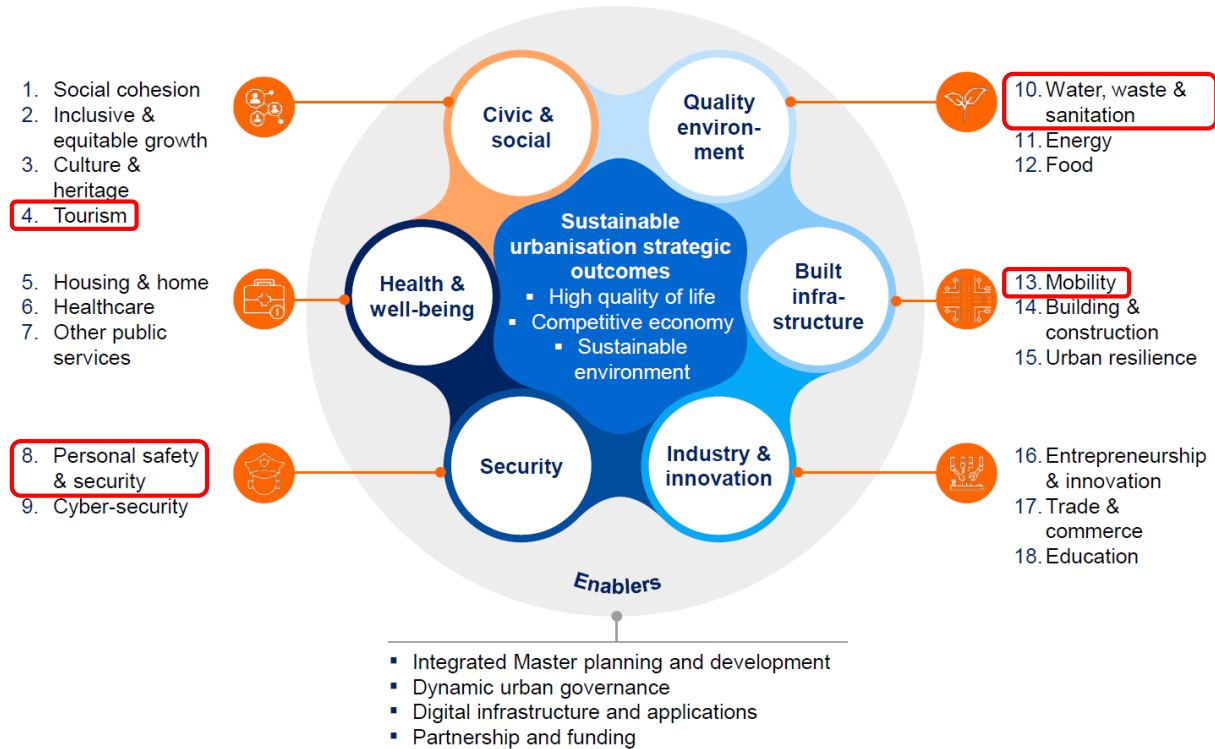
MPT has signed a memorandum of understanding (hereinafter referred to as MOU) with the Ministry of Interior and Safety of the Republic of Korea for e-government activities, and the e-government master plan is expected to be established according to this MOU. Also, according to DPT, MPT is planning to construct a data center in Phnom Penh in 2022. DPT has an intention to construct a small data center in Siem Reap Province, but there are no detailed plans.

⁷ ASCN Smart City Action Plans (as of 8 July 2018)

⁸ GovInsider (<https://govinsider.asia/connected-gov/siem-reap-cambodia-angkor-wat-mayor-so-platong-data/>)

2.3 Current Conditions and Issues of Target Sectors in Siem Reap

According to the ASEAN Sustainable Urbanization Strategy, the framework for sustainable urbanization consists of 18 sectors listed in the image below. In this survey, based on the Provincial Administrations' interest, "tourism", "mobility", "security", and "waste" were selected as target sectors, and the current conditions and issues of these four sectors were identified. In order to achieve sustainable urbanization, other various sectors as listed below need to be the subject of studies and solutions for the issues.



Source: ASEAN Sustainable Urbanisation Strategy (partially modified by the JICA Survey Team)

Figure 2.18: The Framework for Sustainable Urbanization Target Sectors in this Survey

2.3.1 Tourism

(1) Current Situation and Issues

1) Tourist Arrivals to Siem Reap

i) Number of Annual Tourist Arrivals

In Siem Reap, the number of foreign and Cambodian visitors continues to grow every year except in 2019 and the total number of visitors increased from 2,861,396 in 2010 to 4,264,325 in 2019 as shown in Figure 2.19. Both domestic and international visitor arrivals decreased drastically in 2020 due to the effect of COVID-19.

According to DoT, the supposed reasons for the drop in foreign tourist numbers in 2019 include the following:

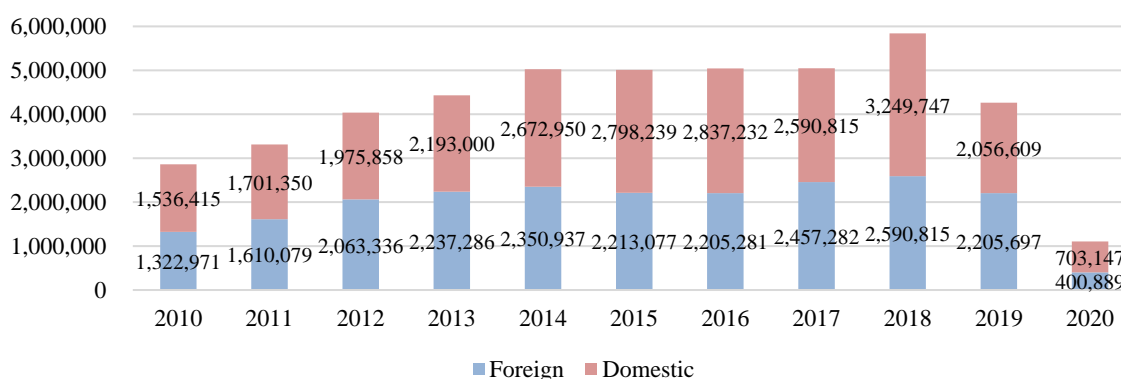
- Decline of western tourists due to Chinese tourists' bad manners
- Slowdown in China's economic growth due to the impact of China-United States trade war (impact on the middle class and above who can travel overseas)
- Competitive environment with neighboring countries (successful measures to attract tourists in case of Vietnam)

On the other hand, the Tourism Development Master Plan Siem Reap (2021-2035) claims that “the drop of international tourist arrivals is because Siem Reap has not yet responded to the global tourism trends of diversification of tourism products”.

Also, according to interviews with travel agents, many tours using chartered flights (including tours around neighboring countries) were planned from around 2012 to 2018. This led to a concentration of foreign tourists in Siem Reap, and the number of tourists in 2019 appears to have decreased. However, in reality, it is more correct to view the situation as having returned to its original state after the special demands.

In fact, the decline in the number of foreign tourists in 2019 is largely due to the decline in Chinese tourists. The main reasons are the slowdown of the Chinese economy mentioned above, the decrease in opportunities to visit due to the decrease in tours using charter flights, and conversely, the movement of visitors to other cities in Cambodia, especially Sihanoukville. In addition, according to interviews with travel industry workers, although a large number of visitors can be expected at one time if an MICE event is held, it is recognized that the promotion is not sufficient in Siem Reap.

MoT applies the data of foreign visitors to AAP prepared by the Angkor Enterprise to the number of foreign visitors to Siem Reap. Therefore, Siem Reap tourists who did not visit the park are not included in the statistics. The statistics on the number of domestic visitors to Siem Reap are based on passing traffic and other factors so that the figures may include locals or visitors for business purpose.



Source: DoT

Figure 2.19: Foreign and Cambodian Visitor Arrivals to Siem Reap from 2010 to 2020

ii) Top Ten Markets of Visitors to Siem Reap in 2019

China is the top market among the top ten markets of Siem Reap with 873,297 visitors or 39.4% in 2019. It is 77.7% smaller than in 2018. The United States of America is the second largest market of Siem Reap, accounting for 7.5% and followed by South Korea accounting for 6.1%. Top ten countries’ visitors except Japan showed a decrease compared to 2018. Especially China and South Korea showed a significant decrease that shows a vulnerability of the partly dependent structure (Table 2.21).

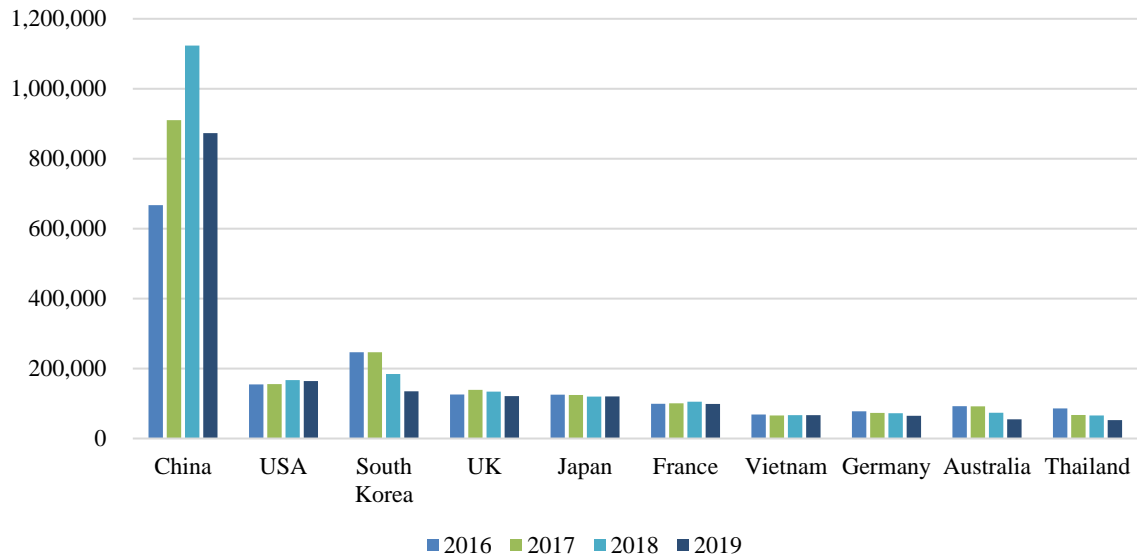
Table 2.21: Top Ten Markets of Visitors to Siem Reap (AAP) by Nationality in 2019

Country	No. of Visitor	Share (%)	Change (%) 2018/2019
1. China	873,297	39.6	77.7
2. United States of America	164,448	7.5	98.5
3. South Korea	134,886	6.1	73.2
4. United Kingdom	121,116	5.5	90.3
5. Japan	120,231	5.5	100.1
6. France	99,076	4.5	94.0
7. Vietnam	66,586	3.0	99.9
8. Germany	65,171	3.0	90.2

Country	No. of Visitor	Share (%)	Change (%) 2018/2019
9. Australia	54,942	2.5	74.6
10. Thailand	52,695	2.4	79.9
Subtotal	1,754,467	79.5	82.9
Other countries	451,230	20.5	94.9
Total	2,205,697	-	85.1

Source: Angkor Enterprise

Figure 2.20 shows the change in the number of visitors by country for the top ten countries over the last four years from 2016 to 2019. The number of visitors from China shows increase except in 2019 while those of other countries are flat or declining.

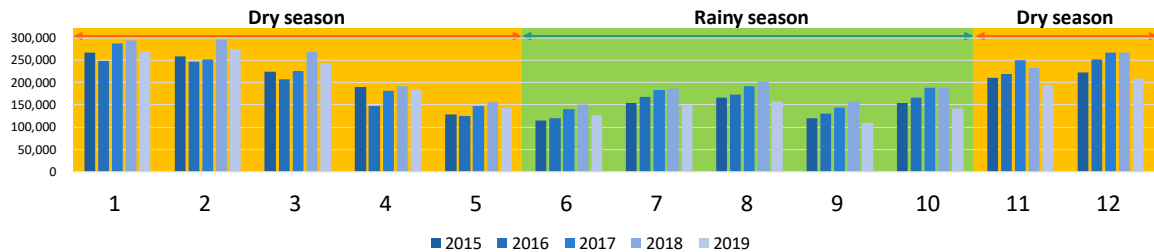


Source: Angkor Enterprise

Figure 2.20: Top Ten Markets Visitor Arrivals at Siem Reap by Country (2016-2019)

iii) Seasonal Difference in Foreign and Cambodia Visitors to Siem Reap

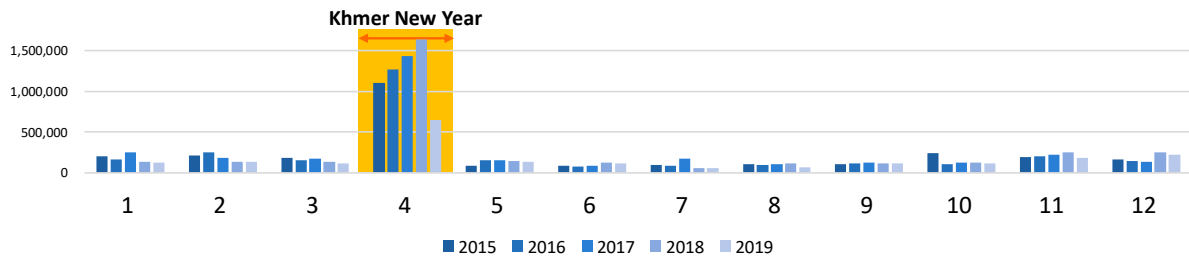
Foreign visitor arrival to Siem Reap has a seasonal fluctuation as shown in Figure 2.21. The tourism peak season corresponds to the dry season starting from November to May and especially, the period from November to March records large numbers of visitors when the amount of rainfall is small. Visitor arrivals are relatively less during the rainy season (from June to October) except during the summer vacation season (July-August).



Source: MoT

Figure 2.21: Foreign Visitor Arrivals at Siem Reap by Month (2015-2019)

Cambodian visitor arrivals to Siem Reap has also a seasonal fluctuation as shown in Figure 2.22. Tourist numbers are concentrated in April, when there are public holidays (Khmer New Year). There are no big differences among the rest of the months although June-July record the lowest in the last five years.



Source: DoT

Figure 2.22: Cambodian Visitor Arrivals at Siem Reap by Month (2015-2019)

iv) Foreign Visitors to AAP

The table below shows the number of foreigners who visited AAP in the recent five years. The number of visitors showed an increase in 2017 and 2018 when more chartered flights were arranged compared to other years although the number of visitors have been stagnant in recent years.

Table 2.22: Number of Foreign Visitors to AAP (2015-2019)

	2015	2016	2017	2018	2019
Number	2,213,077	2,205,281	2,457,282	2,590,815	2,205,697
Annual growth (%)	-5.9	-0.4	11.4	5.4	-14.9

Source: Angkor Enterprise

Regarding admission tickets sold at the entrance of AAP in 2019, 68.6% of the visitors purchased 1-day ticket and 30.5% purchased 3 days ticket. It indicates that most visitors visiting AAP stay at Siem Reap for one to three days. This trend has been the same in recent years although the share of 1-day ticket tends to increase.

Table 2.23: Number of Sold Tickets for AAP by Type

Ticket type	2017		2018		2019	
	Number	Share (%)	Number	Share (%)	Number	Share (%)
1 day	1,564,787	63.7	1,767,979	68.3	1,514,105	68.6
3 days	869,201	35.4	801,273	30.9	672,335	30.5
7 days	23,294	0.9	21,563	0.8	19,257	0.9
Total	2,457,282	-	2,590,815	-	2,205,697	-

Source: Angkor Enterprise

2) Tourism Resources in Siem Reap

Siem Reap is known as a city with a world heritage site, Angkor archaeological site, but there are various tourism resources other than the Angkor archaeological site. Many of them are underutilized because the routes for tourists are generally fixed. In addition, the provision of information to individual tourists is often insufficient. Also, the inconvenience of transportation is one of the reasons why it is excluded from the tourist route. Effective utilization of these existing and undeveloped resources is indispensable. On the other hand, under the COVID-19 epidemic, interest in ecotourism is increasing among Cambodians. According to local information, 2,000 to 3,000 Cambodians visit the Angkor archaeological site and its surroundings every day to enjoy outdoor activities such as cycling and camping.

i) City Area

a) Old Market Area

Among the urban areas, the old market area located near the Siem Reap River has not only products for local residents such as fresh food and daily necessities, but also souvenirs for tourists. At night, there are many mobile stalls selling crepes and yakisoba.

b) Pub Street

On the north side of the old market area is Pub Street, which is lined with many restaurants for tourists. This area was developed during the French colonial era, and although many colonial architectures remain, many restaurants are designed with exterior and interior that are not historic.

c) Along Sivatha Street

Sivatha Street is the main street of the city area, where large shopping malls, hotels, restaurants, bank branches, massage shops, and night markets are located. Nearby the roundabout is where bus operators and guesthouses are located, and down to the south will lead to the Tonle Sap area.

d) Along Charles De Gaulle Street

The street connects the city area and the Angkor Archaeological Park. Large resort hotels are located along the street, but few tourists are seen walking, since most of the traffic is just passing from the city area to the heritage area or vice versa. The Angkor National Museum, which demonstrates the royal historical path of the Golden Era of the Khmer Kingdom through state-of-the-art multimedia technology to provide visitors a full pictorial story of the legend for easy comprehension, is located here.

e) Along National Road No. 6 (West side)

Newly developed high-rank resort hotels, guesthouses, and large restaurants for tourists are located in this area. Also, the Cambodian Cultural Village, a theme park for Cambodian culture and history including a wax museum, small-scale models of Cambodian architecture and monuments, exhibitions and traditional dance shows, used to be located here, but due to the deterioration of management caused by COVID-19, it closed in November 2020. Also, the Angkor Eye, a Ferris wheel with 85 meters height, first in Cambodia and one of the largest in Asia, offering an inescapable experience for locals and tourists overlooking Siem Reap City and the famous temples of Angkor Wat, is located in this area.

f) Along National Road No. 6 (East side)

The largest market in Siem Reap (Phsar Leu) is located in this area. Also, many shops for locals are located here as well, and the number of tourists seen is less compared to other areas.

g) Along Wat Bo Street

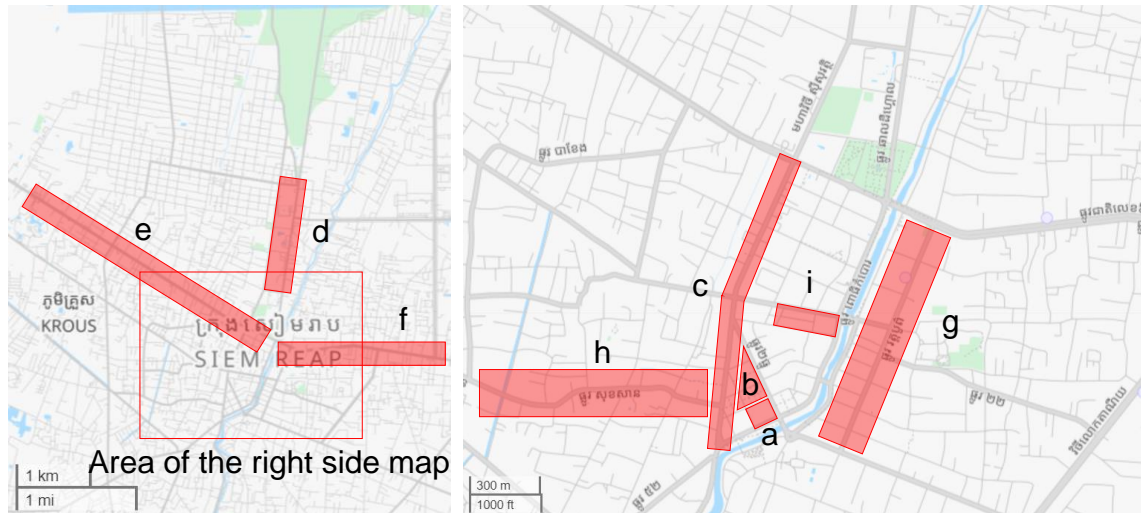
Many local restaurants popular among locals and backpackers are located in this area. In the south part, many restaurants owned by foreigners are located as well, and there are many westerners seen in this area.

h) Along Sok San Street

Many restaurants and bars recently opened in this area, and many expats can be seen.

i) Kandal Village

The central market used to be located in this area. During the recent ten years, souvenir shops, cafes, and restaurants owned by foreigners have opened business in this area.



Source: JICA Survey Team

Figure 2.23: Location of Tourism Resources in the City Area

ii) Heritage Area

a) Angkor Archaeological Park

AAP consists of around 100 temples built in the 9th century to 14th century. The major temples and ruins are Angkor Wat, Angkor Thom, Bayon, Ta Prohm, and Elephant Terrace scattered around the Angkor Archeological Area. Phnom Bakheng, a hill of Bakheng Temple located south of Angkor Thom, is the most popular sunset area that is always overcrowded at sunset.

Most foreign tourists visit these close and major temples by following “small tour route” by joining group package tour. “Grand tour route” including Preah Khan and East Mebon is also a good option to view the major temples especially for tourists who spend more time for visit.

Restoration and conservation works for Angkor Wat and other temples have been carried out by UNESCO and international agencies. In recent years, tourists are able to access major temples and ruins through improved roads.

There are three types of entry tickets. The current prices are applicable from February 2017 and are USD 37 (1 day), USD 62 (3 days), and USD 72 (7 days).

a) Balloon

It offers an aerial view of the Angkor Wat complex, Phnom Bakheng, West Baray and Tonle Sap Lake at a 200 m height from the ground.

iii) Tonle Sap Area

a) Tonle Sap Lake

Tonle Sap Lake is one of the largest freshwater lakes in the world, located 30 minutes driving to the south from central Siem Reap. It flows into Mekong River through Tonle Sap River at the south of Phnom Penh. At the Tonle Sap Lake, people can visit floating fishing villages with small tourist boats operated by local people. Tourist boat cruise is one of the most attractive tourism resources in Siem Reap.

b) Phnom Krom

It is a temple located on the mountain on the shore of Lake Tonle Sap. At dusk, the setting sun is reflected on the surface of Tonle Sap Lake, making it a popular photo spot.

iv) Others

a) Roluos Group

Roluos Group is the remains of Hariharalaya, the first capital before Angkor was built. It is known as the “Roluos Group” due to its proximity to the modern town of Roluos. It is located 13 km east of Siem Reap along NR6 and its access is relatively easy and comfortable.

b) Phnom Kulen National Park

It is a riverside archaeological site located about 50 km northeast of the center of Siem Reap. There are several brick temples on the mountain. In addition to them, there are two waterfalls with sculptures on the riverbed and waterfall basins where tourists can play in the water. Tourists do not need an encore ticket, but they need to buy a ticket for this destination for USD 20.

3) Tourism Products

In line with the constant growth of tourists to Siem Reap over the last ten years, there has been a small boom of galleries, boutiques, and souvenir shops offering variety of selection of handicrafts, silks, and carvings. Table 2.24 shows popular souvenirs by visitors’ nationality.

Table 2.24: Popular Tourism Products by Visitors’ Nationality in Siem Reap

Nationality	Popular Products
China	Accessories (bags, jewelries - the expensive ones such as gold, silver and diamond), diamonds, wines (imported wines from other countries such as France, Spain, Portugal, Chile, and Australia which are probably cheaper than the ones in China), branded clothes, and perfumes
United States of America	Silk, art, sculpture, weaving craft products, rattan craft products, painting, stone/wood carving, kroma, and books
South Korea	Silk, linen shirt, magnets, painting, clothes, and jewelries
United Kingdom	Silk, art, sculpture, weaving craft products, rattan craft products, painting, stone/wood carving, kroma, books, and clothes adapted to the hot climate such as t-shirt and linen shirt
Japan	Silk, art, sculpture, weaving craft products, rattan craft products, painting, stone/wood carving, kromas, books, clothes, and recycled bags
France	Silk, art, sculpture, weaving craft products, rattan craft products, painting, stone/wood carving, kroma, and books
Vietnam	Accessories
Germany	Silk, art, sculpture, weaving craft products, rattan craft products, painting, stone/wood carving, kroma, and books
Australia	Silk, art, sculpture, weaving craft products, rattan craft products, painting, stone/wood carving, kroma, and books
Thailand	Accessories

Source: JICA Survey Team (based on interview surveys)

4) Tourism Attraction

i) Traditional Apsara Dance

A traditional Apsara dance show is the most popular night attraction for visitors to Cambodia. The Apsara dance show is held at several restaurants and restaurants at hotels during dinnertime, which is always included in tour programs of package tours in Siem Reap.

ii) Shadow Puppet Show

Shadow puppet show is a sacred tradition that dates back to the pre-Angkorian times, with bas-reliefs from the 7th century. Believed to have been born in Siem Reap, where performances took place in paddy fields or pagodas, performances were traditionally dedicated to the divinities and could only take place on special occasions three or four times a year. Currently, shadow puppet shows are being performed in two theaters in Siem Reap.

5) Information Transmission

There are four existing Siem Reap Provincial Tourist Center in the center of Siem Reap (Figure 2.24). The information centers offer services such as arranging tour guides and rental cars as well as distributing tourist information and materials. Except these, there are no tourist information centers at other important tourism spots such as the Culture and Tourism Zone and the Old Market area. Despite their helpful services, these establishments seem to be unknown to foreign tourists.



Source: JICA Survey Team

Figure 2.24: Existing Tourist Centers

There is also an official page of Siem Reap Provincial Hall as well as DoT on Facebook. Although the frequency of publication is not low, most of them are in Khmer only, making it difficult for foreigners to understand.

On the other hand, many hotels and guesthouses in the area have free maps and free newspapers (e.g. English, Japanese), as well as information about local tours. Also, travel agencies plan and introduce local tours in their stores and on their websites.

Thus, it can be said that the information dissemination by the private sector is reaching tourists through local and web media, while the information dissemination by public organizations has relative room for improvement.

6) Marketing and Promotion

Although the importance of marketing is recognized by relevant authorities and stakeholders, practical marketing has not been successful yet. There is a room to improve the promotion based on strategic marketing (by nationality, by purpose of visit, etc.). Especially, online tools shall be effective for potential visitors living in foreign countries.

7) Typical Tour Patterns in Siem Reap

Cambodian and foreign tourists to Siem Reap aim to visit temples and ruins in the Angkor Archeological Park. Most of the foreign tourists visiting those sites are the participants of group bus tours arranged by local travel agencies with tourist guides. Backpackers and individual tourists visit Angkor Wat and other sites by car taxi, motorcycle taxi, or bicycle.

In contrast, Cambodian tourists are likely to visit those sites individually. Group tour is not common for local tourists.

The typical tourist destinations by Cambodian and international tourists in Siem Reap are summarized below.

Reason of visiting	Holidays	
Major visit route	Day 1: Angkor Wat > Angkor Thom > Terrace of the elephants > Preah Khan Temple > Ta Prohm > Phnom Bakheng > Pub Street / Night Market Day 2: Kampong Phluk > Bakong Temple > Pub Street / Night Market Day 3 (optional): Tonle Sap (the big lake)	
Length of stay	2-3 days	
Average expense	30 USD/day	
Popular season	Holidays seasons: – April: Khmer New Year – November: Water Festival – December: New Year	
Trip planning	Between friends and family	
Trip style	Friends and family	
Frequency	Several times	

Source: JICA Survey Team (based on interviews with local residents)

Figure 2.25: Major Tourist Destination (Cambodian)

Reason of visiting	Holidays	
Major visit route	Day 1: Bayon > Ta Prohm > Angkor Wat > Phnom Bakheng (sunset) > Apsara dance show (diner) Day 2: Beng Mealea > Banteay Srei > Tonle Sap > Cambodia Circus show (diner) Day 3: Angkor War (sunrise) > Old market > Spa	
Length of stay	3-4 days	
Average expense	120 - 300 USD/day	
Popular season	Holidays seasons: – High: Oct-Feb – Peak: Christmas, New Year's Eve & Chinese New Year	
Trip planning	Between friends and family	
Trip style	Friends, family and individual	
Frequency	Once	

Source: JICA Survey Team (based on a Japanese guidebook (Chikyu no Arukikata))

Figure 2.26: Major Tourist Destination (International Tourists)

8) Accommodation and Tourism-related Service Businesses in Siem Reap

i) Accommodation

The number of hotels is increasing every year in line with the rapid growth of tourism, which increased from 125 with 9,468 rooms in 2010 to 228 with 14,599 rooms in 2019.

Besides hotel development, the number of guesthouses also increased rapidly in Siem Reap. The number of guesthouses was 210 with 2,766 rooms in 2010 and it increased to 310 with 4,621 rooms in 2019.

Table 2.25: Number of Hotels and Guesthouses in Siem Reap Province (2009-2019)

Year	Hotels				Guesthouse			
	Number	Change	Rooms	Change	Number	Change	Rooms	Change
2010	125		9,468		210		2,766	
2011	138	10.4%	10,407	9.9%	230	9.5%	3,207	15.9%

Year	Hotels				Guesthouse			
	Number	Change	Rooms	Change	Number	Change	Rooms	Change
2012	153	10.9%	10,866	4.4%	217	-5.7%	3,196	-0.3%
2013	183	19.6%	11,281	3.8%	229	5.5%	3,497	9.4%
2014	170	-7.1%	11,527	2.2%	250	9.2%	3,851	10.1%
2015	188	10.6%	12,093	4.9%	294	17.6%	4,445	15.4%
2016	197	4.8%	12,609	4.3%	292	-0.7%	4,389	-1.3%
2017	220	11.7%	13,460	6.7%	296	1.4%	4,811	9.6%
2018	260	18.2%	14,456	7.4%	251	-15.2%	4,910	2.1%
2019	228	-12.3%	14,599	1.0%	310	23.5%	4,621	-5.9%

Source: DoT

ii) Travel Agency and Tour Guide

As shown below, the numbers of travel agency in Siem Reap Province were 146 in 2010 and 327 in 2019; it has more than doubled in ten years.

Table 2.26: Number of Travel Agencies in Siem Reap Province (2010-2019)

Year	Number	Change
2010	146	
2011	149	2.1%
2012	150	0.7%
2013	266	77.3%
2014	270	1.5%
2015	274	1.5%
2016	286	4.4%
2017	288	0.7%
2018	316	9.7%
2019	327	3.5%

Source: DoT

The number of registered licensed tour guides in Siem Reap Province was 4,320 as of end 2017. Among the registered tour guides by language in Siem Reap, English, Japanese, and Chinese tour guides are dominating and account for 32%, 19% and 18%, respectively as shown below. Chinese as well as Korean spoken tour guides have shown significant growth in ten years.

Table 2.27: Registered Licensed Tour Guides by Their Working Language in Siem Reap Province (2013-2017)

Language	2017	2016	2015	2014	2013	2017/2013
English	1,371	1,313	1,278	1,275	1,273	7.7%
Japanese	815	805	783	767	757	7.7%
French	279	258	251	250	246	13.4%
Chinese	766	738	717	669	634	20.8%
Korean	237	231	219	199	174	36.2%
Thai	393	386	371	358	321	22.4%
German	110	110	107	107	107	2.8%
Spanish	124	113	113	112	112	10.7%
Italian	25	25	25	25	25	0.0%
Russian	81	81	77	77	70	15.7%
Vietnamese	119	117	114	111	100	19.0%
Total	4,320	4,177	4,055	3,950	3,819	

Source: MoT

iii) Restaurant and Souvenir Shop

According to the list of registered licensed restaurants in Siem Reap Province by MoT as of end 2019, the total number of restaurants is 196.

Small souvenir shops are mainly located at Old, Taprom and Central Markets, selling various souvenirs and handicrafts such as Thai and Cambodian silks, silk products, statues, silver containers,

wood carvings, gems, antiques, and T-shirts. Most of the large hotels also have their own souvenir shops for staying guests.

In recent years, various kinds of souvenirs, handicrafts and textiles, and art products are produced and sold at shops operated by non-governmental organizations (hereinafter referred to as NGOs) and foreign owners in cooperation with local craftsmen. Major souvenir shops such as Artisans D'Angkor and Institute of Khmer Traditional Textiles (hereinafter referred to as IKTT) are introduced in tourism guidebooks. In addition, T Galleria, one of the world's most popular duty-free shop opened its store in Siem Reap in 2016 offering an unrivaled luxury shopping experience in the heart of Siem Reap. Some of the major souvenir shops are summarized below.

Table 2.28: Major Souvenir Shops in Siem Reap

Name of Souvenir Shop (Location)	Operation and Management	Major Selling Items	Other Related Shops/Facilities/Services
Artisans D'Angkor	Private (Local)	Wood and stone carving, silk products (bags, clothes, cushion covers, etc.)	<ul style="list-style-type: none"> • Training school of wood and stone carving, lacquer painting, silk woven for young peoples in rural areas (Course period: 6-8 months) • Guide tour of workshops and facilities • Angkor Silk Farm (15 km west of town) • Airport Ships (Siem Reap Airport)
Institute of Khmer Traditional Textiles (300 m south of the Old Market)	Private (Japanese and Local)	Quality Cambodian traditional woven silk textiles and products (cloth, scarf, clothes, etc.) and silk handicrafts	<ul style="list-style-type: none"> • Training school of silk weaving, dying, silk handicraft for local peoples from the rural villages • Guide tour of workshops • Developing a handicraft village in the AAP
Senteurs d'Angkor (in Old Market)	Private (French)	Natural cosmetics	<ul style="list-style-type: none"> • Workshop • Free shuttle bus between shop and workshop building
Ashi (in Night Market)	NPO (Japanese)	Bags, poaches using banana paper	<ul style="list-style-type: none"> • Operation of Japanese language school
T Galleria Angkor (next to Angkor National Museum)	Private (Hong Kong)	Branded goods, cosmetics, alcohols, tobacco, local souvenirs	<ul style="list-style-type: none"> • Free shuttle bus • Duty-free

Source: JICA Survey Team based on tourist guides books

9) General Impressions of Siem Reap Held by Tourists

The local situation faced by tourists visiting Siem Reap is shown in Table 2.29. Attractive tourism resources and hospitality are cited as positive aspects, while the development of infrastructure, quantity and quality of tourism sector workers, and promotion are cited as negative aspects.

Table 2.29: Current Situation Faced by Tourists in Siem Reap

	Infrastructure	Service
Positive	<ul style="list-style-type: none"> • World heritage resources • Various destination and local products (souvenirs) 	<ul style="list-style-type: none"> • High hospitality
Negative	<ul style="list-style-type: none"> • Insufficient infrastructures and equipment (e.g., telecommunication environment in Angkor Archeological Park, public transportation) • Lack of garbage disposal management (negative impact to landscape as well as living environment) 	<ul style="list-style-type: none"> • Angkor Archeological Park ticket system (inconvenient location of sales offices, inconvenient purchasing methods, unestablished online ticket purchasing system, etc.) • Insufficient education/information/communication of local people about heritage values of Angkor • Limited human resources/skills in tourism industry • Insufficient promotion strategy and method to attract various international market (attraction of repeaters, coordination with surrounding countries)

Source: JICA Survey Team based on existing plans

(2) Organizations

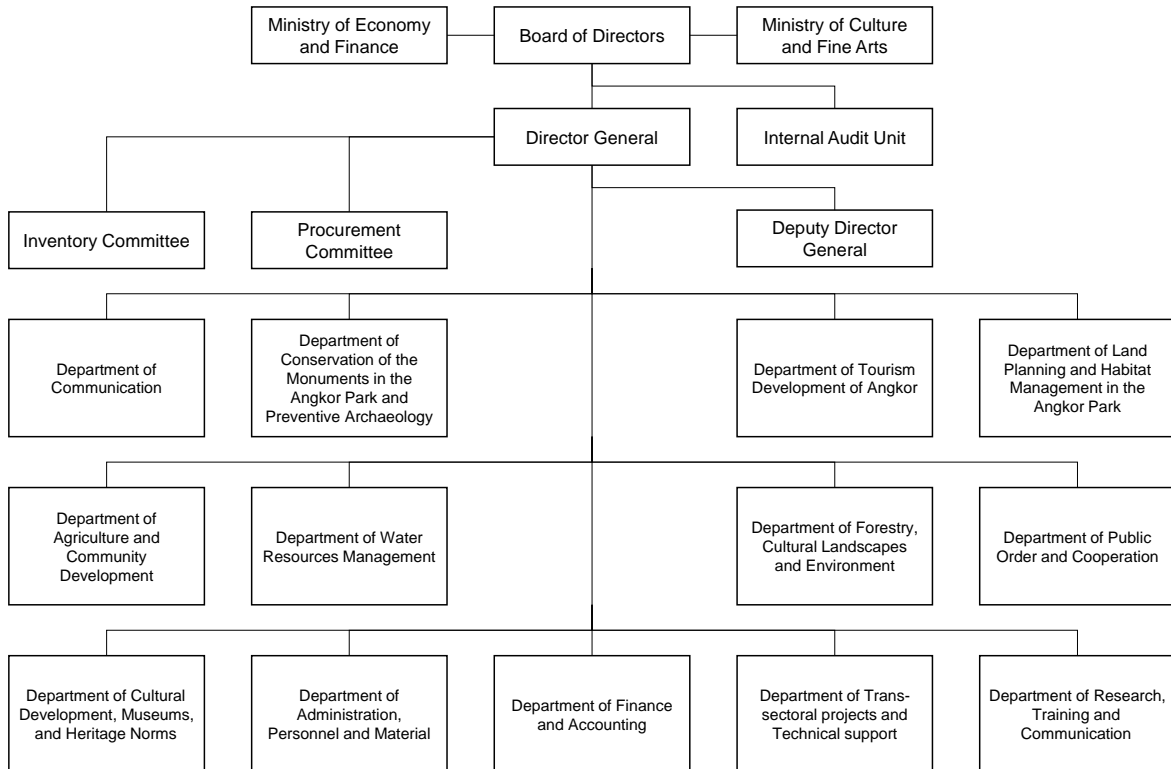
1) DoT (Siem Reap Provincial Department of Tourism)

The tourism administration in Siem Reap Province is under the jurisdiction of DoT, a line department of MoT. DoT collects data, information, and statistics on foreign tourists and tourism businesses and reports them to MoT.

In terms of the relationship with the Provincial Administration, the DoT office is located about 2 km away from the provincial hall. Based on surveys conducted so far, it is confirmed that there are no regular opportunities for consultation between the two parties, but meetings are set up and discussed as needed.

2) APSARA National Authority

APSARA National Authority is a national government institution established in 1995. Its mission is to ensure the conservation of the Angkor site, which is designated as a World Heritage Site by UNESCO, and to develop policies concerning its protection. The figure below shows the organization structure of APSARA National Authority. The “Department of Urban Planning and Siem Reap-Angkor Area Development”, formerly said to have existed in 2009, cannot be seen.



Source: JICA Survey Team (according to information from APSARA National Authority)

Figure 2.27: Organization Structure of APSARA National Authority

The missions that APSARA National Authority raises are as follows:

- Protection and preservation: Ensure, in the region of Siem Reap and Angkor, the protection, the preservation, and the valuation of national cultural property, including monuments, preservation maintenance, restoration, management of the historic water system.
- Development of tourism: Conceive and lead the development of cultural tourism of the region of Siem Reap and Angkor. In charge of the awareness of the tourism about AAP and its cultural and historic resources.

- Community and social management: Maintain dialogue with the communities living among traditional villages on site. Carry out sustainable development to contribute to the implementation of the policy of the Royal Government of Cambodia for poverty reduction.
- Regional management: Establish partnerships with provincial and territorial authorities and enhance the cultural values of the site and its region, especially the cultural heritage of Siem Reap Town.
- International cooperation: Cooperate with institutions and organizations, both local and international, which have objectives answering the vocation of ANA and are operating in the region (UNESCO, ICC Angkor, etc.).
- Environmental protection: Protection and conservation of forests, gardens, and biodiversity within and around AAP.

Projects such as road repair, signage maintenance, and irrigation canal maintenance within the site are carried out by the “Department of Trans-sectoral Projects and Technical Support”. On the other hand, the walkway installation along Siem Reap River and management of roadside trees, which were duties said to have been done by the “Department of Urban Planning and Siem Reap-Angkor Area Development” in 2009, are currently conducted by MPWT in the 38 Road Construction Project. Little participation of APSARA National Authority is seen in this project. On the other hand, in terms of tourism promotion, the website of the APSARA National Authority has been renovated to provide more information to tourists in an attractive way. They are also planning to monitor congestion at various sites in the Angkor Archaeological Park through the digitalization of the Angkor Pass, and develop an advance reservation system to ease queue congestion at spots with limited numbers of visitors (such as the Third Corridor of Angkor Wat).

3) Angkor Enterprise

Angkor Enterprise is a public administration, which is under the technical supervision of MoT and financial supervision of MEF, and has duties such as managing and collecting revenue from selling AAP tickets, providing a proposal on how to collect revenue of selling ticket from AAP, etc. Through the interviews so far, it is confirmed that Angkor Enterprise has a relationship with APSARA National Authority when their decision and advice are needed. With the provincial administration, they share the information and collaborate with each other during tourism-related meeting opportunities.

(3) Existing Plans

1) Tourism Development Master Plan Siem Reap (2021-2035)

On March 30th 2021, the “Tourism Development Master Plan Siem Reap (2021-2035)” was approved. The master plan was scheduled to be approved in early 2020, but the procedure was delayed due to the COVID-19 epidemic. Table 2.30, Table 2.31, and Figure 2.28 show the outline of the master plan.

Table 2.30: Outline of Tourism Development Master Plan Siem Reap (2021-2035)

Objective	To transform the province into a major and attractive tourist destination in the region and the world based on the foundation of cultural, natural, and historical heritage, religion, and Cambodianess. To ensure sustainable and inclusive manner in tourism development, Siem Reap shall follow good practices from all eras, especially the Angkor Empire era, as well as take into account the “Clean, Green and Smart” in this modern setting and the path to building a digital economy.
Goals to achieve	<ul style="list-style-type: none"> • Developing priority tourism zone in Siem Reap • Developing new tourism products • Promoting tourism and attracting tourists • Strengthening quality and sustainability of tourism development in Siem Reap • Managing Siem Reap’s environment • Developing infrastructure and enhancing connectivity to support tourism in Siem Reap • Reinforcing governance for supporting Siem Reap tourism development based on the participatory approach

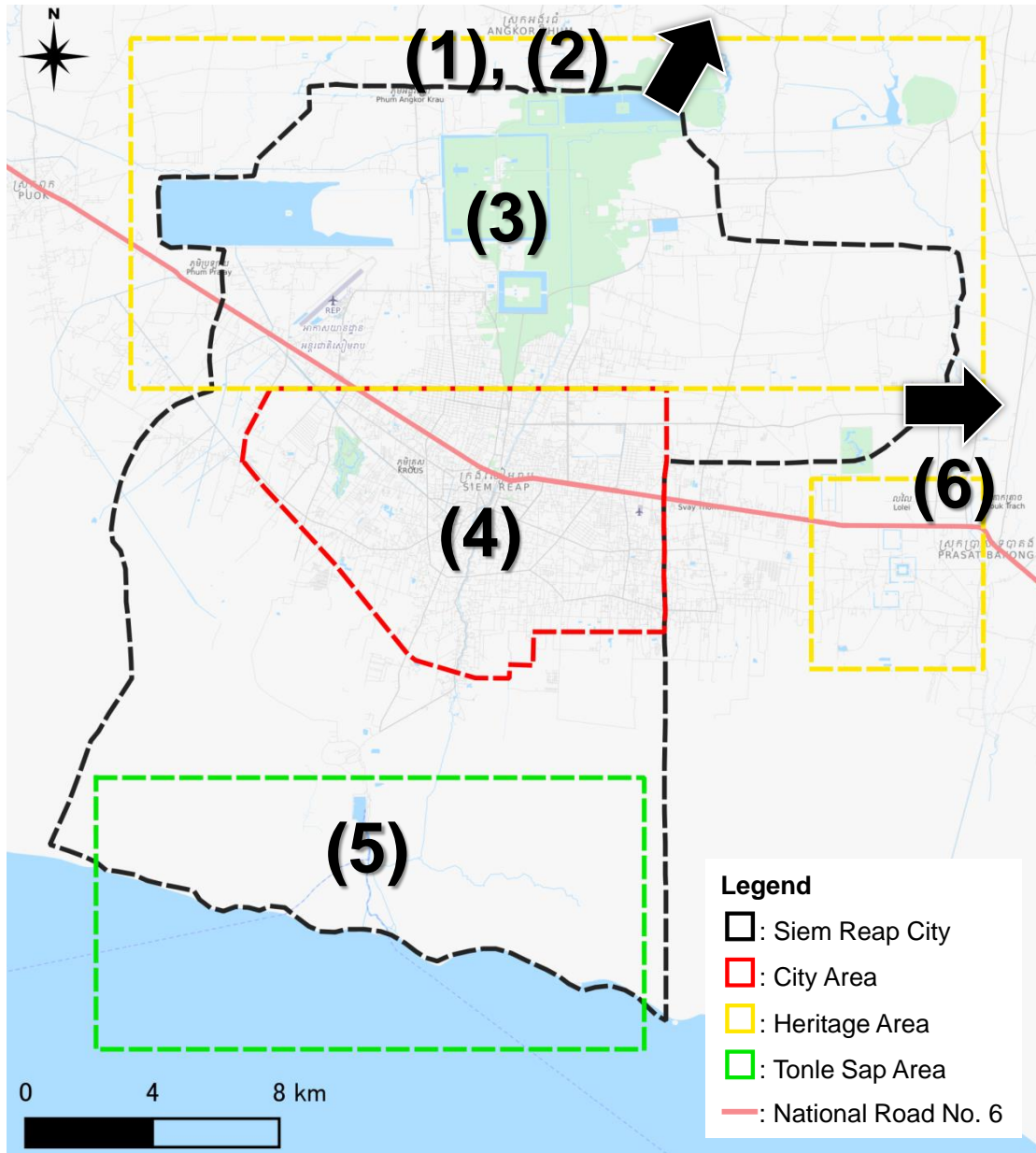
Strategies	<ul style="list-style-type: none"> • Strategy for Development of Priority Tourism Zone • Strategy for Development of New Tourism Products • Strategy for Promoting Tourism and Attracting Tourists • Strategy for Strengthening Quality and Sustainability of Tourism Development • Strategy for Managing Environment • Strategy for Developing Infrastructure and Enhancing Tourism Support Connectivity
Principle poles of tourist development	<ul style="list-style-type: none"> (1) Kulen Mountain (2) Banteay Srei (3) Angkor Archeological Park (4) Siem Reap City (5) Tonle Sap (6) New Development Site (Grand Siem Reap)
Target year	Short-term (2021-2023), mid-term (2023-2030), long-term (2030-2035)

Source: Tourism Development Master Plan Siem Reap (2021-2035)

Table 2.31: Details of Principle Poles of Tourist Development Proposed in the Tourism Development Master Plan Siem Reap (2021-2035)

(1) Kulen Mountain	<ul style="list-style-type: none"> • The development of religious tourism and faith tourism • The development of natural tourism and ecotourism • The development of natural tourism and adventure tourism • The development of research and science tourist destination • The improvement of the quality of tourism services in Phnom Kulen National Park • Management and development mechanism in Phnom Kulen National Park
(2) Banteay Srei	<ul style="list-style-type: none"> • The development of Banteay Srei area to make it a new and attractive destination for Siem Reap • Improving the value of natural resources and maximize the economic benefits through tourism • Management mechanism and tourism development at Banteay Srei
(3) Angkor Archeological Park	<ul style="list-style-type: none"> • Tourist flow management in the Angkor Heritage Site • Protecting the environment in the Angkor Heritage Site • Enhancing governance for Angkor Heritage Site
(4) Siem Reap City	<ul style="list-style-type: none"> • Establishment of tourist attractions in Siem Reap City center • Expanding buffer zone of Siem Reap City to serve the tourism growth • Management mechanism and tourism development for Siem Reap City
(5) Tonle Sap	<ul style="list-style-type: none"> • Improving tourism service and product diversification at Tonle Sap Area • Strengthening quality of environment and landscape of Tonle Sap Lake • Management and development mechanism in Tonle Sap Area
(6) New Development Site (Grand Siem Reap)	<ul style="list-style-type: none"> • Eco-buildings, Eco-transport, Eco-living • Smart city • Green living, Green transportation, and Smart city

Source: Tourism Development Master Plan Siem Reap (2021-2035)



Source: JICA Survey Team

Figure 2.28: Location of Principle Poles of Tourist Development

2) Roadmap for Recovery of Cambodia Tourism During and Post COVID-19

The “Roadmap for Recovery of Cambodia Tourism During and Post COVID-19” was approved by the Prime Minister on April 3, 2021. The roadmap, prepared by the MoT, is a national plan to revive the tourism industry that was severely damaged by COVID-19. It divides tourism recovery into three stages and proposes a roadmap and project for each stage.

Table 2.32: Phasing and Strategies in the “Roadmap for Recovery of Cambodia Tourism During and Post COVID-19”

Phase	Strategy
Phase 1 (Resilience & Restart): Crisis management in the New Normal phase and planning for recovery (2020 ~ 2021)	Economic Assistance for Private Sector and Employment
	Promote Domestic Tourism and Prepare to Welcome International Tourists: “Special Tourists under Healthcare Surveillance and Management”
	Develop Tourism Governance Mechanisms

Phase	Strategy
Phase 2 (Recovery): Recovery of tourism sector (2022 ~ 2023)	Recovery of Economy and Employment in Tourism Sector
	Recovery of the International Markets (Regional) and Continue to Promote Domestic Tourism
	Enforce the New Tourism Governance Mechanisms
Phase 3 (Relaunch): Preparation for the new future of tourism sector in Cambodia (2024 ~ 2025)	Promote Economic Growth and Decent Work in Cambodia's Tourism Sector
	Strength of Domestic Tourism and Expanding Cambodia's Tourism to International Markets (Beyond 2023)
	Future Tourism Governance

Source: Roadmap for Recovery of Cambodia Tourism During and Post COVID-19

Table 2.33: Project List of Post-covid Tourism Recovery Roadmap

Section	Project Title	Priority of Time (Phase Number)
Protect and Promote the Economy and Employment in the Tourism Sector in Cambodia	1. Travel Bubble and One Way/Two Way Closed-Loop Chartered Plane	1, 2
	2. Cambodia: The Implementation of Tourism Safety Measures Campaign for (2021-2023)	1, 2
	3. Tourism Digital Literacy and Digital Skills Campaign (2021-2025)	1, 2
	4. Economic Leakage Reduction in Tourism	1, 2, 3
	5. Establishment of the National Vocational School in Tourism (Siem Reap and Monduliri Provinces)	3
	6. Tourism Satellite Account (TSA) Project	1, 2
Promote the Cambodian Tourism Market	7. Feasibility Study of Angkor Heritage Development: Smart Tourist Destination	1, 2
	8. Chong Khneas's Tourism Port Improvement Project	1, 2
	9. Pedestrian Area Planning Project in Siem Reap, Phnom Penh and Sihanouk	1, 2
	10. Establishment of Cambodia Pass	1
	11. Develop Physical Infrastructures (Roads are priority) including Water, Electricity, Sewerage, and Environmental Management (especially garbage) to Promote Domestic Tourism Movement to Tourist Attractions	1
	12. Development of Self-driving Tourism	1, 2
	13. Clean Up Cambodia Campaign: To Welcome SEA Game-2023 Event	1, 2
	14. Strengthening the Promotion of Domestic Tourism Information and the Establishment of Tourist Information Centers at Provinces/Cities	2
	15. Visit Cambodia Year 2022-2023	2
	16. MICE Tourism Attraction Project: Cambodia as a Destination for MICE Tourism	1, 2, 3
Promote Tourism Governance	17. Capacity Building Program for Cambodia's Tourism (2021-2023)	1, 2

Source: Roadmap for Recovery of Cambodia Tourism During and Post COVID-19

3) Other Projects under Planning and in Implementation

According to Angkor Enterprise, online ticket purchasing service is planned although it remains before the operation amid COVID-19 epidemic.

During the second Tourism Investment Forum held in Phnom Penh on November 21, 2019, 38 projects and USD 9,000,000,000 worth of investments have been approved for the tourism sector in the whole country by CDC from 2016 to November 2019. The projects that are planned in Siem Reap out of the 38 projects are to be collected.

Table 2.34 shows several large-scale tourism-related projects under planning in Siem Reap.

Table 2.34: Tourism-related Projects under Planning in Siem Reap

Project	Project Owner	Outline	Expected Year of Completion
Angkor Wildlife & Aquarium	Angkor Wildlife & Aquarium Co Ltd (Cambodian-Japanese joint venture in association with US company)	<ul style="list-style-type: none"> The project will be built on 100 ha of land, divided into three phases. The first phase will cost USD 18,000,000 in investments and will begin operations in May 2021. The second and third phases will include a botanical garden, exhibition halls, reptile sites, a recreation area, shops and world-class hotels. The total investment will be worth USD 70,000,000. 	May 2021
Cambodia-China Cultural Park	Angkor International Culture Investment & Development (China)	<ul style="list-style-type: none"> The project will be developed in Sla Kram Commune in Siem Reap, home to the AAP The total investment will be worth USD 27,500,000. 	-
Mixed-use Development	Thai companies	<ul style="list-style-type: none"> The project will comprise holiday homes, resorts, and a floating market on 500 ha land. The total investment will be worth USD 200,000,000. 	-

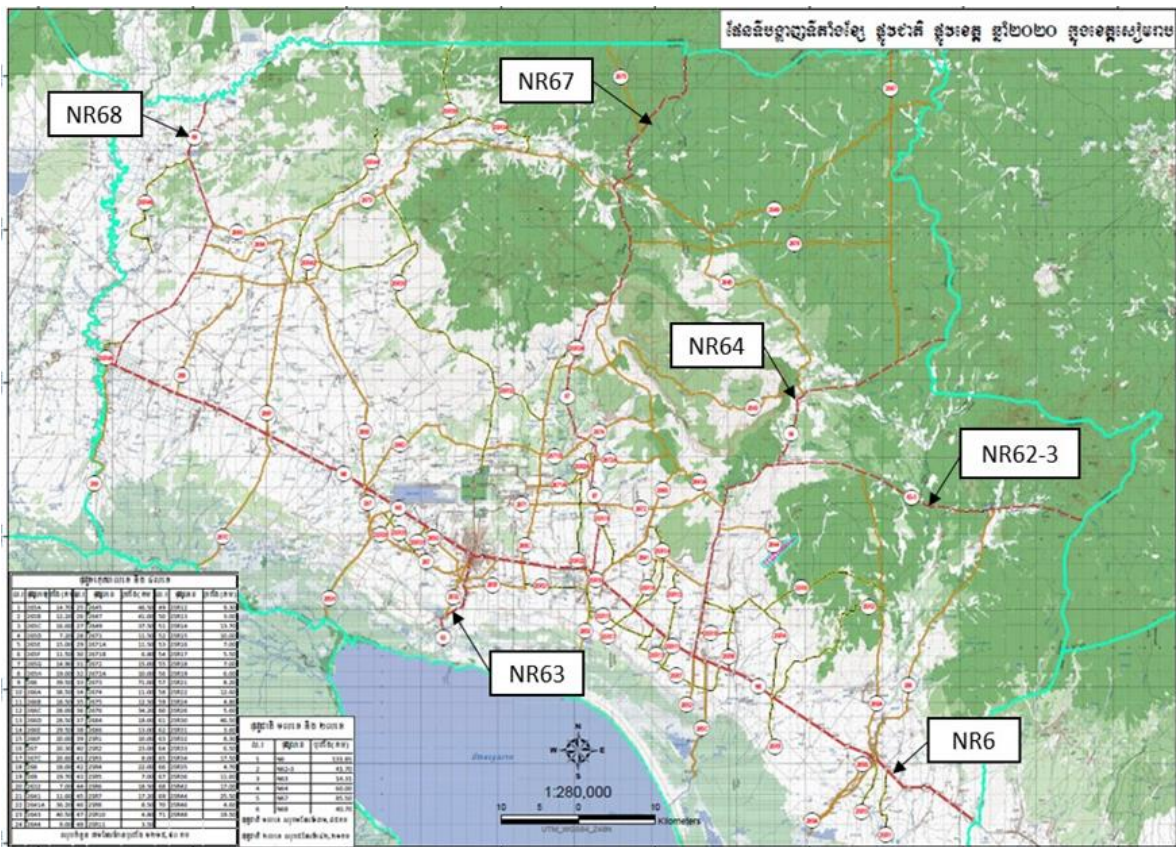
Source: JICA Survey Team based on local newspapers

2.3.2 Mobility

(1) Current Condition and Issues

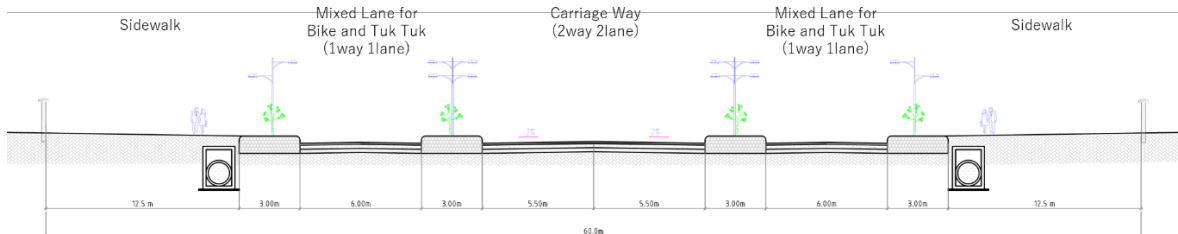
1) Road Network

Siem Reap Province has 374 km long national roads and 860 km long provincial roads (Figure 2.29). There are six national roads, No. 6 (Phnom Penh - Siem Reap - Banteay Meanchey), No. 62-3 (Siem Reap - Kampong Thom), No. 63 (Siem Reap – Tonle Sap), No. 64 (Siem Reap - Stung Treng), No. 67 (Siem Reap - Oddar Meanchey), and No. 68 (Siem Reap - Oddar Meanchey). Out of these roads, NR6 passes from southeast to northwest and connects between the city center of Siem Reap and the next provinces (Kampong Thom, Banteay Meanchey). A typical cross section of NR6 is shown in Figure 2.30.



Source: DPWT

Figure 2.29: Major Road Network in Siem Reap Province



Source: DPWT

Figure 2.30: Typical Cross Section of NR6 (Around Angkor Market)

2) Public Transportation

i) Bus

There is no route bus in Siem Reap Province, but some express buses connect between Siem Reap and other cities. Currently, more than ten companies have operated express buses as shown in Table 2.35. Destinations of the buses are not only domestic cities, such as Phnom Penh and Battambang, but also the cities of next countries, such as Bangkok and Ho Chi Minh City. When the Borey Seang Nam Bus Station was opened in 2009, many bus companies load and unload passengers in this station. However, the number of bus companies using the bus station has been decreasing in recent years. This is because as the main means of transportation between cities have changed from large-sized buses to vans, more companies are loading and unloading passengers in front of their offices in the city instead of the bus station.

Moreover, the Siem Reap Bus Station has been set up at a sub-urban area by the government supporting private and public transportation. However, the system of the Siem Reap Bus Station does not work at present because the passengers have less willingness to take the buses at the bus station due to its inconvenient location. The express buses are operated by private companies; in this case, the private bus companies have their own bus stops to drop off or pick up passengers.

Table 2.35: Express Bus Network from/to Siem Reap

Operator	Destinations
Mekong Express Limousine Bus	Phnom Penh, Battambang, Banteay Meanchey, Ho Chi Minh City (Vietnam)
Liang U.S Express Bus	Phnom Penh, Kampong Cham
Orient Express 1907 Bus	Phnom Penh
Larryta Express	Phnom Penh, Sihanouk Ville
Virak Buntam Siem Reap Bus Branch	Bangkok, Siem Reap, Ho Chi Minh, Kampong Cham, Kampong Thom, Kampot, Koh Kong, Koh Rong Samloem, Kratie, Monduliri, Phnom Penh, Poi Pet, Preah Vihea, Ratanakiri, Stung Treng, Sihanouk Ville
Olongpich Express Transportation	Battambang, Koh Rong Saleom, Koh Rong, Sihanouk Ville, Kampot, Koh Rong, Phnom Penh, Poi Pet, Phu Quoc Island, Pursat, Ha Tien (Vietnam), Kep, Ho Chi Minh City (Vietnam), Bangkok (Thailand), Cambodia Lao Border,
Rithya Monduliri Express	Monduliri. Phnom Penh
Angkor Express Mini Van	Phnom Penh
Seila Angkor Khmer Express	Phnom Penh
Phnom Penh Sorya Bus Siem Reap	Phnom Penh, Kampot, Battambang, Banteay Meanchey, Poi Pet, Kep, Kampong Cham, Kratie, Sihanouk Ville, Pursat, Kampong Chhnang, Kampong Thom, Bavet, Ho Chi Minh City (Vietnam)
Capitol Bus Station	Phnom Penh, Sihanouk Ville, Battambang, Pailin, Poi Pet, Bangkok (Thailand), Ho Chi Minh City (Vietnam), Chau Doc (Vietnam), Kampong Cham, Kampot, Pailin
Mey Hong Transport	Phnom Penh, Sihanouk Ville
V.R Express Travel and Tour	4000 Island (Lao), Don Det (Lao), Pak Se (Lao), Vieng Chan (Lao)
Pacific Express Siem Reap	Phnom Penh, Kampot

Source: JICA Survey Team

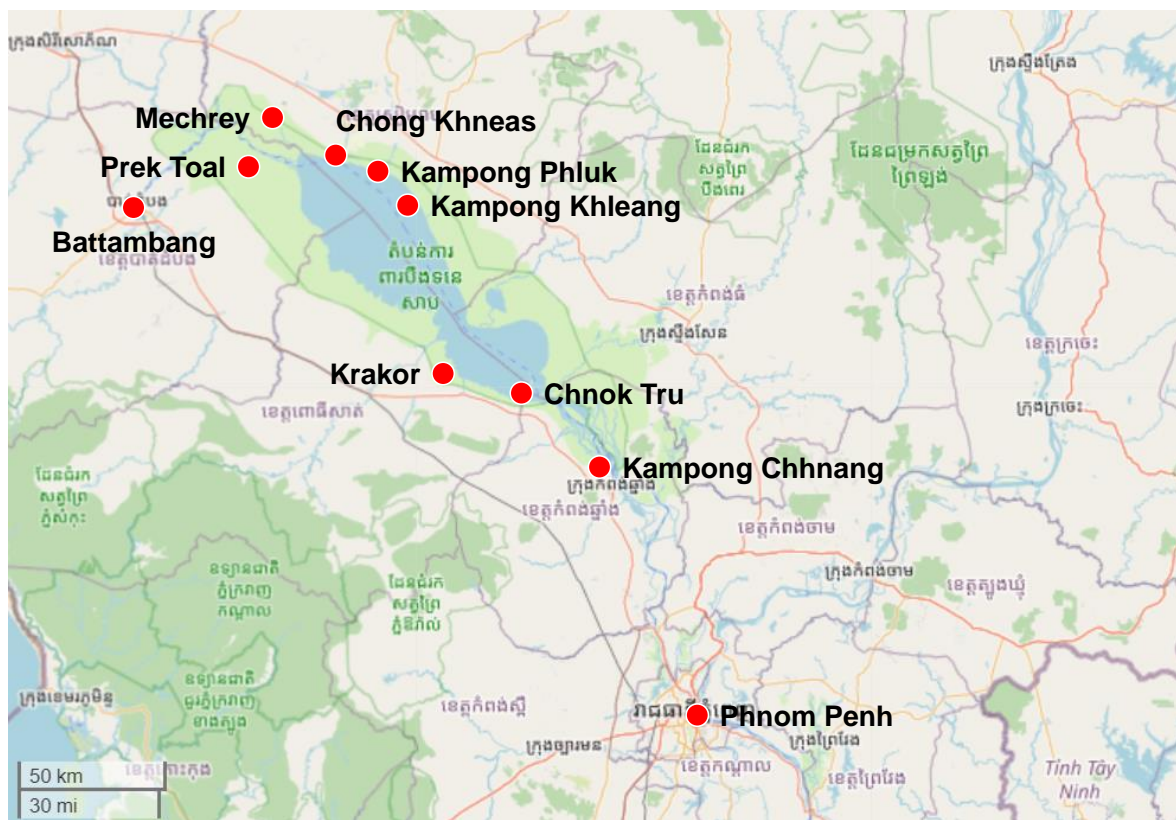
ii) Water Ferry

Water Ferry is one of the essential transportations around Tonle Sap Lake. Ten water ferry routes are available from/to the ports in Siem Reap and the ferry is operated by some private companies (Table 2.36 and Figure 2.31). Chong Kneas Port in Siem Reap is a main port of water ferry transportation and the ferry from/to the port connects with ports in Siem Reap Province and other provinces. In general, the ferry has two types. One is “local boat” for mainly local people and the other is “speed boat” for mainly tourist. Particularly, “local boat” is used as not only one of the passenger transportations but also one of the logistics means. However, the water ferry is not operated during the dry season due to the low water level of Tonle Sap Lake.

Table 2.36: Water Ferry Route from/to Siem Reap

Water Ferry Route	Distance (km)
Chong Kneas (Siem Reap Province) ⇔ Phnom Penh (Phnom Penh Municipality)	251
Chong Kneas (Siem Reap Province) ⇔ Kampong Chhnang (Kampong Chhnang Province)	151
Chong Kneas (Siem Reap Province) ⇔ Chnok Tru (Kampong Chhnang Province)	109
Chong Kneas (Siem Reap Province) ⇔ Battambang (Battambang Province)	96
Chong Kneas (Siem Reap Province) ⇔ Krakor (Pursat Province)	83
Chong Kneas (Siem Reap Province) ⇔ Kampong Khleang (Siem Reap Province)	48
Chong Kneas (Siem Reap Province) ⇔ Prek Toal (Battambang Province)	25
Chong Kneas (Siem Reap Province) ⇔ Kampong Phluk (Siem Reap Province)	25
Chong Kneas (Siem Reap Province) ⇔ Mechrey (Siem Reap Province)	16
Mechrey (Siem Reap Province) ⇔ Prek Toal (Battambang Province)	13

Source: DPWT



Source: JICA Survey Team

Figure 2.31: Location of Ports for Water Ferry

iii) Tuk tuk

Tuk-tuk is mainly used for short range travel by residents and tourists inside a province. Two tuk-tuk applications, “PassApp” and “Grab”, are available in Siem Reap at present.



Source: Khmer Times

Figure 2.32: Images of Tuk Tuk in Cambodia

iv) Shared Van

Shared van is mainly used by local people for going to and from the provinces of Cambodia. The van is parked at parking space in a public market that also serves as a van terminal and passenger waiting station. Passengers can ride on the van not only at the terminal but also on roadsides in the middle of the way. They can use it as transportation inside the provinces as well.

v) Airport

Siem Reap International Airport is located in the west of Siem Reap City and 8 km away from the city center (Figure 2.33). The airport is operated by VINCI Airports, a French company. It has one runway whose length is 2,550 m and many international flights. There are direct flights for eight countries and domestic flights for Phnom Penh and Sihanoukville. The number of passengers has increased gradually until 2019; 3,900,000 passengers used the airport in 2019. Currently, airport bus and railway are not existing, so passengers need to ride tuk-tuk or taxi for transport between the airport and the city center of Siem Reap.

In addition, a new airport is being constructed in the east of Seam Reap Province at present for dealing with the lack of capacity of the existing airport. The construction work will be completed in 2023 and Yunnan Investment Holdings, a Chinese company, will operate the airport after the completion of construction. The new airport will have a runway whose length is 3,300 m and the capacity is 7,000,000 passengers per year.



Source: VINCI Airports

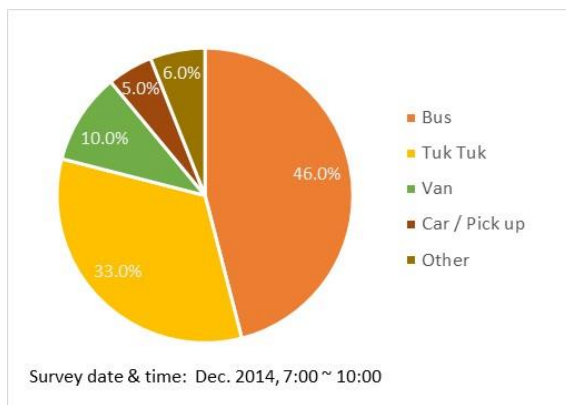
Figure 2.33: Location of Airports

3) Transportation Means for Tourists

Tuk-tuk is the main transportation means in Siem Reap where there is no route bus. However, other transportation means are also used by tourists. The modal share of foreign tourists in Siem Reap was

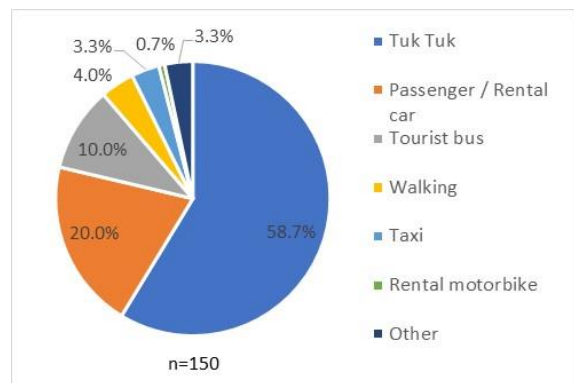
surveyed in front of the Angkor Thom South Gate in 2014. According to the survey result, bus and tuk-tuk were the main transportation means around the AAP area (Figure 2.34). Furthermore, major transportation means for tourists were surveyed through interview with tourists in the “Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia” (hereinafter called “Korean MP Study”). From the interview survey result, it can be inferred that tuk-tuk, passenger car, rental car, and tourist bus are the main transportation means for tourists in Siem Reap (Figure 2.35).

Moreover, electric vehicles (hereinafter referred to as EV) were once introduced as means of transportation in AAP and rental car for tourists. However, electric four-wheeled vehicles are rarely in operation nowadays. On the other hand, rental electric motorcycles (e-bike) have become widespread as a means of transportation for tourists.



Source: The Study for environmental and cultural city formation supporting with JCM in Angkor Heritage area, Cambodia

Figure 2.34: Modal Share of Tourists at the front of Angkor Thom South Gate (2014)



Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

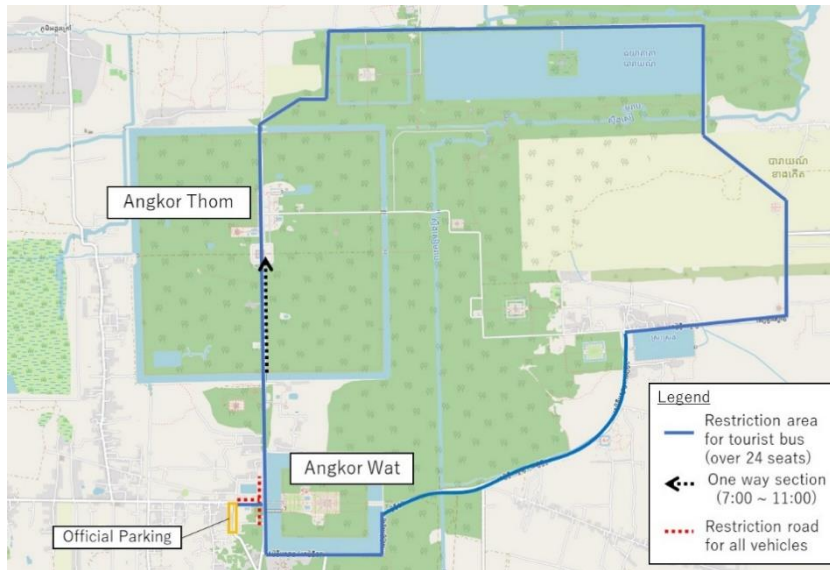
Figure 2.35: Major Transportation Means for Tourists in Siem Reap (2017)

i) Tourist Bus

Main passengers of tourist bus are Chinese tourists. The Siem Reap Provincial Governor got the clearance to introduce the restriction area for tourist bus from January 30, 2013 (Figure 2.36 and Figure 2.37). Since large buses with more than 23 seats are prohibited to enter into this restricted area, some tourists use small buses operated by tour companies and hotels to tour AAP. In some cases, tourists get off the large bus at the official parking lot in front of the West Gate of Angkor Wat and go sightseeing on their foot. This official parking lot has a capacity of about 100 large buses, 64 small buses (24 to 32 seats), and 180 passenger cars.

Therefore, some tourists travel around the area by minibus (Figure 2.38). The minibus is operated by some hotels or travel companies and with tour guides depending on the tour contents.

In addition, the section between the southern gate of Angkor Thom and Prasat Bayon has been operated as one-way route from 7:00 to 11:00.



Source: JICA Survey Team

Figure 2.36: Restriction Area for Vehicles around AAP



Source: APSARA National Authority

Figure 2.37: Sign of Restriction for Large Tourist Bus



Source: <https://cambodia.sketch-travel.com/>

Figure 2.38: Minibus Operated by a Travel Company

ii) Rental Car with Driver

Rental car with a driver is one of the transportations for traveling around Siem Reap Province. It can be booked for half day or one day through travel companies. Moreover, in the past, Blue Mobility Ltd. provided EV rental services for tourists. However, it received protests from TTA. As a result, they are providing the service through the tour companies with price which is higher than the price of normal rental car services in limited numbers.



Source: The Study for Environmental and Cultural City Formation Supporting with JCM in Angkor Heritage Area, Cambodia

Figure 2.39: EV Rental Car by Blue Mobility Ltd,

iii) Rental Motorbike

Rental motorbike is a popular transportation method for tourists. There are some rental motorbike shops in the city center. Tourist can rent the bike without international license for motorbike and the rental price is approximately USD 15 per day. In addition, e-bike is also available in some rental motorbike shops for decreasing air pollution (Figure 2.40).



Source: <http://www.greene-bike.com/gallery.html>

Figure 2.40: Example of e-bike in Siem Reap

i) Electric Cart

In 2008, the Mobility Unit operated by the APSARA National Authority was established with the backup of China, and about 30 electric carts were provided by the Hunan Provincial Government of China. Initially, it was operated for tourists to move around Angkor Thom (fee: USD 3/person), but due to the backlash of TTA drivers and low needs, the offer (B to C operation) has ended. After that, it has been used as a dedicated vehicle for customers of the facility/store in partnership with a specific accommodation facility, duty-free shop, souvenir shop, etc. (B to B rental).



Source: The Study for Environmental and Cultural City Formation Supporting with JCM in Angkor Heritage Area, Cambodia

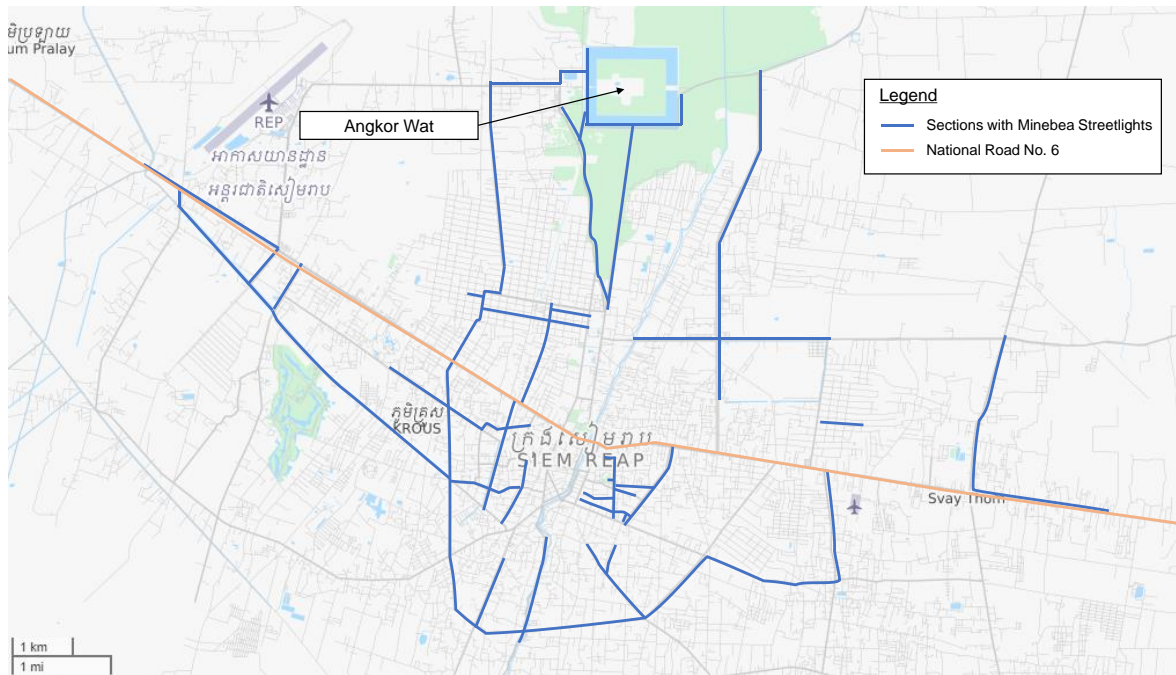
Figure 2.41: Electric Cart Provided from China

ii) Tuk-tuk

Tuk-tuk is one of the main transportations for not only the residents but also tourists in Siem Reap. Moreover, it is the most characteristic vehicle and one of the tourism contents in Cambodia for foreign tourists. In 2014, the study about the possibility of EV tuk-tuk introduction in Siem Reap was done by some Japanese companies by utilizing JCM scheme. During the study period, some surveys including questionnaire survey for tuk-tuk drivers and driving test with actual EV tuk-tuk which was planned to be introduced were conducted. However, gasoline tuk-tuk was converted to liquefied petroleum gas (hereinafter referred to as LPG) tuk-tuk, not EV tuk-tuk, from 2017 after the study. Furthermore, the quality of the EV tuk-tuk is not good enough. Therefore, the introduction of EV tuk-tuk in Siem Reap by Japanese companies was not realized.

4) Street Lighting

LED streetlights are partly introduced in Siem Reap by MinebeaMitsumi by utilizing the Joint Credit Mechanism (hereinafter referred to as JCM) scheme between Cambodia and Japan. By utilizing the scheme, a total of 3,620 streetlights were introduced to Siem Reap Province, and another 500 streetlights are planned to be additionally installed without using the JCM scheme. Figure 2.42 shows the area where streetlights with wireless control were introduced in 2016 and 2017. Furthermore, the LED streetlights will be installed in the 38 Road Construction Project which began from November 2020 in Siem Reap Province.



Source: JICA Survey Team (according to information from MinebeaMitsumi)

Figure 2.42 : Location of Streetlights Installed by MinebeaMitsumi

5) Current Issues

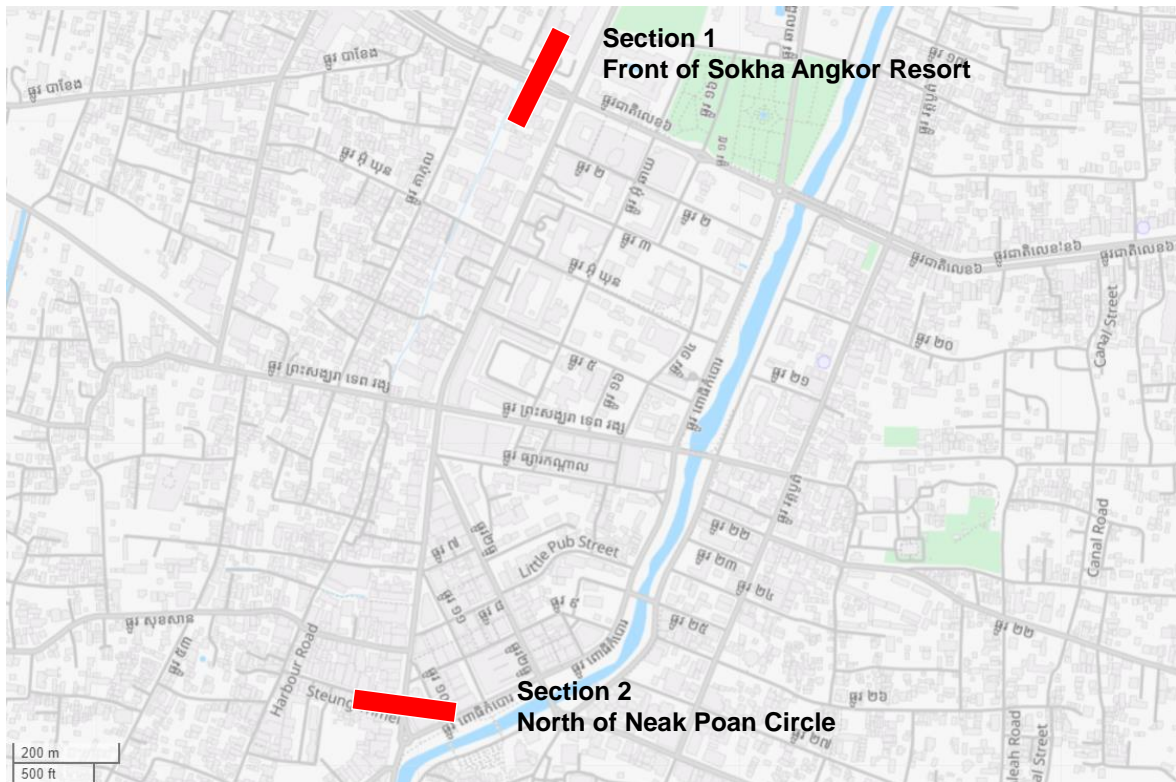
i) Traffic Congestion

NR6 is the main road connecting the east and west side of Siem Reap City. The City Ring Road (Phare Circus Ring Road) has not functioned as a bypass road of NR6 because of bad pavement condition and its long detour route. Moreover, the new bypass road which is planned to be constructed on the south side of NR6 does not provide the service yet. Interregional traffics including Heavy Goods Vehicle (hereinafter referred to as HGV) and inner city traffics are mixed on the NR6 because there is only one main road connecting the eastern and western parts of Siem Reap City area. The lack of significant bypass has caused traffic congestion during the peak hour on the sections around the city center. Under these circumstances, a state decree has banned trucks that do not have the permission from the provincial administration from entering the city center of Siem Reap. Although the traffic volume of large vehicles in the city center has been decreased by the restriction, traffic congestion is still seen around the city center.

The JICA Survey Team calculated the congestion level on the section of two streets in the city center in Figure 2.43 based on the data of traffic count survey which was done on August 10-15, 2017 in the “Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia” (hereinafter called “Korean MP Study”). The congestion level (Q/C) was calculated by the formula below.

$$\frac{Q}{C} = \text{Traffic Volume (PCU/hour)} \div \text{Maximum highway capacity (PCU/hour)}$$

In this study, the number of vehicles was converted to passenger car unit (hereinafter referred to as PCU) applying the passenger-car equivalents in Table 2.37.



Source: JICA Survey Team

Figure 2.43: Location of the Sections

Table 2.37: PCU Conversion by Vehicle Class

Vehicle Class	Passenger-car Equivalent
Motorcycle	0.30
Light Vehicle	1.25
Heavy Vehicle	3.00

Source: Data Collection Survey on Development of Roads and Related Facilities in National Road No.1 and around Border of Cambodia and Viet Nam

The maximum highway capacity of each road is lower than the base capacity, and estimated by the following formula based on the “Highway Capacity” published by the Japan Road Association:

$$CM = CB \times \gamma L \times \gamma C \times \gamma N \times \gamma I$$

Where,

CM = Maximum highway capacity (PCU/hour)

CB = Base highway capacity (PCU/hour)

γL = Adjustment factor by lane width

γC = Adjustment factor by lateral side clearance

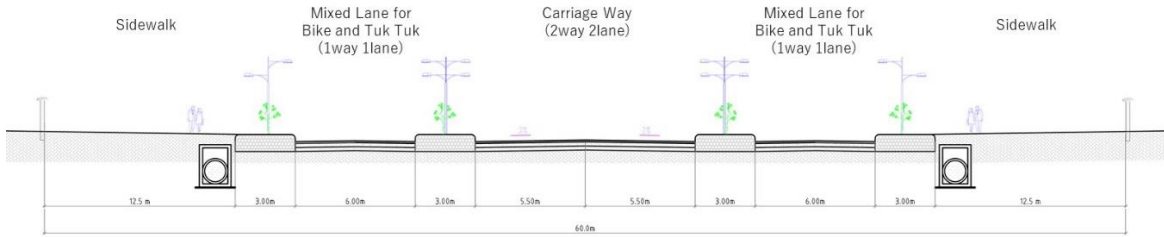
γN = Adjustment factor by two-wheeled vehicle mix rate⁹

γI = Adjustment factor by roadside environment

⁹ $\gamma N = \frac{100}{100 + E \times M}$

Where, E = PCU of two-wheeled vehicle / M = two-wheeled vehicle mix rate

Following the typical cross section shown below, the adjustment by lane width and lateral side clearance will not be required¹⁰. On the other hand, the adjustment factor by roadside environment was adopted based on the “Highway Capacity” (Table 2.38).



Source: DPWT

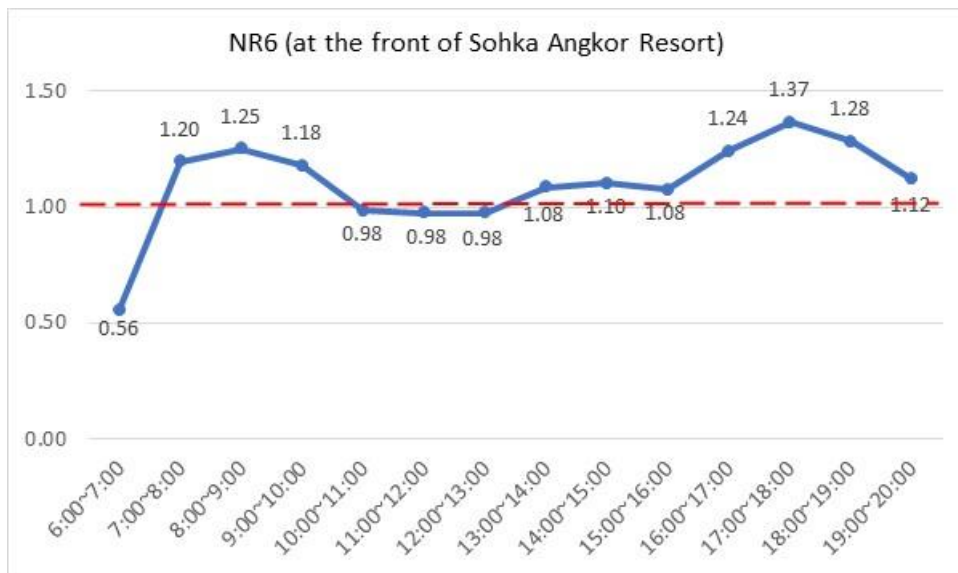
Figure 2.44: Typical Cross Section of NR6

Table 2.38: Adjustment Factor by Roadside Environment

Roadside Environment	Adjustment Factor
Rural area	0.90 ~ 1.00
Suburban area	0.80 ~ 0.95
Urbanized area	0.70 ~ 0.90

Source: Highway Capacity, Japan Road Association

The result of the calculation is shown in Figure 2.45 and Figure 2.46. In general, if the value exceeds 1.00, it can be estimated that the road is congested. The congestion level at Section 1 exceeded the standard from 7:00 to 10:00 and 13:00 to 20:00, and the traffic congestion peak hour is 17:00 to 18:00. It can be assumed that the lack of capacity of the road is one of the reasons of traffic congestion during peak hours on NR6. At Section 2, the congestion level was less than the standard and almost the same at any time. However, there is a possibility that the traffic congestion peak hour at the point is during nighttime when tourists gather for enjoying their night life around Pub Street¹¹.

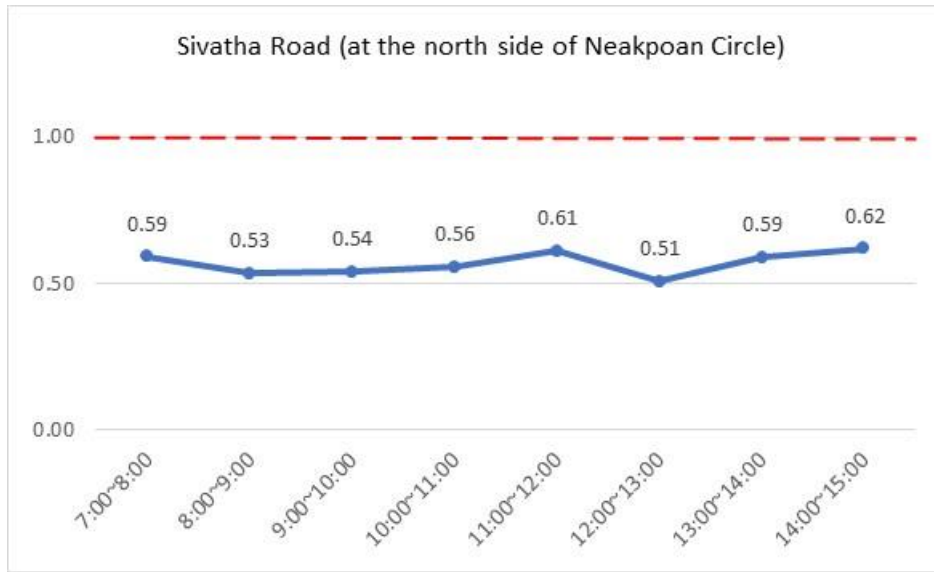


Source: JICA Survey Team (calculation based on the traffic count survey of Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia)

Figure 2.45: Congestion Level at Section 1

¹⁰ In the traffic count survey in “Korean MP Study”, the traffic volumes of carriageway and mixed lane were not separated. Therefore, it was assumed that the traffic volume is the data of only carriageway in this calculation.

¹¹ The traffic count survey data in the “Korean MP Study” is available only from 7:00 to 15:00 at Section 2.



Source: JICA Survey Team (calculation based on the traffic count survey of Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia)

Figure 2.46: Congestion Level at Section 2

It was also pointed out that the short distance between some intersections and inappropriate shape of some intersections are the cause of traffic congestion on the report based on the two-year activities of the JICA Senior Japan Overseas Cooperation Volunteer (hereinafter referred to as JOCV) dispatched to DPWT until October 2020¹².

In addition to the lack of road capacity, inappropriate traffic signal is a cause of traffic congestion in the city center as well. On some signalized intersections in the city center, the right of way is not secured because both the straight and the left turn signals are active at the same time (Figure 2.47). Furthermore, roundabouts with irregular shapes have also caused traffic congestion. Their scales do not meet the standard to control traffic flow efficiently.



Source: JICA Survey Team

Figure 2.47: Example of Inappropriate Traffic Signal Phase

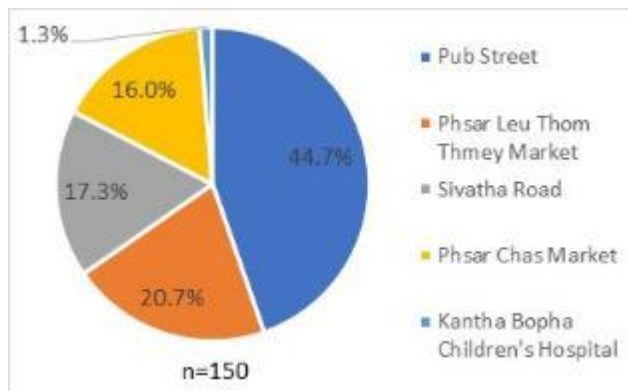
¹² Internal document of DPWT: “The recommendations for urban road and traffic management in Siem Reap”



Source: JICA Survey Team

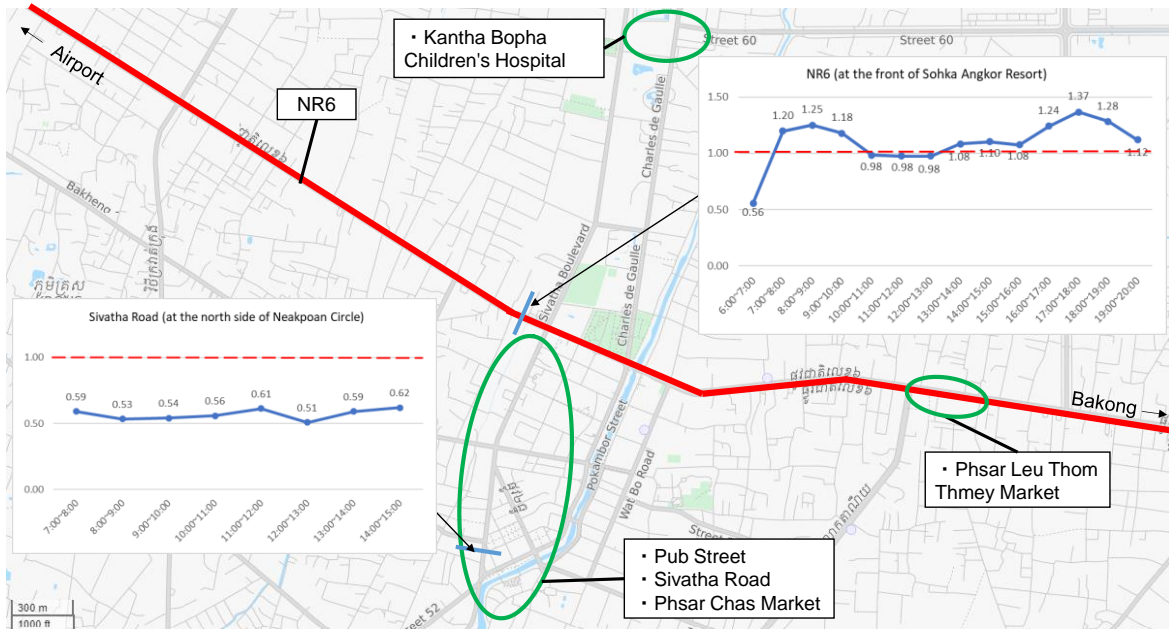
Figure 2.48: Roundabouts in the City Center

Furthermore, there are traffic jams on the roads around the city center area according to the questionnaire survey to tuk-tuk drivers in the “Korean MP Study”. They pointed out that the roads around Pub Street, Phsar Leu Thom Thmey Market, Sivatha Road, and Phsar Chas Market are congested (Figure 2.49 and Figure 2.50). These roads are used as waiting areas for tuk-tuk drivers and there is not enough space for waiting so it is speculated that tuk-tuks waiting for their passengers on the roads decrease the capacity of the roads and disturb the influent traffic flow.



Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.49 : Congested Area with Traffic (Tuk-Tuk Driver)



Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.50 : Location of Congested Area with Traffic in the City Center

The number of vehicles in Siem Reap Province will constantly increase on average by 1.94% year by year based on the projection (Table 2.39). In 2035, the total number of vehicles will be one and half times more than the number in 2016. If the number increases predictably, the traffic condition in Siem Reap will get worse.

Table 2.39: Projection of Number of Vehicles in Siem Reap Province

Vehicle Type	2016	2020	2025	2030	2035	Unit: Vehicle Average Growth Rate
Motorbike	256,177	296,611	322,675	345,882	366,850	1.91 %
Light Vehicle	44,922	53,958	58,699	62,921	66,736	2.11 %
Heavy Vehicle	6,222	7,474	8,131	8,715	9,244	2.11 %
Total	307,261	358,043	389,505	417,518	442,829	1.94 %

Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

ii) Occupation by On-street Parking¹³

In the center of Siem Reap City, a lot of motorbikes and cars park on sidewalks or roadside shoulders. Moreover, some commercial activities on the roadside including vendors disturb the traffic flow and pedestrian’s passage. These situations reduce the road capacity for vehicles and the pedestrians are forced to walk on the roadway.

Based on the questionnaire survey for tourists in the “Korean MP Study”, 74.7% of the respondents felt the inconvenience of sidewalk in Siem Reap and the main reason of the inconvenience was on-street parking with sidewalks. The results of the questionnaire survey for pedestrians also show that approximately 60% of the respondents felt that sidewalks are not convenient and said that the

¹³ In the “Law of Road Traffic” of Cambodia, parking on the roadway, at sidewalk reserved for pedestrians, and at the space of at least 5 meters away from the zebra crossing for pedestrians or on the zebra crossing, is prohibited. Regarding parking on roadsides in towns or densely populated areas, the law describes “all kinds of vehicles shall stop or park in parallel with their traffic directions” and “stopping and parking of all kinds of vehicles shall not interfere other vehicles, which are traveling”. In addition, the traffic police officers are authorized to tow away the vehicles, which are parked in a way that interferes or leads to possible harms to other vehicles, and to keep them at the road traffic police station in case the owners do not accept the fining or are not present under the law.

discontinued sidewalks and obstacles, and on-street parking with sidewalks are the two main reasons of the inconvenience (Figure 2.55 and Figure 2.56).



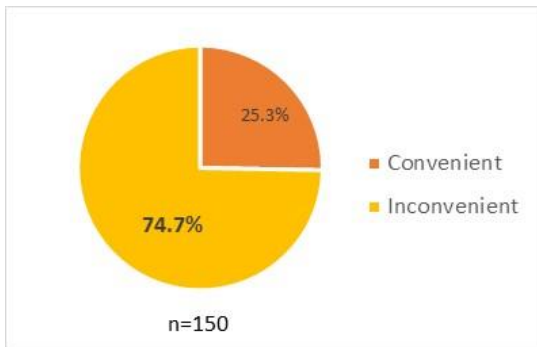
Source: JICA Survey Team

Figure 2.51: Parked Motorbikes on Roadside



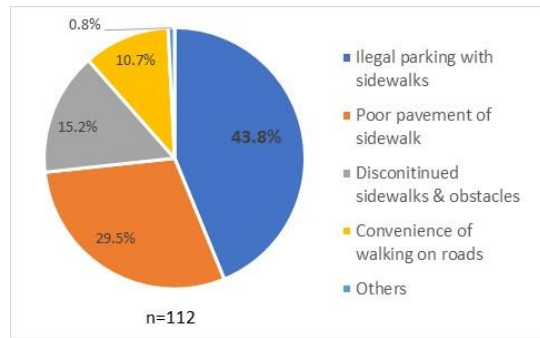
Source: JICA Survey Team

Figure 2.52: Parked Vehicles and Vendors on Roadside



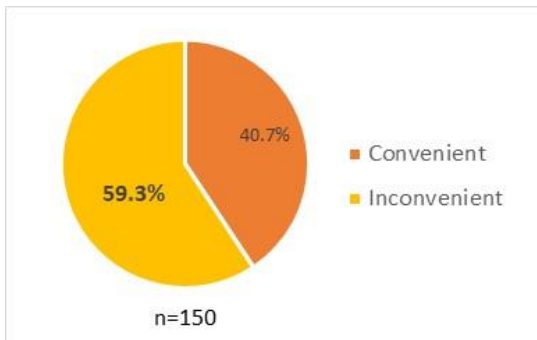
Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.53: Perception about Convenience of Sidewalk (Tourist)



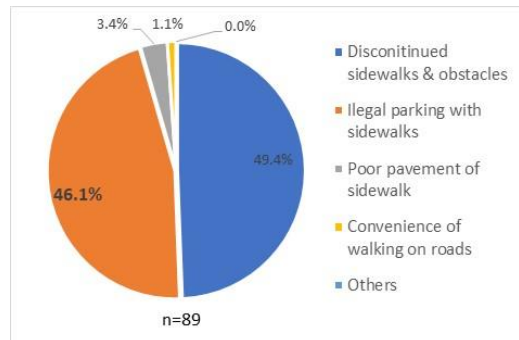
Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.54: Inconvenience of Sidewalk (Tourist)



Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.55: Perception about Convenience of Sidewalk (Pedestrian)



Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

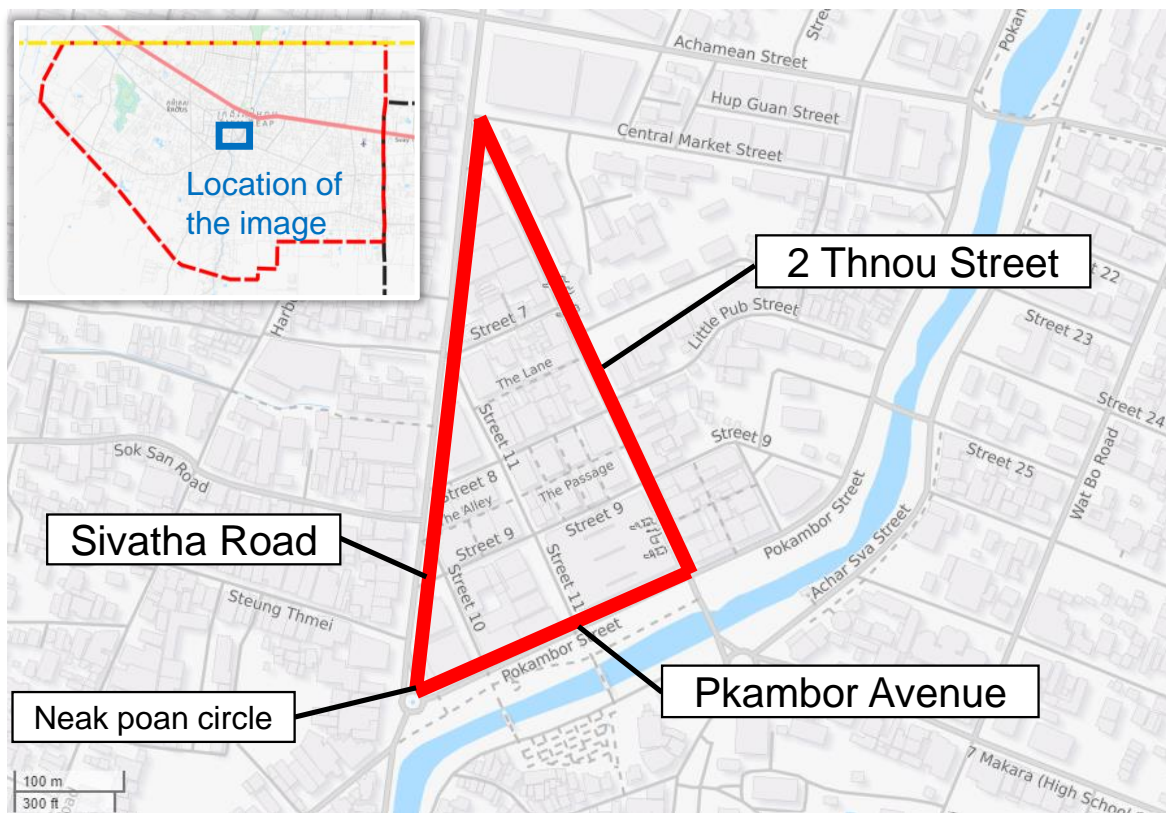
Figure 2.56: Inconvenience of Sidewalk (Pedestrian)

In the “Korean MP Study”, parking condition survey was also conducted. The survey was done on October 24, 2017 (Tue.) for collecting the data of the number of illegal parking vehicles on the roads

around the night market area. The periods of survey were 14:00~15:00, 17:00~18:00, and 20:00~21:00. The survey results of the main streets (Figure 2.57) are shown in Table 2.40.

Constantly, there were approximately 1,000 vehicles that have parked illegally on the roadside and sidewalk of these streets in the afternoon. The number of illegally parked motorbikes accounted for 60 to 70% of the amount. Moreover, the number of illegal parking increases at nighttime (20:00~21:00) compared with daytime. The main reason of the increase of the number is assumed that many of the tourists visit the area for enjoying night life at night.

Actually, DPWT has introduced "even and odd days parking system" on some roads around Pub Street as a measure against on-street parking. This measure has installed odd and even signs on both sides of the road. Parking is prohibited on odd-numbered days on the roadside where odd-numbered road signs are installed. On the other hand, parking is prohibited on even-numbered days on the roadside where even-numbered road signs are installed. However, according to DPWT, the system is not fully functional because of the lack of awareness of drivers and residents.



Source: JICA Survey Team

Figure 2.57: Survey Area of Parking Survey

Table 2.40: Parking Survey Result

Time Slot	Vehicle Type	On Roadside (Veh)	Rate (%)	On Sidewalk (Veh)	Rate (%)
14:00 ~ 15:00	Motorbike	483	63.6	178	70.6
	Tuk-tuk	149	19.6	18	7.1
	Passenger car	128	16.8	56	22.2
	Total	760	100.0	252	100.0
17:00 ~ 18:00	Motorbike	481	66.1	121	68.0
	Tuk-tuk	177	24.3	24	13.5
	Passenger car	70	9.6	33	18.5
	Total	728	100.0	178	100.0
20:00 ~ 21:00	Motorbike	543	59.7	114	55.6
	Tuk-tuk	289	31.8	24	11.7
	Passenger car	78	8.6	67	32.7

Time Slot	Vehicle Type	On Roadside (Veh)	Rate (%)	On Sidewalk (Veh)	Rate (%)
	Total	910	100.0	205	100.0

Unit: Vehicle/hour

Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia



Source: JICA Survey Team

Figure 2.58: Odd Sign



Source: JICA Survey Team

Figure 2.59: Even Sign

iii) Risk of Traffic Accident

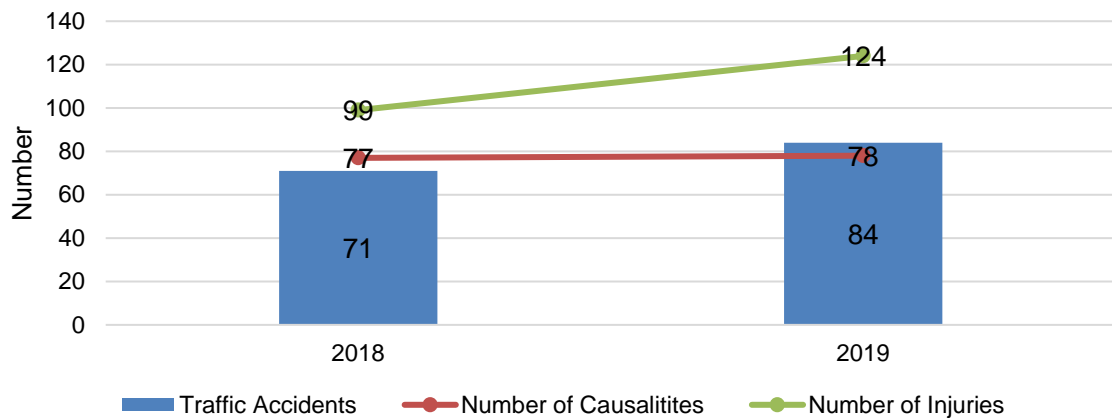
84 traffic accidents were confirmed in 2019 based on the annual report of the Siem Reap Provincial Police Headquarters¹⁴. Compared with the data in 2018, the number of traffic accidents increased from 71 cases (Figure 2.60). Regarding the number of casualties, the number of death due to accident was nearly unchanged. On the other hand, the number of serious or minor injuries obviously increased (99 to 124). The number of casualties included some foreigners. In 2019, three Chinese died, and one English and seven Chinese had serious injury. Moreover, eight Chinese, two German, two Costa Ricans, one American, one Irish, and one Colombian had minor injury. It can be assumed that not only foreigners who live in Cambodia but also some inbound tourists have been involved in traffic accidents.

In addition, the number of traffic accidents by district in 2019 was organized in Figure 2.61. The numbers are most numerous in Siem Reap City followed by Puok District. It can be inferred that the numbers of traffic accidents are common in the area where traffic volume is large, for example, around the center of the city and along NR6.

Compared with Thailand and Vietnam, the number of deaths due to traffic accident per 100,000 people in Siem Reap Province is few (Table 2.41). However, the number is approximately three times as many as the number of Singapore and twice as many as the number of Japan. Moreover, it is speculated that a lot of traffic accidents without death (traffic accident resulting in property damage) were not reported from the fact that the number of deaths and accidents are almost the same. The reason for this is as follows. First, the local people do not often report the small traffic accident without deaths¹⁵. Second, there is a possibility that traffic accident statistic including traffic accident reporting system is not collected adequately by the Provincial Police Headquarters. According to the interview with some traffic police officers on the roads in Siem Reap City by the JICA Survey Team, if the police got called by a third party, the police will come to the place where a traffic accident occurs. However, if the two parties have an agreement on the problem by themselves without the intervention of the police, the police will not report it. It is essential to grasp such small accidents without deaths for taking measures for preventing the occurrence of traffic accident.

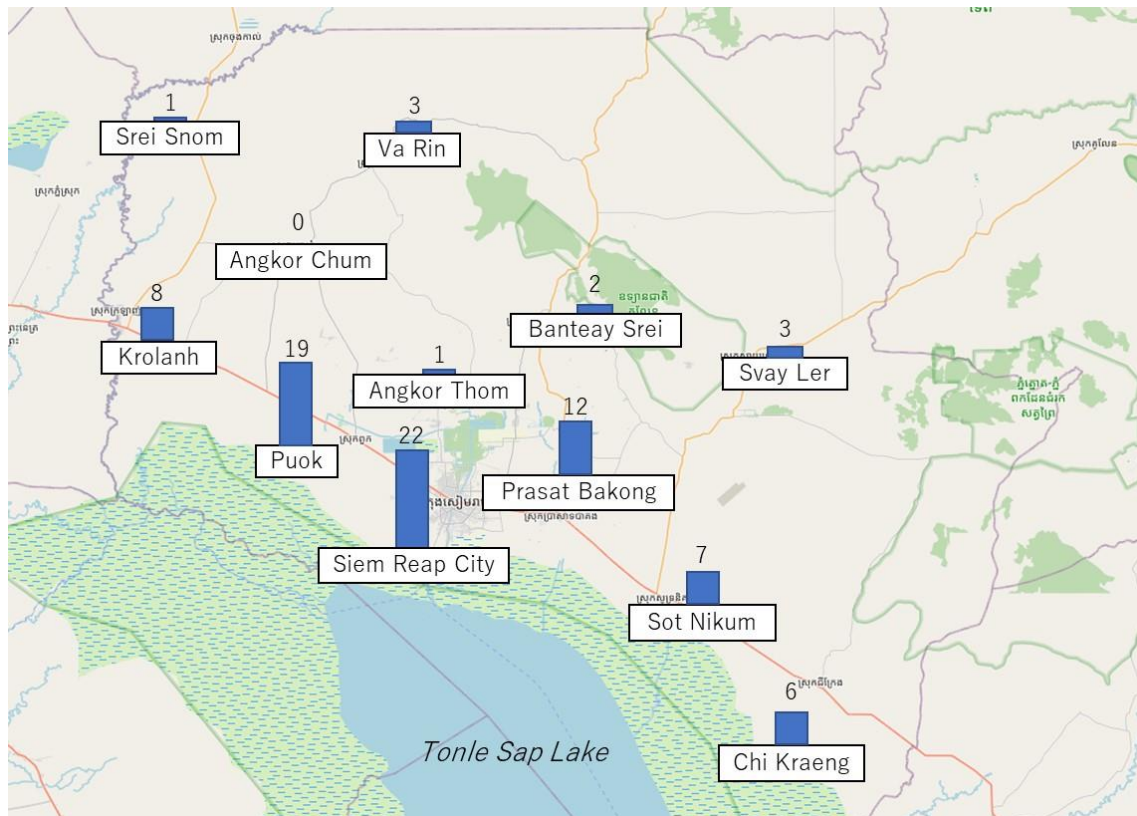
¹⁴ The data was collected from November 20, 2018 to November 19, 2019.

¹⁵ In the "Law of Road Traffic" of Cambodia, it is stated that "if the accident results in only damages to the properties, the two parties may make their mutual settlement without any intervention from traffic police officers".



Source: Siem Reap Provincial Police Headquarters

Figure 2.60: Number of Traffic Accidents and Casualties in 2018 and 2019



Source: Siem Reap Provincial Police Headquarters

Figure 2.61: Number of Traffic Accidents by District in 2019

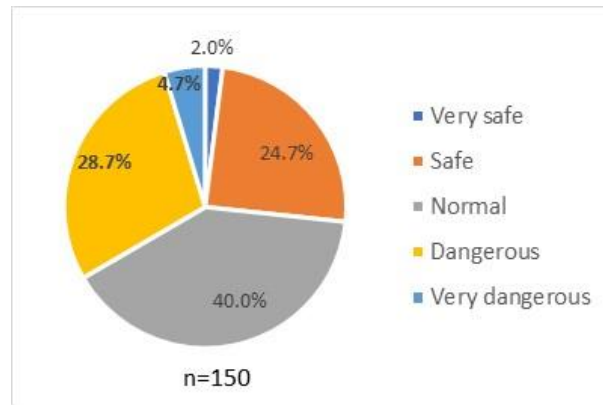
Table 2.41: Number of Deaths Due to Traffic Accidents per 100,000 People (ASEAN + Japan)

Country/Area	Number of Deaths Due to Traffic Accident per 100,000 People (Person)
Siem Reap Province (2019)	7.8
Cambodia (2016)	17.8
Thailand (2016)	32.7
Vietnam (2016)	26.4
Malaysia (2016)	23.6
Singapore (2016)	2.8
Japan (2016)	4.1

Source: WHO

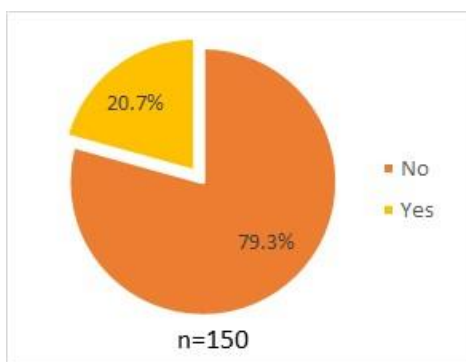
Around the city center, there is the risk of pedestrian accident on the intersection because the signal phase for pedestrians is not secured in some intersections. Following the result of the questionnaire survey for tourists in the “Korean MP Study”, 33.4% of the respondents felt the risk of pedestrian accidents while crossing the road. On the other hand, the ratio of the respondents who felt safety of road crossing was only 26.7% (Figure 2.62). In addition, approximately 20% of the respondents had the experience of traffic accident while walking based on the questionnaire survey for pedestrians in the “Korean MP Study” (Figure 2.63). The largest type of traffic accident was the crash accident with motorbikes and the second was the crash with passenger cars (Figure 2.64).

Moreover, as mentioned above, sidewalks and pedestrian spaces are occupied by parked cars, motorbikes, tuk-tuk, and commercial activities. It can be pointed out that these situations may increase the potential of traffic accidents for pedestrians and tourists. Furthermore, the root causes of traffic accidents in Siem Reap are inadequate basic facility installation (streetlights and traffic signals), inappropriate crossing designs, and lack of public awareness on road traffic regulations and driving manners according to the report by the JICA Senior JOCV dispatched to DPWT. These issues are recognized by DPWT and the Provincial Police Headquarters; thus, large construction works including road improvement, installation of LED streetlight, on-street parking space, and new traffic signal system will be done in the ongoing 38 Road Construction Project.



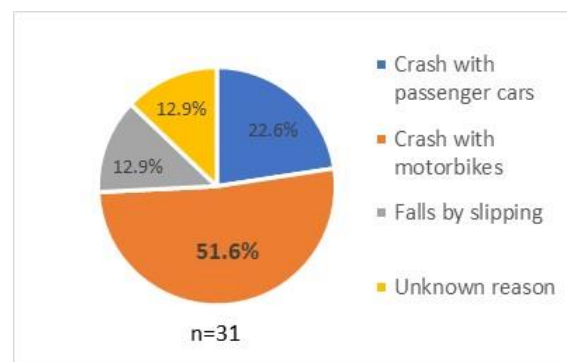
Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.62: Perception about Road Crossing (Tourist)



Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.63: Experience of Traffic Accident (Pedestrian)

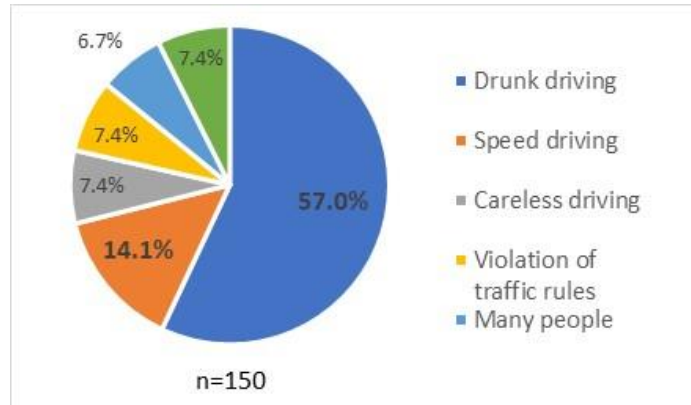


Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.64: Type of Traffic Accident (Pedestrian)

As for the cause of traffic accident, 57.0% of the respondents thought that the main cause of traffic accident during the nighttime is drunk driving and 14.1% of the respondents guessed speed driving is the main cause based on the questionnaire survey for tuk-tuk drivers in the “Korean MP Study”

(Figure 2.65). Illegal and dangerous driving behaviors of some drivers have put pedestrians at risk of traffic accident.

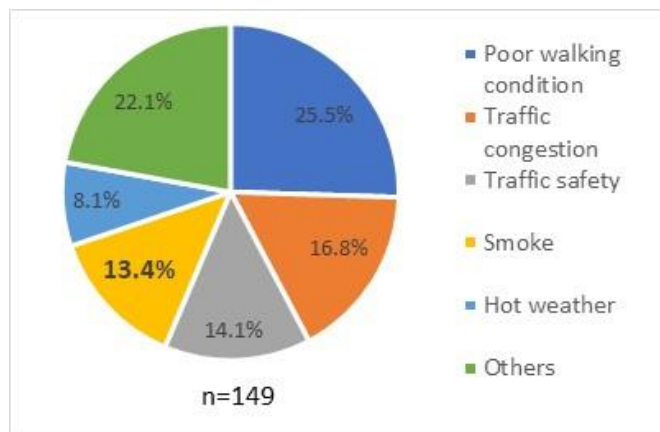


Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.65: Cause of Traffic Accident during Night-time (Tuk Tuk Driver)

iv) Air Pollution

Motorbikes, private cars, buses, and trucks which are driven in Siem Reap are mostly aged. They emit significant amount of gases and affect the air quality. In addition, the dust is blown up into the air when the vehicles drive on unpaved roads and the smell of exhaust gas decreases the attractiveness of the city as a destination. According to the questionnaire survey for tourists in the “Korean MP Study”, smoke was one of the main causes of inconvenience while moving in Siem Reap (Figure 2.66). Moreover, air pollution is a bad influence on not only the tourists’ satisfaction but also the residents’ life satisfaction and health. Furthermore, the APSARA National Authority has been concerned about the influence of gas emission of old vehicles on the Angkor Heritage Site for some time and intends to introduce EV in Siem Reap.



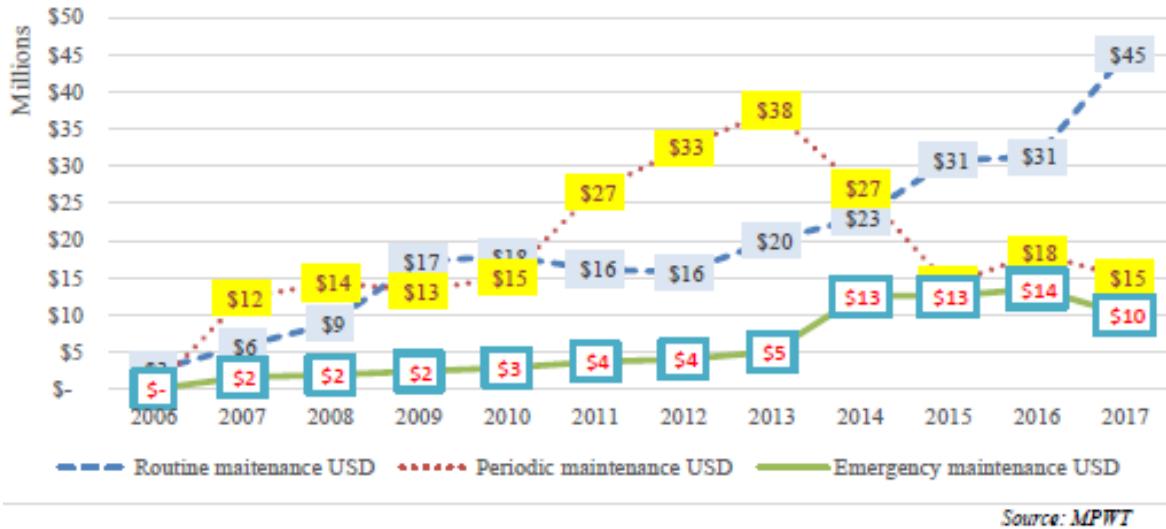
Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.66: Inconvenience While Traveling (Tourists)

v) Damage of Road

According to the statistics data of MPWT, the road maintenance budget, which consists of periodic maintenance, routine maintenance, and emergency maintenance costs, in Cambodia increased approximately twice from 2010 to 2014 (Figure 2.67). One of the features after 2013 is that the amount of periodic maintenance cost decreased and the other maintenance costs, which are for routine and emergency maintenance, increased. This trend is assumed to have increased the need for emergency maintenance, which is one of the post-maintenance approaches from time to time when the damages which have potential to affect traffic badly occurred. As a background to the decrease

in the cost of periodic maintenance compared to before, it is also possible that the damage rate has increased due to an increase of traffic volume. On the other hand, from the results of the DPWT’s information, they prepare and submit their three-year maintenance plan to MPWT, but due to financial constraints, maintenance works were not able to be carried out as planned. The improvement of road pavement is one of the important things as a supportive infrastructure for economic activities and for improving tourists’ satisfaction. Therefore, it seems necessary again to take measures to conduct maintenance periodically as planned considering the viewpoint of life cycle costs or effect on the traffic flow.



Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.67: Road Maintenance Budget by Year in the Cambodia

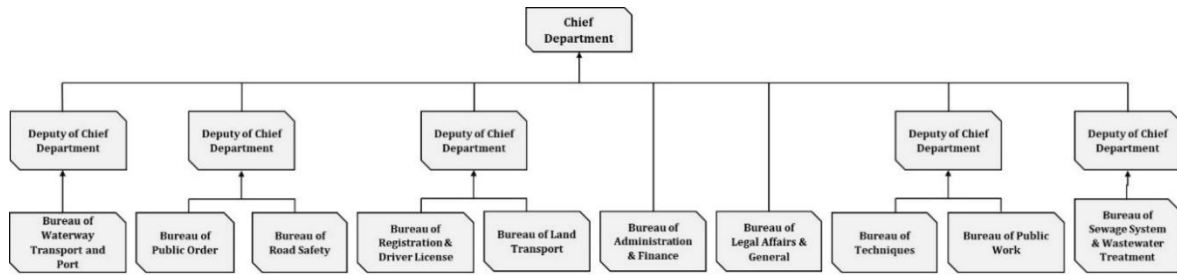
Regarding the damage of road pavement separately between carriageway and sidewalk, for the carriageway, the proposed plan recommended that the future paved ratio in Siem Reap should be improved to 78.2% by 2035 against 49.5% currently. The improvement would be expected to help economic growth by increasing travel speed and providing secure road condition. On the other hand, for sidewalk, tourists answered that the pavement condition was an inconvenient issue for them through the interview survey in the “Korean MP Study”. Other pedestrians who live in Cambodia (local and foreign people) requested the improvement of pavement as second priority in the survey.

Under the above conditions, the improvement of road pavement seems to be requested urgently from the viewpoint of fundamental infrastructure for economic growth not only in Siem Reap but also in Cambodia and for the satisfaction of tourists. From the fact of increasing emergency cost in 2014, the long-term periodic maintenance works seem to be required. On the other hand, DPWT prepares the three-year advanced plans on road maintenance, but the budget for the road maintenance works is limited and not enough to carry out the works in accordance with the plans.

(2) Organizations

1) DPWT (Siem Reap Provincial Department of Public Works and Transport)

DPWT has an important role for the road maintenance work in Siem Reap. The organization, which consists of 10 bureaus and 58 staffs (Figure 2.68) has managed the national roads, provincial roads, and other roads as assigned by the Royal Government of Cambodia.



Source: DPWT

Figure 2.68: Organization Chart of DPWT

2) Other Organizations

In addition, there are three organizations which maintain the roads in Siem Reap. First, the Procurement Unit of Siem Reap Provincial Headquarters manages the roads in the city center. Second, the APSARA National Authority manages the roads situated in the territory of AAP as well as in the temple boundary. Third, the Department of Rural Development of Siem Reap manages the roads with width of less than 4 or 5 meters.

(3) Existing Plans and Studies

In order to understand the status and the policy of road and transportation in Siem Reap, existing reports and documents of plans were collected and reviewed. The reviewed previous plans and studies are shown in Table 2.42.

Table 2.42: Relevant Plans and Studies

No.	Name of Plan and Study	Year
1	The Study on the Road Network Development in the Kingdom of Cambodia (JICA)	2006
2	The Study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town in the Kingdom of Cambodia (JICA)	2006
3	The Follow-up Study on Integrated Master Plan for Sustainable Development of Siem Reap City in the Kingdom of Cambodia (JICA)	2010
4	National Strategic Development Plan of Cambodia (NSDP, 2014-2018)	2014
5	Land Use Master Plan of Siem Reap, 2035 Vision, 2014-2018 (Royal Government of Cambodia)	2018
6	Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia (MoLIT, MPWT, DPWT, and CDC)	2018

Source: JICA Survey Team

1) The Study on the Road Network Development in the Kingdom of Cambodia (JICA, 2006)

The main objective of the study, which was conducted by JICA, was to formulate a road network development master plan covering the whole country of Cambodia, aiming at the year 2020 and to carry out pre-feasibility study for high priority projects selected in the short term (until 2010).

Table 2.43: Contents of The Study on the Road Network Development in the Kingdom of Cambodia

Item	Contents
Target Year	2020
Vision and Strategy	<p><u>Vision</u> “rehabilitation” to “economic development”</p> <p><u>Strategy</u> Strategy 1: Multi Growth Pole Development Strategy 2: National Integration Strategy 3: Development of International Corridor Strategy 4: Enhancement of Rural Economic Development Strategy 5: Regional Development for Poverty Reduction</p>

Item	Contents
	<p style="text-align: center;">Road Network Development Strategy for Cambodia</p>
<p>Action and Schedule</p>	<p style="text-align: center;">Road Development Plan during Each Term</p> <p>【Road Network Development】</p> <ul style="list-style-type: none"> • Widening and upgrading of 1-digit road • Construction of bypass around major cities • Reinforcement of road network around Phnom Penh City by Ring Road • Improvement of accessibility to provincial capital • Reinforcement of main 2-digit roads • Strengthening of international highway (Greater Mekong Sub-region and Asian Highway) • Improvement of access to the border of neighboring countries

Item	Contents																																																						
	<p style="text-align: center;">Road Development Concept Table ES-1 Road Development Concept</p> <table border="1"> <thead> <tr> <th>Vision</th> <th>Philosophy and Strategy</th> <th>Objectives</th> <th>Target</th> </tr> </thead> <tbody> <tr> <td rowspan="6">"Rehabilitation" to "Economic Development"</td> <td colspan="3">Philosophy 1: Road development which contribute to the national governance and economic development</td> </tr> <tr> <td>Strategy 1: Multi Growth Pole Development (Contribution to capital city and regional centers)</td> <td>To contribute to multi-core national development instead of that of sole initiative by Phnom Penh</td> <td>Expansion to 4-lane on the national roads connecting to Phnom Penh and introduction of Ring Road, Bypasses construction at major regional cities such as Siem Reap and Kampong Chhnang</td> </tr> <tr> <td>Strategy 2: National Integration (Road network development to expand national administration)</td> <td>To contribute to national integrity and administration with remote areas where road access is very limited</td> <td>Improvement into all-weather roads at the sections of two digit national roads so as to realize easy connection to Phnom Penh even in the rainy season</td> </tr> <tr> <td>Strategy 3: Development of International Corridor (Expansion of trade and commodity flows to and from neighboring countries)</td> <td>To contribute to expansion of trade with neighboring countries, distribution industry and increase in employment</td> <td>Functional strengthening of one and two digit national roads in the areas adjacent to boarders, improvement of accessibility to rails, water ways and distribution centers.</td> </tr> <tr> <td colspan="3">Philosophy 2: Road development which contributes to the regional development and poverty reduction</td> </tr> <tr> <td>Strategy 4: Enhancement of Rural Economic Development (Road network to support regional economy)</td> <td>To contribute to promotion of regional industries, expansion of investment and increase in employment</td> <td>Enhancement of road access, especially by two digit national roads, to high potential areas of tourism, agriculture and manufacturing</td> </tr> <tr> <td>Strategy 5: Regional Development for Poverty Reduction (Alleviation of poverty and reduction of income disparity)</td> <td>To contribute to enhancement of Basic Human Need (BHN); 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Source: The Study on the Road Network Development in the Kingdom of Cambodia


2) The Study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town in the Kingdom of Cambodia (JICA, 2006)

The main objective of the study, which was conducted by JICA, was to prepare an integrated master plan for the sustainable development of Siem Reap/Angkor Town in the long run with a view to achieving a reasonable balance among tourism industry, urban environment, and institutional capacity and to propose a package of measures with a view to promoting and diversifying local economy based on tourism development.

Table 2.44: C Contents of The Study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town in the Kingdom of Cambodia

Item	Contents
Target Year	2020
Vision & Strategy	Vision

Item	Contents				
	<p>“A beautiful and unique tourist city based on a harmony of history, arts, and nature of Khmer”</p> <p><u>Strategy</u></p> <ol style="list-style-type: none"> Promoting Tourism Focused on Up-market Maximizing Local Benefits from Tourism Making Town More Attractive to Tourists Making Town More Sustainable in Environment Strengthening Infrastructures for Tourists and People Strengthening Local Administration and Finance <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Siem Reap/ Angkor Town 2020</th> <th style="width: 50%; text-align: center;">6 STRATEGIES</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: middle;"> <div style="border: 1px solid gray; padding: 5px; width: fit-content; margin: 0 auto;"> <p>A beautiful and unique city based on a harmony of history, arts and nature of Khmer</p> </div> <div style="display: flex; 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<p>Road Development Plan</p>	<ol style="list-style-type: none"> Improving bottlenecks and developing sub-arterial road network in the urban area Improving the road condition and facility in the urban area Developing road network for the future urbanization area Improving access to Angkor Heritage Site Establishing an efficient road maintenance system <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <p style="font-size: small;">Road Network 2020</p> <ul style="list-style-type: none"> — Paved Main Road — Existing Road Improvement — New Road Construction Siem Reap District </div> <p style="text-align: center;">Expected Road Network in 2020</p>				
<p>Action Plan</p>	<ol style="list-style-type: none"> French bridge improvement project Sub-arterial road parallel to the NR6 (Phase I) 				

Item	Contents
	<p>3. Upgrading the Hun Sen Peace Road (Phase II) 4. Completion of sub-arterial road network in the urban area up to 2012 (Phase III) 5. Completion of sub-arterial road network in the urban area up to 2020 (Phase IV) 6. Institutional improvement and campaigns for road safety 7. Rural heritage network rehabilitation project 8. Introduction of environmental public transport in the Angkor Archeological Park 9. Bicycle track construction in the Angkor Archeological Park 10. Institutional improvement for efficient road maintenance</p>  <p>Source: JICA Study Team Figure II.5.16 Proposed Bus Route and Restricted Zone against Private Car Entry Proposed New Bus Route and Restricted Zone against Private Car Entry</p>

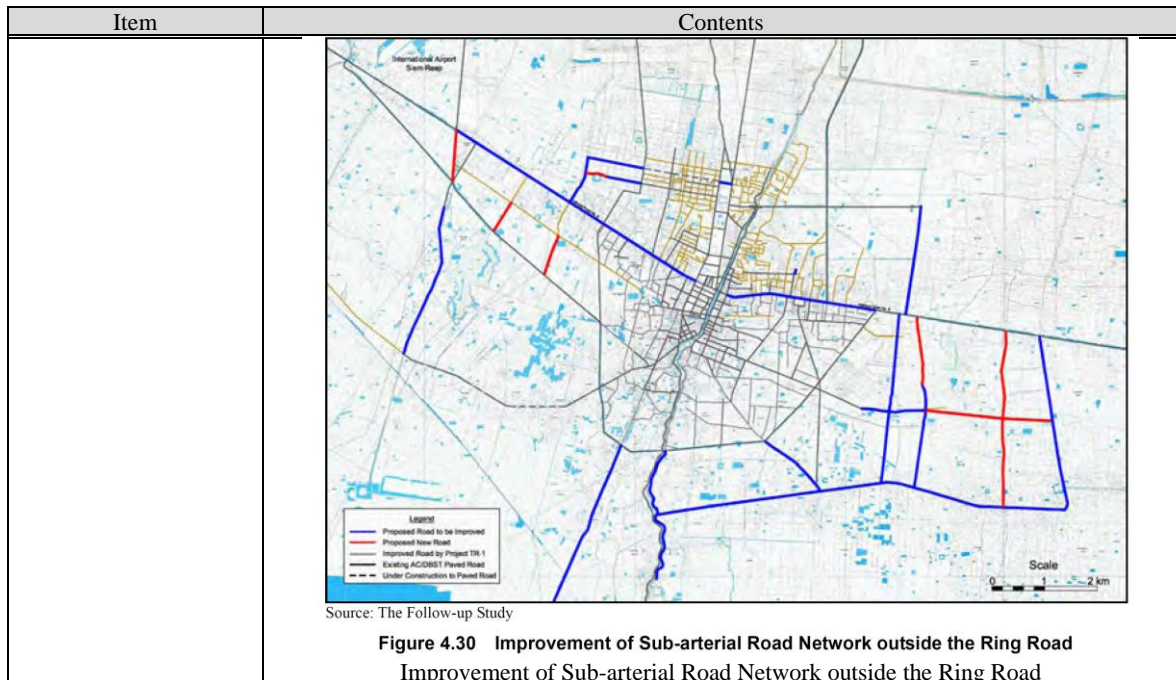
Source: The study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town in the Kingdom of Cambodia

3) The Follow-up Study on Integrated Master Plan for Sustainable Development of Siem Reap City in the Kingdom of Cambodia (JICA, 2010)

The study was conducted for the realization of the development plan for the transportation sector and urban development sector in the report of “The Study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town in the Kingdom of Cambodia” by JICA.

Table 2.45: Contents of The Follow-up Study on Integrated Master Plan for Sustainable Development of Siem Reap City in the Kingdom of Cambodia

Item	Contents
Road Maintenance Plan	<ul style="list-style-type: none"> • Preparation of Road Inventory • Monitoring of Road Condition • Coordination on Road Maintenance Policy between DPWT and DRD
Road Development Plan	<ul style="list-style-type: none"> • Improvement of Sub-arterial Road Network within the NR6 and the Ring Road • Improvement of Sub-arterial Road Network outside the Ring Road • Construction of Sub-arterial Road Parallel to NR6 • Institutional Improvement and Campaigns for Road Safety • Rural Heritage Network Rehabilitation Project • Bicycle Track Construction in the AAP



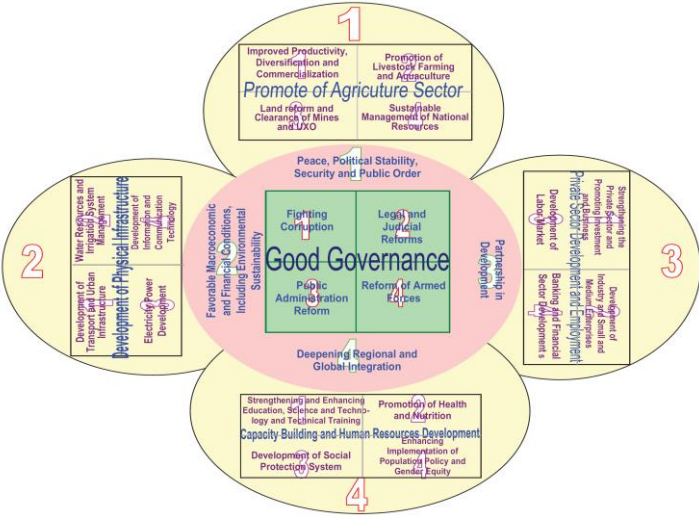
Source: The Follow-up Study on Integrated Master Plan for Sustainable Development of Siem Reap/Angkor Town in the Kingdom of Cambodia

4) National Strategic Development Plan of Cambodia 2014-2018 (Royal Government of Cambodia, 2014)

The Royal Government of Cambodia formulated the National Program to Rehabilitate and Develop Cambodia (hereinafter referred to as NPRD) in 1994, the first five-year Socio-Economic Development Plan (hereinafter referred to as SEDP I 1996-2000) to lay out its rehabilitation and development vision putting emphasis on macro-economic stability, social development, and poverty reduction. After that, SEDP was updated once (hereinafter referred to as SEDP2: 2001-2005). After 2006, the National Strategic Development Plan (hereinafter referred to as NSDP) was formulated as a new national plan using the structure of the Rectangular Strategy of the Royal Government every four years (NSDP 2006-2010, NSDP Update 2009-2013, and NSDP 2014-2018).

Table 2.46: Contents of National Strategic Development Plan of Cambodia 2014-2018

Item	Contents
Target Year	2018
Strategy	<p><u>Rectangular Strategy (Phase 3)</u></p> <ul style="list-style-type: none"> <li>• Promotion of agriculture sector <ul style="list-style-type: none"> <li>Improved productivity, diversification, and commercialization <li>Land reform and clearance of mines and unexploded ordnance (UXO) <li>Promotion of livestock farming and aquaculture <li>Sustainable management of national resource <li>• Private sector development and employment <ul style="list-style-type: none"> <li>Strengthening the private sector and promoting investment and business <li>Development of industry and small medium enterprise <li>Development of landmark <li>Banking and finance <li>• Development of physical infrastructure <ul style="list-style-type: none"> <li>Development of transport and urban infrastructure <li>Water resource and irrigation system management <li>Electricity power development <li>Development of information and communication technology <li>• Capacity building and human resource development <ul style="list-style-type: none"> <li>Strengthening and enhancing education, science, technology, and technical training <li>Promotion of health and nutrition

Item	Contents
	<p>Development of social protection system Enhancing implementation of population policy and gender equity</p> <ul style="list-style-type: none"> • Good governance <ul style="list-style-type: none"> Fighting corruption Legal and judicial reforms Public administration reforms Reform of armed forces  <p style="text-align: center;">Rectangular Strategy for Phase 3 (2014~2018)</p>
<p>Policy Priority for Transport Infrastructure and Urban Development</p>	<ol style="list-style-type: none"> 1. Stepping up the construction of national, provincial, and rural roads, particularly by targeting the paving of 300 to 400 km of additional roads per year with asphalt or concrete pavement. 2. Directing more attention to the repair and maintenance of the transport system, particularly roads, through the strengthening of mechanisms and enhancement of road repair and maintenance system, including effective and strict enforcement of punitive measures against overloading. 3. Further focusing on traffic safety through the improvement and stricter enforcement of the “Law on Land Traffic”, including the strict enforcement of measures against traffic violation, strengthening vehicle safety inspection and the system for issuance of vehicle roadworthiness certificates, etc. 4. Designing and implementing the Master Plan for Transport Infrastructure Development to connect all parts of the country and with the neighboring countries through developing multi-modal and cross border transport systems along with an efficient and competitive logistics system aimed at promoting investment, trade, tourism, and rural development. 5. Preparing necessary policies and legal framework for the management and development of infrastructure, such as the Law on Roads and related regulations addressing road standards and quality. 6. Preparing a Master Plan for Urban Infrastructure Development, in particular public transport in urban areas and connectivity of production centers on the outskirts of municipalities, main economic poles, industrial zones and special economic zones to reduce traffic congestion, etc. 7. Further encouraging participation of the private sector in the development of transportation infrastructure by strengthening and improving the “public-private partnership” mechanism.
<p>KPI</p>	<ul style="list-style-type: none"> • Rural roads rehabilitated (out of the total rural roads of 40,000 km) ⇒2018: 32,000 km • Length of paved roads of 11,914 km (including roads and provincial roads) ⇒2018: 12,263 km • DBST rural roads or concrete road ⇒2018: 2,330 km • Studied and pilot-constructed paved rural roads of 450 km that have capacity to protest against climate change 100% ⇒2018: 360 km
<p>Action and Schedule</p>	<p>A. In the Road Sector:</p>

Item	Contents
	<ul style="list-style-type: none"> • Improve more than 3,500 km of road infrastructure in the next 5 years. • Improve 1-digit national roads. • Expand from Double Bituminous Surface Treatment (hereinafter referred to as DBST) to Asphalt Concrete (hereinafter referred to as AC) pavement. • Widen 1-digit national roads from 2 lanes to 4 lanes in and around major cities. • Increase the pavement ratio in 2-digit national roads from 50% to 90%. • Install drainage facilities in 1-digit national roads for flood control. • Increase traffic signals in the capital area for smooth and safe traffic. • Introduce bus public transportation system in the capital area. • Install CCTV cameras in 1-digit national roads to check the over-speeding and overloaded vehicles to reduce traffic accidents and improve road safety. • Encourage the construction of high speed roads (1st priority is Phnom Penh to Preah Sihanouk). <p>B. In the Road Transport Sector:</p> <ul style="list-style-type: none"> • Continue enforcing the sub-decree on management of repair garage and processing/ assembling garage. • Continue enforcing the sub-decree on road transport business. • Continue enforcing the Prakas on the Procedure of Vehicle Registration. • Continue enforcing the law on road transport contracts. • Formulate a new draft law on road traffic. • Reduce the time for issuing vehicle registration, license plate, and driving license. • Improve the officers' capacity. • Modernize the vehicle registration and inspection system using Information Technology (hereinafter referred to as IT) system. <p>E. Road Safety</p> <ul style="list-style-type: none"> • Continue the preparation of 10 years road safety action plan. • Prepare for the defense of national road safety policy by further urging the legal enforcement of road traffic law. • Monitor the process of safety helmet inspection center construction. • Continue organizing the seminar on road safety management. <p>I. Urban Transport</p> <ul style="list-style-type: none"> • Strengthen environmentally-friendly urban transportation. • Plan public transport in major urban centers. • Prepare a new master plan and development of infrastructure for urban transport, including a project for commuter light train to contribute to the reduction of carbon dioxide (hereinafter referred to as CO₂) emission. • Foster efficient, effective, and safe urban public transport infrastructure, and services managed and owned by the private sector. • Put in place additional measures for the management of traffic, to minimize traffic congestion. • Enforce the Traffic Law and improve road safety. <p>J. Management of Statistical Database and Planning</p> <ul style="list-style-type: none"> • Strengthen and improve planning, statistics, data management, and information dissemination in the transport sector. • Strengthen human and institutional capacity in the transport sector. <p>K. Development of Policy, Legal, and Regulatory Framework</p> <ul style="list-style-type: none"> • Implement the Road Traffic Law. • Continue formulating laws, sub-decrees, Prakas, and other legal documents related to public works and transports.

Source: National Strategic Development Plan of Cambodia 2014-2018

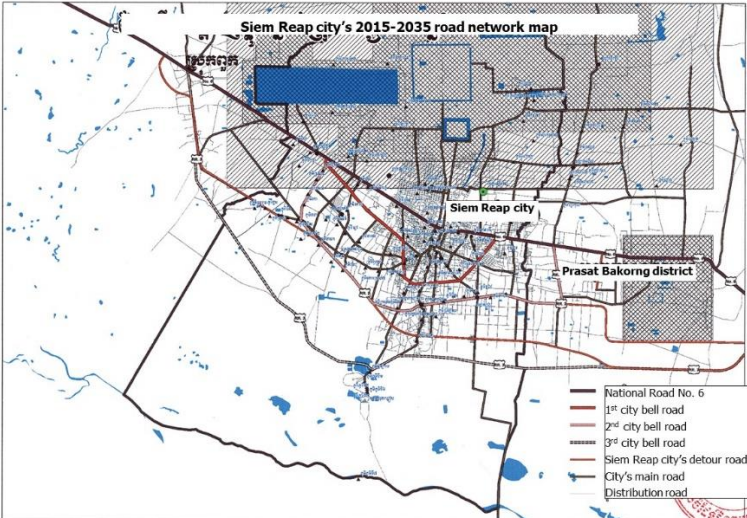
5) Land Use Master Plan of Siem Reap, 2035 Vision

Based on the Rectangular Strategy Phase 3 and NSDP 2014-2018, the Royal Government of Cambodia has set out a national policy on the land management of the Kingdom of Cambodia to ensure that the land across Cambodia is managed, used, protected, and developed through the integration of the land management strategic plan and the sector-based harmonization of necessary rules and tools in each geographical area. The Siem Reap Provincial and Municipal Committee for

Land Management and Urban Planning has developed the land use master plan of Siem Reap for achieving the 2035 vision as basis for managing and directing the development of the Siem Reap municipal territory in accordance with the national vision and policy on land management of the Kingdom of Cambodia and other key sectoral policies.

Table 2.47: Contents of Land Use Master Plan of Siem Reap, 2035 Vision

Item	Contents
Target Year	2035
Vision and Target Goals	<p><u>Vision</u> “Siem Reap city into the pole of heritage, culture, history, and world’s tourism”</p> <p><u>Goal</u></p> <ol style="list-style-type: none"> 1. Control the land use and urbanization in a standard of the world’s heritage, cultural, and historic sites with effectiveness, sustainability, balance, and integration; 2. Promote the economic growth, develop attractive business, support public and private investments to ensure social equity and employment opportunity; 3. Enhance the protection of the world heritage, natural resources, environmental protection, green development, and effective prevention of disaster; 4. Maximize the quality and effectiveness of infrastructure improvement, development and protection; 5. Integrate physical, economic, social, cultural, and environmental plans, and sector-based plans to ensure social harmonization and sustainable development; and 6. Address and respond to the needs of competent authorities and the people.
Action and Schedule	<p><u>Road sector</u></p> <ul style="list-style-type: none"> • Organize and improve the trading and tourism roads, designating NR6 as a tourism and light traffic road. • Organize and improve the 1st and 2nd city belt roads for general transport, in particular the traffic related to Siem Reap City. • Build and improve the 3rd city belt road connecting the roads between the cities, connecting NR6 other than Puok District Town, passing Siem Reap City in the south to NR6 other than Prasat Bakong District Town which is a road for transportation, trading, and tourism. • Build and improve the quality and aesthetics of the road along Siem Reap River in accordance with the green development principle and to become an ecological tourism area. • Organize and improve the public road parking areas to meet the global heritage city standard. • Build and improve the bridges, public parking areas, city belt road system, roads in the city and heritage area. • Improve and share information about road traffic safety. <p><u>Transport sector</u></p> <ul style="list-style-type: none"> • Restore old bridges built in the previous regimes and construct additional bridges across Siem Reap River. • Construct and renovate city belt roads. • Construct a detour in the south of the city. • Improve the roads in the municipal area until 2020. • Construct roads in the municipal areas until 2025. • Construct roads in the municipal areas until 2035. • Promote relevant institutions and the road safety campaign. • Restore and repair the road toward the rural heritage area. • Repair public transportation means that do not pollute the environment in Angkor Resort. • Improve institutional capacity to effectively maintain the road.

Item	Contents
	 <p style="text-align: center;">Road Network of Siem Reap (2015 to 2035)</p>

Source: Land Use Master Plan of Siem Reap, 2035 Vision


6) Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia (MoLIT, MPWT, DPWT, and CDC, 2018)

i) Main Contents

The main objective of the study, conducted by the Ministry of Land, Infrastructure and Transport of the Republic of Korea (hereinafter referred to as MoLIT), MPWT, DPWT, and CDC, was to establish an implementable master plan for infrastructure development in Siem Reap by proposing middle and long term targets and comprehensive implementation plan, and to conduct a pre-feasibility study on one of the priority projects in the plan for proposing the way to implement effectively the project.

Table 2.48: Contents of Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Item	Contents
Target Year	2035
Vision, Goal, and Strategy	<p>Vision: “World Class Tourist City”</p> <p>Goals: 1. City of safe pedestrian environment 2. City of clean air 3. City of convenient transportation</p> <p>Strategy: • Improvement of pedestrian • Improvement of green transportation system • Improvement of urban transportation system</p>

Item	Contents
	 <p style="text-align: center;">Vision and Strategy</p>
Action	<ul style="list-style-type: none"> • Improvement of city center sidewalk (To resolve the on-street parking practice on sidewalk and to start comprehensive maintenance including re-surfacing and pavement of sidewalk) • Creation of pedestrian only zone • Improvement of traffic signal system (at six intersections in the city center) • Standardization of roundabout • Introduction of one-way circular system (around Pokambor Street) • Introducing distance-based remork fare system • On-street parking system (around Pub Street) • Off-street parking • Enforcement of on-street parking • Installation of green transportation • Establishment of transportation corporation • Introduction of LPG remork moto • Introduction of route bus • Introduction of Intelligent Transport System (hereinafter referred to as ITS)

Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Below are the proposed measures in the “Korean MP Study”.

ii) Proposed Measures

a) Introduction of ITS

It was proposed to optimize signal operation over the road network such as an electronic traffic adaptive controller on independent intersections and congested road sections. Moreover, it was also suggested to establish a Traffic Management Center (hereinafter referred to as TMC) after the South Bypass of NR6 is constructed. In the mid-term, the TMC will have a function as a control center of traffic, disaster, and crime prevention and the installation of Closed-Circuit Television (hereinafter referred to as CCTV) is required for more effective management. CCTV network and traffic signal control system can collect data and provide information on Video Management Software/System (hereinafter referred to as VMS) and television monitor in real time (Figure 2.69).



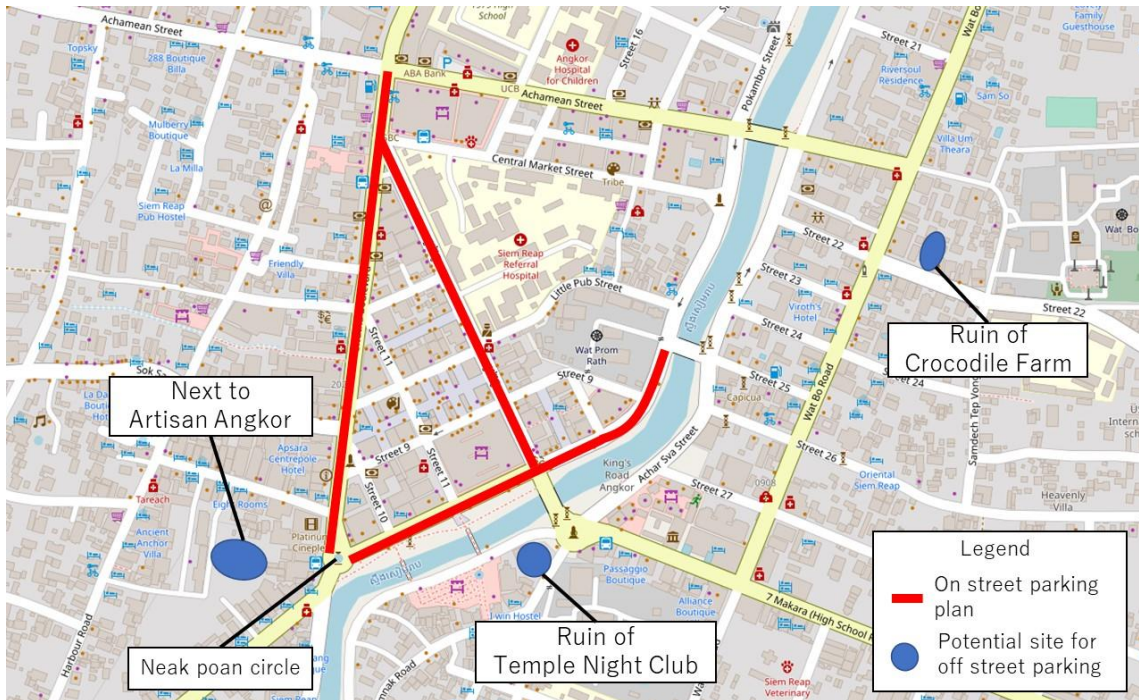
Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.69: ITS Components

b) Introduction of On- and Off-street Parking

On-street parking and off-street parking were proposed as countermeasures for on-street parking (Figure 2.70). As a first step, the introduction of on-street parking with parking meter system around the Night Market area was recommended because of its low construction cost and no need to acquire extra land.

However, the study team of the “Korean MP Study” pointed out that on-street parking may decrease the capacity of roads, increase the risk of traffic accident, and cause mixed traffic flow, and recommended shifting from on-street parking to off-street parking in the long term. The potential sites for off-street parking space around the Night Market area were already discussed with DPWT.



Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.70: On Street Parking and Off-Street Parking Plan

c) Installation of Tuk-tuk Station and Terminal

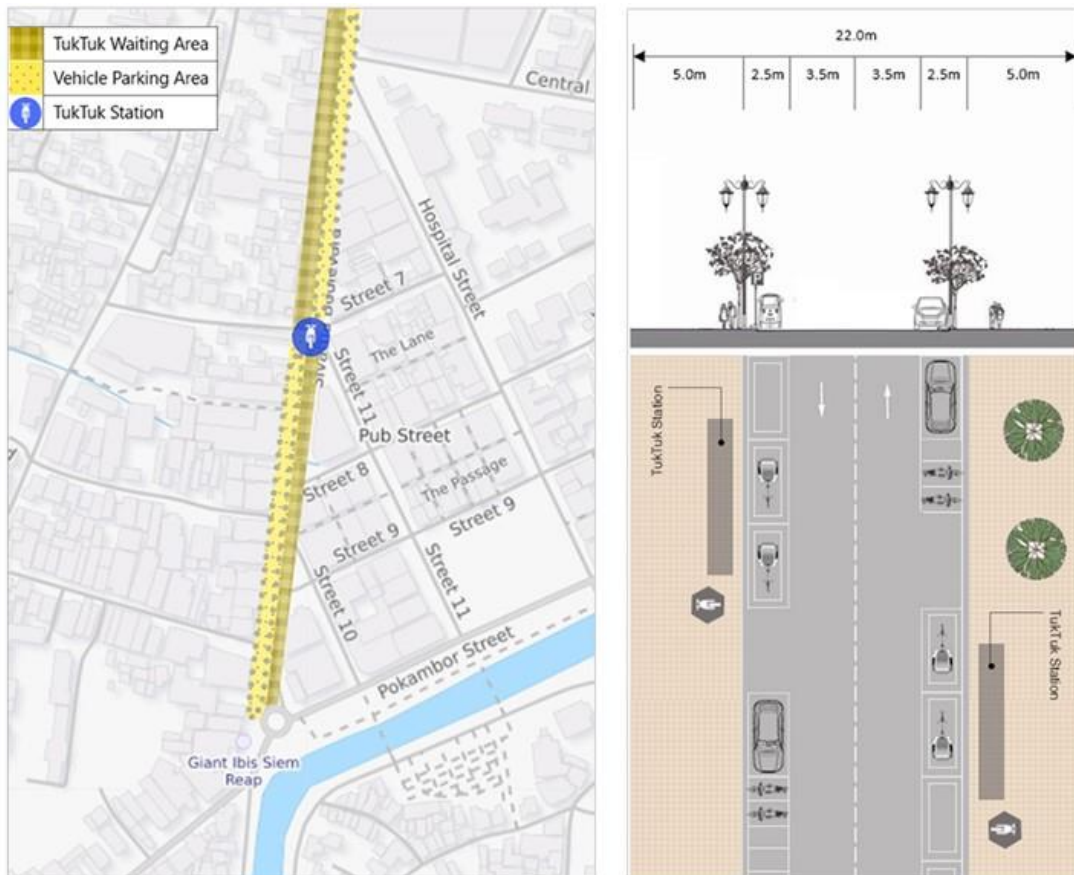
It was proposed to provide tuk-tuk station and waiting areas on both sides of the three main streets around the Night Market (Sivatha Road, 2 Thnou Street, and Pokambor Avenue) after the restoration of sidewalks (Figure 2.71 and Figure 2.72). In addition to the station and waiting area,

it was recommended to create tuk-tuk terminal from a long-term perspective. Specifically, the utilization of the aboveground part of the existing market sites, such as the Night Market and Old Market, was suggested as a way for the installation of the terminal.



Source: <https://www.thailandtrains.com/local-transport-from-bangkok-hua-lamphong-train-station/>

Figure 2.71: Example of Tuk-tuk Station



Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.72: Road Section Plan for Sivatha Road with Tuk-tuk Station

d) Introduction of LPG Tuk-tuk

The introduction of LPG tuk-tuk with light emitting diode (hereinafter referred to as LED) lamps, global positioning system (hereinafter referred to as GPS), and communication devices was proposed for the improvement of the road transport environment such as improvement of air quality (Table 2.49). Moreover, the establishment of the operation system including automated payment system and navigation devices was required for the maximization of the function of public system with modernized services. In addition, the LPG filling station was planned at the same time and the location of the stations was strategically considered based on the driver’s convenience, tourism routes, and so on.

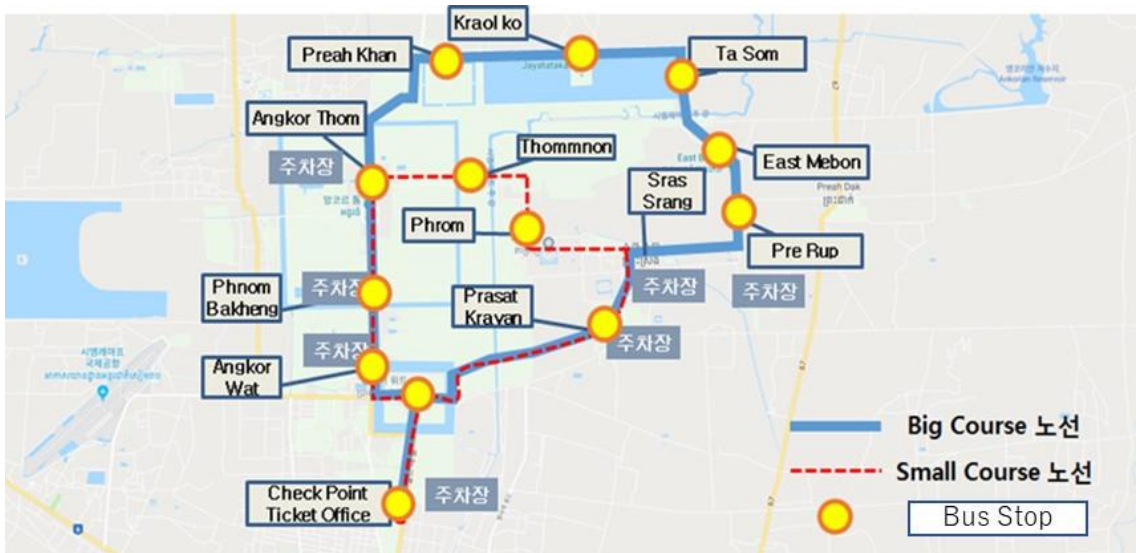
Table 2.49: LPG Tuk Tuk Introduction Plan

Classification	Short Term (2018~2020)	Mid Term (2021~2025)	Long Term (2026~2035)	Total
No. of Introduced Units	3,000	7,000	-	10,000
Introduction Rate (%)	30.0	70.0	-	100

Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

e) Introduction of Route Bus

It was proposed to introduce route bus around tourist attractions for dealing with the increasing traffic demand and providing convenient transportation to residents and tourists during the mid-term (2021 to 2025). It is free to get on and off the buses with whole day ticket at designated tourist spots. The study team of the “Korean MP Study” suggested to introduce compressed national gas (hereinafter referred to as CNG) bus or electrical bus from the perspective of the environment and cultural heritage protection. The bus route will consist of two routes, “Big Course” and “Small Course”. The “Big Course” will connect 11 bus stops on the outskirts of the city and the “Small Course” will connect 8 bus stops in the inner city as shown in Figure 2.73



Source: Green Urban Transport & Road Network Improvement Master Plan in Siem Reap, Cambodia

Figure 2.73: Route Map of Route Bus and Bus Stops

7) Other Ongoing Projects and Planned Projects in the Future

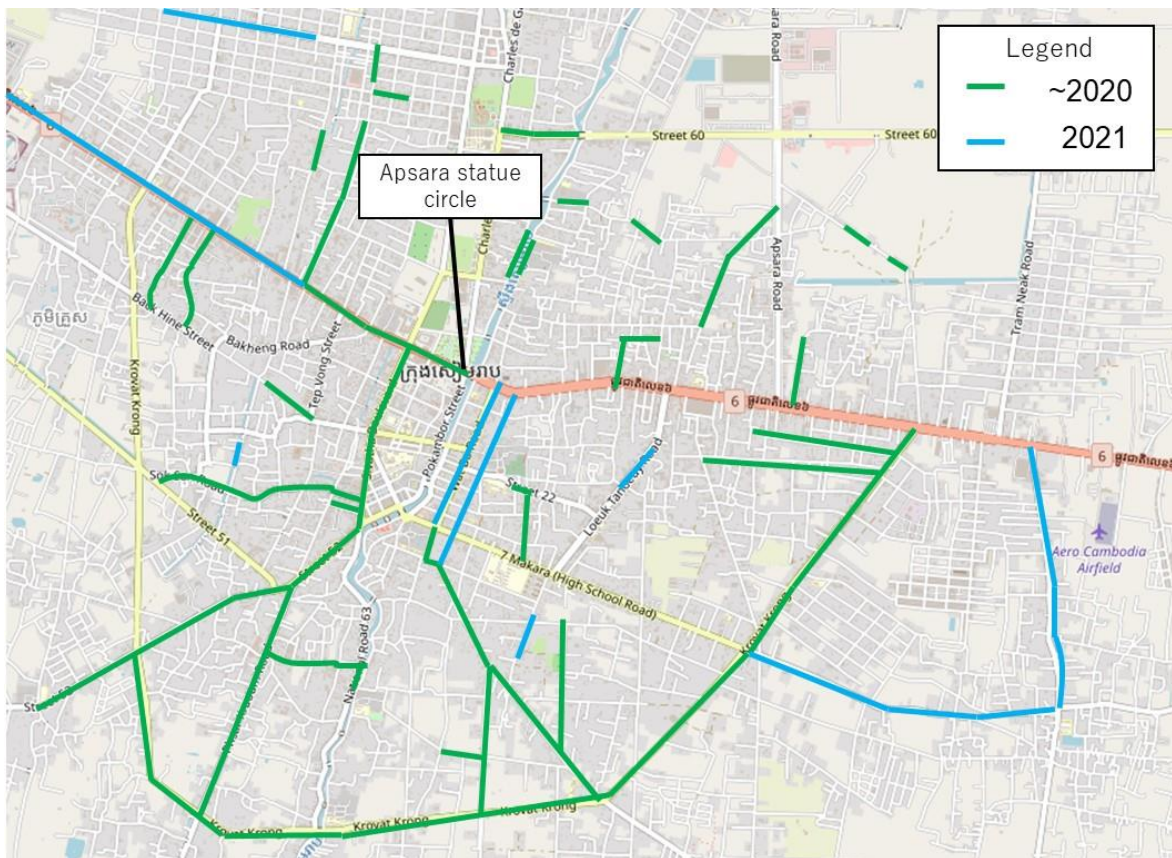
i) Road Improvement Work

The Procurement Unit of Siem Reap Provincial Headquarters has undertaken road improvement works around the city center of Siem Reap. The improvement plans in 2020 and 2021 are shown in Table 2.50 and Figure 2.74.

Table 2.50: Road Improvement Plan of the City Center in 2021 by the Procurement Unit of Siem Reap Provincial Headquarters

Condition	Name of Site	Pavement	Length (m)
Improvement	Bottleneck (Psar Kroam) to Southern (Phnom Kroam Road)	Reinforced Concrete (hereinafter referred to as RC)	1,400
New Construction	Along Barang Chongbou School	RC	260
New Construction	La Pe Road to South	RC	32
New Construction	Corner of Borey Perfect to Drainage System	RC	228
New Construction	Northern Road of Tram Neak Pagoda	RC	232
Improvement	Road 30		1,460
Improvement	Bottleneck (Hout Chea Construction) to Southern Pren Pagoda	RC	1,125
Improvement	Road 60 (Angkor Villa II) to Northern Museum	RC	1,510
Improvement	NR 6 (Angkor Khemra Hotel) to Southern	RC	570
Improvement	7 January Road to Road Villa Visay	RC	1,070

Source: Procurement Unit of Siem Reap Provincial Headquarters



Source: Procurement Unit of Siem Reap Provincial Administration

Figure 2.74: Road Improvement Plan of the City Center in 2020 and 2021 by the Procurement Unit of Siem Reap Provincial Headquarters

Moreover, DPWT also developed the road improvement plan in the province from 2021 to 2023 and the plan was already submitted to MPWT for budget approval.

Table 2.51: Road Improvement Plan from 2021 to 2023 by DPWT

Road Class	Name of Site	Pavement	Length (m)
Road 2SR3	Svay Dangcum Commune, Teouk Vil Commune, Siem Reap Town (KM 07+430 ~ KM 14+950)	DBST	7,520
NR67	Varin District	DBST	7,500

Road Class	Name of Site	Pavement	Length (m)
	(KM 25+900 ~ KM-80+00)		
Road 267	Svay Dangkum Commune, Siem Reap Town (KM 17+300 ~ KM 19+700)	Concrete Road	2,400
Road 265E	Rolous Commune, Bakong District (KM 00+00 ~ KM 07+00)	Asphalt DBST	7,000
Road 266D	Rom Pouk District to Angkor Thom District (KM 01+150 ~ KM 13+400)	DBST	11,600
Road 266E	Connecting Road from Angkor Chhum District to Varin District Siem Reap Province (KM 33+770 ~ KM 46+770)	Red Gravel	9,100
Road 266F	Angkor Chhum District, Sorsor Sdom Commune (KM 03+270 ~ KM 14+200)	Asphalt DBST	10,930
Road 265B	Kok Thlok Krom Commune, Chi Kreng District (KM 06+00 ~ KM 10+000)	DBST	4,000
Road 2641	Kunream Commune, Banteay Srey District (KM 26+100 ~ KM 36+100)	Red Gravel	10,000
Bridge (Connect between 265F to NR63)	Siem Reap District, Siem Reap Town (Road 265F KM 11+400)	Concrete Bright	46
		Road Connect Bridge	150
NR6	Kondek Commune, Brasat Bakong District NR6 (KM 305 ~ KM 305+650)	AC	650
NR64	Svay Loeu District (KM 38+500- KM 45+00)	DBST	1,400

Source: DPWT



Source: DPWT

Figure 2.75: Road Improvement Plan from 2021 to 2023 by DPWT

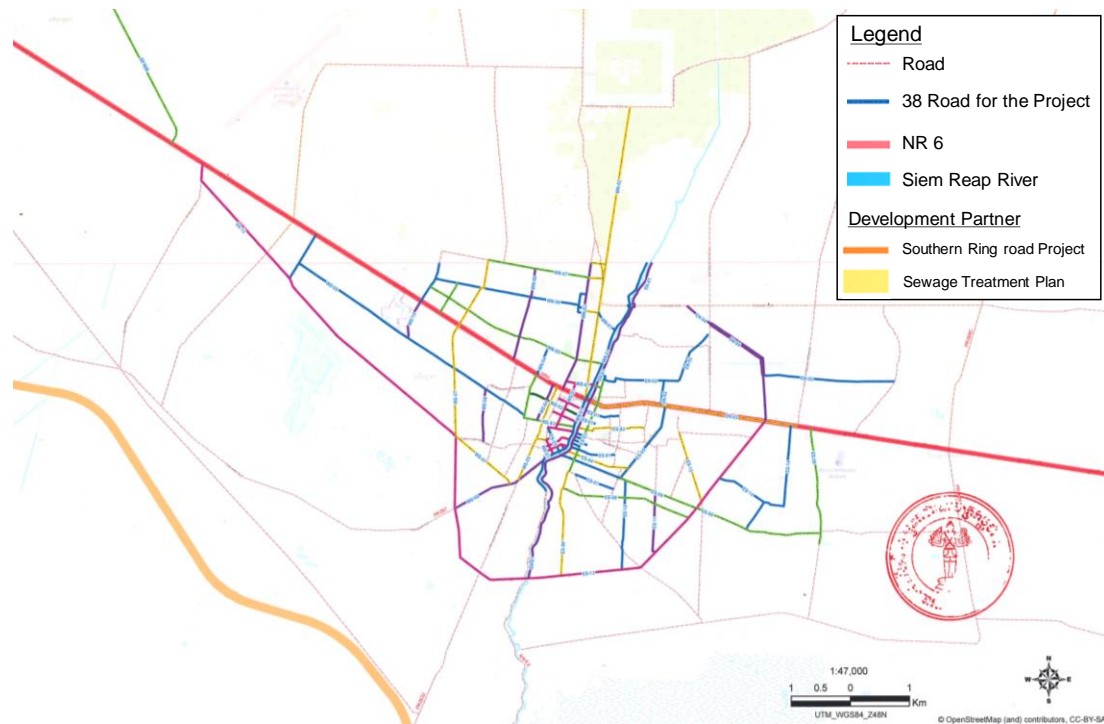
ii) 38 Road Construction Project

On November 29, 2020, the official inauguration ceremony was held in Siem Reap with Prime Minister Hun Sen and the “38 Road Construction Project” began in Siem Reap Province. The project budget is set at USD 150 million and mainly consisted of road projects budget for construction and improvement work of the roads with total length of 109 km (USD 140 million) and other projects budget for construction works of drainage system and so on (USD 9 million). The contents and conceptual drawings of the project are shown in Table 2.52, Figure 2.76, and Figure 2.77. The Siem Reap Provincial Administration is not included in the implementation organization but it has the role of coordinating between the working group and the local residents who are affected by the construction project. For the local residents, the Provincial Administration has the responsibility to find solutions such as resettlement and site compensation.

Table 2.52: Contents of 38 Road Construction Project

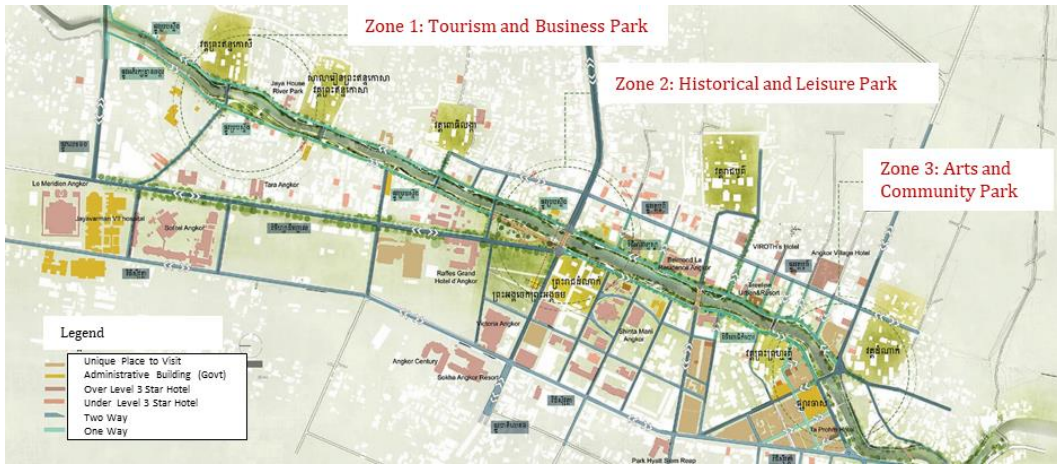
Vision	Smart and potential tourism city set by the Royal Government of Cambodia as a core national development zone and a cultural, historical, and natural tourism destination
Duration	November 2020 ~ December 2021 (13 months)
Budget	USD 150 million (National Budget)
Implementation Organization	MPWT, MLMUPC, DPWT, Army Corps of Engineers
Item	<ul style="list-style-type: none"> • drainage system (stormwater) • sewage system (wastewater) • flood protection and drainage improvement • sidewalks and streetlight poles as well as other aspect • cable network • power transmission system • sidewalk for disability • bicycle lane • parking lots • traffic sign and markers • security camera systems

Source: MLMUPC and Khmer Times



Source: MPWT

Figure 2.76: Mapping of 38 Road Construction Project in Siem Reap Province



Source: MPWT

Figure 2.77: Development Plan around Siem Reap River in 38 Road Construction Project



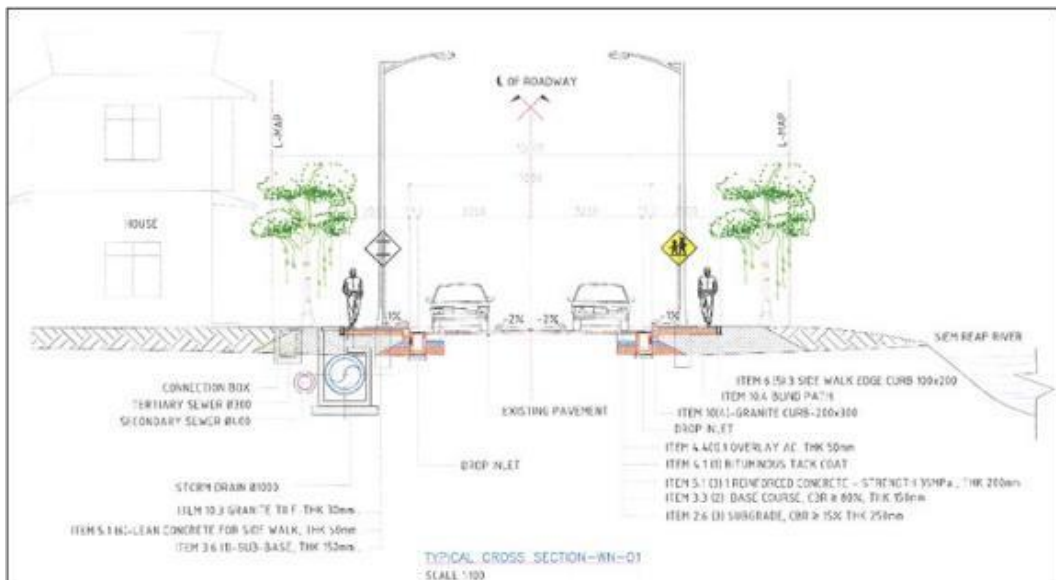
Source: MLMUPC and Khmer Times

Figure 2.78: Conceptual Drawing of Road



Source: MLMUPC and Khmer Times

Figure 2.79: Conceptual Drawing of Intersection



Source: MPWT

Figure 2.80: Example of Cross Section in 38 Road Construction Project (Pokambor Avenue)

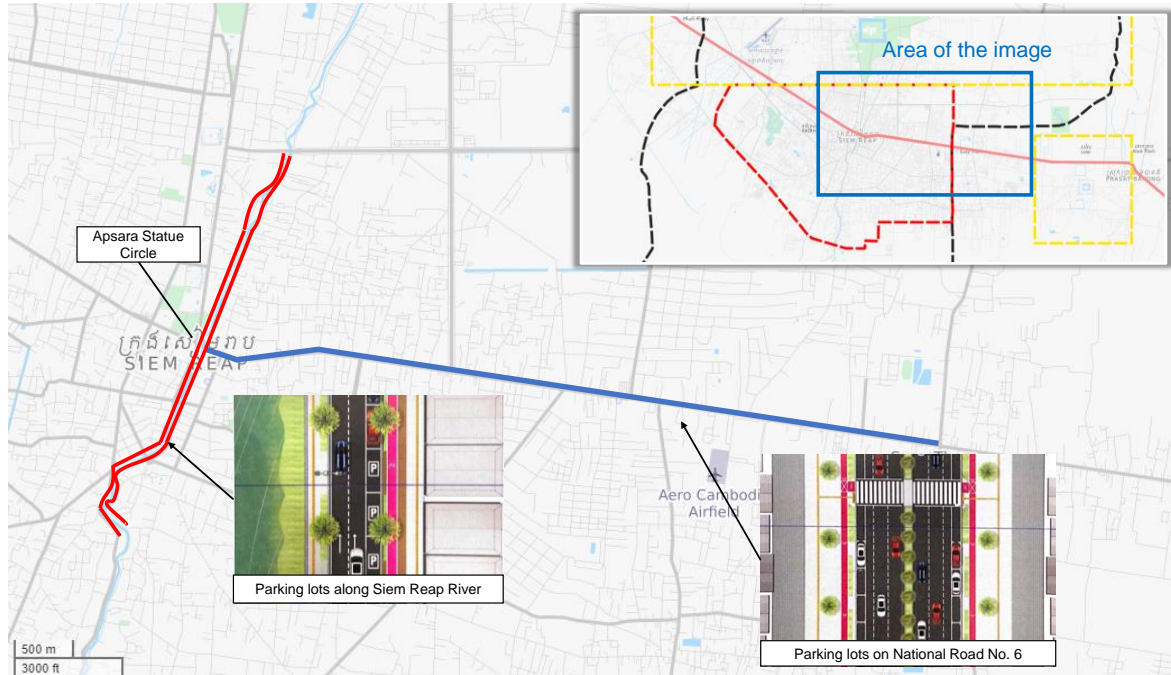


Figure 2.81 : Image of On-street Parking Lot Installed in 38 Road Construction Project

iii) Introduction of Route Bus

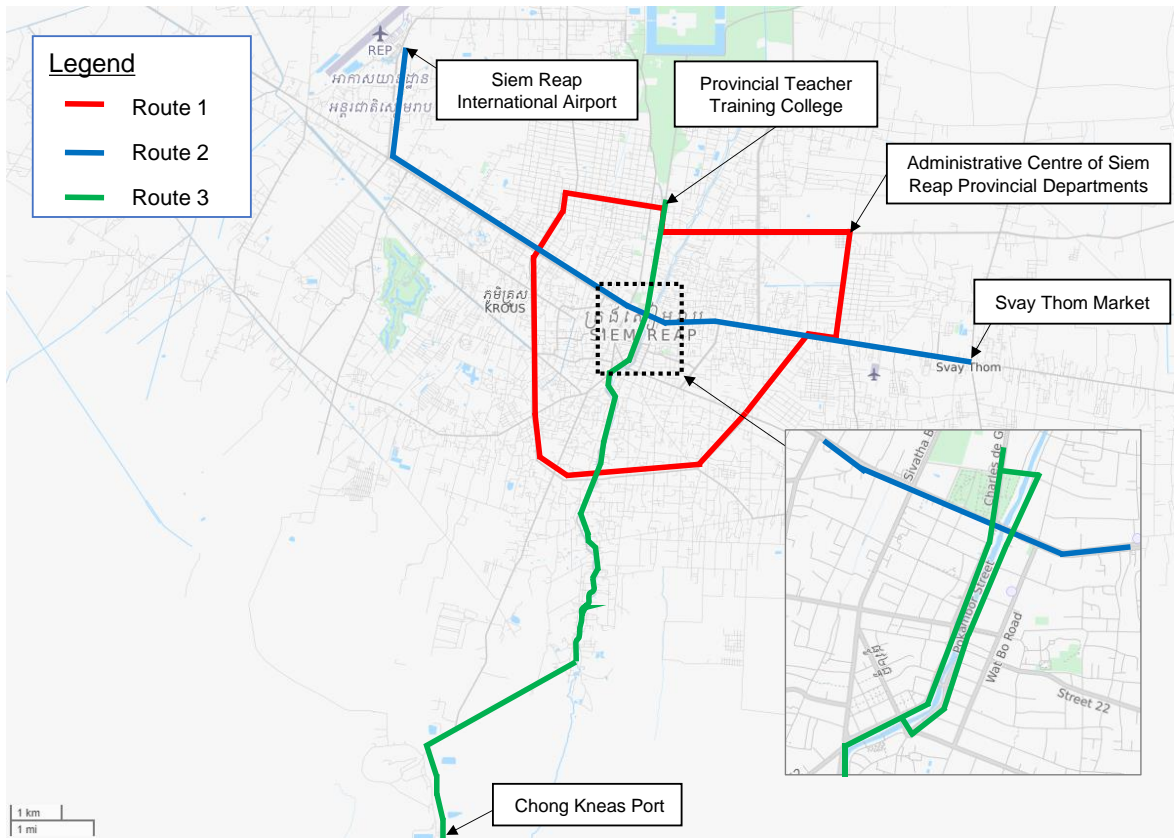
Regarding the route bus plan in Siem Reap Province, the General Department of Land Transport (hereinafter referred to as GDLT), MPWT conducted a field survey in Siem Reap in 2019 with a team of consultants for the ADB project "Supporting Sustainable Integrated Urban Public Transport Development (SSIUPTD)". Then, the information about candidate routes (3 routes), bus stop locations, bus garage/bus terminal locations, and related data were collected. The preliminary draft plan in the study is shown below.

Table 2.53: Route Bus Plan in Siem Reap Province

Route No.	Route	Length	No. of Vehicles
1	Preah Ang Chek Preah Ang Chorm~Angkor Wat National Park~Siem Reap International Airport~Jayavarman VII Roundabout~Preah Ang Chek Preah Ang Chorm	26 km	15
2	NR67~Svay Thom market~Preah Ang Chek Preah Ang Chorm~Jayavarman VII Roundabout~Puok Market	25 km	15
3	Chong Kneas~Psar Chas Roundabout~Preah Ang Chek Preah Ang Chorm ~Bayon Temple~Tilean Chol Domri (Elephant Terrace)	23 km	15

Source: MPWT

In January 2021, a basic agreement about pre-feasibility study support for the introduction of E-Bus in Siem Reap was signed between GDLT and GGGI. Currently, the pre-feasibility study is being implemented. The figure below shows the three route plans presented in February 2021. It was shown at a meeting with the APSARA National Authority and the provincial administration.



Source: MPWT

Figure 2.82: Route Plan of E-Bus by GGGI

iv) Construction Project of New International Airport

At present, a new international airport has been constructed by Chinese companies and the airport will be operated from 2023. Moreover, a new city will be developed around the airport too.

2.3.3 Security and Safety

The current conditions of “crime”, “traffic accidents”, “fire”, and “natural disasters” as hazards that anyone can suffer were reviewed.

(1) Current Condition and Issues

1) Crime

i) Overall Situation and Reputation

According to the Security Annual Report 2019, published by the Siem Reap Provincial Police, from November 20, 2018 to November 19, 2019, 484 crimes were detected, which was 78 more than the year before. Since the number of the population in Siem Reap Province is reported as 994,540¹⁶, crime incidents per 100,000 persons is 48.67. The majority of the crime reported are drug related (388 cases), implicating that the Siem Reap Provincial Police is putting effort in drug eradication.

According to interviews with travel agencies operating in Siem Reap, the characteristics of crime in Siem Reap are as follows:

- Criminals target both locals and foreign tourists.
- Crimes do not occur in specific areas of Siem Reap City.
- Street crimes (bag snatching and pickpocketing) are most common types of crime that occur in Siem Reap City.
- Cases of crime victimization of Japanese people are often reported in Phnom Penh, whilst few cases were reported in Siem Reap in the past one year.
- Not all crimes (especially bag snatching and pickpocketing) are reported to the police; thus, it is likely that more crimes are actually occurring than the numbers reported by the police.

The Overseas Security Advisory Council (hereinafter referred to as OSAC) of the Bureau of Diplomatic Security, United States Department of State rates Cambodia as “Level 1 (Exercise Normal Precautions)”, although also notes that tourists need to exercise increased caution in Phnom Penh due to crime.

The Ministry of Foreign Affairs of the Government of Japan also rates Cambodia’s danger level as “Level 1” nationwide. However, the Embassy of Japan in Cambodia notes that there is a chance of foreigners being victims of petty crimes such as bag-snatching, pickpocketing, and fixed gambling, as well as felony such as robbery and murders, especially in urban areas and tourist destinations. The embassy also notes that the number of crimes officially reported by the police is considered as below the actual number of crime occurrence.

ii) Felony

68 felonies were reported, which decreased by 2 from the 2018 report. 88 people were arrested, including 1 woman and 18 foreigners, which consist of 1 New Zealander, 8 Chinese, 6 Indian, 2 Russian, and 1 Japanese. A total of 17 deaths (of which 2 are women), 10 serious injuries, and 4 minor injuries were reported.

a) Robbery

One case of robbery was reported in Kork Jork of Siem Reap City.

b) Murder

19 cases of murder were reported, as shown in Table 2.54. 1 case of the 19 is in Siem Reap City (Sala Kamreuk), while the other 18 occurred outside Siem Reap City.

¹⁶ As of 2019 (from General Population Census of the Kingdom of Cambodia 2019)

Table 2.54: Places of Murders Reported in Siem Reap Province in 2019

District	Commune	Number
Siem Reap City	Sala Kamreuk	1
Other Districts	Ji Kraeng	1
	Rong Kor	1
	Porpel	1
	Sandaek	1
	Sombouk	1
	Puk	1
	Kork Dong	1
	Khnat	1
	Mean Chey	1
	Kanhtout	1
	Dom Dek	1
Slaeng Spean	1	

Source: Security Annual Report 2019

c) Illegal Detention

One case of illegal detention was reported in Srae Nouy.

d) Rape

Four cases of rape were reported, in Kantraeng, Rerl, Svay Dangkum, and Lvea Kraeng.

e) Theft

49 cases of theft were reported (Table 2.55). 12 of the 49 cases occurred in Siem Reap City.

Table 2.55: Places of Theft Reported in Siem Reap Province in 2019

District	Commune	Number
Siem Reap City	Svay Dangkum	4
	Sro Ngae	1
	Sala Kamreuk	5
	Teuk Vil	1
	Nokor Thom	1
Other Districts	Rolous	2
	Khnar Sanday	1
	Krolanh	1
	Slokram	4
	Balang	1
	Knat	1
	Kork Dong	1
Anlong Samnor	1	

Source: Security Annual Report 2019

f) Snatching

Ten cases of snatching were reported, as shown in Table 2.56. All of the ten cases were reported in Siem Reap City.

Table 2.56: Places of Snatching Reported in Siem Reap Province in 2019

District	Commune	Number
Siem Reap City	Sala Kamreuk	3
	Svay Dangkum	1
	Kork Chok	3
	Norkor Thom	1
	Slokram	1
	Chrav	1

Source: Security Annual Report 2019

g) Fraud

Three cases of fraud were reported, in Slokram, Svay Sor, and Svay Ddangkum.

h) Intentional Violence

Nine cases of intentional violence were reported, of which 7 are in Svay Ddangkum and 2 are in Rerl.

i) Domestic Violence

Three cases of domestic violence were reported, in Sro Ngae, Duan Keo, and Khnong Phnom.

iii) Gambling

a) Online Gambling

Six cases of illegal online gambling were reported, all of which were reported in Svay Dangcum, involving 199 Chinese, 2 Malaysian, and 1 Indonesian.

b) Card Gambling

One case of illegal card gambling was reported in Kouk Jork, with four arrested.

iv) Drug Abuses

388 cases of drug abuses were reported in 2019, which increased by 67 compared to 2018. 1,242 people were arrested, including 78 females and 5 foreigners (1 Argentinian, 1 Danish, 1 Vietnamese, and 2 Thai). Detailed information is shown in Table 2.57.

Table 2.57: Drug Abuse Cases in Siem Reap Province in 2019

Type of Case	Number of Cases	Number of Suspects	Number of Female
Drug transport	2	7	2
Drug trading	143	444	40
Drug storing	53	100	7
Drug distribution	35	77	8
Drug usage facilitation	1	1	0
Drug usage	154	613	21
Total	388	1242	78

Source: Security Annual Report 2019

v) Human Trafficking

21 cases of human trafficking were reported, which increased by 11 compared to 2018. 25 were arrested including 6 females and 2 foreigners (1 American and 1 Russian), and there were 69 victims.

vi) Countermeasures

According to the interview survey with the Siem Reap Provincial Police, 20 CCTV cameras are installed in Siem Reap City. All of the 20 are located in the Pub Street area, to monitor petty crimes such as pickpocketing and bag-snatching.

On the other hand, many hotels have security guards for crime prevention. The number of people to be paid depends on the size of the hotel, but it is about USD 150 to USD 450 per person per month. In some cases, security guards are dispatched through a security guard dispatching company, and in other cases, they are personally dispatched.

2) Traffic Accidents

i) Reported Cases

According to the Security Annual Report 2019, 88 cases of traffic accidents were reported, which were 15 more than in 2018. Of the 88 cases, 84 are in roadways, and 4 are in waterways. As for Siem Reap City, 22 cases were reported, with 20 deaths (of which 6 are females), 12 serious injuries (of which 1 is female), and 13 minor injuries (of which 1 is female). 17 motorbikes, 7 tuk-tuks, and 1 bicycle were damaged. shows the communes in Siem Reap City where traffic accidents took place.

Table 2.58 shows the communes in Siem Reap City where traffic accidents took place.

Table 2.58: Places of Traffic Accidents Reported in Siem Reap City in 2019

Commune	Number
Svay Dangkum	7
Slokram	2
Jrev	1
Nokor Thom	2
Teuk vil	2
Siem Reap	4
Sror Ngae	2
Sala Kamreuk	2

Source: Security Annual Report 2019

Table 2.59 shows the causes of traffic accidents that occurred in Siem Reap Province in 2019.

Table 2.59: Causes of Traffic Accidents Reported in Siem Reap Province in 2019

Causes	Number
Over speed limit	27
Not driving on the right-hand side of the road	22
Dangerous overpass attempt	3
Broken car	4
Drunk driving	3
Not paying attention	10
When backing-up	2
Road crossing	4
Dozing driving	3
Ignoring traffic lights	1
Illegal parking	1

Source: Security Annual Report 2019

According to reports by a JICA Senior JOCV dispatched to DPWT, the root causes of traffic accidents in Siem Reap are inadequate basic facility installation (streetlights and signals), inappropriate crossing designs, and lack of public awareness on road traffic regulations and driving manners.

ii) Countermeasures

According to the Security Annual Report 2019, in Siem Reap Province, a total of 454,242 vehicles were inspected with suspicion of illegal driving and a total of 16,762 were found illegal, leading to fine payment¹⁷ (Table 2.60).

Table 2.60: Number of Inspected Vehicles and Vehicles with Fine Payment

Type of Vehicle	Inspected	Fine Payment
Cars	129,527	8,247
Motorcycles	324,715	16,762
Total	454,242	25,009

¹⁷ As of a year from November 2018 to November 2019

Source: Security Annual Report 2019

The reasons for fine payment for cars and motorcycles are in Table 2.61 and Table 2.62, respectively.

Table 2.61: Reasons for Fine Payment of Cars in Siem Reap Province in 2019

Reasons	Number
No safety belts	2,219
Over speed limit	4,941
Ignoring traffic signs	221
Exceeding passenger limits	59
Carry bulky	40
No lights at nighttime	8
No number plates	8
No checking	431
Dark stickers on mirrors	5
No original registration paper	72
Overload	68
Expired license	36

Source: Security Annual Report 2019

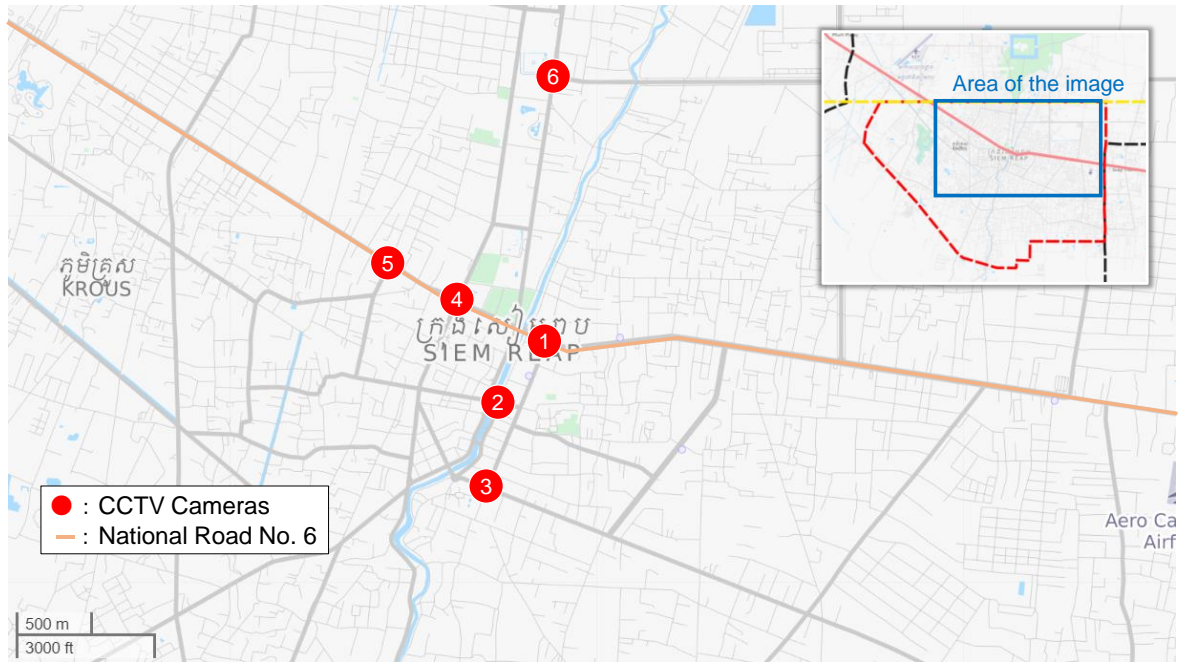
Table 2.62: Reasons for Fine Payment of Motorcycles in Siem Reap Province in 2019

Reasons	Number
No helmet	13,454
No mirrors	2,086
Ignoring traffic signs	456
Ignoring traffic lights	41
No lights at nighttime	61
Vehicle modification	110
No number plates	522
Color modification	24
Drunk driving	5
Expired license	3

Source: Security Annual Report 2019

According to an interview survey with the Siem Reap Provincial Police Headquarters, in Siem Reap Province, there are six places with CCTV cameras installed to observe the traffic flow, which are located at the following intersections:

- Kors Ke intersection traffic light
- Spean Thmor Wat
- Intersection between Total Petrol Station and Wat Domnak
- Behind Preah Ang Chek Preah Ang Chorm
- Tonle Sap intersection traffic light
- Khunthak Bopha Hospital intersection traffic light



Source: JICA Survey Team

Figure 2.83: Current Location of CCTV Cameras

Due to the low resolution, the CCTV cameras can just provide information of the traffic flow and cannot detect information on number plates of vehicles. Also, as part of the 38-road construction project, 200 CCTV cameras are said to be planned to be installed in the city.

3) Fire

i) Reported Cases and Current Situation

69 cases of fire were reported in Siem Reap Province, which increased by 29 from 2018.

Especially in the Old Market and Pub Street, where buildings are densely built up and combustibles are accumulated, the risk of the spread of fire is high.

ii) Countermeasures

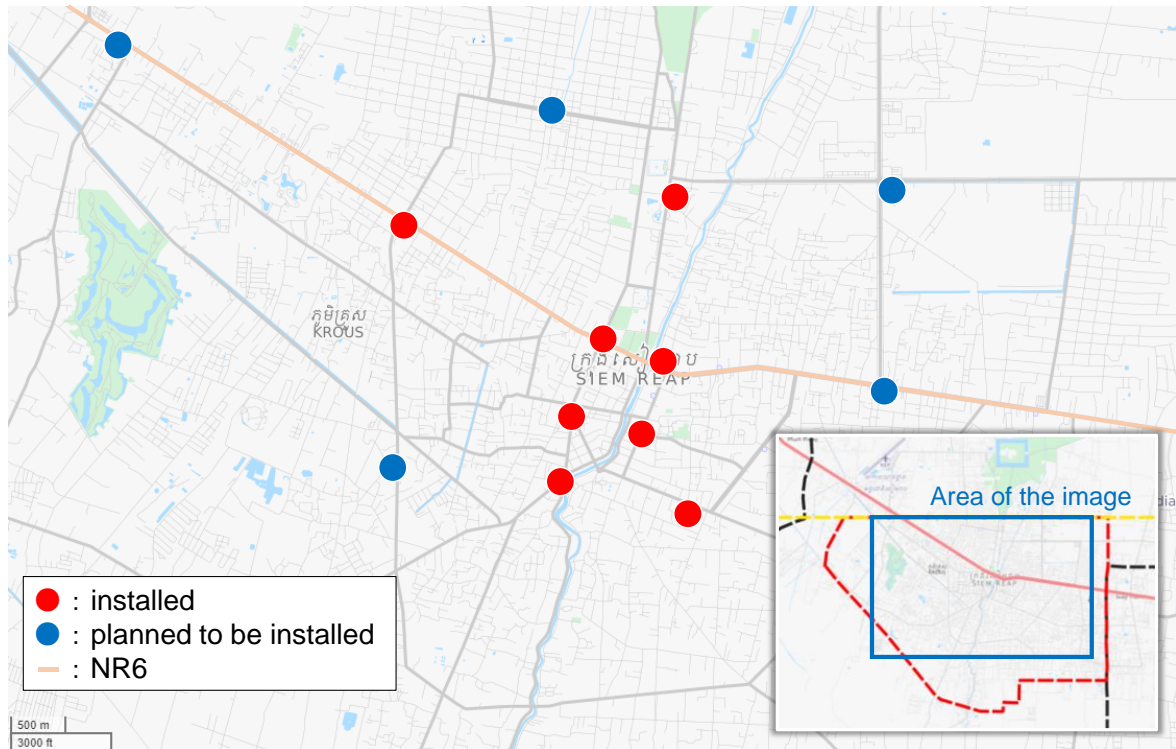
The Siem Reap Provincial Police has an Office of Fire Prevention and Rescue that serves for firefighting by responding to emergency calls 24 hours, as well as introducing to local people the prevention and control measures of fire. For the 69 cases of fire detected by the Siem Reap Provincial Police, a total of 98 water trucks and 12 fire hoses were used for fire extinguishing. Also, the Office of Fire Prevention and Rescue has conducted inspections on hotels for fire safety systems and technologies, that include 597 fire extinguishers, 172 fire hoses, and 15 fire hydrants. In case of events in Pub Street, the Office of Fire Prevention and Rescue also collaborated with relevant units to inspect the Pub Street area for any danger related to fire.

However, despite the high risk of fire, the infrastructure for firefighting and irrigation is not sufficiently developed. Currently, hydrants have been installed in eight locations in Siem Reap, and five more hydrants will be installed¹⁸. While the minimum distance between these fire hydrants is about 400 m, it is needed to install them at intervals of about 250 m in order to enable sufficient fire extinguishing at any point in the city¹⁹. Continuous promotion of infrastructure development for fire

¹⁸ The project will be implemented with the Siem Reap Water Supply Authority's own funds after the completion of the 38 Road Construction Project.

¹⁹ According to the Japanese standards of fire hydrants, in city areas, the fire hydrant must be within 80 ~ 120 m distance from the fire extinguishing target. Hence, in order to perform efficient fire extinguishing in any spot, fire hydrants need to be provided within 160 ~ 240 m distance from each other.

extinguishing is needed, but at the same time, it is also necessary to introduce systems and equipment that will help local residents and store employees to detect, evacuate, and extinguish fires appropriately as soon as possible.



Source: JICA Survey Team (based on information from Siem Reap Water Supply Authority)

Figure 2.84: Location of Fire Hydrants

As for related laws and regulations, in Cambodia, the “Law on Fire Prevention and Fire Fighting” was established in 2013 with the commitment of MoI, and the “Law on Construction” was established in 2019 with the commitment of MLMUPC. However, the two laws do not specify detailed regulations for fire prevention. MoI regulates construction standards for fire safety in the “2019 FIRE SAFETY SYSTEMS - BUILDING DESIGN CODE”, but it does not specify on general buildings, and this code is rarely referred to in construction permission operation. MLMUPC is drafting the building design code for fire safety with the support of the Japanese government, but it is not yet established.

4) Natural Disasters

According to the Köppen climate classification, Siem Reap is located in a tropical savanna climate with dry-winter characteristics. It has a distinct dry season (November to April) and rainy season (May to October); due to this annual drastic change in weather, natural disasters such as flood, lightning, and storms are seen.

i) Flood

According to the National Committee for Disaster Management in Cambodia (hereinafter referred to as NCDM), in Siem Reap City, from 2000 to 2019, three major flooding have been reported, in 2009, 2011, and 2013. The flood in 2009 killed one person; the flood in 2011 killed 12 people; and the flood in 2013 killed three people. Flood is mainly seen from September to October, at the end of the rainy season.

In the rainy season, flooding occurs frequently in urban areas. Although drainage infrastructure from the urban area to the outside of the city has been developed to reduce flood damage in the urban area,

knee-level flooding occurs several days a year in the urban area as well even if knee-level floods often resolve within a few hours.

ii) Lightning

According to NCDM, in Siem Reap City, from 2000 to 2019, eight lightnings with human damage have been reported, with a total of 9 deaths and 9 injuries. Details are shown in Table 2.63. Lightening is mainly seen from April to June, where the climate is transitioning from the dry season to the rainy season.

Table 2.63: Lightning with Human Damage Reported in Siem Reap City from 2000 to 2019

Date	Deaths	Injuries
May 14, 2008	2	0
June 15, 2011	2	0
August 6, 2011	0	6
May 19, 2012	1	0
June 5, 2016	1	0
June 7, 2016	0	2
April 28, 2017	1	1
June 1, 2019	2	0

Source: NCDM

iii) Storms

According to NCDM, in Siem Reap City, from 2000 to 2019, numerous storms have been reported, with a total of two people killed, 21 people injured, 481 houses destroyed, and 369 houses damaged. The storms were observed from February to October.

iv) Countermeasures

a) National Action Plan for Disaster Risk Reduction

Drainage measures by infrastructure development, such as drainage infrastructure development, will be described in detail in Section "2.5.4 Waste".

The National Action Plan for Disaster Risk Reduction (hereinafter referred to as NAP-DRR) is developed by NCDM with the purpose to pursue proactive and integrated way to reduce risk to hazards through sustainable, innovative, and realistic strategies with stronger partnership of all stakeholders. Following the guidelines for the development of action plan by the Council of Ministers, it only includes the activities that are important, priority, and 'must do' in nature. The NAP is aligned with the planning cycle of NSDP. The latest NAP-DRR published is the NAP-DRR for 2014-2018. The NAP-DRR for 2019-2023 was expected to be released in October 2019, although not released yet.

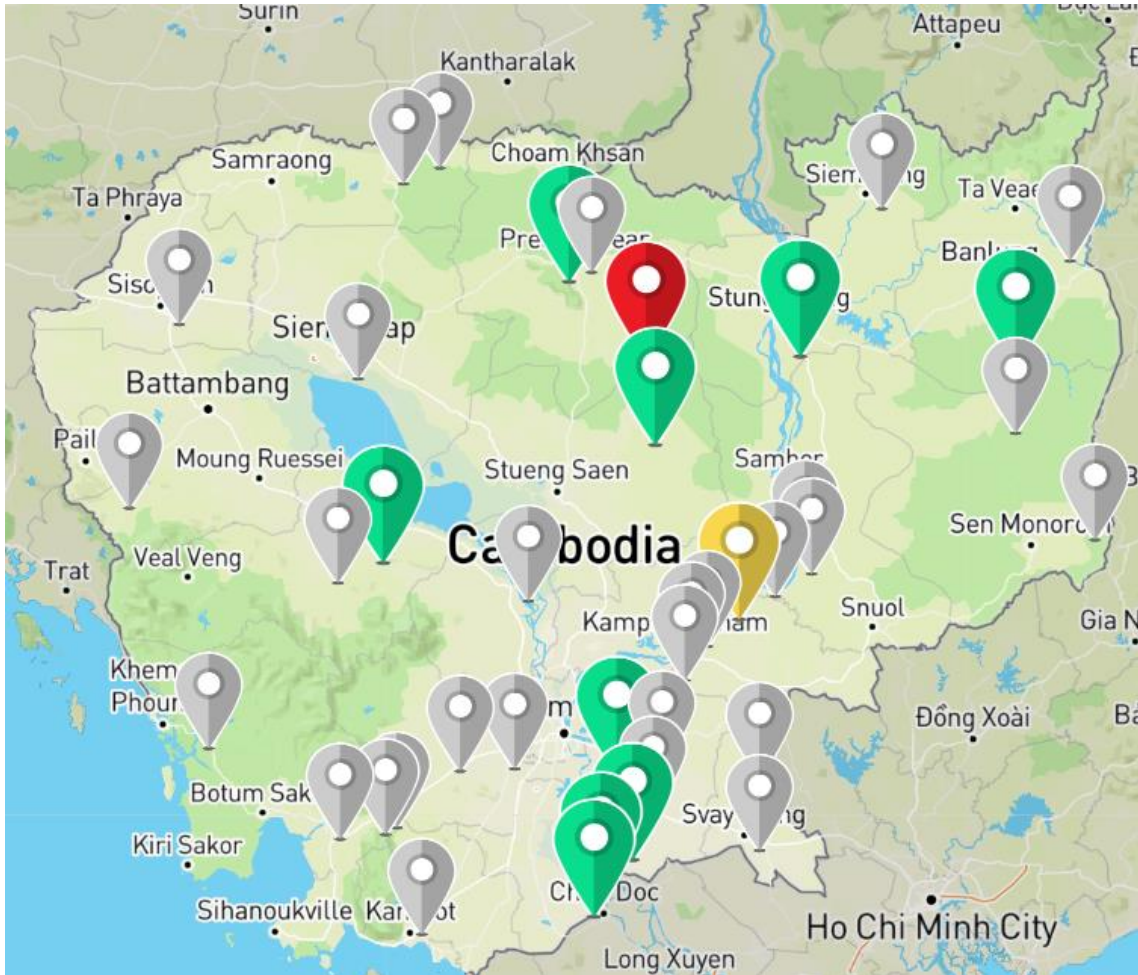
The NAP-DRR for 2014-2018 consists of five strategic components, which are the following:

- Consolidating and further enhancing the capacity of the disaster management institutions at national, sub-national, and local community levels.
- Enhancing risk assessment and improving early warning systems.
- Development and use of innovation and knowledge to build resilience.
- Reduction of the underlying causes of risks.
- Enhancing emergency response and recovery capabilities at all levels.

b) EWS 1294 Early Warning System

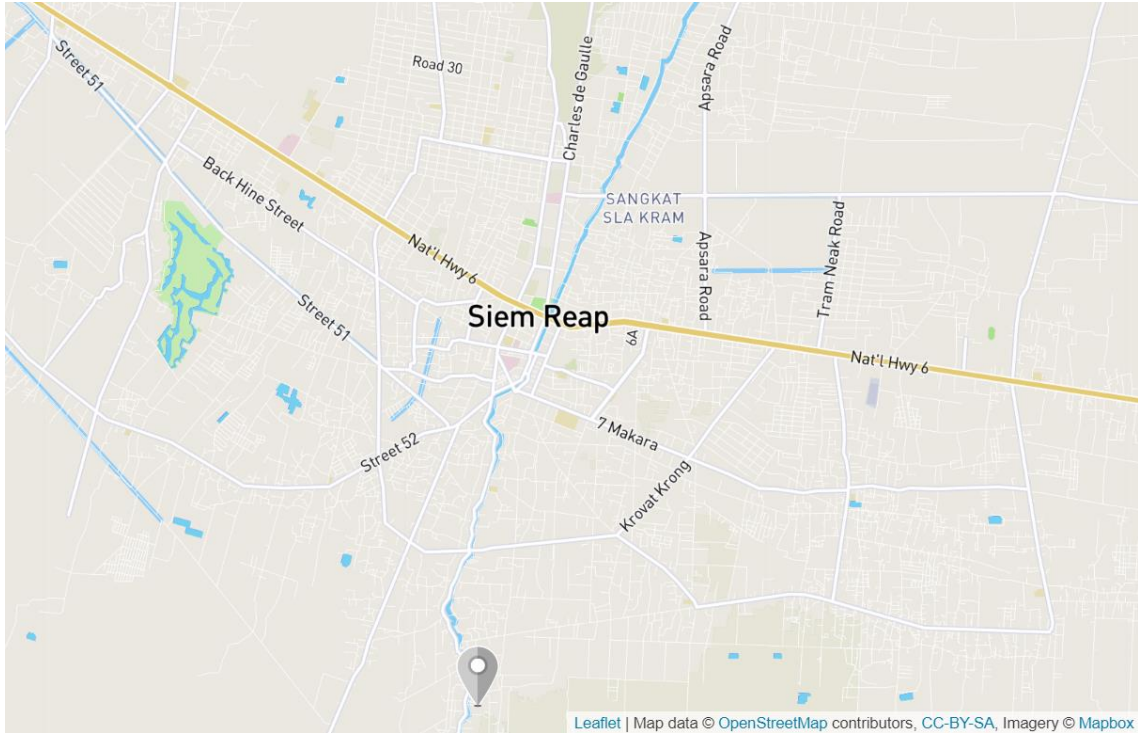
With cooperation of the People in Need (hereinafter referred to as PIN) Cambodia and the United Nations Development Program (hereinafter referred to as UNDP), NCDM developed the "Early Warning System (hereinafter referred to as EWS) 1294" that delivers advance warnings to people in areas that are frequently flooded. Users are required to register their province, district, and

commune via a free call to 1294. Solar-powered water gauges located in rivers continuously record meteorological information, and the acquired data is sent via the Cambodian cellular mobile phone network. In case of danger of flooding, registered users will receive calls via their mobile phones that notify the danger before occurrence. According to EWS 1294's website, 19 sensors are active in Cambodia as of August 11, 2020. One water gauge is set on a bridge crossing Siem Reap River, in the southern part of the city, although the gauge is not active. As of December 2020, mention of the water gauge in Siem Reap has disappeared from the web page.



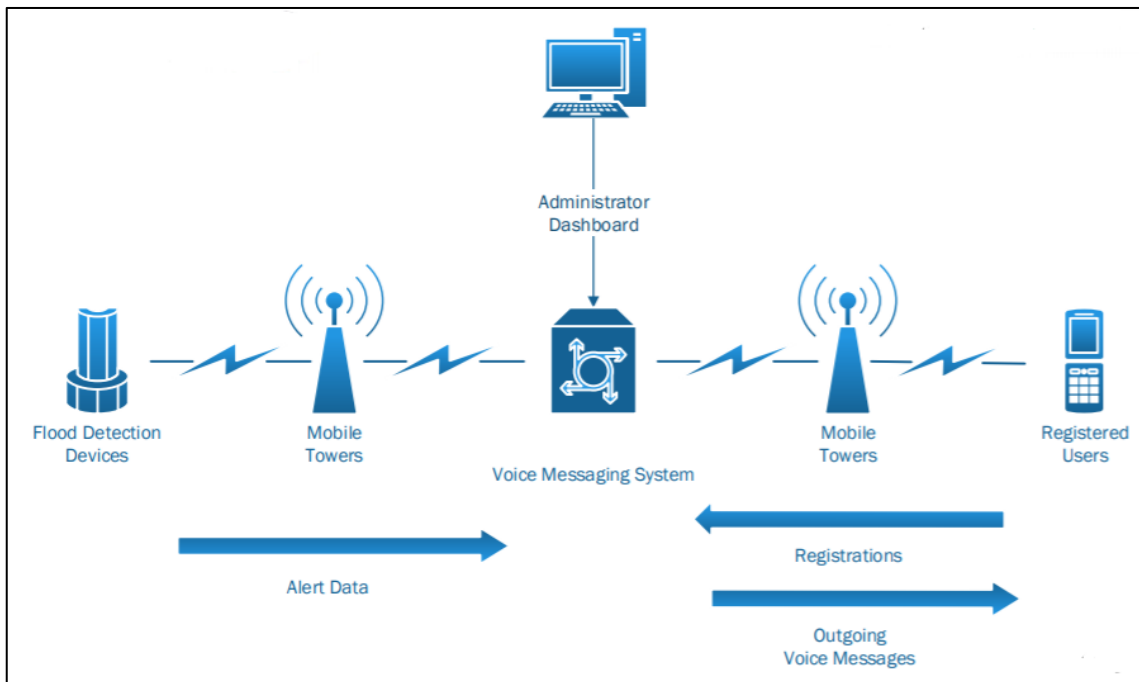
Source: EWS 1294 (image as of August 11, 2020)

Figure 2.85: Location of Sensors of EWS 1294 in Cambodia



Source: EWS 1294, Open Street Map (image as of August 11, 2020)

Figure 2.86: Location of Sensors of EWS 1294 in Siem Reap City



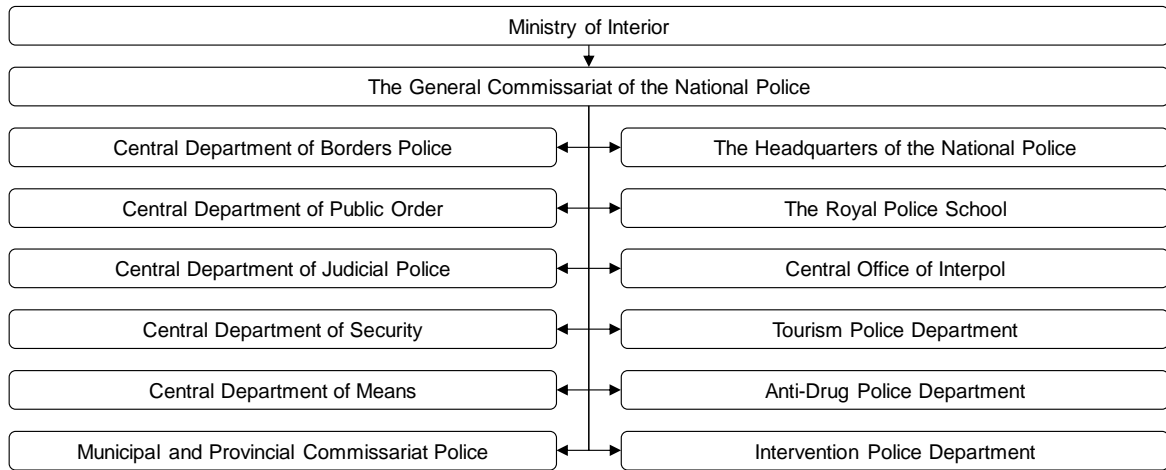
Source: United Nations Office for the Coordination of Humanitarian Affairs

Figure 2.87: Image of EWS 1294 System

(2) Organizations

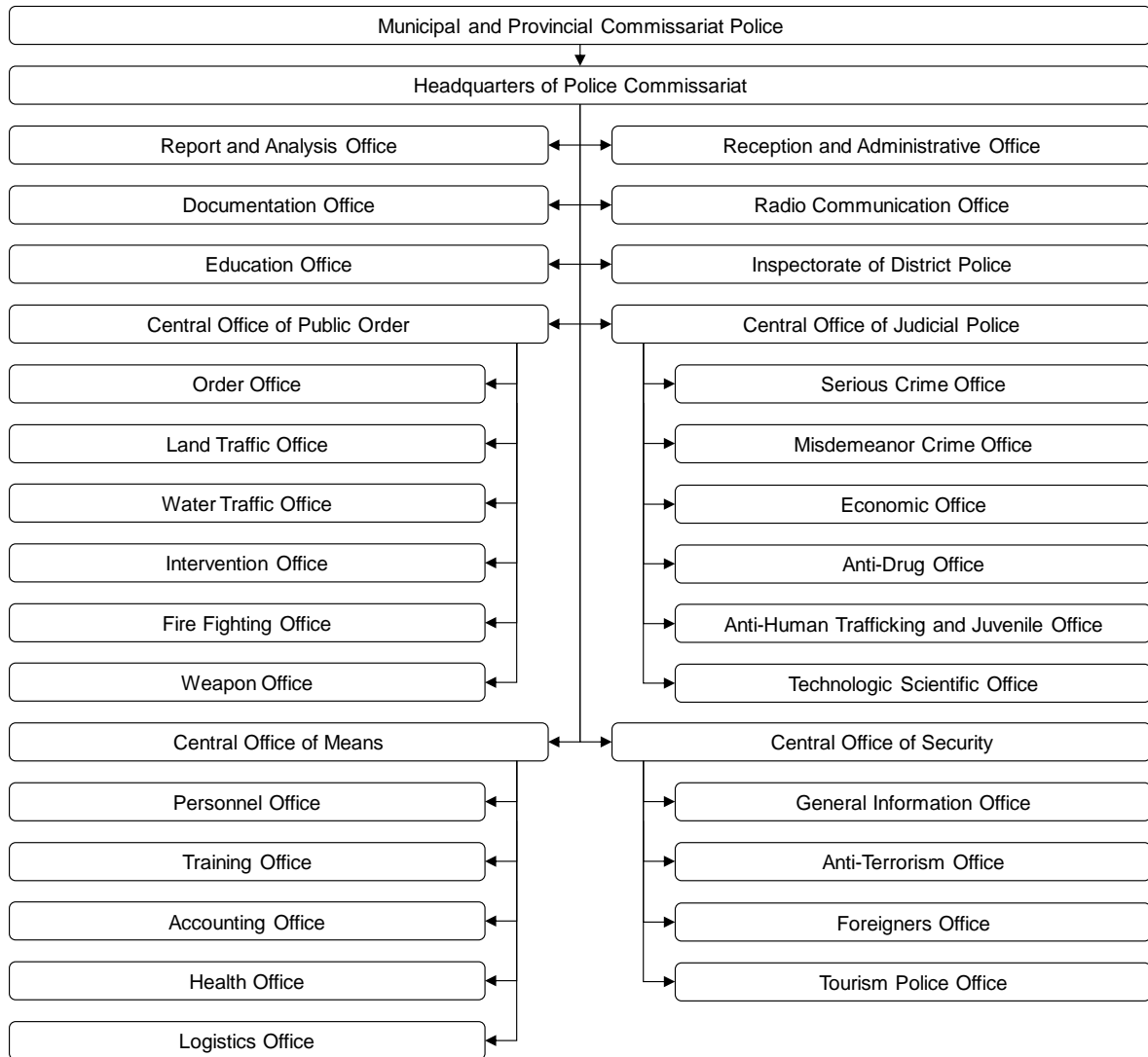
1) Siem Reap Provincial Police

The Cambodian National Police is one of the three general departments within MoI Figure 2.88 shows the organization structure of the National Police of Cambodia. Figure 2.89 shows the organization structure of the provincial police.



Source: JICA Survey Team (based on information from the Ministry of Interior)

Figure 2.88: Organization Structure of the National Police



Source: JICA Survey Team (based on information from the Ministry of Interior)

Figure 2.89: Organization Structure of the Provincial Police

The Siem Reap Provincial Police has 100 administrative police stations, with 772 staffs employed, of which 47 are females.

The national police has set nine safety principles for village/commune level, which are the following:

- No to all kinds of stealing, snatching, robbery
- No producing and dealing illegal drug
- No prostitute women and children trafficking and domestic violence
- No gangster
- No illegal game, using illegal weapon and crime
- No traffic accident
- No danger due to unexploded ordnance
- Safety prevention measures, control and respond to natural disasters
- No illegal controls

The provincial police shall act in line with the principles above, and also disseminate the principles to the local community via public forums. According to the Security Annual Report 2019, in 2019, the Siem Reap Provincial Police has set 731 times of public forums with 28,867 participants, including 16,820 females.

2) Siem Reap Provincial Gendarmerie

The Royal Gendarmerie of Cambodia is a branch of the Royal Cambodian Armed Forces and it is responsible for the maintenance of public order and internal security in Cambodia. The paramilitary unit has a strength of 10,000 soldiers deployed in all provinces.

(3) Existing Plans

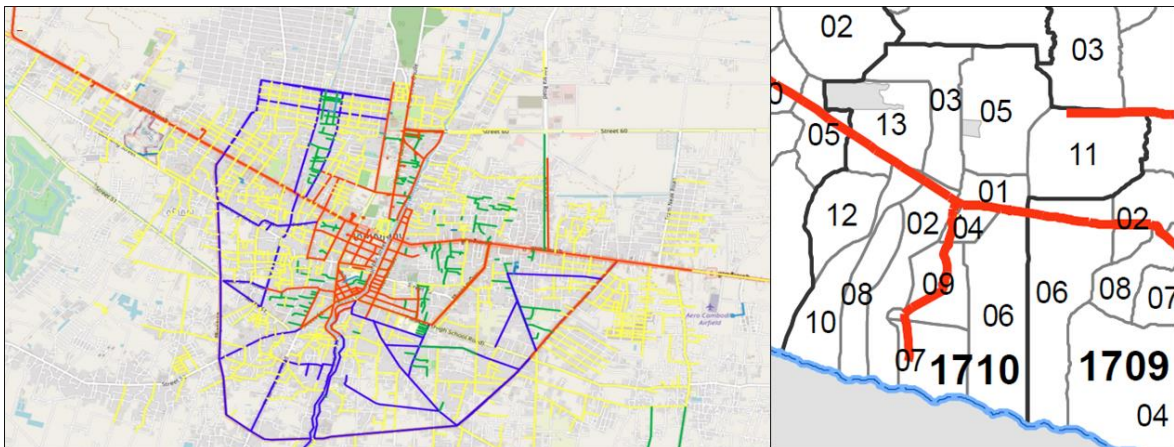
As of the date of submission of this report, no existing specific master plan related to the security sector is found.

2.3.4 Waste

(1) Solid Waste

1) Current Situation

Siem Reap Province has a total population of around 1,060,000 and receives around 3,000,000 tourists per year. There is a population of 245,494 living in Siem Reap City. Formalized waste collection is concentrated in Siem Reap City, mainly in the four central communes (sangkat) that cover one third of the city area and that can be considered as the fully urbanized area within the city boundaries with roughly two-thirds of the city population. However, the suburban areas, with over 100,000 people, do not have formalized waste collection. Waste collection is fully outsourced to the Global Action for Environment Awareness Waste Management Company (hereinafter referred to as GAEA), servicing the urban districts (Krong Siem Reap). The company services streets where most people pay GAEA directly for the service. In addition, GAEA has contractual obligations to collect all the waste along the main roads of the city and along the riverbank. With only about 30,000 households (150,000 people) paying for the collection service, there is not so much ratio of collection. The other people who do not pay get their waste collected because they live in small streets and narrow roads that are serviced or they put out their waste along roads that are serviced and find other outlets, similar to the people in communes who do not receive waste collection service. Up to 150 tons of waste per day are collected; about an equal amount remains uncollected. The latter is thrown away in public space, such as along riverbanks and along road curbs, at night or on empty land plots.



Source: GAEA

Figure 2.90: GAEA Collection Area (red lines)

Overall, roughly 65% of the total city population has direct or indirect access to waste collection with half of them (around 35% of total city population) paying for it. In GAEA's contract, the Siem Reap government stipulates that waste fees can be collected with the electricity bill which then, through the government, would be transferred to the company. However, the government never took steps to arrange for this as people protested. Hence, the government allows GAEA to collect waste fees directly from the customers. Without any government payments, there is no compensation for the waste that GAEA must collect along roadsides and from public spaces. There is not much capacity in the city to manage wastes. Siem Reap Province has its own contracted staff to collect wastes in the river water. Overall, waste disposal and collection are still in poor condition. In addition to the GAEA contract which due to its size has been signed with the provincial administration, there is a second contract between the Siem Reap City Hall and the company WEGREEN for collecting the waste from the Angkor temple complex, the airport, and museums. Also, here, the customers pay for the service. Households pay USD 1.00 per month; small businesses pay USD 2.00 ~ 5.00 per month with hotels paying more (20 room hotels would pay USD 30.00 per month). Tariffs are set by the MEF (Table 2.67), and GAEA and other companies have been implementing the conventional

collection system such as transaction between companies and household or business operators. If everyone would pay, tariffs from households are roughly equivalent to USD 10/ton, which is insufficient to cover the full costs including sanitary disposal. Non-paying citizens complicate the financing and tariffs from other users become higher on a per ton basis and thus, they cross-subsidize to some extent. The Ministry of Health (hereinafter referred to as MoH) manages hospital waste, which is managed separately but ends up at the same disposal site as the waste collected by GAEA.

GAEA uses 5-ton compactor trucks to collect waste and a transfer station, 10-ton compactor trucks for direct hauling, and a few 20-ton trucks for transfer from the transfer station as the disposal site is 25 km outside Siem Reap. GAEA has started pilots in some villages to put an 8 m³ container with collection once a week at a charge of USD 1.00/household per month. Waste disposal is practiced as open dumping in two locations with limited control measures on site. The sites attract around 200 waste pickers. The site used by GAEA is 8 ha and has some 5-6 years of remaining disposal capacity.

In March 2015, the government set up a USD 5,000,000 fund to allow sub-national government bodies to take responsibility for waste management in their cities. This initiative is coordinated by the environment, economy, and interior ministries and municipalities. Each sub-national authority is given decision-making power for contracting with private waste collecting companies. Given this initiative, in November 2015, a new Sub-decree No. 113 on urban garbage and solid waste management was introduced. It aims to strengthen and delegate the responsibilities of sub-national governments on managing garbage and wastes in their municipalities. It details the responsibilities of concerned authorities including MoE, MoI, and sub-national governing bodies. From this fund, the government has provided an environmental sanitation budget to sub-national administrations to temporarily and partially bridge financing gaps (USD 1,250,000 in 2015 and USD 2,000,000 in 2016). Siem Reap received USD 200,000 in 2017 and used this for collection services in some districts outside the city center and is now contracting funds of USD 190,000 from the same fund for a new contractor to continue these services for 2018. When asked what the current needs are to improve solid waste management (hereinafter referred to as SWM), two suggestions were proposed by the city representatives. Firstly, it was suggested to focus on community participation to agree on the responsibilities and obligations to pay for waste collection services and promote household level waste separation as now they put mixed wastes into the bags. Secondly, to invest in waste collection and disposal facilities. Also, interest was mentioned from international companies to invest in small-scale waste-to-energy plants with an eye on the high electricity tariffs in Cambodia.

On the other hand, the current final disposal site in Siem Reap is operated as open dumpsite causing severe environmental damages and health risks. Any type of waste, including hazardous, medical, and animal waste, is disposed at the dumpsite which creates environmental risks for the citizen. The waste leachate is not collected and forms a severe environmental hazard due to surface and groundwater pollution. Toxic waste components are neither disposed separately nor treated and lifeways contaminate waste bodies. The produced methane is not collected, thus releasing greenhouse gas and being a major risk of landfill fires. The surrounding environment is being littered due to windblown plastic material. In addition to these severe environmental impacts, the open disposal of waste provides major health risks for nearby citizen, workers, and waste pickers. The disposal of waste without compaction and at steep slopes put workers and waste pickers at additional safety risk. The environmental and health hazards caused by current landfills, in connection with already limited capacities and rapidly increasing waste volumes, require urgent investment in landfill rehabilitation, landfill expansion or new landfills, and waste treatment. Existing dumpsites are reaching their capacity limit as well. This situation will further intensify in the near future, particularly due to rapidly rising waste volumes. What is not transported to the landfills is delivered to another dumpsite or remains uncollected, openly disposed into the environment, or otherwise burnt. The currently low landfill capacities, inadequate sanitary standards, and predicted increase in waste volumes make investments into waste treatment and disposal an urgent necessity.

The general information regarding solid waste in Siem Reap is summarized in Table 2.64.

Table 2.64: General Information Regarding Solid Waste in Siem Reap

Requests	Info
Collection fee	There is a table for price collection depending on the state of the household, number of family members, number of floors, businesses, etc.
Collection frequency	2 times per day - depends on timetable Normally in the city center, before dawn and after dusk
Road sweeping	Currently, there is no operation of road sweeping in Siem Reap City. However, on August 4, 2020, there were few trucks for road sweeping donated from China to the Siem Reap Provincial Hall.
Type of vehicles	Small rickshaws for small streets, and compactor trucks (5 to 10 tons trucks)
Waste transfer	Small compactor trucks transfer wastes at GAEA place
Intermediate treatment facility	Prasat Bakong (~6 km from city center)
Final disposal	In Bakong District (~25 km from city center) and other places
Recycling companies	Currently, there are no companies or NGO that work on this matter. However, there is some plan for the near future. For example, GAEA will recycle the glass bottles. Also, it will have a Chinese company investor which will work on recycling waste into electricity (with the capacity of 12 MW, 20 km from the city center). Japanese firms also plan to recycle waste plastic and waste asphalt.
Amount of waste collection	Between 270-320 tons per day, but there are still many wastes that cannot be collected by GAEA as some households do not pay the service.
Environmental education	Recently, there were some workshops with GAEA about waste management in the households. They focused on recycling organic wastes, waste packaging, and waste categorizing.
Private investment	Mizuda Waste Management Co., Ltd. The Chinese-owned Mizuda Waste Management Co., Ltd. has completed its feasibility study concerning its planned construction of a waste-generated power plant in Siem Reap Province. Zhang Xiaozhong, a company representative, said the plant needs about 210,000 tons of waste per year to produce 12 MW of electricity, which is equivalent to about 10 percent of the province's total demand. The company estimates that the province will produce 600 tons of waste per day by 2022 and 1,000 tons per day by 2035. Zheng also said, "Both sides have recognized the technical and operational benefits of the waste-burning plant, which provides quality environmental cleaning and also electricity." • The plant's location is still being discussed, and it will be ~20 km from the city center. However, the Mizuda plan has no progress currently due to the impact of COVID-19.

Source: JICA Survey Team (based on interviews with Siem Reap City municipal government and GAEA Waste Management)



Source: JICA Survey Team

Figure 2.91: Location of Solid Waste Treatment Facilities



Source: JICA Survey Team

Figure 2.92: Open Dumpsite



Source: JICA Survey Team

Figure 2.93: Situation of a Bad Impact to the Environment



Source: JICA Survey Team

Figure 2.94: Garbage Situation in Town

The generation of solid waste volume based on the Tourism Development Master Plan Siem Reap (2021-2035) is shown in Table 2.65 and Table 2.66²⁰.

Table 2.65: Solid Waste Prediction (2020 – 2035)

Waste in ton per day and per year		2020	2025	2030	2035
By local people	Per day	363.0036	411.3240	466.0776	528.1188
	Per year	132496.3	150133.3	170118.3	192763.4
By tourists	Per day	13.1070	50.8004	89.1973	201.7474
	Per year	4784.0658	18542.1487	32557.0060	73637.8027
Total	Per day	376.1106	462.1244	555.2749	729.8662
	Per year	137280.3798	168675.4087	202675.3300	266401.1647

Source: Tourism Development Master Plan Siem Reap (2021-2035)

²⁰ “4R” refers to “reduce, reuse, recycle and refuse”

Table 2.66: Solid Waste Reduction Prediction Applying the 4R strategy (2020-2035)

Waste in ton per day and per year		2020	2025	2030	2035
By local people	Per day	0	20.5662	69.9116	105.6238
	Per year	0	7506.66	25517.75	38552.67
By tourists	Per day	0	2.5400	13.3796	40.3495
	Per year	0	927.11	4883.55	14727.56
Total	Per day	0	23.1062	83.2912	145.9732
	Per year	0	8433.77	30401.30	53280.23

Source: Tourism Development Master Plan Siem Reap (2021-2035)

Table 2.67: Tariff for Waste

No.	Type of Payer	Monthly Tariff (USD)
RE1-10	Household	1 ~ 20
RC1-RC4	Business operator	2 ~ 6
RS1-RS6	Restaurant	10 ~ 100
GH1-GH5	Guesthouse	10 ~ 40
AP1-AP2	Apartment and condominium	7 ~ 10 / room
HT1-HT3	Hotel	1.5 ~ 3 / room
EN1-EN3	Night club	20 ~ 100
SM1-SM3	Supermarket	30 ~ 100
CO1-CO2	Office	15 ~ 25
BK1-BK2	Bank	25 ~ 50
NG1-NG5	Organization	5 ~ 30
CM1	Theater	50
SR1-SR3	Garage	15 ~ 50
ST1-ST4	Warehouse	5 ~ 100
GS1-GS6	Gas station	20 ~ 50
CL1-CL4	Clinic	10 ~ 50
UV1-UV3	Private school	10 ~ 100
MA1-WO3	Factory and plant	6 ~ 100
GV1-GV2	Public organization	10 ~ 20
	Market	400 ~ 1,000

Source: Siem Reap Municipal Administration

2) Organizations

The Siem Reap provincial administration is taking responsibility for SWM including dumpsite management and issuing “Concessionaire Contract” with waste collection companies. DoE is a coordinator between Siem Reap and the waste collection companies. Solid waste collection is fully outsourced to private companies. Below are the main companies related to solid waste in Siem Reap City.

- GAEA: Covers Siem Reap City area excluding the APSARA National Authority jurisdiction and the surrounding district, and is entrusted with the management of the final disposal site.
- WEGREEN: Collecting the waste from the Angkor temple complex, the airport, and museum.
- CINTRI: As a new operator in 2017, it is in charge of one district (between Tonle Sap Lake and NR6), and the final disposal site is on the company's land adjacent to the GAEA disposal site.
- ACTIVE GREEN CITY: Funded by the municipal; Company is responsible for collection of household garbage located at small streets.

3) Existing Plans

Based on the National Environment Strategy Action Plan, the WB will conduct the “Pre-feasibility Studies for Solid Waste Management Investment Recommendation and Landfill Site Suitability Analysis (Project)” from year 2020 in the PROBLUE trust fund program.

The project aims to support solid waste management policy and legislation as well as capacity development for both provincial and national levels to demonstrate improved solid waste management performance adaptable and scalable to other provinces and Siem Reap will receive

selected solid waste infrastructure, specifically landfills, to improve the environmental performance of the waste disposal.

On the other hand, Chinese-owned Mizuda Waste Management Co., Ltd. has completed its feasibility study concerning its planned construction of a waste-generated power plant in Siem Reap Province.

It announced that the plant needs about 210,000 tons of waste per year to produce 12 MW of electricity, which is equivalent to about 10 percent of the province’s total demand. The company estimates that the province will produce 600 tons of waste per day by 2022 and 1,000 tons per day by 2035. The plant’s location is still being discussed, and it will be 20 km from the city center.

4) Legal System for Urban Waste

Cambodia’s Law on Environmental Protection and Natural Resource Management (1996) designates the MoE as the leading agency tasked with formulating policies, issuing regulations, and coordinating actions on waste management and pollution control. Sub-decree No. 113 (2015) “Management of Urban Garbage and Solid Waste” (August 27, 2015) stipulates the waste separation, storage, cleaning, collection, operation of collection vehicles, recycling, and management of final disposal sites. Under this sub-decree, the waste management ministries are MoI and MoE. MoI has instructed provincial governments to establish a management system, and each province has clarified its action plan, budgetary measure, and administrative role. MoE is also able to give comments on permission to use final disposal sites, management system, and technical advice on provincial action plan and implementation system. Based on this sub-decree, three ministries (MoI, MoE, and MEF) established penalty provisions (Prakas No. 8682) in September 2019, but the operational status could not be confirmed.

In addition, the country’s Sub-Decree on Management of Plastic Bags (No. 168, 2017) aims to increase the effectiveness of plastic reduction by regulating its importation, production, and distribution. The forthcoming National Waste Strategy and Action Plan for Cambodia (2018-2030) defines a roadmap for improving waste management practices and aims to provide authorities at all levels with instructions to effectively manage solid waste and plastics.

5) Summary

Siem Reap’s environmental sector, especially the improvement of waste management, is a high development priority. It will take a considerable amount of time and needs the improvement of human resources to resolve it, considering what the residents want and what administrative services are.

The summary of issues related to the solid waste sector in Siem Reap is shown in Table 2.68.

Table 2.68: Summary of Issues and its Factors related to the Solid Waste Sector

Issue	Factor
Government does not have a proper waste management system and entrusts the management to each district or an outsourced private company, and does not have data such as quantity, quality, recovery rate, and fee income.	<ul style="list-style-type: none"> • The demarcation of the roles between the public sector, private business, and citizens is unclear. • The provincial administration does not understand the current situation of solid waste (i.e., data is not collected). • The management principles of the dumpsites are unclear. • Human resource for solid waste management is lacking. • Administrative services related to waste management are unclear.
It is unclear for city hall to understand the concessionaire contract. The city hall and DOE are the supervisory authorities, but they cannot point out what they are doing to manage and show concrete improvement measures.	<ul style="list-style-type: none"> • There is no data on tipping fee and necessary expenses. • Concessionaire’s management skill is not sufficient. • Solid waste collection operation by private companies is not witnessed by the provincial administration. • Road condition to households living in remote area or out of the main road area is bad for collection by garbage trucks. • City hall has announced to terminate the concessionaire contract with GAEA until end of year 2019; however, city hall is still discussing with GAEA about the expansion of the dumpsite area.

Issue	Factor
Environmental contamination at the existing final disposal is a serious condition due to waste dumping without proper treatment or sorting for recycling.	<ul style="list-style-type: none"> Investment for necessary equipment for tipping is not enough. Not enough land space or location for dumpsite. No intermediate treatment process is conducted by the concessionaire. Health issues and issues of child labor caused by solid waste picking by the informal sector.
People’s environmental awareness is poor.	<ul style="list-style-type: none"> Environmental education like 3-R campaign activities is not properly carried out by the government. No penalty for illegal dumping.
Illegal dumping is seen in and around the city.	<ul style="list-style-type: none"> Penalties for illegal dumping are not sufficiently working. Solid waste collection outside Siem Reap City is unclear. Not enough solid waste collection cars.

Source: JICA Survey Team

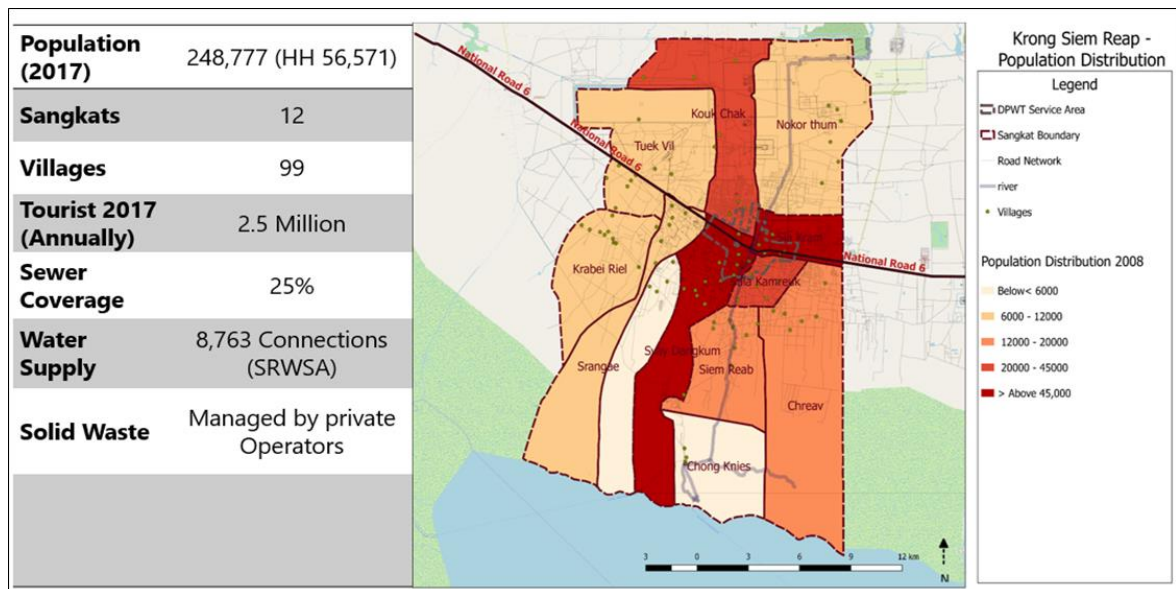
(2) **Wastewater**

1) **Current Situation**

i) **Basic Situation**

At present, Siem Reap’s wastewater collection network is insufficient, partially covering only 4 out of the 13 communes or 24% of the city’s surface area. While it is connected to a wastewater treatment plant, the network is not operating as designed and this has led to very low sewer connection rates. According to MPWT, the existing system is not sustainable enough, especially in the long term. This is due to the rapid growth of the province’s economy especially in the tourism sector which has resulted in the rapid increase of wastewater. Figure 2.95 shows the brief situation related to waste in Siem Reap City.

In addition, the road drainage pipe is currently being developed in connection with the 38 City Roads Improvement Project. Although it supports to provide measures against inundation and flooding, many drainages are open canal, so that many places are clogged due to illegal dumping of waste, and it is necessary to improve the current citizens’ awareness of dumping garbage.



Source: SWTPU

Figure 2.95: Waste Situation of Siem Reap City

There are many issues to be solved in the wastewater sector currently. The summarized issues are categorized in Especially, the government faces the financial problem. When the wastewater treatment plant (hereinafter referred to as WWTP) has started operation, the provincial administration has announced that WWTP must be connected to the sewerage system by the type of wastewater or

rainwater that has a system flow to the treatment plant. In Siem Reap Province, and all of the hotels, guesthouses, restaurant, domestic and private company, public administration, enterprise, private school and also people living in the coverage area of the sewerage system must be connected.

Even if this kind of announcement will be successful, the income from the sewage usage fee is as low as USD 6,000/month and it is difficult for the authority to repay the loan to the Asian Development Bank (hereinafter referred to as ADB) with total amount of USD 48,000,000. There are problems such as the sewerage usage fee itself is too cheap, the collection efficiency is poor due to direct collection by the officials, and unpaid fees due to the lack of understanding by users.

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Table 2.69: Current Issues related to Wastewater

General Issues	<ul style="list-style-type: none"> Decades-old drainage system (combined) and most of the open drains are seriously clogged Polluted water sources from wastewater/waste Further deterioration is expected through rapid town development, land use and zoning development, and basic infrastructures (flood protection, water flow regulation system, town center drain, river channel)
Technical Aspects	<ul style="list-style-type: none"> Deterioration of water quality (Influent BOD, Max. 200-300 mg/L; Effluent COD, Max. 8 mg/L), Standard COD, Min 8 mg/L Lack of septage management (no septage disposal site)
Organizational and Institutional Aspects	<ul style="list-style-type: none"> Strengthening of implementation bodies responsible for sewage management Determination of scope of works for central and provincial administration Securing technical level and human resources for sewage management Insufficient management and monitoring of industrial wastewater Lack of guidelines for sewage management in large-scale development area Sewage pipe inventory is not maintained The laying of the sewage pipe has not been performed in consideration of standard quality, maintenance, construction and proper inspection since the design guidelines, construction procedures, and inspection standards have not been established
Financial Aspects	<ul style="list-style-type: none"> Insufficient improvement fund Establishment of autonomous sewerage authority Collaboration with water supply authorities for collection Seeking resources for operation and maintenance cost

Source: JICA Survey Team

Siem Reap Provincial Administration determines the principles of the service charge for the connection and monthly service user fee for sewer discharge into public sewage system, collection and treatment of wastewater in the service coverage areas in Siem Reap according to each type and category, in Cambodian Riel (hereinafter referred to as KHR), as shown in Table 2.70.

Table 2.70: Tariff fee for Connection and Monthly User Fee of Sewage

Type of Customers	Service Network Connection Fee (KHR)	Monthly Service Fee (KHR)
Private residences:		
Residence size smaller than 70 m ² (type 1)	82,000	4,000
Residence size between 70 m ² and 300 m ² (type 2)	123,000	13,000
Residence size from and above 300 m ² (type 3)	205,000	35,000

Type of Customers	Service Network Connection Fee (KHR)	Monthly Service Fee (KHR)
Hotels:		
Hotel, between 1 and 20 rooms (type 1)	164,000	110,000
Hotel, between 21 and 41 rooms (type 2)	246,000	123,000
Hotel, between 41 and 60 rooms (type 3)	287,000	186,000
Hotel, between 61 and 100 Rooms (type 4)	410,000	522,000
Hotel, between 101 and up (type 5)	902,000	1,260,000
Guesthouses:		
Guesthouse, between 1 and 7 rooms (type 1)	82,000	30,000
Guesthouse, between 8 and 15 rooms (type 2)	164,000	58,000
Guesthouse, from 16 and up (type 3)	287,000	120,000
Building for Rent:		
Building, between 1 and 10 rooms (type 1)	122,000	22,000
Building, between 11 and 20 rooms (type 2)	184,000	36,000
Building, between 21 and 40 rooms (type 3)	246,000	121,000
Building, between 41 and 60 rooms (type 4)	287,000	182,000
Building, between 61 and 100 Rooms (type 5)	410,000	516,000
Building, from 101 and up (type 6)	902,000	1,244,000
Restaurants:		
Restaurant, between 1 and 40 chairs (type 1)	164,000	37,000
Restaurant, between 41 and 100 chairs (type 2)	205,000	46,000
Restaurant, from 101 chairs and up (type 3)	246,000	187,000
Karaoke:		
Karaoke, between 1 and 7 rooms (type 1)	164,000	36,000
Karaoke, between 8 and 15 rooms (type 2)	184,000	66,000
Karaoke, from 16 and up (type 3)	287,000	112,000
Club/cinema/disco	205,000	65,000
Other types of customers:		
School (private/public) between 1 and 24 rooms	123,000	25,000
School (private/public) between 25 and 45 rooms	143,000	59,000
School (private/public) between 46 and up	184,000	218,000
Hospitals / clinics (private / public) between 1 and 7 rooms	143,000	32,000
Hospitals / clinics (private / public) between 8 and 15 rooms	164,000	37,000
Hospitals / clinics (private / public) between 16 and up	205,000	49,000
Small-scale factory/ hand craft	287,000	68,000
Car / motorbike wash	205,000	57,000
Bank	205,000	90,000
Company office / nongovernmental organization office	164,000	69,000
Souvenir shop / supermarket	144,000	25,000
Snooker club	144,000	24,000
Other centers	164,000	208,000
Small scale business store	123,000	11,000
Food place	123,000	14,000
Market:		
Phsar Nhe	213,000	50,000
Central Market	287,000	473,000
Phsar Chas Market	746,000	174,000
Angkor Night Market	531,000	358,000
Taney Market	88,000	60,000
Huy Leng Market	177,000	119,000
Phsar Phum Treang Market	88,000	60,000
Phsar Leu Market	2,761,000	1,861,000
Phsar Samaki Market	1,380,000	931,000
Phsar Angkor New Market	319,000	215,000
Phsar Wat Po Langka Market	354,000	239,000
Shops (for New Market) in 1 shop	2,000	1,000
Public toilet	41,000	9,000
Public septic tank pumping service (contractual form)		
Septic tank, type I (for private residence)	One truck-load pumping: KHR 120,000	

Type of Customers	Service Network Connection Fee (KHR)	Monthly Service Fee (KHR)
Septic tank, type II (type 1 and 2 for hotels, guesthouses, restaurants and public buildings)	One truck-load pumping: KHR 200,000	
Unconnected septic tank (for residence outside service system)	One truck-load pumping: KHR 250,000	

Source: MEF Prakas, 23rd March 2016

There is also an issue with water pollution in Tonle Sap Lake. Tonle Sap Lake acts as a natural pump that swallows water from the Mekong River during flood and expels it during drought. Flood forests and floodplains are created around the lake by changing the water level through the exchange of water, and the blessings of nature are nurtured.

However, due to the recent small rainfall and the El Nino phenomenon, the flow of the Mekong River is also affected, and the water level of the lake has dropped significantly. A considerable amount of house wastewater from tourists visiting Siem Reap and people living in the Tonle Sap Lake is mixed in, and illegal dumping into the Siem Reap River is added. In these circumstances, the deterioration of the water quality has led to serious issues. And the water quality of Tonle Sap Lake deteriorates significantly during the dry season when there is little water, and becomes muddy with foul odor when the water level rises during the rainy season.

In order to improve the pollution situation of Tonle Sap Lake, an NGO started a project to disseminate toilet technology to water-dwelling residents and installed a simple domestic wastewater purification device using plants, but there is not so big improvement at present.

On the other hand, JICA implemented “The Project on Establishment of Environmental Conservation Platform of Tonle Sap Lake” as SATREPS for the Global Science and Technology Joint Research Promotion Project, and cooperated with other countries from April 2016 to March 2021. The project is aimed at understanding the processes determining lake water quality and associated risks, and establishment of a framework for conservation of the lake environment using water environment analytical tool. Siem Reap is waiting for the announcement of the analysis result to be utilized for the future water quality improvement.

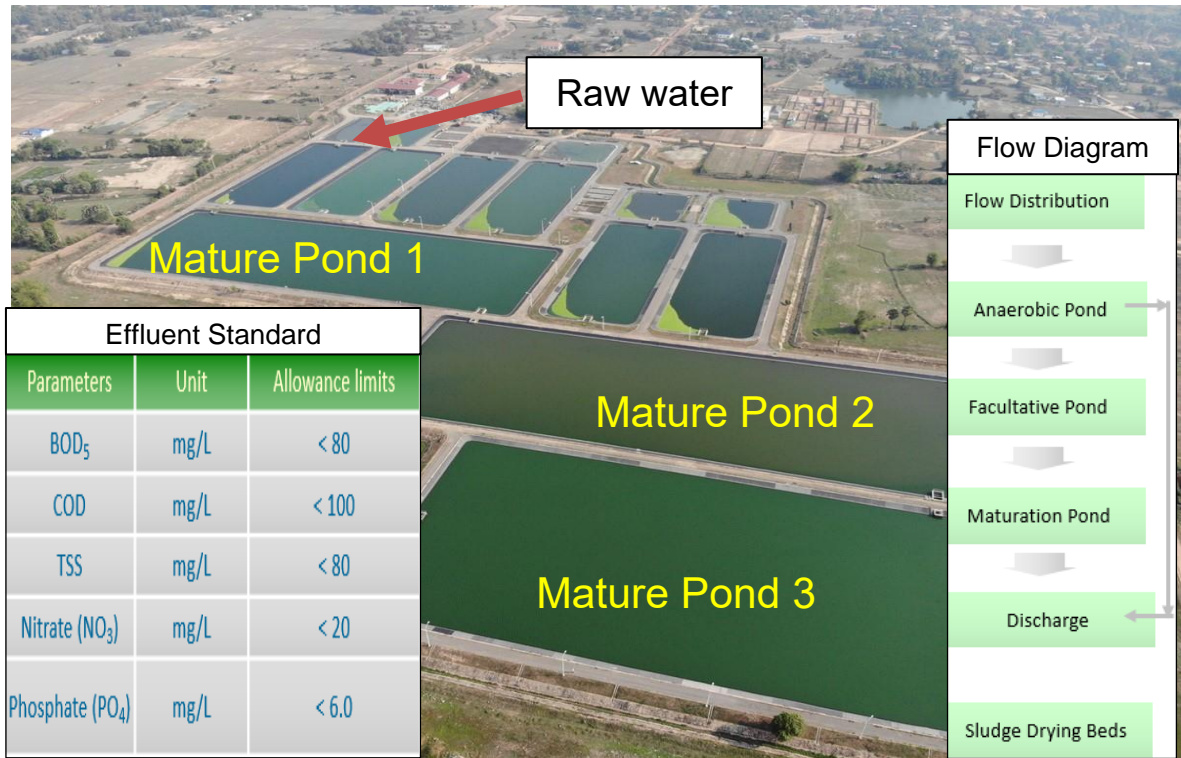


Source: Former JICA Senior Volunteer, JICA Survey Team

Figure 2.96: Current Situation of Lake Tonle Sap

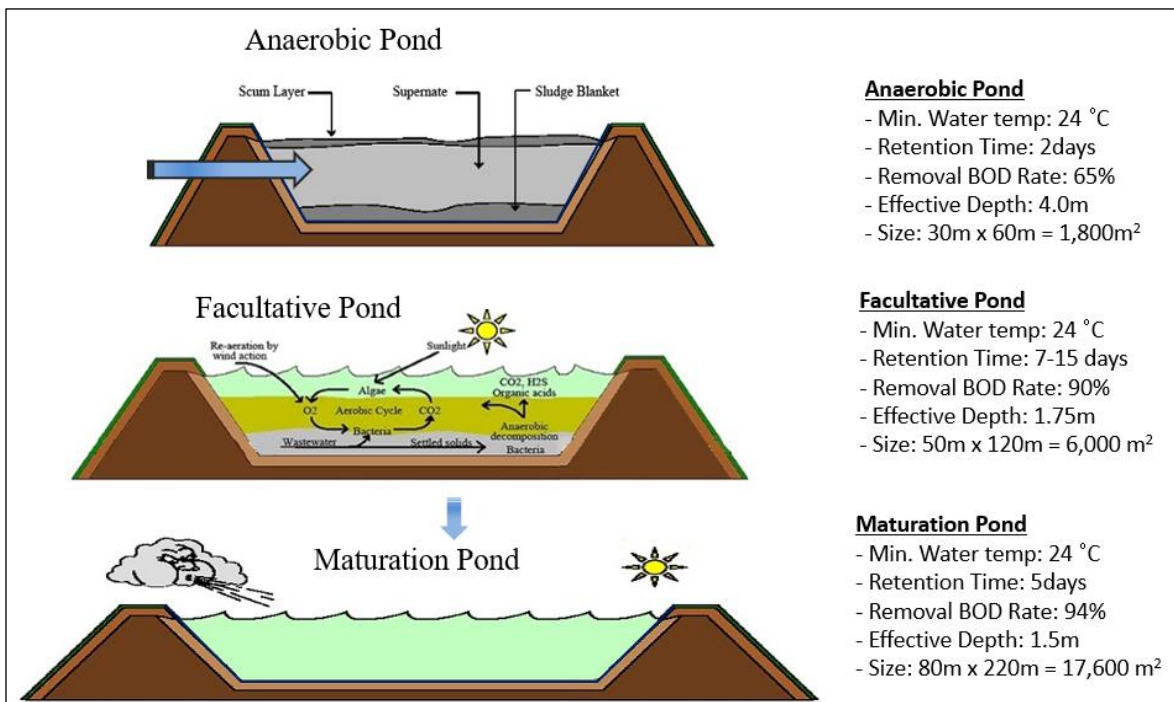
ii) Capacity of Wastewater Treatment Plant (WWTP)

Siem Reap Province currently has one wastewater treatment facility with the capacity to treat up to 8,000 cubic meters of contaminated water per day, as well as three wastewater pump stations with the capacity for draining up to 56,386 m³/day of water, which contains stormwater and canal wastewater. However, the increasing population and tourists have required water demand. MPWT plans to increase the capacity of the wastewater treatment system with separated sewer system in Siem Reap, which also provided for two additional pump stations to reach up to 80,000 m³/day of water by year 2040 in response to the rapid increase in waste volume. In terms of planning the new plant, the commissioning of this awaits the restoration of the interceptor sewer to full functionality. The capacity of the WWTP can only treat about 50% of wastewater generated at the current time (as in 2016), and even when extended to 16,000 m³/day, it will not have sufficient capacity to include sewage from the eastern side of the city in 2030. A separate eastern WWTP will be required to serve the eastern zone.



Source: SWTPU

Figure 2.97: Wastewater Treatment Plant



Source: SWTPU

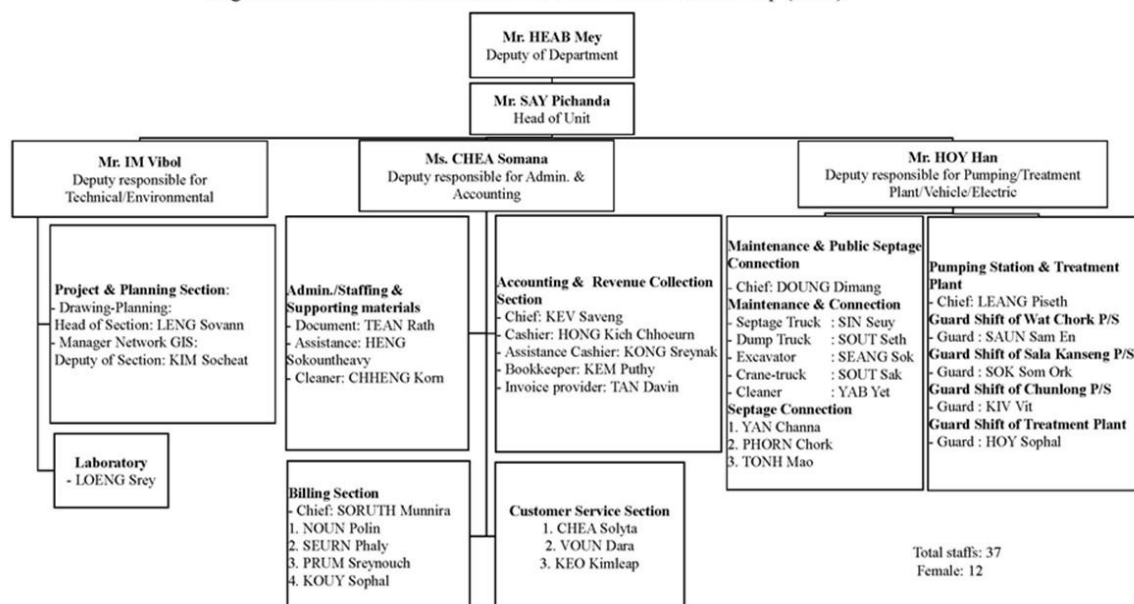
Figure 2.98: Concept Design for Wastewater Treatment Plant

2) Organizations

MPWT creates technical standards policy and budget planning, while DPWT leads the overall supervision and management. The duties of the Sewerage and Wastewater Treatment Plant Unit (hereinafter referred to as SWTPU) are the following:

- Planning, and sewer facility and WWTP management,
- Operation and maintenance of physical materials,
- Collect wastewater utility services,
- Water quality control at WWTP and other locations, and
- Participate in organized social movement to clean environmental water and sanitation.

Organization Chart of Wastewater Treatment Plant in Siem Reap (2018)



Source: SWTPU

Figure 2.99: Organization Chart of SWTPU

3) Existing Plan

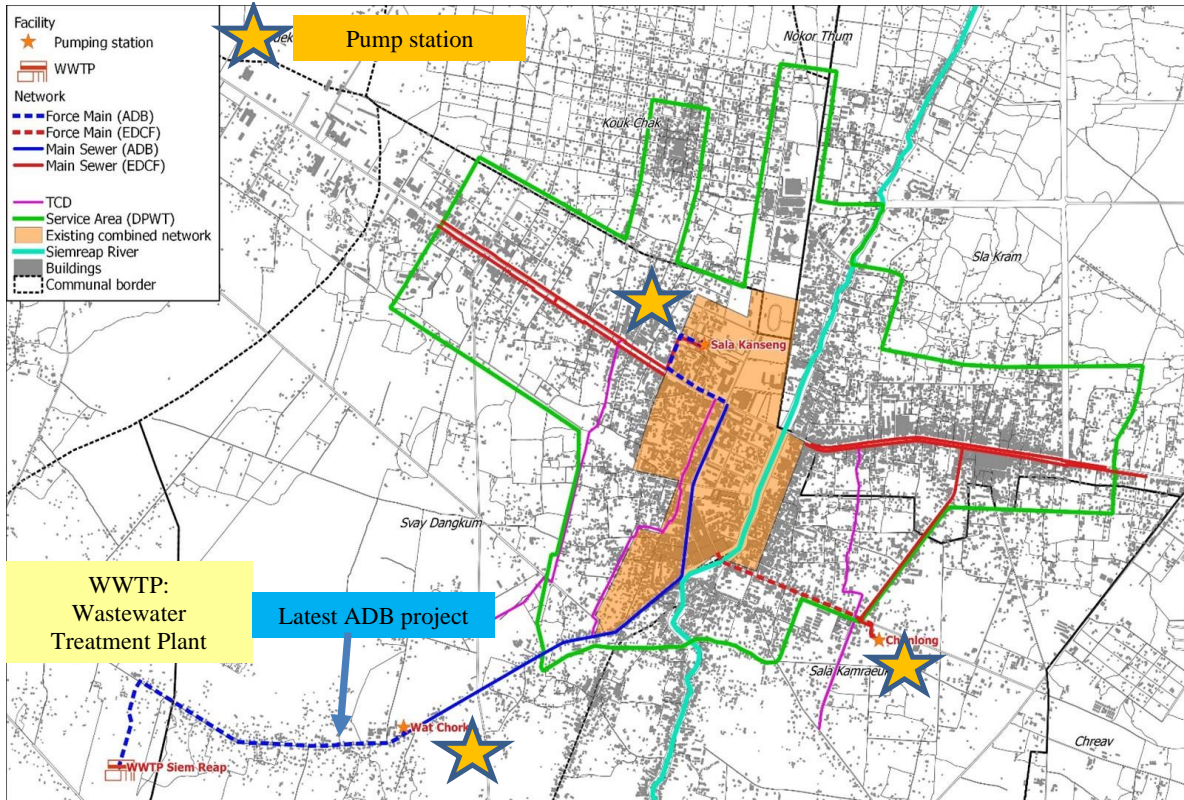
Siem Reap has implemented the following project financed by various donors. However, the existing wastewater collection network has an insufficient catchment area covering only four out of 13 communes. This has led to a large conveyance gap between households and the main trunk sewer lines. These trunk sewers are part of the current wastewater collection network, which consists of around 20 km of main collectors, three pumping stations, and one WWTP and which is not currently operating as designed. The main interceptor sewer has collapsed at multiple points and as a result, a substantial amount of the city’s domestic sewage is being discharged directly into the natural environment such as rivers and canals causing heavy water pollution and posing an imminent health threat to the local population. Some septic sludge is being conveyed to the WWTP, but it is being discharged in an inappropriate manner which is resulting in severe operational difficulties.

Table 2.71: Outline of Wastewater Projects

Project Number		1	2	3	Total (1 ~ 3)	4
Project period		2007 ~ 2009	2009 ~ 2012	2011 ~ 2014	-	2019 ~ 2020
Donor		ADB	AFD	EDCF	-	ADB
Project budget (USD)		14,400,000	3,960,000	29,960,000	48,320,000	12,000,000
Service starting year		2010	2012	2014	-	2020
Service area (ha)		2264	416	1,083	1,763	
Method of discharge		interceptor	only rainwater	interceptor	-	interceptor
WWPT (lagoon)	Capacity (m ³ /day)	2,776	-	5,224	8,000	-
	Site area (ha)	20.3	-	18.679	38.979	-
Pump station	Wat Chork Central Station	14,000	-	-	-	-

Project Number		1	2	3	Total (1 ~ 3)	4
capacity (m ³ /day)	Chulong East Station	-	-	13,127	-	-
	Sala Kanseng West Station	-	-	11,335	-	-
Drainage length (m)	Total	8,588	7,815	18,395	34,798	3,662
	City center	2,100	7,815	4,832	14,747	-

Source: SWTPU



Source: JICA Survey Team (base map provided by SWTPU)

Figure 2.100: Wastewater Network

The above-mentioned 38 City Roads Improvement Project (Figure 2.88), which is being implemented with national budget, has installed a new gutter to prevent flooding in the city, and the sewage pipes are drained to the existing sewage treatment plant. However, the JICA Survey Team worries about the capacity of the existing treatment plant. On the other hand, restoration work on the Siem Reap River (Figure 2.89) is undergoing. It is expected that the problem of wastewater flowing into the river will be solved in the future.



Source: JICA Survey Team (March and May 2021)

Figure 2.101: Wastewater Work under 38 City Roads Improvement Project



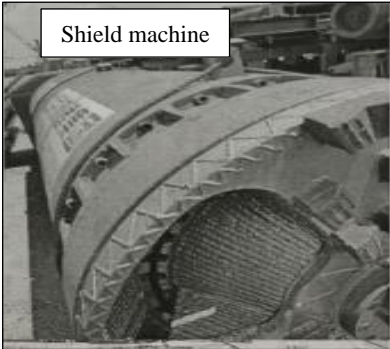
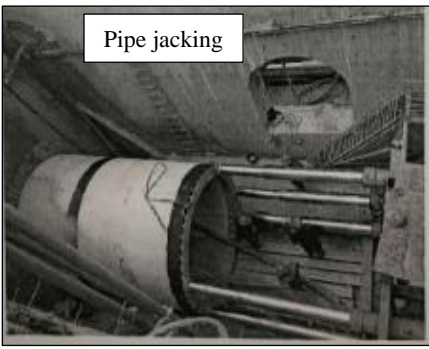
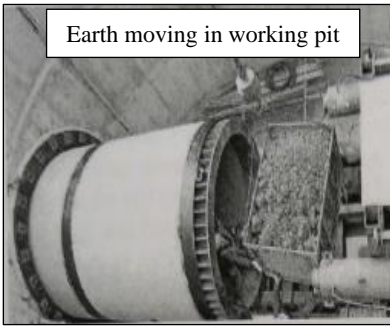
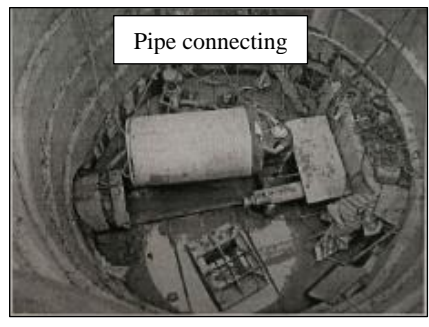
Source: JICA Survey Team (March and May 2021)

Figure 2.102: Restoration Work of Siem Reap River

Of the projects listed in Siem Reap has implemented the following project financed by various donors. However, the existing wastewater collection network has an insufficient catchment area covering only four out of 13 communes. This has led to a large conveyance gap between households and the main trunk sewer lines. These trunk sewers are part of the current wastewater collection network, which consists of around 20 km of main collectors, three pumping stations, and one WWTP and which is not currently operating as designed. The main interceptor sewer has collapsed at multiple points and as a result, a substantial amount of the city's domestic sewage is being discharged directly into the natural environment such as rivers and canals causing heavy water pollution and posing an imminent health threat to the local population. Some septic sludge is being conveyed to the WWTP, but it is being discharged in an inappropriate manner which is resulting in severe operational difficulties.

Table 2.71, project number 4 is the latest project, which is "Design, Supply and Installation of Replacement Inceptor Sewer in Siem Reap". The project description is shown in Table 2.72.

Table 2.72: Project Description of the ADB Wastewater Project

Project implementation	Executing agency: MPWT Implementation unit: DPWT and the city administration Project funding: Cambodia Government, ADB & AFD	
Project site	3.7 km gravity trunk sewer along Sivathq Road from NR6 to Wat Chok Road pump station	
Project information	The depth of the existing pipeline ranges from 3.5 m (to pipe invert) at the upstream end to 7.5 m at the pump station. The new pipeline will be similar as it will connect into the upstream and downstream manholes. In addition, 37 manholes will be installed along the new pipeline to allow each of the existing manholes to be cross-connected to the new pipeline. At loan preparation, it was envisaged that trenchless technology will be used to lay the new pipeline to avoid lengthy road openings and sheet piling. The contractor was using the micro-tunneling method to ensure that the existing pipe could be operational at all times and also due to the uncertainty about the condition of the existing pipe.	
Pipe material and size	<ul style="list-style-type: none"> • 1000 mm internal diameter ductile iron pipe • 100 mm thick concrete external coating for protection • Internally, pipe is lined with high aluminum content cement 	
Project cost and duration	Construction cost: USD 12,930,000 Duration: April 2019 to June 2020	
Construction arrangement	 <p>Shield machine</p>	 <p>Pipe jacking</p>
	 <p>Earth moving in working pit</p>	 <p>Pipe connecting</p>

Source: SWTPU

The City Development Initiative for Asia (hereinafter referred to as CDIA) is planning to conduct feasibility studies and construction projects to implement a USD 25,500,000 grant by the World Bank. According to MPWT in March 2019, the plan will be to construct branch pipes and an expert dispatchment to SWTPU is considered, although not implemented yet.

2.4 Urban Issues

2.4.1 Description of Issues

(1) Issues Related to General Administrative Operation

Referring to the current situation of general administrative operation in Siem Reap, issues related to this topic are listed below.

Table 2.73: General Administrative Operation Issues in Siem Reap

Sector	Specific Issues	Generalized Issue
Administrative Organizations	<ul style="list-style-type: none"> Since the current Smart City Committee does not include the APSARA National Authority, DoT, and the provincial police, it is difficult for the committee to deal with multi-sectoral issues, especially those related to tourism. There are no detailed discussions on specific smart city projects yet in the Smart City Committee. The committee is yet to play its role to drive the smart city projects forward. Officers of the Siem Reap Provincial Administration cannot handle works that require technical knowledge. 	1. Need for administrative organization structure for cross-sectoral collaboration
	<ul style="list-style-type: none"> The Siem Reap Provincial Administration does not have the organizational taskforce to promote smart city-related measures. 	2. Need for a Smart City Promotion Division
	<ul style="list-style-type: none"> There has been no discussion between private companies and the Smart City Committee. There is no fundamental basis for the public sector and the private sector to collaborate on multi-sectoral projects or projects in new disciplines. Academic research or academic projects with an active participation from the public sector are seldom seen in Siem Reap. 	3. Need for an organizational basis for multi-stakeholder collaboration
Legal Systems and Business Support	<ul style="list-style-type: none"> Although there are various laws to refer to and legal procedures to follow in terms of business operation, information regarding these are not collected. This makes private business hesitant to launch its business in Siem Reap. Procedures for launching multi-sectoral business or businesses in new disciplines are not clear, making private businesses hesitant to launch their businesses in Siem Reap. 	4. Need to clarify and ease the complex legal procedures
	<ul style="list-style-type: none"> There has been no discussion between private companies and the Smart City Committee. The public sector has not been successful in inviting public initiatives to provide public services as part of the private companies' business. 	5. Need for active promotion of private smart city business
Data Management	<ul style="list-style-type: none"> Lack of software (such as GIS) Insufficient infrastructure for data storing and sharing (such as the construction of data centers) 	6. Need for improvement of hardware and ICT circumstances
	<ul style="list-style-type: none"> Data is not stored in formats that are easily utilized in individual departments. Due to lack of experience, capacity of individual governmental officers to appropriately deal with data is not enough. 	7. Need for multi-sectoral data sharing and utilization
	<ul style="list-style-type: none"> Decision making process of information disclosure is redundant, leading to slow information disclosure. 	8. Need for open data system, data security, and regulations

Source: JICA Survey Team

1) Administrative Organizations

In terms of administrative organizations, while there are various administrative organizations such as the provincial administration and the departments under the line ministries, coordination across organizations to promote smart city projects is not enough. In addition, there are no divisions or units to promote businesses in new disciplines, such as smart city-related projects. Also, the city has not established a system to solve urban issues in cooperation and collaboration with various stakeholders, such as private businesses, academic institutions, residents, and tourists. In light of the above, the

JICA Survey Team has identified the following major issues: “1. Need to formulate and enhance the administrative organization structure for cross-sectoral collaboration”, “2. Need to establish Smart City Promotion Division”, and “3. Need to establish an organizational basis for multi-stakeholder collaboration”.

2) Legal Systems and Business Support

In the area of legal systems and business support, while there are many laws and regulations to be referred to and institutional procedures to be followed for project implementation, such information is not provided in a comprehensive manner, which is a hurdle for the private sector to consider in project implementation. In addition, there are few discussions on policies and projects between the private sector and the public sector, and the public sector has not been able to actively attract private projects that provide urban services that cannot be covered by the public sector. Based on the above, the main issues are “4. Need to clarify and ease the complex legal procedures”, and “5. Need for active promotion of private smart city business”.

3) Data Management

In the data management and telecommunications sector, there is a lack of comprehensive data infrastructure and organizational structure that support future urban operating systems, open data, and related systems that support it. Lack of understanding of related organizations is a major issue as well. Considering these matters, the key issues of data management and telecommunication sector are listed as “6. Need for improvement of hardware and ICT circumstances”, “7. Need for multi-sectoral data sharing and utilization”, and “8. Need for open data system, data security, and regulations”.

(2) Issues Related to Target Sectors

Referring to the current situation of target sectors in Siem Reap, the issues related to this topic are listed below.

Table 2.74: Issues of the Target Sectors in Siem Reap

Sector	Specific Issues	Generalized Issue
Tourism	<ul style="list-style-type: none"> Although AAP has been visited by huge number of visitors both international and domestic, other resources remain unknown or even undiscovered. This strong but limited image results to one time visit to the site. Tourist information is not centralized, making it difficult for individuals to consider combinations of tourist services that suit their preferences. As a result, the city has not become an attractive tourist destination for individual tourists. Failure to capture demand from non-tourist visitors, such as MICE. 	9. Need to strengthen promotion as a tourist city
	<ul style="list-style-type: none"> Mobility available to tourists is limited to tourism buses, tuk-tuk, and rental cars. In particular, there is a lack of short-distance mobility, which undermines the convenience of tourist behavior. Since information of various transportation is not centralized, tourists are not able to compare and select multiple transportation on site. It is not possible to optimize the choice of transportation for individual tourists according to the situation. In many cases, only cash payment is accepted. It is not convenient for purchasing. 	10. Need to improve the convenience of tourist behavior
	<ul style="list-style-type: none"> In the heritage area, additional information (history, etc.) to improve the attractiveness is not visually provided. Tourism services with added value (educational aspects of tourism services, community-based tourism, etc.) have not been sufficiently developed. Although some parts of the city, such as the streetscape of Pub Street, have potential as tourist attractions, they are not fully utilized. 	11. Need to improve the attractiveness of local experiences at tourist attractions

Sector	Specific Issues	Generalized Issue
Mobility	<ul style="list-style-type: none"> Traffic congestion has been caused and the risk of traffic accident has been increased by inappropriate traffic signals and intersection configuration. Comfortability and safety of pedestrians have been impaired by on-street parking on sidewalks and roadside. 	12. Need for comfort against traffic congestion and on-street parking
	<ul style="list-style-type: none"> Road maintenance plan is existing but the budget for the maintenance is not enough. Road maintenance system considering life cycle cost is not practiced because adequate road management system is not introduced. 	13. Need for optimized road maintenance
	<ul style="list-style-type: none"> A lot of gas emission from old vehicles has caused air pollution and decreased comfortability of tourists and QOL of residents. 	14. Need for clean air and environmentally friendly mobility
Security	<ul style="list-style-type: none"> Crime rate is relatively low (compared to Phnom Penh), but international tourists are recommended to take sensible precautions against crime. Upgrade of crime prevention and crime detection is needed. Upgrade of prevention and detection of dangerous driving is needed. 	15. Need for more safety against risks of traffic accidents and crimes
	<ul style="list-style-type: none"> Facilities and systems for early fire detection and initial fire extinguishing by local residents and workers prior to the firefighting by the public sector is needed. Upgrade of warning system to citizens and tourists is needed. 	16. Need for more safety against disasters (fire, flood, etc.)
Waste	<ul style="list-style-type: none"> Citizens' and tourists' behavior towards garbage disposal and wastewater is damaging the environment. [Solid waste, Sewage] 	17. Need for enlightenment towards environmentally-friendly actions
	<ul style="list-style-type: none"> Responsibility demarcation among related organizations is unclear. As a result, private companies' waste management operation (including basic data, such as collected garbage amount and number of contracted households) is not fully monitored by the public sector. [Solid waste] The capacity of the public sector to manage and control waste management operation is lacking. [Solid waste] The toll collection system is not efficiently established, and the operation is not sustainable. [Solid waste, Sewage] 	18. Need for enforcement of the public initiative
	<ul style="list-style-type: none"> The environment of the landfill is unsanitary. [Solid waste] The capacity of the wastewater treatment plant is not enough for future wastewater. [Sewage] 	19. Need for engineering of infrastructure

Source: JICA Survey Team

1) Tourism Sector

In the tourism sector, the largest issue at the moment is the sharp drop in the number of foreign tourists due to the travel restrictions imposed by COVID-19. However, even excluding the impact of COVID-19, the number of foreign tourists dependent on chartered flight tours from China has been declining, and it is necessary to attract more diverse tourists, including individual tourists from other countries and visitors for MICE and *other* purposes, and to secure repeat visitors. In order to do so, it is first necessary to develop promotions that appeal to a variety of people. It is also necessary to make the city more attractive by improving the convenience of booking, payment, and mobility before actually receiving tourism services. Furthermore, tourism services themselves need to become more attractive and break away from monolithic mass tourism. In addition, it is desirable that all these processes from promotion to improvement of tourism services be carried out on a single integrated platform. Considering these matters, the key issues of the tourism sector are listed as “1. Need for strengthening promotion as a tourist city”, “2. Improving the convenience of tourist behavior”, and “3. Improving the attractiveness of local experiences at tourism attractions”.

2) Mobility Sector

In the mobility sector, the common challenges found in cities in other developing countries, such as traffic congestion, road accidents, illegal parking, air pollution, more efficient road maintenance, and road user satisfaction/demand, are addressed. These issues tend to be concentrated on arterial roads and central urban areas (business districts) in Siem Reap; it is, therefore, necessary to take efficient

and effective measures on those areas. In addition, as an international tourism city, it is effective to tackle such issues with smart technology as a leading city, and it is necessary to implement the efforts while keeping an eye on such strategies. Considering these matters, the key issues of the mobility sector are listed as “4. Need for comfort against traffic congestion and illegal parking”, “5. Need for optimized road maintenance”, and “6. Need for clean air and environmentally-friendly mobility”.

3) Security and Waste Sectors

In the security and environment sector as well, there are common challenges found in cities in other developing countries. The key issues of the security sector are listed as “7. Need for more safety against risks of traffic accidents and crimes” and “8. Need for more safety against disasters (fire, flood, etc.)”. The key issues of the environment sector are listed as “9. Need for proper waste management and urban cleanliness” and “10. Need for clearer river water and drainage water”. As mentioned above in the mobility sector, it is necessary to work more thoroughly and in advance of other cities, as Siem Reap is an international tourist city.

2.4.2 Summary of Urban Issues in Siem Reap



Source: JICA Survey Team

Figure 2.103: 19 Major Issues in Siem Reap

The roadmap for solving the above major issues will be proposed in the next chapter.

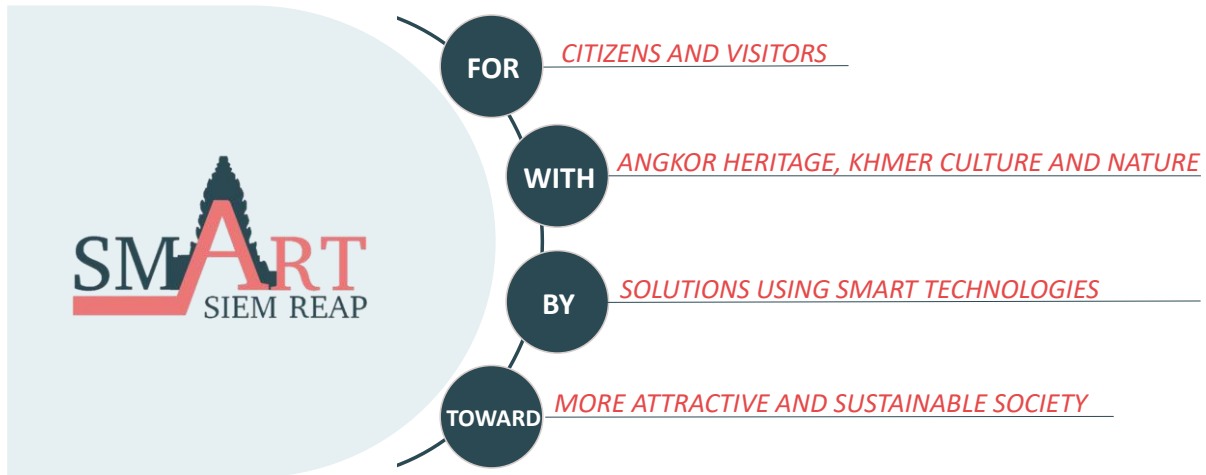
Chapter 3 Roadmap for Smart City

3.1 Vision and Strategies

3.1.1 Vision and Concept

(1) The Smart City Vision

With 2035 as the target year, the vision “SIEM REAP SMART” is set up for the realization of Siem Reap's smart city. Figure 3.1 shows the vision for “SIEM REAP SMART”.



Source: JICA Survey Team

Figure 3.1: The Vision for SIEM REAP SMART

The vision consists of four pillars, namely: “FOR”, “WITH”, “TOWARD”, and “BY”. The four pillars support the objective mentioned in the tourism masterplan (“Realize high-quality tourism industry including cultural tourism and sustainable tourism”), as well as promoting the enhancement of the QoL of citizens. The vision was agreed by the governor of Siem Reap Province (H.E. Mr. Tea Seiha) in the 3rd steering committee, and was agreed by the deputy governor of Siem Reap Province (H.E. Mr. Ly Samrith) in the 5th steering committee.

The first pillar is "FOR", which stands “for whom”, emphasizing the objective of realizing a smart city for citizens and tourists.

The second is the important value "WITH", emphasizing that while accepting advanced technology, the culture, nature, and history represented by the Angkor ruins that Siem Reap has cultivated from the past to the present should be inherited for the future without damaging.

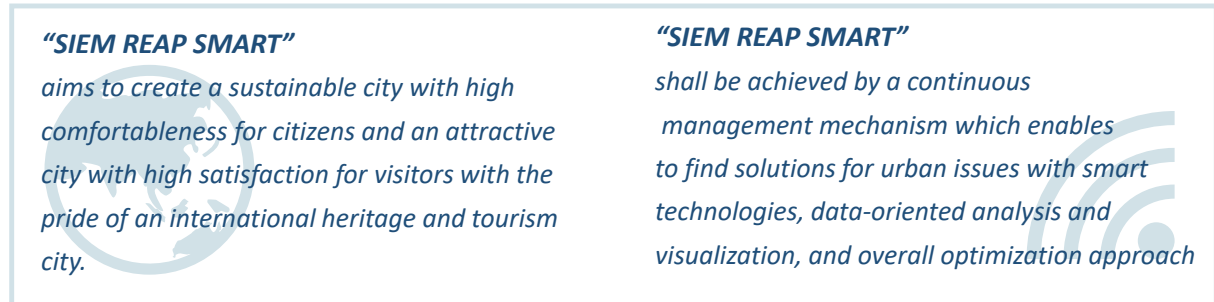
The third is "BY", emphasizing that not only technology-oriented approaches but also a solution-oriented approach of how to solve urban issues is important.

The fourth is "TOWARD”, emphasizing that the direction we should aim for is not introduction of smart technology, but to realize a sustainable society, a comfortable urban environment, and tourism infrastructure for citizens and tourists.

(2) The Smart City Concept

Next, the concept of SIEM REAP SMART is shown in Figure 3.2. “SIEM REAP SMART” aims to create a sustainable city with high comfortableness for citizens and an attractive city with high satisfaction for visitors with the pride of an international heritage and tourism city. “SIEM REAP SMART” shall be achieved by a continuous management mechanism which enables to find solutions

for urban issues with smart technologies, data-oriented analysis and visualization, and overall optimization approach.



Source: JICA Survey Team

Figure 3.2: The Concept of SIEM REAP SMART

As already mentioned in Chapter 2, general administrative issues and issues in the target sectors have become apparent in Siem Reap. In order to solve these urban issues, not only by newly building infrastructure and facilities, but utilizing the concept of smart city and optimizing the operation of existing infrastructure and facilities through data analysis and visualization using smart technology shall be effective.

3.1.2 Strategic Approach

(1) Strategic Approaches for the Realization of the Vision and Concept

Strategic approaches are proposed to achieve the vision and concepts. The roadmap consists of two strategic approaches, namely, “technical approach” and “operational approach”. The structure of the approaches is shown in the figure on the next page.

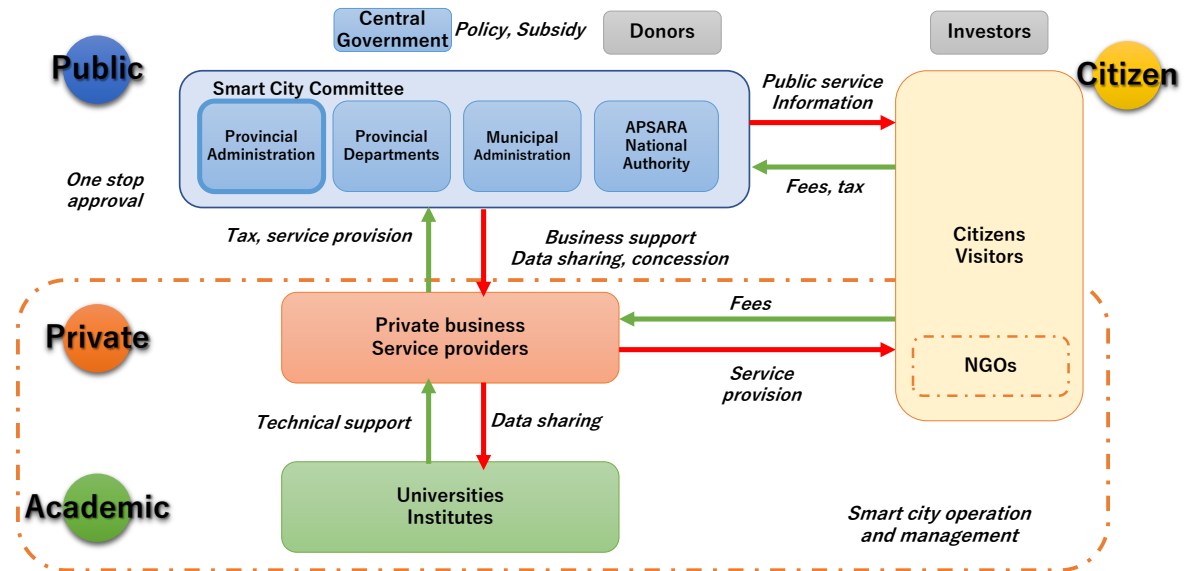
1) The Administrative Approach

The “Administrative Approach” consists of policies that the public sector needs to implement in order to achieve the smart city according to the roadmap. The approach is structured by three pillars. In the “Administrative Organizations” pillar, it aims to strengthen the administrative body that plays the main role in smart city realization, and also aims to enhance the interaction among stakeholders for open innovation. The “Legal Systems and Business Support” pillar aims to improve the business environment in Siem Reap and clarify the role of the public sector to support smart city-related businesses. The “Data Management” pillar lists up measures to promote the data collection and utilization, which is a fundamental aspect of the smart city concept.

To promote the smart city roadmap, the roles and collaboration mechanism among four stakeholders including industry (private sectors), public (governments), academic institutions (universities and institutes), and communities (citizens and tourists) are described below.

- Private sectors: They are main actors to implement actions and projects of smart city as service providers. They contribute to urban service improvement and sustainable development by operating business for profit.
- Governments: They are facilitators of overall process including policy and legal formulation, planning, project implementation. They establish and operate a smart city platform for collaboration among stakeholders.

- Universities and institutes: They promote research and development of smart technologies, project implementation and monitoring in collaboration with private sectors, and collaborate with domestic and international academic institutions.
- Citizens and tourists: They are beneficiaries of urban environment improvement, as well as potential service providers for urban environment management and area management.



Source: JICA Survey Team

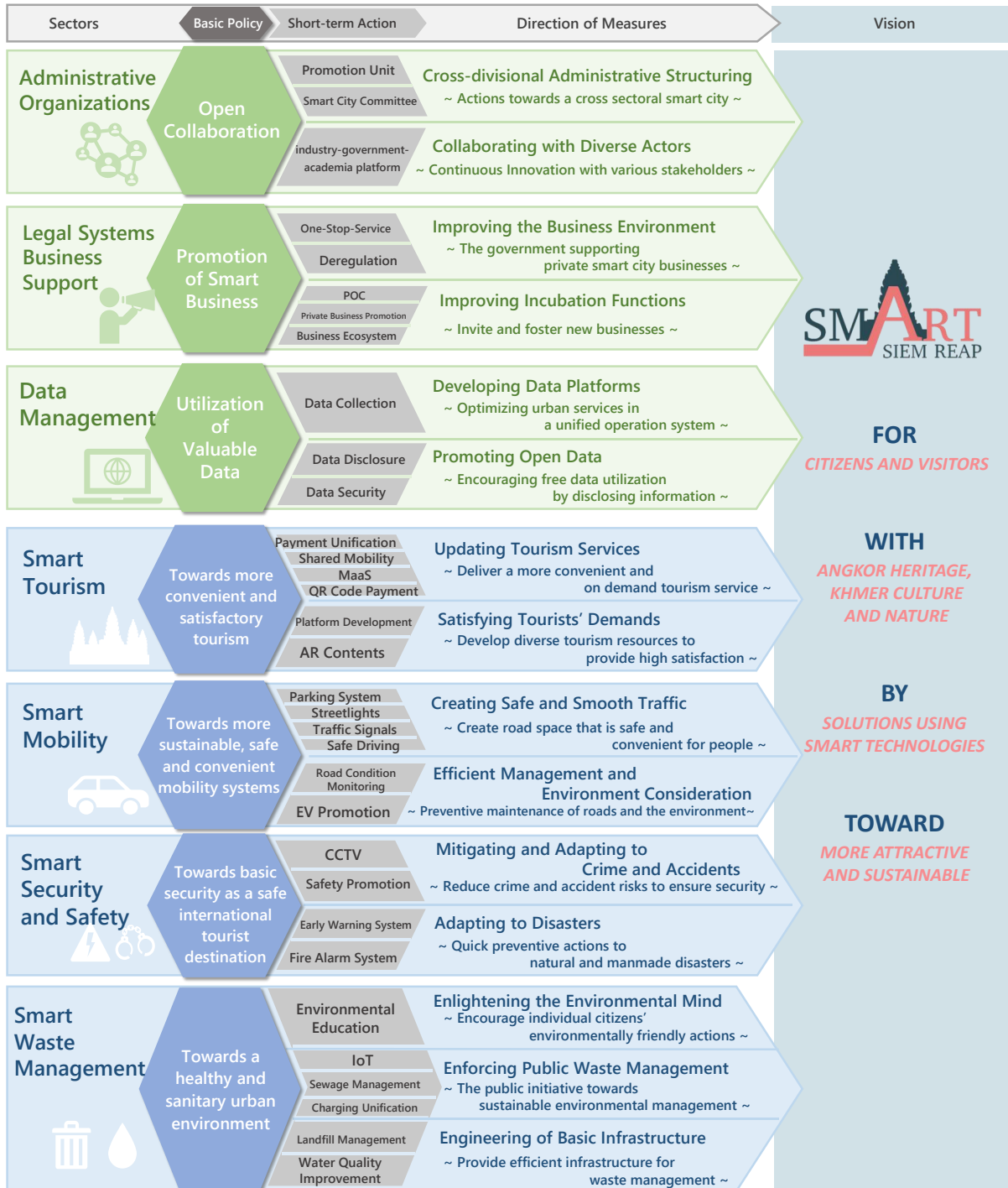
Figure 3.3: Collaboration Mechanism among Stakeholders

2) The Sectoral Approach

In the “Sectoral Approach”, basic policies are set for target sectors, namely “Smart Tourism”, “Smart Mobility”, “Smart Security and Safety”, and “Smart Waste Management”. Under the basic policies, policy directions and short-term actions are proposed.

(2) The Overall Roadmap

The figure below shows the overall roadmap to realize the vision and concept of SIEM REAP SMART.



Source: JICA Survey Team

Figure 3.4: The Overall Roadmap for SIEM REAM SMART

3.1.3 Development Framework and Referred Plans (as Given Conditions)

The development frame is reviewed in the roadmap for realizing smart cities. Population, tourism demand, space composition, and land use, which are the main development frames, are set as follows as given conditions according to the upper-level and related plans. However, since these many of the plans were made prior COVID-19, and the impact of COVID-19 is still ongoing at the time of submission of this report, it is necessary to conduct reviews that takes into account the post-conflict situation.

(1) Development Framework

1) Population Frame (from the Land Use Master Plan of Siem Reap City 2035)

According to the Land Use Master Plan of Siem Reap City 2035, the population of Siem Reap City is forecasted as 440,099 in 2035. According to the census data, the population of Siem Reap City in 2018 was 287,753, which means that the population of Siem Reap City is expected to grow for another 53% in the next 17 years.

On the other hand, according to the Land Use Master Plan of Siem Reap City 2035, the labor force per sector in 2008 and 2035 are estimated as in below²¹. Among all types of industry, the labor force for the secondary industry, which includes handicraft, is expected to rise the most drastically.

Table 3.1: Labor Force by Sector of Siem Reap City in 2008 and 2035

Type of Industry	Labor Force in 2008	Labor Force in 2035	Increase Ratio
Primary	21,153	34,328	+62%
Secondary	16,599	76,894	+363%
Tertiary	63,459	117,630	+85%

Source: Land Use Master Plan of Siem Reap City 2035

2) Tourism Demand Frame (from the Master Plan of Tourism Development in Siem Reap Province (2020-2035))

According to the Master Plan for Tourism Development in Siem Reap Province (2021-2035), the annual number of visitors in Siem Reap Province is expected to increase from about 4.26 million in 2019 to about 18.41 million in 2035. In 2020, the number of tourists decreased to about 1.1 million due to COVID-19, but according to the Master Plan for Tourism Development in Siem Reap (2021-2035), it is expected to increase after 2021 (Table 3.2).²²

Table 3.2: Tourism related Numbers Forecast (until 2035)

Item		2019	2023	2028	2030	2035
Annual Visitor Arrival	Total	4,262,306	3,359,585	7,772,446	10,536,489	18,413,140
	Foreigner	2,205,697	1,326,319	3,682,821	5,127,960	7,534,656
	Domestic	2,056,609	2,033,266	4,089,625	5,408,529	10,878,484

²¹ The prediction was calculated before the COVID-19 epidemic. This prediction was calculated based on the number of labor force per sector in the 1998 National Census and the 2008 National Census. In the prediction, the labor force of the secondary industry is significantly increasing compared to other industries because there was a significant increase of labor force of the secondary industry between 1998 and 2008. However, in the land use masterplan, manufacturing and industrial land use is not allocated enough to accommodate the increase of secondary industry labor force calculated, and this prediction is not to be realized. In this survey, this increase of labor force is not considered as a precondition, but just as a reference.

²² According to the Master Plan of Tourism Development in Siem Reap Province (2021-2035), assumptions for the change in the number of visitors for scenario 1 (with implementation of the actions listed in the master plan) are as follows:

Foreigner

2020: 78% decrease from the previous year due to COVID-19

2021 ~ 2022: 45% increase per year as recovery period

2023 ~ 2025: 30% increase per year as recovery period

2026 ~ 2030: 18% increase per year

2031-3035: 5% increase per year

Domestic

2020: 55% decrease from the previous year due to COVID-19

2021 ~ 2023: 30% increase per year as recovery period

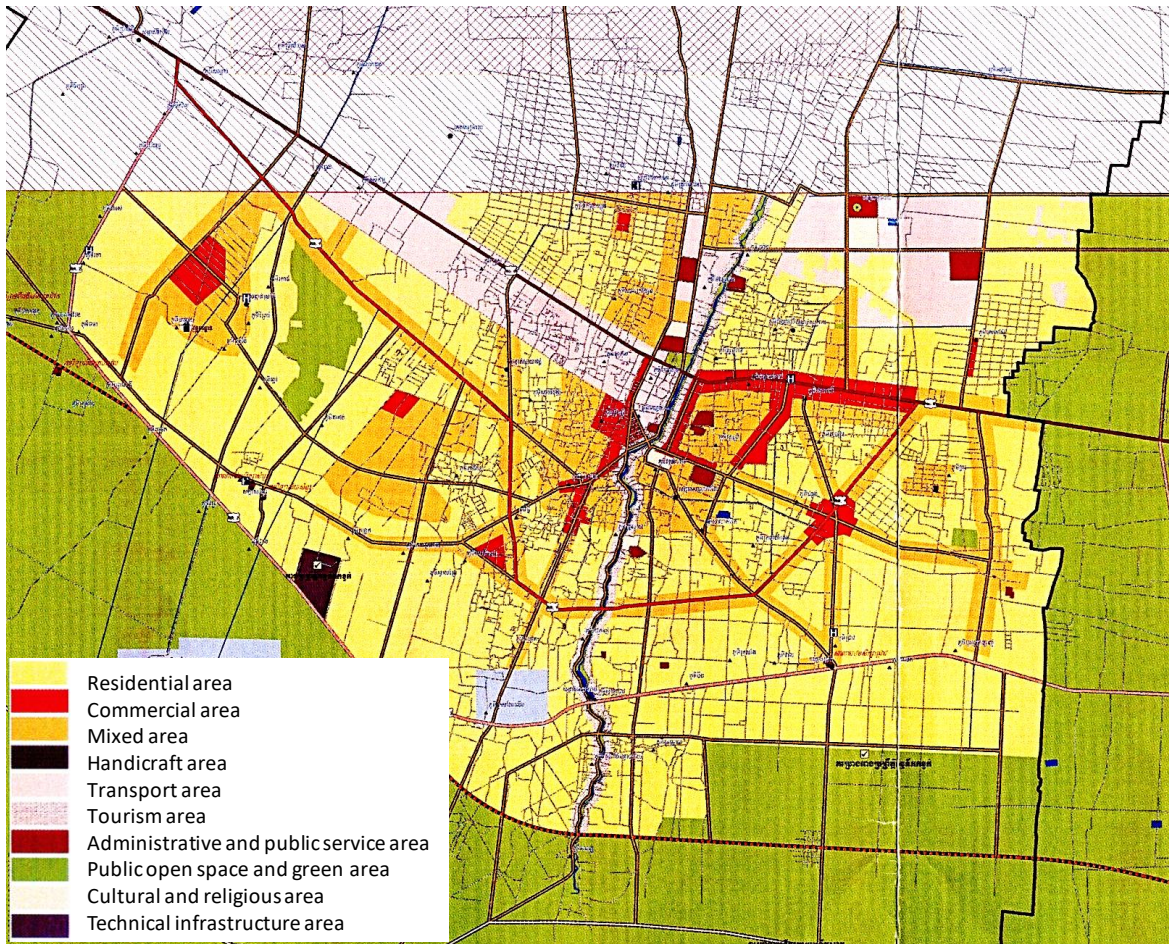
2024 ~ 2035: 15% increase per year

Item		2019	2023	2028	2030	2035
Average Length of Stay	Foreigner	2.8	2.8	4.5	4.5	4.5
	Domestic	1.0	2.5	2.5	2.5	2.5

Source: The Master Plan of Tourism Development in Siem Reap Province (2021-2035)

3) Spatial Structure and Land Use Frame (from the Land Use Master Plan of Siem Reap City 2035)

The figure below shows the land use plan of Siem Reap City center area for 2035 in the Land Use Master Plan of Siem Reap City 2035. Transport area and tourism area are located along NR6 mainly on the west side, while commercial areas are located along the east side of NR6, the city center, and around other major junctions. Mixed areas are located along sub-arterial roads, and most of the rest of the urban land is designated as residential area. Much of the land designated as commercial area, mixed area, transport area, and tourism area are already developed. However, many vacant lands can be observed in areas designated as residential area. Thus, it is planned that these vacant lands are to be developed into residential land use for the city to shelter the growing population. This master plan targets Siem Reap City, thus the new urban development mentioned in the Tourism Development Master Plan Siem Reap (2021-2035) is not mentioned in this master plan.



Source: Land Use Master Plan of Siem Reap City 2035

Figure 3.5: Future Land Use of Siem Reap City Center Area Planned for 2035

(2) Reference Policies for Relevant Plans

The Siem Reap Tourism Development Master Plan 2035 has already been approved by the Prime Minister and has a clear position as an administrative plan. This roadmap refers to the tourism masterplan as the main high-level plan and sets the vision and policy direction that respects the objective

stated in the tourism masterplan (“realization of a high quality tourism industry including cultural tourism and sustainable tourism”). The target areas of this roadmap, i.e., “City Area”, “Heritage Area”, and “Tonle Sap Area”, correspond to “Siem Reap City”, “Angkor Wat Temple Area”, and “The Big Lake”, respectively, which are set as the main tourism development sites in the tourism masterplan. On the other hand, this roadmap does not limit its scope to tourism, but also aims to create an attractive and sustainable society for citizens, which is beyond the scope of the tourism masterplan.

On the other hand, the “Land Use Master Plan of Siem Reap City 2035” is a plan approved by the Minister of MLMUPC. Its vision is to become a hub of heritage, culture, history and world tourism, and mainly covers land use and spatial planning. This roadmap was formulated with care that it does not conflict with the contents of the Land Use Master Plan. On the other hand, the population frame and the land use and spatial planning frame of this roadmap will be based on the Land Use Master Plan.

However, as mentioned at the beginning of this section, the impact of COVID-19 is continuing at the time of submission of this report, and the future remains uncertain. Considering one of the characteristics of smart cities, which is to collect, accumulate, and analyze data for use in planning, establishing a system that can flexibly respond to the needs of smart cities by utilizing data in the implementation phase of the future roadmap is necessary.

In addition, the “Roadmap for Recovery from COVID-19” compiled in this study is in the same position as this roadmap in the sense that the provincial administration will promote implementation. It is expected that it will be incorporated into this roadmap as necessary.

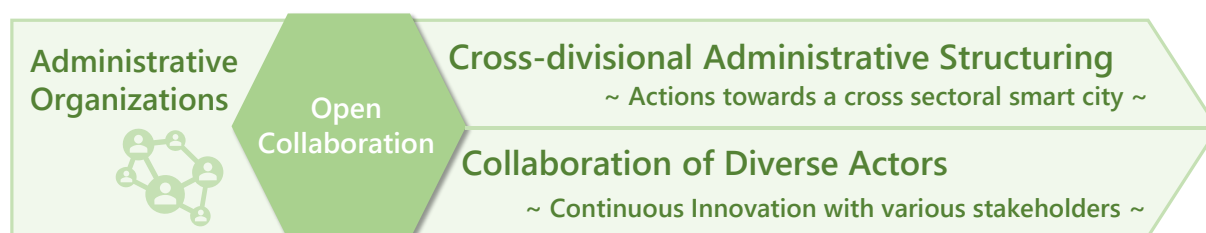
3.2 Basic Policies and Directions of Measures

3.2.1 Basic Policies and Directions of Measures of the Administrative Approach

The administrative approach consists of three pillars, namely: “Administrative Organizations”, “Legal Systems and Business Support”, and “Data Management”. These will be a fundamental basis for the implementation of the sectoral approach and the realization of the smart city. It shall be promoted by government organizations, while actively participated by academic and private entities.

(1) Administrative Organizations

The basic approach for administrative organizations is “Open Collaboration”. The two main directions of measures are “cross-divisional administrative structuring” and “collaborating with diverse actors”.



Source: JICA Survey Team

Figure 3.6: “Administrative Organizations” Pillar

We aim to create an organizational structure that facilitates interaction across industry, government, academia, and the private sector, as well as information sharing and collaboration across sector departments within the local government. In order to promote interaction among stakeholders in the industry, government, academia, and the private sector, it is necessary to create opportunities and venues where they can gather in an industry-government-academia platform for the realization of the vision, exchange information and opinions on the roadmap and business development. Through such opportunities and venues, it is expected that open innovation will be induced. Within the government, in order to strengthen the organizational structure of the government that facilitates information sharing and collaboration across sector departments, it is required to strengthen the cross-departmental Smart City Committee within the government and establish a promotion division that will play a central role.

The correspondence between issues, direction of measures, and short-term actions are shown below.

Table 3.3: Issues, Direction of Measures, and Short-term Actions in the Administrative Organizations Pillar

Issues	Direction of Measures	Short-term Actions
1. Need for administrative organization structures for cross-sectoral collaboration <i>→The Smart City Committee does not include major organizations such as APSARA, DoT, and the provincial police. →There are no individual project-based discussions in the Smart City Committee yet.</i>	Cross-divisional Administrative Structuring ~Actions towards a cross sectoral smart city~	<ul style="list-style-type: none"> • Enhancement and Operation of the Smart City Committee • New Establishment of the Smart City Promotion Division
2. Need for a Smart City Promotion Division <i>→The provincial administration does not have the function to promote smart city-related projects</i>		

Issues	Direction of Measures	Short-term Actions
<p>3. Need for an organizational basis for multi-stakeholder collaboration</p> <p>→There are no discussions between the Smart City Committee and private business operators yet.</p> <p>→There are no proactive collaboration between the public sector and the academic sector yet.</p>	<p>Collaborating with Diverse Actors ~Continuous Innovation with various stakeholders~</p>	<ul style="list-style-type: none"> Formulation and Operation of the Private-Public-Academic-Citizen Platform

Source: JICA Survey Team

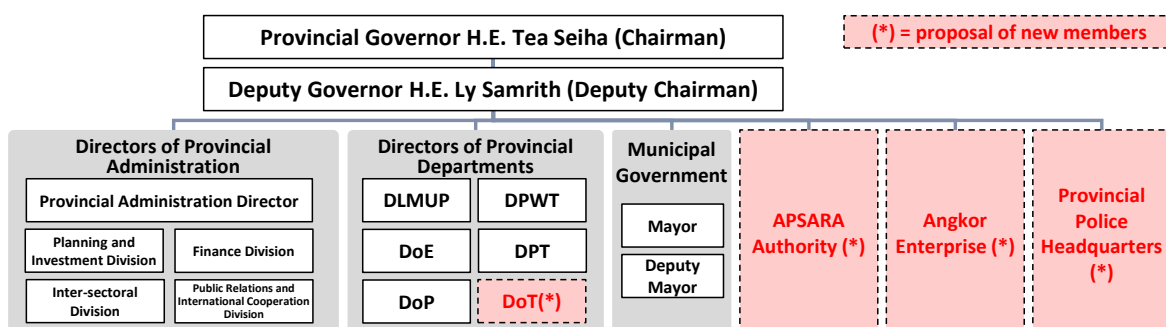
As an implementation structure to promote this roadmap, the provincial government (Smart City Promotion Division, Smart City Committee), industry-government-academia platforms, and information cooperation measures with the central government ministries and relevant agencies have been organized.

1) Enhancement and Operation of the Smart City Committee

To implement a smart city road map, the missions and capacities of the existing SCC shall be enhanced. The following actions will be taken:

- SCC will enhance its mission and tasks to implement the Smart City Road Map.
- To achieve the goals of tourism promotion and safety improvement, DoT and Provincial Police Headquarters will participate in the SCC.
- To manage and implement the projects in the Angkor Heritage Area, the APSARA National Authority and Angkor Enterprise will participate in the SCC. It will be further considered to establish the Working Group focusing on the heritage area, for which preservation issues are important as well as smart city development.
- The Planning and Investment Division will establish the “Smart City Promotion Division” as the main secretariat of SCC to be the front of public-private-academic collaboration platform.

The SCC will take a leading part to coordinate with the private sector, universities and institutions, and citizens to realize a smart city. To implement the pilot projects, a task force will be established with technical and financial supports from the line ministries. So, the smart city implementation mechanism including coordination among stakeholders and capacity development will be enhanced.



Source: JICA Survey Team

Figure 3.7: Proposal on the Enhancement of the Smart City Committee

2) New Establishment of the Smart City Promotion Division

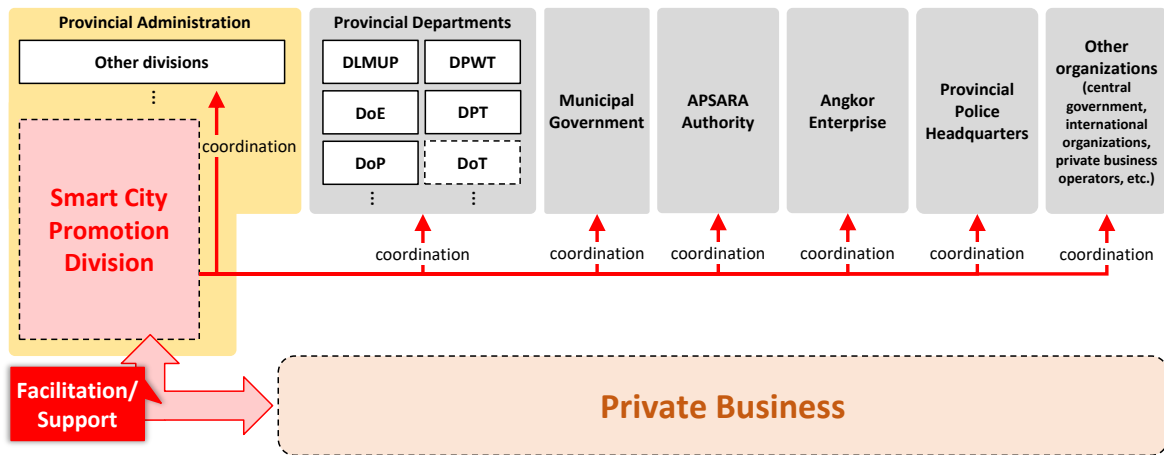
The establishment of a “Smart City Promotion Division” is proposed, which will be the coordination division for private investors, and a coordination body of relevant governmental organizations. The major roles of the division are proposed as follows:

i) Expected Functions

- Assessment of projects based on the criteria for smart projects (e.g., compliance with roadmaps, SDGs, partnership of public, private and academic sector, technical and financial support, necessity of PoC, etc.)
- Preparation of application forms for businesses using smart technologies
- Consultation with private sectors
- Consolidation of necessary administrative procedure (investment approval, permission, etc.)
- Selection of PoC (pilot projects) and support implementation
- Data sharing with private companies (excluding private information)
- Coordination with private companies to utilize data acquired by private companies for public purposes
- Business matching of private sectors (domestic, international)

ii) Proposed Operation

The Smart City Promotion Division is expected to be a division under the Siem Reap Provincial Administration. However, if this organizational structure change takes time through negotiation and inspection from MoI, the other divisions (such as the Planning and Investment Division) may cover its role in the initial stages of the implementation of the smart city roadmap.



Source: JICA Survey Team

Figure 3.8: The relationship with the Smart City Promotion Division and Relevant Organizations

3) Industry-Academia-Government-Community Platform

The industry-academia-government-community platform will be established to implement the smart city roadmap in Siem Reap Province by bringing together companies, universities/research institutes, Siem Reap Province/city government (Smart City Committee), community organizations, etc.

i) Expected Functions

- Promotion/priority support for smart city-related businesses: Provide financial and technical support/cooperation depending on each role, such as utilization of subsidies and activity funds by the central government and donors, efficiency and simplification of business approval procedures by the central government, technology and funding by businesses, and technology and know-how by universities and research institutes.
- Information sharing/matching support: Supports companies, universities/research institutes, and government agencies to introduce organizations that can provide solutions and to expand successful model projects to other regions. A business matching meeting inviting businesses from overseas is conducted once a year.

- Dissemination promotion activities in Japan and overseas: Introduce the efforts of pilot projects, disseminate information such as keynote speeches by experts, and share information by e-mail and online seminars for platform members.

ii) Operation

The platform will be built within the framework of the existing organizational structure in the short term. The Smart City Committee, which is composed of government agencies, takes the lead, and the Smart City Promotion Division manages various meetings as the secretariat by recruiting members of businesses, universities, research institutes, etc., holding subcommittees, and promoting participation in existing international conferences such as ASCN meetings, Conference of Japan-Cambodia Urban Development Platform, etc.

- General meeting: It will be a place for understanding and consensus building among representatives of industry, academia, government, and the private sector. Decision-making shall be made by each institution and based on their respective procedures. The plenary meeting is held about once a year.
- Subcommittee meeting: To solve common problems, discuss solutions by theme and sector such as mobility, tourism, environment, security, and data management, and promote information sharing and joint projects. The subcommittee is held about once every three months, with the participation of government agencies that have jurisdiction over the sector, private businesses participating in the project, universities and research institutes, etc. Conduct technical discussions for approval of new businesses.

In the medium to long term, Special Purpose Companies (SPCs) and Special Purpose Vehicles (SPVs) will be established with the participation of multiple private businesses and citizen groups, and will be responsible for the operation of City OS and area management for improving the urban environment. Part of the profits of various businesses and funds from companies and funds can be used as operation and management expenses.

(2) Legal Systems and Business Support

The basic approach for legal systems and business support is “Promotion of Smart Business”. The two main directions of measures are “improving the business environment” and “improving incubation functions”.



Source: JICA Survey Team

Figure 3.9: “Legal Systems and Business Support” Pillar

In the area of legal systems and business support, the public sector is required to promote business support for private businesses in order to promote and support the creation of new smart businesses related to smart technologies. The creation of a start-up ecosystem for private businesses will be the key to this. In addition, it is necessary to establish a one-stop service contact point within the government and to deregulate the system in order to facilitate private sector business. In addition, the promotion of Proof of Concept (PoC) is also an important approach, and it will be effective to create opportunities and places where PoC can be easily carried out. In order to appeal to residents and promote their understanding, priority areas that can serve as showcases, such as pub streets and other downtown shopping areas, may be established.

The correspondence between issues, direction of measures, and short-term actions are shown below.

Table 3.4: Issues, Direction of Measures, and Short-term Actions in the Legal Systems and Business Support Pillar

Issues	Direction of Measures	Short-term Actions
4. Need to clarify and ease the complex legal procedures <i>→Information on laws and regulations are not offered in a single directory.</i> <i>→Legal procedures for projects in new disciplines are unclear.</i>	Improving the Business Environment ~The government supporting private smart city businesses~	<ul style="list-style-type: none"> Improvement of Business Operation Environment for Private Companies
4. Need for active promotion of private smart city business <i>→The public sector has not been able to proactively attract private businesses that provide urban services that cannot be covered by public projects.</i>	Improving Incubation Functions ~Invite and foster new businesses~	<ul style="list-style-type: none"> Incubation of Private Businesses for Public Services

Source: JICA Survey Team

1) Improving the Business Environment

As institutional procedures to promote this roadmap, it is necessary to implement one-stop service procedures within the central government, procedures for implementing other projects (pilot projects, full-scale projects), and deregulation measures.

Especially in the case of smart technology, there are businesses that cross multiple sectors (tourism and transportation, etc.), unprecedented new businesses such as MaaS, and businesses that use soft infrastructure (data) as products, in the entire country of Cambodia. In addition to improving the system, it is important to speed up the project implementation procedure at the state level. Specifically, system improvement and simplification of procedures are required in the following points:

- **Project approval:** Shortening the project approval procedure such as land use permission, development/construction permission, environmental assessment, tourism license, firefighting confirmation, etc., and making it a one-stop service. Centering on the Smart City Promotion Division, various procedures by private businesses and support procedures for the central government and CDC are consolidated and simplified. In particular, the central government has jurisdiction over applications for investment permits (CDC), tourism/hotel services (MoT), real estate/housing development (MEF), construction projects (MLMUPC), etc., and online services are available. To build a website that integrates these at the central level.
- **Data management:** Legal system for personal information protection, licensing for commercial use of public data, ensuring security of data management, etc. It is under the jurisdiction of the DPT, state police, and state government.
- **Public space use permission:** Procedures for permission to use demonstration experiments on roads, handling of new mobility services, Road Traffic Law, etc. It is under the jurisdiction of MPWT (for national roads), DPWT, Traffic Police, and central government.

2) Improving Incubation Functions

In the absence of sufficient financial and technical capacity in the public sector, active attraction of private sector projects by the public sector is essential to promote this roadmap. In Siem Reap City, it is necessary for the provincial administration (Smart City Promotion Division) to take the lead in promoting this roadmap and actively attracting private sector projects to solve urban issues. In this study, the JICA Survey Team and the provincial administration jointly held a business contest (described in detail in Chapter 4) to invite private businesses that contribute to solving urban issues in Siem Reap. Through the implementation of the business contest, it is hoped that the contest will

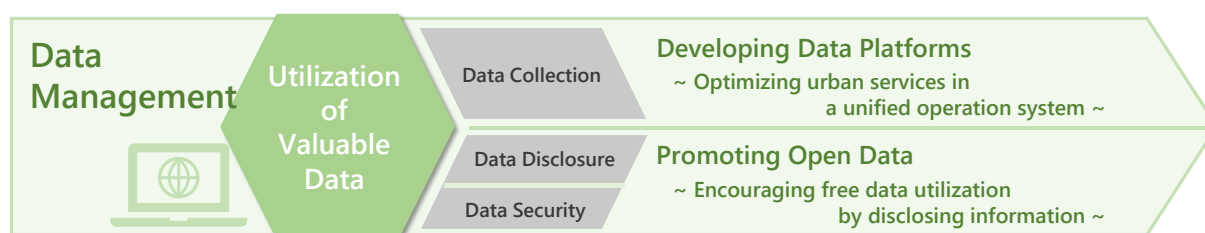
trigger emergent ideas from the private sector, which would be difficult for the public sector to come up with on its own, and that it will attract projects that have the prospect of securing sustainable profitability from the perspective of the private sector. This will require strategic process management of open innovation based on the leadership of the public sector, as well as facilitation to draw out innovative financing ideas from the private sector that do not rely on public funds, and to foster understanding and consensus among the parties involved from the planning stage.

In addition, in order to attract private-sector smart city-related projects and promote the roadmap in a sustainable manner to solve urban issues, the provincial administration needs to strategically select private projects to be attracted based on the following strategic evaluation criteria.

- Solution: Will the project contribute to solving urban problems and benefit residents and tourists?
- Sustainability: Can the project be sustained as a business, not just a one-time pitch event?
- Feasibility: Do both the public and private sectors have the resources to actually implement the project?
- Strategy: Is it a sector that should be strategically attracting the private sector's vitality to solve the problems according to the roadmap?

(3) Data Management

The basic approach for legal systems and business support is “Utilization of Valuable Data”. The two main directions of measures are “developing data platforms” and “promoting open data”.



Source: JICA Survey Team

Figure 3.10: “Data Management” Pillar

In data management, it is important to build a system to collect and share data across sectors and to multiple stakeholders in order to induce innovation and to create new and improve urban services. To this end, it is necessary to build a platform for centrally managing the data extracted from various projects, a system for disclosing data while taking privacy into consideration, and beyond that, efforts to build a data platform.

The correspondence between issues, direction of measures, and short-term actions are shown below.

Table 3.5: Issues, Direction of Measures, and Short-term Actions in the Legal Systems and Business Support Pillar

Issues	Direction of Measures	Short-term Actions
6. Need for improvement of hardware and ICT circumstances →Infrastructure for data storing and sharing is inefficient.	Developing data platforms ~Optimizing urban services in a unified operation system~	• Integrated Data Collection and Analysis (D-01)
7. Need for multi-sectoral data sharing and utilizing →Data storage format is inefficient. →Experience of government officers is lacking.		• Integrated Data Collection and Analysis (D-01)

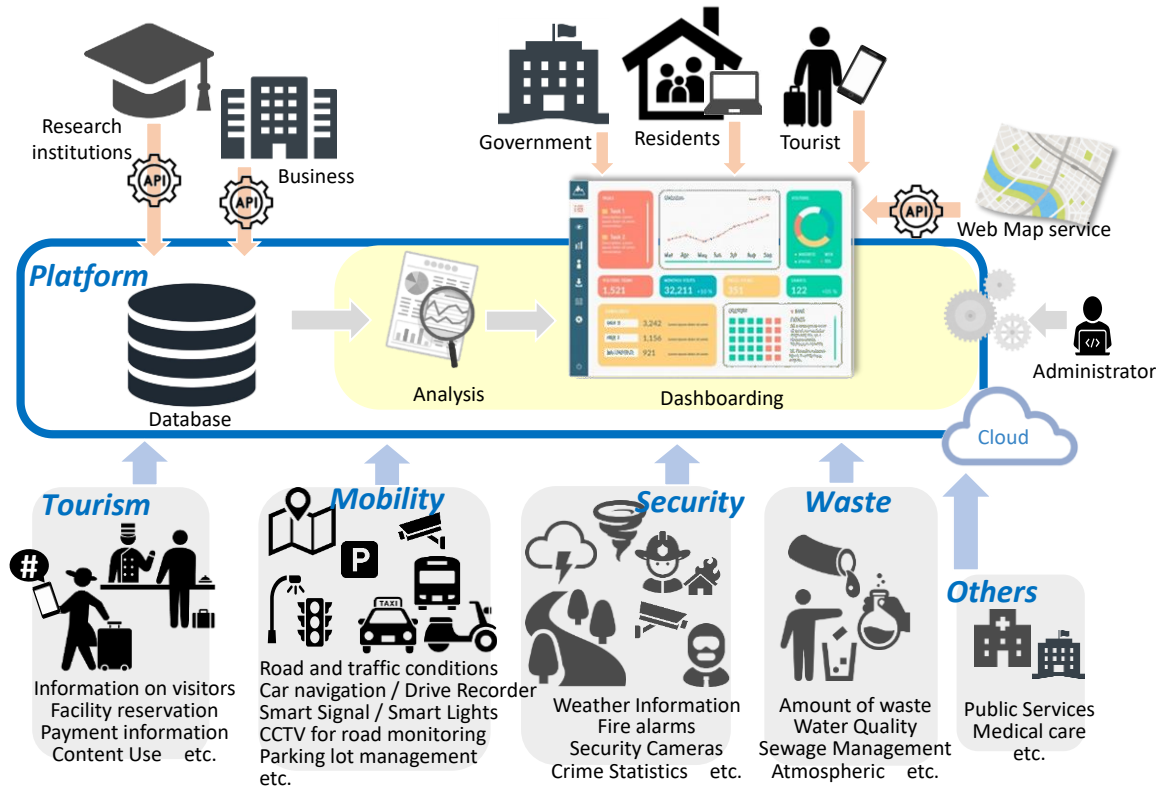
Issues	Direction of Measures	Short-term Actions
8. Need for open data system, data security, and regulations <i>→Decision making process for information disclosure is redundant.</i>	Promoting Open Data ~Encouraging free data utilization by disclosing information~	<ul style="list-style-type: none"> Data Dissemination to Relevant Stakeholders (D-02)

Source: JICA Survey Team

1) The Development of the Data Platform and Promotion of Open Data

In order to achieve data-driven urban management, the city OS and management center (on-premises or in the cloud) shall be constructed in stages. Besides this, data integration, external system linkage with systems related to mobility, waste, energy, security, etc. and data disclosure shall be promoted. As a result, the following benefits can be expected:

- Administrative efficiency
- Consideration for the environment
- Information accessibility and service improvement for residents
- Revitalization of corporate and start-ups activities
- Improving services for tourists and revitalizing the tourism industry



Source: JICA Survey Team

Figure 3.11: The Smart City Management Center and City OS Model



Source: JICA Survey Team

Figure 3.12: Examples of Dashboards

The obsolescence of systems and applications is an issue not only in the data management, but in general. It will be necessary to continue to study the sustainability of the entire system considering programs to promote open innovation and the cooperation and utilization of the private sector for some functions.

2) Basic Policy for the Establishment of the Data Platform

The following shows the basic policy for the establishment of the data platform.

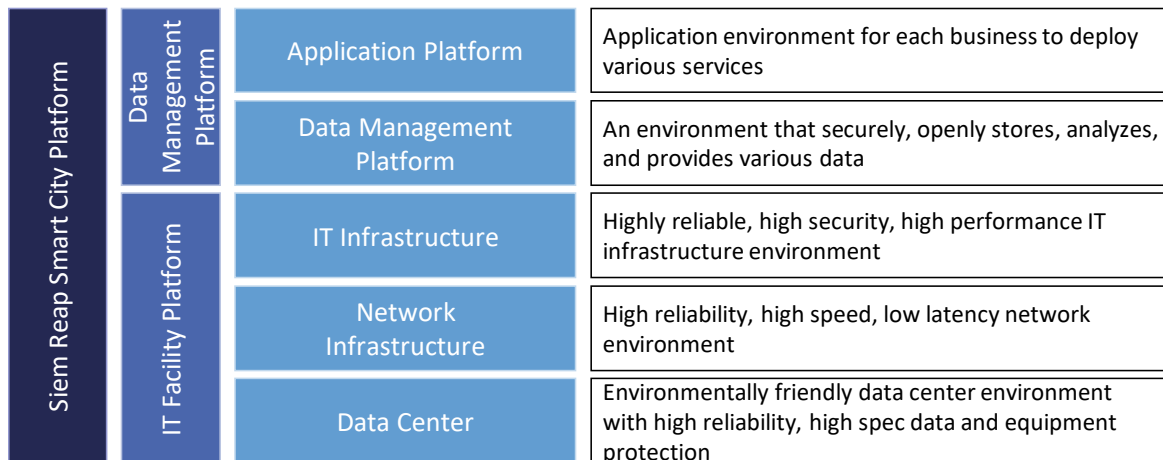
i) Design Policy

The following four items will be suggested in consideration of the design policy of the data platform.

- Agnostic from Organizations and Industries
- Data Board
- Secure and Open
- Open Participation

ii) Technical Requirements

The five layers of physical IT platform requirements that are necessary to develop and build the above-mentioned data platform design concept are as follows:

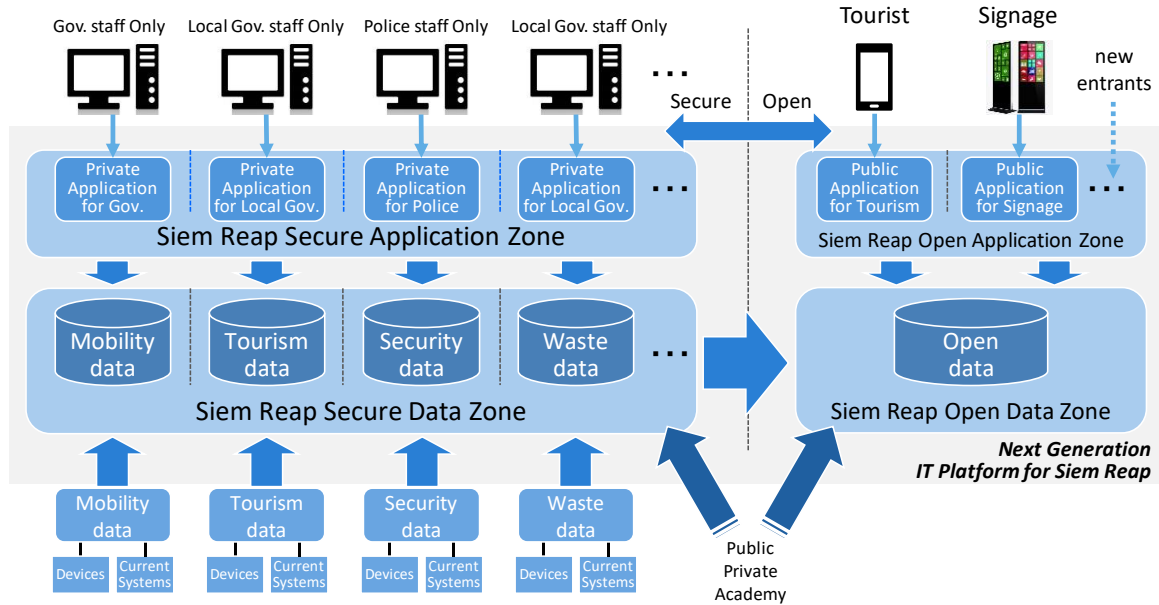


Source: JICA Survey Team

Figure 3.13: The 5 Technical Requirements for the Data Platform

3) Conceptual Diagram

With the design policies, technical requirements, and security consideration described above, the data platform components and deployment design shall be described below. It shall run on cloud system so that the system portability is also secured.



Source: JICA Survey Team

Figure 3.14: The Data Platform Conceptual Diagram

4) Data Security

In order to promote the use of open data, data security must be ensured so that various stakeholders can provide and use the data with confidence. Security measures need to be comprehensively implemented in the following elements.

- Governance aspect: Determination of the direction of the entire smart city initiatives and measures, formulation of rules and basic policies, and organizational structure.
 - Formulation of security policies: Formulate information security basic policies, security measures standards, and data handling standards (including personal privacy protection).
 - Dissemination of the policy to multi-stakeholders: To ensure that the formulated policy is applied to various stakeholders, it should be appropriately reflected and incorporated in procurement specifications, contracts, and terms and conditions.
 - Ongoing efforts to maintain governance: In order to continuously maintain and improve the security of smart cities, the PDCA cycle shall be implemented, security policies and measures shall be continuously reviewed, and investments in security shall be continued as appropriate.
- Data platform aspect: From the perspective of security of the platform itself, implement security measures to prevent external attacks and incidents from occurring.
 - Measures to prevent external attacks, etc.: Implement and operate access control, appropriate authority settings, authentication functions, security monitoring, etc. for the platform.
 - Measures to prevent incidents from occurring: Measures to prevent attacks from entering the platform during the planning, design, development, and operation processes.
 - Measures to be taken in case of an incident: In order to minimize the damage in case of an incident, measures such as encryption of external communication and data, backups, and logs should also be implemented.

- Asset aspect: Effectively monitor and manage the security of devices such as IoT devices, networks for distributing data to data platforms, and relay devices, so that appropriate security measures can be implemented.
 - Monitoring and management of assets: While monitoring and managing assets, new vulnerabilities should be addressed on an ongoing basis.
 - Measures for the assets themselves: Implement communication and data encryption, authentication functions, and physical security measures, especially for IoT devices.
- Individual services aspect: Implement security measures for individual services such as priority projects of the roadmap.
 - Risk assessment for individual services: Identify risks based on the security policy formulated in advance, and formulate a policy to deal with them.
 - Measures to prevent external attacks, etc.: Implement and operate service access control, appropriate authority settings, authentication functions, security monitoring, etc.
 - Measures to prevent incidents from occurring: Measures to prevent attacks from being introduced in the planning, design, development, and operation processes of services.
 - Measures to be taken in case of an incident: In order to minimize damage in case of an incident, measures such as encryption of external communications and data, backups, and logs should also be taken.

3.2.2 Basic Policies and Directions of Measures of the Sectoral Approach

(1) Smart Tourism

The basic approach for smart tourism is “Towards more convenient and satisfactory tourism”. The two main directions of measures are “updating tourism services” and “satisfying tourism demands”.



Source: JICA Survey Team

Figure 3.15: “Smart Tourism” Pillar

Although Siem Reap is well known as a gateway town to the world heritage site of AAP and has been visited by a huge number of visitors both international and national, its other face remains unknown or even undiscovered. This strong but limited image results to one time visit to the site. In order to overcome this fixed image, creating other/diversified attractiveness is needed at first. In order for Siem Reap to continue to welcome a large number of tourists in the future, it needs to become an attractive and comfortable tourist destination not only for group tourists but also for individual tourists. To do so, individuals need to be able to easily access the tourism resources that are best for them and the means of transportation to them. It is also essential that Siem Reap keeps attractiveness and comfortability for local people. To do so, a structure where not only tourism-related workers but also other sector workers benefit from the tourism sector development is expected. To improve the convenience of tourists, the integrated platform (E-tourism platform) will be used to consistently obtain information and make decisions for tourists involved in a series of tourism activities, from promotion to city transportation and local tourism experiences.

The correspondence between issues, direction of measures, and short-term actions are shown below.

Table 3.6: Issues, Direction of Measures, and Short-term Actions in the Smart Tourism Pillar

Issues	Direction of Measures	Short-term Actions
10. Need to improve the convenience of tourist behavior →Mobility services are not provided on demand. →Payment is often only through cash.	Updating Tourism Services ~Deliver a more convenient and on demand tourism service~	<ul style="list-style-type: none"> Centralized Reservation and Payment System (T-02) Shared Mobility Development (T-03) MaaS Introduction (T-04) Contactless Payment Development with QR Codes (T-05)
9. Need to strengthen promotion as a tourist city 11. Improving the attractiveness of local experiences at tourist attractions →Tourism services are unable to target according to individual preferences. →Digital technology is not fully utilized to add on value to onsite tourism	Satisfying Tourists' Demands ~Deliver diverse tourism resources to provide high satisfaction~	<ul style="list-style-type: none"> Tourism Promotion Platform Development (T-01) Enhancement of Local Tourism Experience with Virtual Contents (T-06)

Source: JICA Survey Team

(2) Smart Mobility

The basic approach for smart mobility is “Towards more sustainable, safe and convenient mobility systems”. The two main directions of measures are “creating safe and smooth traffic” and “efficient management and environment consideration”.



Source: JICA Survey Team

Figure 3.16: “Smart Mobility” Pillar

In smart mobility, it is important to improve in the three aspects of convenience, safety, and sustainability, in order to provide a high-level mobility system for citizens and tourists. This requires improvements in mobility such as transportation systems, road maintenance, and vehicles, including parking management systems and the introduction of electric vehicles.

The correspondence between issues, direction of measures, and short-term actions are shown below.

Table 3.7: Issues, Direction of Measures, and Short-term Actions in the Smart Mobility Pillar

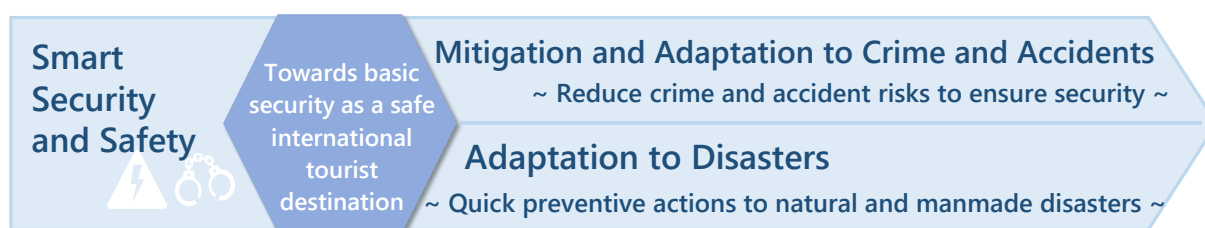
Issues	Direction of Measures	Short-term Actions
12. Need for comfort against traffic congestion and on-street parking →Traffic congestion and accidents occur due to poor design of intersections and traffic signals. →The road is not convenient for pedestrians due to car parking on roads.	Creating safe and Smooth Traffic ~Create road space that is safe and convenient for people~	<ul style="list-style-type: none"> Official Parking System Introduction (M-01) Street Lighting Improvement (M-03) Traffic Signal System Improvement (M-04) Safety Driving and Traffic Safety Management Improvement (M-05)

Issues	Direction of Measures	Short-term Actions
13. Need for optimized road maintenance →Road infrastructure management is not optimized.	Efficient Management and Environment Consideration ~Preventive maintenance of roads and the environment~	• Road Condition Monitoring (M-02)
14. Need for clean air and environmentally-friendly mobility →The gas emission from vehicles is damaging the air environment.		• Promotion of Introduction of EV's (M-06)

Source: JICA Survey Team

(3) Smart Security and Safety

The basic approach for smart security and safety is “Towards basic security as a safe international tourist destination”. The two main directions of measures are “mitigating and adapting to crime and accidents” and “adapting to disasters”.



Source: JICA Survey Team

Figure 3.17: “Smart Security and Safety” Pillar

Siem Reap is satisfying basic security needs so as that its security is rated relatively high by foreign nations such as the United States and Japan. However, as an international tourism city inviting tourists from around the globe, its security standards are not enough, and as a result, tourists are forced to exercise precautions in order to defend themselves and their belongings. Siem Reap is required to enhance basic security as a safe international tourism city, so that tourists can feel safe while they are visiting the city.

The correspondence between issues, direction of measures, and short-term actions are shown below.

Table 3.8: Issues, Direction of Measures, and Short-term Actions in the Smart Security and Safety Pillar

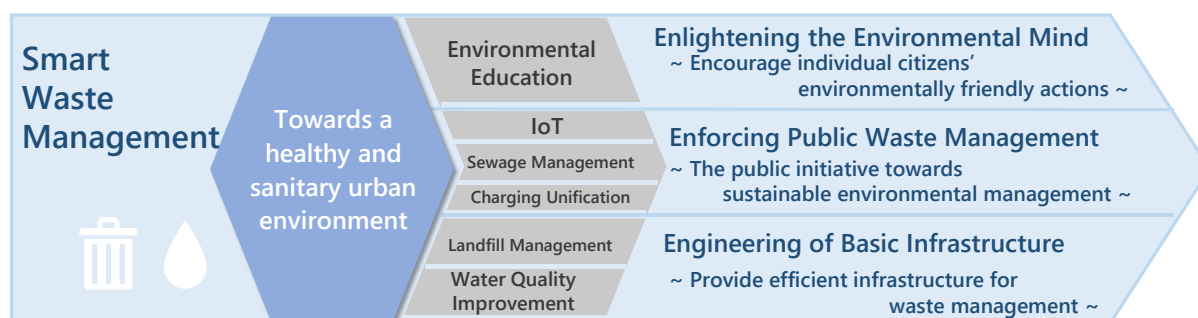
Issues	Direction of Measures	Short-term Actions
15. Need for more safety against risks of traffic accidents and crimes →Quick detection of crime and accidents is needed.	Mitigating and Adapting to Crime and Accidents ~Reduce crime and accident risks to ensure security~	• CCTV System Introduction (S-01) • Public Relations Improvement (S-04)
16. Need for more safety against disasters (fire, flood, etc.) →Quick fire detection for initial firefighting is lacking. →Warning for flooding is not efficiently transmitted to citizens and tourists.	Adapting to Disasters ~Quick preventive actions to natural and manmade disasters~	• Flood Warning System Enhancement (S-02) • Fire Alarm System Installation (S-03)

Source: JICA Survey Team

(4) Smart Waste Management

The basic approach for smart waste management is “Towards a healthy and sanitary urban environment”. The three main directions of measures are “enlightening the

“environmental mind”, “enforcing public waste management”, and “engineering of basic infrastructure”.



Source: JICA Survey Team

Figure 3.18: “Smart Waste Management” Pillar

In smart waste management, the public sector needs to take the initiative to control the necessary projects and develop the infrastructure, while citizens and tourists also need to take appropriate environmental actions in order to achieve an environmentally sustainable future. Especially, the enlightenment is an important solution to be disseminated to the citizens. It aims to determine the citizens’ and students’ attitudes toward waste management through campaigns by the broadcast media and public consultation, to examine the extent to which the broadcast media or school contribute towards campaigns on waste management, to find out how the citizens and school students in Siem Reap perceive the important roles in waste management, and to respond to environmental attitude through behavior change communication.

The correspondence between issues, direction of measures, and short-term actions are shown below.

Table 3.9: Issues, Direction of Measures, and Short-term Actions in the Smart Waste Management Pillar

Issues	Direction of Measures	Short-term Actions
17. Need for enlightenment towards environmentally-friendly actions →Citizens’ and tourists’ behavior towards garbage disposal and wastewater is damaging the environment.	Enlightening the Environmental Mind ~Encourage individual citizens’ environmentally friendly actions~	<ul style="list-style-type: none"> • Solid Waste Management System Improvement (W-01)
18. Need for enforcement of the public initiative →The capacity of the public sector for waste management operation is lacking. →The toll collection system is not efficiently established.	Enforcing Public Waste Management ~The public initiative towards sustainable environmental management~	<ul style="list-style-type: none"> • Garbage Collection IoT Installation (W-02) • Wastewater Facility System Improvement (W-05) • Public Utilities Charging Unification (W-06)
19. Need for engineering of infrastructure →The environment of the landfill is unsanitary. →The capacity of the wastewater treatment plant is not enough for future wastewater.	Engineering of Basic Infrastructure ~Provide efficient infrastructure for waste management~	<ul style="list-style-type: none"> • Landfill Management (W-03) • Water Quality Improvement (W-04)

Source: JICA Survey Team

3.3 Development Programs

3.3.1 Development Programs for the Administrative Approach

As for the development programs for the administrative approach, an action plan for the capacity building of administrative agency staffs and two projects on data management are proposed. In the action plan for capacity building, not only the actions that will be required in the short, medium, and long terms are indicated, but also the detailed actions that should be implemented in the short term of three years in the form of a capacity building project are listed. In order to realize smart cities, it will be important for the government to not only implement projects by sector, but also to coordinate, attract, and promote them in an integrated manner.

(1) Administrative Organization, Legal Systems and Business Promotion

It is necessary to take steps to strengthen the capacity in stages, such as building an organizational structure, improving the system, and verifying and monitoring through demonstration experiments, through the promotion of individual projects. The short-, medium-, and long-term policies are summarized below, and a capacity development project for realizing the short-term policies is proposed.

Table 3.10: Action Plan for Capacity Development

Term	Basic Policy	Measures to be Implemented
Short term (2021-2022)	Promote project implementation in the present organizational mechanism	<ul style="list-style-type: none"> • Assignment of Smart City Promotion Division from a present department/ division of the provincial government and establish one-stop service for project approval • Project information sharing and approval support for large-scale projects in the existing Smart City Committee
Medium term (2022-2024)	Establish the platform led by the Smart City Committee and to promote public revenues through smart technologies by private sectors and city OS	<ul style="list-style-type: none"> • Promotion of private investment through platform activities • Establishment of smart city subsidy system by central and provincial governments • Establishment of tourism development fund (private funds, crowdfunding, fundraising from tourists, etc.) • Legal system development for realizing a smart city
Long term (2025-)	Establish the organization for smart city operation and area management to monetize the city OS	<ul style="list-style-type: none"> • Establishment of SPC/SPV by private sectors and community organizations • Collaboration between public sector and SPC/ SPV for the data platform

Source: JICA Survey Team

For the Siem Reap Provincial Administration and related departments to smoothly implement the activities above, capacity development for governmental officers is necessary. Below is a draft proposal of the capacity development project for three years. It should be noted that a technical cooperation project was discussed between JICA and Siem Reap Provincial Administration separately from this survey.

Capacity Development Program (draft proposal)

1) Upper Aim

Smart city initiatives that contribute to the improvement of Siem Reap's urban environment and regional development are being implemented on an ongoing basis through collaboration between public, private, and academia sectors.

2) Project Aim

Capacity of administrative functions and administrative officers regarding the implementation of the smart city projects in Siem Reap (contributing to the realization of the roadmap) is improved.

3) Expected Outcomes and Activities

i) Outcome 1: An organizational structure to promote smart cities will be established and operated in the Provincial Administration.

a) Activity 1-1: Expansion and management of the cross-sectoral Smart City Committee

Expand the functions of the existing Smart City Committee. In order for the Smart City Committee to actually proceed, the activity and operation plans shall be studied, be actually operated, and the plans and organizational regulations shall be revised as necessary. The committee will also manage the progress of various smart city-related projects. The committee shall also establish a new Smart City Promotion Division.

b) Activity 1-2: Organization and operation of the public-private-academia platform

Cooperation between public, private, and academic sectors is essential for the sustainable implementation of smart city activities. For this reason, a public-private-academia platform for smart cities shall be established, and the Smart City Promotion Division shall be given the functions of the secretariat. First, after examining the basic frame of the system, functions, etc., an activity and operation plan shall be formulated, and regulations shall be established as necessary. The platform shall also introduce smart city projects that are in progress at the time, expand the possibilities for business collaboration, and encourage open innovation. The plan and organizational rules shall be revised as necessary through continuous operation of the platform.

ii) Activity 2: Projects that contribute to the improvement of the urban environment are implemented, and the capacity of those involved is increased.

a) Activity 2-1: Promotion and support to private businesses

The roadmap for smart cities shall be made public through explanatory meetings, etc., to attract and promote the implementation of private sector projects (including PPP projects) that match the roadmap. A contact system through the Smart City Committee shall be established, that can evaluate, review, and support project plans, and clarify and simplify administrative procedures for approving projects related to smart city. In order for these projects to contribute to and collaborate with smart cities, rules shall be established for the provision of collected data, and data shall be provided. In addition, measures to support the implementation of private sector projects (JICA, JCM, etc.) shall be studied, and support shall be provided to bridge the gap to the private sector. At the same time, ways to collaborate with CJCC and provide business support to start-up companies shall be studied.

b) Activity 2-2: Implementation planning, stakeholder coordination, and planning decisions regarding the smartification of government projects

With regard to administrative projects, the Smart City Committee will formulate an implementation plan for smart city projects (installation of sensors, data collection, etc.). The committee shall then coordinate within the public sector, establish task forces as necessary, and implement the project as a smart city project after completing the necessary administrative procedures.

c) Activity 2-3: Progress management, monitoring, and feedback on various projects

The progress and effects of various smart city projects by the private sector and the government shall be monitored through regular meetings of the Smart City Committee. Then, while monitoring the progress and effectiveness of the projects, necessary feedback shall be provided, and ongoing studies shall be conducted to make the projects more effective. Once the

implementation system and budget measures are in place, the preparation and implementation of the next pilot project shall also proceed.

iii) Outcome 3: Preparations are made to develop a data platform and a monitoring mechanism is established.

a) Activity 3-1: Cross-sectoral data set accumulation and sharing

To prepare for the development of a data platform, a server and software shall be installed with a minimum configuration. Then, through a pilot project, the method of data sharing across departments shall be studied, data shall be collected and accumulated, and a trial run of the system shall be conducted. In addition, expansion of the data accumulation and sharing functions shall be continued, and data from private businesses that match the smart city roadmap shall be requested to be incorporated into the data platform.

b) Activity 3-2: Open data

The above data shall be organized and released as a first step toward developing a data set that is easy for the private sector to enter. Rules shall be introduced to convert the base data into open data that allows the private sector to freely initiate projects. At the same time, existing administrative information shall be organized, and the Provincial Administration website shall be renewed.

c) Activity 3-3: Establishment of monitoring indicators and implementation of monitoring

In order to continuously verify the effectiveness of the roadmap, monitoring indicators shall be set. Monitoring shall start based on these indicators, and progress shall be managed by the Smart City Committee. In addition, how to disclose the monitoring status to residents, tourists, and businesses for verification shall be considered. At the end of this project, the roadmap shall be reviewed and revised based on the verification through monitoring.

iv) Outcome 4: Publication of smart city projects both internally and externally

a) Activity 4-1: Ensure publicity and staff understanding within the Provincial Administration

In order to understand and share among government officials the basic recognition of smart cities and the data platform, their future image, the effects of their introduction, and the procedures and methods for their realization, briefings and workshops shall be initiated and disseminated throughout the Provincial Administration. In addition, with the cooperation of the public-private-academia platform, lecturers from the private sector and the academic sector in Japan and abroad shall be invited to hold continuous and regular smart city workshops. On the other hand, training in Japan and third countries shall be delivered to observe the advanced areas of smart city initiatives.

b) Activity 4-2: Planning of external promotion strategies and implementation of promotion activities

An external public relations strategy (including renewal of the state government website) shall be developed. Based on the public relations strategy drafted, public relations shall be promoted. In light of the impact of COVID-19, attention shall be paid to promoting the city as a safe and secure tourist city in connection with smart cities.

c) Activity 4-3: Networking between central government, ASCN cities, and heritage cities

Cooperation with the central government is essential for the promotion of smart cities. A forum for liaison and coordination with the central government on the roadmap and this project shall be set up to share information and request cooperation on a regular basis. In addition, a cross-city network of related parties among ASCN cities and heritage cities shall be formed, and a forum for exchanging information online shall be developed.

(2) Priority Projects for Data Management

For data management, two project groups with a focus on managing the data of the four sectors mentioned above in a cross-cutting manner have been set up. The first phase proposes "Integrated Data Collection and Analysis (D-01)" for data collection and analysis. The next phase is data disclosure, and "Data Dissemination to Relevant Stakeholders (D-02)" is proposed. Although these projects do not directly contribute to improving the satisfaction of citizens and tourists, they are the basis for developing smart city development programs and should be tackled even partially as soon as possible.

Table 3.11: Priority Projects of Data Management

Project	Overview
D-01 Integrated Data Collection and Analysis	Accumulate data for each sector through the sectoral priority projects on a unified data platform.
D-02 Data Dissemination to Relevant Stakeholders	Disclosure of accumulated data to various stakeholders and promotion of open innovation.

Source: JICA Survey Team

3.3.2 Development Programs for the Sectoral Approach

Based on the vision and strategies mentioned above, sector-specific basic policies and development programs for the five major target sectors are proposed. The five major sectors are “smart tourism”, “smart mobility”, “smart security and safety”, and “smart waste management”. Although they are organized per sector in this section, in realizing a smart city, these should be interrelated, and the implementation measures for that interrelationship will be summarized in the following sections.

Multiple project groups are proposed in each sector as development programs. In each case, the project outline (purpose, goals, etc.) from a medium- to long-term perspective and the actions as a priority project from a short-term perspective of 2025 are organized. How to smoothly and effectively proceed with these priority projects as short-term actions is important for realizing a smart city.

(1) Smart Tourism

In the tourism development programs, six project groups were set up. First of all, “Tourism Promotion Platform Development (T-01)” will be carried out to effectively and widely disseminate the attractions of Siem Reap, and “Centralized Reservation and Payment System (T-02)” will be proposed to enable reservation and payment for each tourism content on a centralized platform. Furthermore, “Shared Mobility Development (T-03)” and “MaaS Introduction (T-04)” are proposed to enable tourists to choose the most appropriate means of personal transportation in the local area. In the local area, “Contactless Payment Development with QR Codes (T-05)” to promote the convenience of tourists’ purchasing behavior and “Enhancement of Local Tourism Experience using AR (T-06)” to provide tourists with a more advanced sightseeing experience are proposed. It is assumed that each of these projects will be developed separately, but the ultimate goal is to be able to provide tourists with an integrated e-tourism platform from information acquisition to on-site experience.

Among the priority actions proposed in the Master Plan for Tourism Development in Siem Reap (2021-2035), “Domestic and International Tourist Management Flow in the Angkor Heritage Site”, “The Development of Technology Supporting the Digital Tourism Development in Siem Reap”, and “Development of Siem Reap Pass” are actions that are consistent with the priority projects of this

roadmap. Also, Among the projects proposed in the Roadmap for Recovery of Cambodia Tourism During and Post COVID-19, “Tourism Digital Literacy and Digital Skills Campaign”, “Feasibility Study of Angkor Heritage Development: Smart Tourist Destination”, and “Establishment of Cambodia Pass” are consistent with the priority projects of this roadmap. In the implementation phase of the priority projects, the measures need to be implemented without any mutual discrepancies with these relevant plans and actions.

Table 3.12: Priority Projects of Smart Tourism

Project	Overview
T-01 Tourism Promotion Platform Development	Development of a platform to promote various tourism experiences offered in Siem Reap.
T-02 Centralized Reservation and Payment System	Development and implementation of a system that integrates reservations and payment for various tourism contents.
T-03 Shared Mobility Development	Introduction of a shared mobility service (including bike rental service) to make it more convenient for individual tourists.
T-04 MaaS Introduction	Development of MaaS that allows individual tourists to choose the most appropriate transportation method according to personal preferences.
T-05 Contactless Payment Development with QR Codes	Introduction of a contactless electronic payment system to facilitate local payment procedures.
T-06 Enhancement of Local Tourism Experience using AR	Planning and creation of AR content to make the local tourism experience more attractive.

Source: JICA Survey Team

(2) Smart Mobility

In the mobility development programs, six project groups were set up. In addition, two mobility service projects proposed by the smart tourism sector are also closely related to this sector. The six project groups can be broadly divided into road management, traffic management, and vehicle management. In road management, "Official Parking System Introduction (M-01)", "Road Condition Monitoring (M-02)" and "Street Lighting Improvement (M-03)" will be implemented to improve the comfort and safety of the road environment. In traffic management, "Traffic Signal System Improvement (M-04)" and "Safety Drive Improvement (M-05)" will be implemented to improve traffic comfort by alleviating traffic congestion. In the final vehicle management, "EV Promotion (M-06)" will be implemented to promote the expansion of environment-friendly transportation methods. These projects will contribute to improving the satisfaction of both citizens and tourists.

Table 3.13: Priority Projects of Smart Mobility

Project	Overview
M-01 Official Parking System Introduction	Installation of smart parking system in the city area.
M-02 Road Condition Monitoring	Introduction of an application for checking road conditions, and use of collected data on road surface damage and evaluation for road maintenance and repair planning.
M-03 Street Lighting Improvement	Multi-functionalization of street lighting in target areas through integrated operation with cameras, environmental sensors, parking sensors, etc.
M-04 Traffic Signal System Improvement	Procurement, installation, and operation of equipment for traffic signal coordination, signal control, traffic control, and other systems.
M-05 Safety Drive Improvement	Introduction of an application service for understanding driving behavior and disclosure of collected data and implementation of safety training for drivers.
M-06 EV Promotion	Formulate policies to promote the introduction of electronic vehicles and promote the development and introduction of electric tuk-tuk and other electric vehicles.

Source: JICA Survey Team

(3) Smart Security and Safety

In the safety and security development programs, four project groups were set up. These projects can be broadly divided into three categories: crime prevention, disaster prevention, and information. The crime prevention system is "CCTV System Introduction (S-01)", which aims to ensure safety as a tourist city, improve the degree of security of tourists, and improve the status as a tourism city. The disaster prevention system is "Flood Warning System Enhancement (S-02)" and "Fire Alarm System Installation (S-03)", which aim to ensure safety in the event of an unforeseen situation. The final information system is "Public Relations Improvement (S-04)", which actively publicizes safety information to citizens and tourists in cooperation with security authorities. These projects will contribute to improving the satisfaction of both citizens and tourists.

Table 3.14: Priority Projects of Smart Security and Safety

Project	Overview
S-01 CCTV System Introduction	Centralized management, analysis, and disclosure of CCTV data in integrated system
S-02 Flood Warning System Enhancement	Broad announcement of disaster warning information to residents and international tourists
S-03 Fire Alarm System Installation	Installation of fire alarms in areas with high risk of fire.
S-04 Public Relations Improvement	Establish a system for centralized collection and management of daily crime and traffic accident information in the police, and announcement information through the state police and government web pages and tourism apps.

Source: JICA Survey Team

(4) Smart Waste Management

In the smart environment management development programs, six project groups were set up. These projects can be broadly divided into three categories: solid waste management, wastewater management, and management related to infrastructure services in general. In the solid waste management, there are "Solid Waste Management System Improvement (W-01)", "Garbage Collection IoT Installation (W-02)", and "Landfill Management (W-03)". In the wastewater management, there are "Water Quality Improvement System (W-04)" and "Water Facility System Improvement (W-05)". In general management, there is "Public Utilities Charging Unification (W-06)". Although these projects are related to the satisfaction of tourists, they are mainly aimed at contributing to the improvement of living environment and the satisfaction of citizens.

Table 3.15: Priority Projects of Smart Waste Management

Project	Overview
W-01 Solid Waste Management System Improvement	Collecting, disposing, and charging for waste using a waste management system in model districts and reduction of the amount of waste generated in the city through the enhancement of environmental education.
W-02 Garbage Collection IoT Installation	Installation of trash cans with sensors that show the amount of waste for separate waste collection and accumulation and disclosure of collected data on a platform.
W-03 Landfill Management	Construction of sanitary landfills that meet environmental standards and conducting appropriate operation and management of landfills.
W-04 Water Quality Improvement System	Improving the water quality of Siem Reap River using a monitoring system and improving the riverfront landscape.
W-05 Water Facility System Improvement	Accumulation of data on existing drainage pipes and monitoring drainage capacity and enhancement of sewage lines and treatment facilities through expansion or construction of new sewage treatment plants.
W-06 Public Utilities Charging Unification	Monitoring through the establishment and operation of a centralized collection system of utility charges that integrates water, wastewater, and waste utilities.

Source: JICA Survey Team

3.3.3 Priority Projects

24 priority projects with project outline targeting 2035 and short-term actions targeting 2025 are listed below.

(1) Data Management

1) Project D-01: Integrated Data Collection and Analysis

Project D-01		Integrated Data Collection and Analysis	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	6. Need for improvement of hardware and ICT circumstances 7. Need for multi-sectoral data sharing and utilization		
Objective	To establish an integrated data collection and analysis system of the urban environment		
Project Goal	The urban environment is monitored and analyzed appropriately for decision making by both public and private sectors.		
Target Area	All		
Issues to be Solved	<ul style="list-style-type: none"> • Vertical division among responsible departments of each sector • Paper-based management of existing statistical data • Lack of facilities for data management (including data centers) 		
Indicators (KPI)	<ul style="list-style-type: none"> • The amount of data input 		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Provincial Administration, DPT	
	Sub	Private Business (system developer), State Department in charge of each sector, Provincial Police	
	Relevant Organizations	-	
Main Action [Key Player]	<ol style="list-style-type: none"> 1. Coordination of relevant agencies for development of cross-sectoral data platform [Provincial Administration] 2. Planning and development of data platform (cloud service contract or installation of new on-premises system) [Provincial Administration, DPT, Private Business] 3. Input of existing statistical data into the data platform [Provincial Administration, Provincial Departments in charge of each sector, Provincial Police] 4. Input of data from other projects into the integrated data platform [Provincial Administration, Provincial Departments in charge of each sector, Provincial Police] 5. Maintenance and inspection of the entire system [Private Business, DPT] 		
Fund Source Business Model	If the data platform is procured through a cloud service contract, the procurement cost will be relatively small, so the initial investment is financed by the Provincial Administration. If necessary, ODA funding will be a part of the TC scheme. Operation and maintenance costs will be also funded by the Provincial Administration.		
	Initial Cost	For cloud: Provincial Administration (ODA funding support also assumed) For on-premises: ODA funding support (Cost for reference: USD 300,000 (software development), USD 400,000 (environment setup), USD 50,000 (data input))	
	O&M Cost	Provincial Administration	

2) Project D-02: Data Dissemination to Relevant Stakeholders

Project D-02		Data Dissemination to Relevant Stakeholders	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	8. Need for open data system, data security, and regulations		
Objective	To establish data disclosure system for relevant stakeholders to utilize and benefit themselves		
Project Goal	Data obtained through the smart city concept is disclosed to relevant stakeholders with easy access and consideration of privacy etc.		
Target Area	All		
Issues to be Solved	<ul style="list-style-type: none"> Data publication and utilization process for each stakeholder Detailed data security management procedure 		
Indicators (KPI)	<ul style="list-style-type: none"> Amount of data to be published, number of accesses 		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Provincial Administration, DPT	
	Sub	Private Business (platform provider), Provincial departments in charge of each sector, Provincial Police	
	Relevant Organizations	Private company (data beneficiary)	
Main Action [Key Player]	<ol style="list-style-type: none"> Consideration of rules and regulations for data handling [Provincial Administration, DPT] Data processing for privacy consideration for data release [DPT] Release each information stored in Project D-01 to the public through API with consideration for privacy protection [Provincial Administration, DPT] 		
Fund Source Business Model	Initial investment is not expected. (It will be implemented in Project D-01.)		
	Operation and maintenance costs will also be integrated with Project D-01, but business activities will become more active based on the disclosed information, and a certain amount of revenue will be received by the Provincial Administration from the tax revenue. It will cover the operation and maintenance costs of Project D-01.		
	Initial Cost	-	
	O&M Cost	Provincial Administration	

(2) Smart Tourism

1) Project T-01: Tourism Promotion Platform Development

Project T-01		Tourism Promotion Platform Development	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	9. Need to strengthen promotion as a tourist city		
Objective	To attract a large number of tourists to Siem Reap in a sustainable manner		
Project Goal	To promote a variety of tourism services on the same platform		
Target Area	All		
Data Management	<ul style="list-style-type: none"> Number of views for each promotion 		
Issues to be Solved	<ul style="list-style-type: none"> Burden of platform development cost Measures to ensure the number of views Mechanism to enable continuous updating 		
Indicators (KPI)	Number of views for each promotion		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	DoT, private sector operators (system developers)	
	Sub	Private sector operators (tourism service providers), DPT	
	Relevant Organizations	-	
Main Actions [Key Player]	<ol style="list-style-type: none"> Understanding the needs of visitors to Siem Reap (tourism, MICE, etc.) and planning related to promotion, etc. [DoT] Development of a platform to publish promotional contents [Private sector (system developer)] Development of promotional contents and posting them on the platform (VR, etc.) [Private sector (tourism service providers)] Operation of the promotion platform [private sector (system developer)] Accumulate and publish data on the data platform [DPT]. 		
Fund Source Business Model	Since this is a highly public project that contributes to the promotion of tourism in Siem Reap, and the investment amount is relatively small, the initial investment is expected to be made through DoT's own funds. It is assumed that the DoT will collect publication fees from tourism businesses that publish contents, which will be used for the operation and maintenance costs.		
	Initial Cost	DoT funding (ODA funding support is also assumed)	
	O&M Cost	Operation and maintenance cost Collection of publication fees from private businesses (tourism service providers)	
Data Management	<ul style="list-style-type: none"> Number of views for each promotion 		

2) Project T-02: Centralized Reservation and Payment System

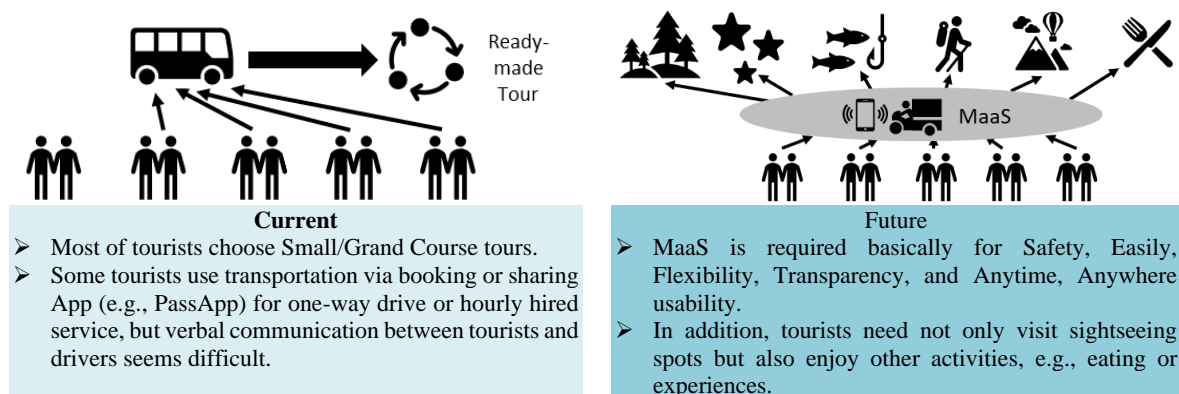
Project T-02		Centralized Reservation and Payment System	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	9. Need to strengthen promotion as a tourist city 10. Need to improve the convenience of tourist behavior		
Objective	To make it easy for individual tourists to create their own personalized sightseeing plans		
Project Goal	To operate a platform that allows one-stop reservation and payment for various tourism contents		
Target Area	All		
Data Management	<ul style="list-style-type: none"> Tourist spots to be reserved by each individual 		
Issues to be Solved	<ul style="list-style-type: none"> Involvement of each tourism operator Adjustment of interests with existing travel agencies 		
Indicators (KPI)	Number of users (number of reservations)		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	DoT, private sector operators (system developers)	
	Sub	Private sector operators (each tourism content provider), DPT	
	Relevant Organizations	-	
Main Actions [Key Player]	<ol style="list-style-type: none"> Planning and study of one-stop reservation and settlement for tourism services [DoT] Creation of a one-stop platform for reservation and settlement of tourism services [Private Sector (System Developer)] Attracting the listing of various tourism services [DoT]. Operation of reservation and settlement platform [Private sector (system developer)] Accumulate and publish data in the data platform [DPT]. 		
Fund Source Business Model	<p>Since this is a highly public project that will contribute to the promotion of tourism in Siem Reap, and the investment amount is relatively small, the DoT is expected to make the initial investment with its own funds, but if necessary, ODA funds can be considered as part of the technical cooperation scheme.</p> <p>It is assumed that the DoT will collect listing fees from tourism businesses that list their services, which will be used for the operation and maintenance costs.</p>		
	Initial Cost	DoT funding (ODA funding support is also assumed)	
	O&M Cost	Operation and maintenance cost Collection of publication fees from private businesses (tourism service providers)	
Data Management	<ul style="list-style-type: none"> Tourism spots to be reserved by each individual 		

3) Project T-03: Shared Mobility Development

Project T-03		Shared Mobility Development	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	10. Need to improve convenience of tourist behavior		
Objective	Improving the convenience of travel for tourists		
Project Goal	To commercialize small shared mobility and provide it to tourists		
Target Area	All		
Data Management	<ul style="list-style-type: none"> Usage status (location information, etc.) 		
Issues to be Solved	<ul style="list-style-type: none"> Adjustment of interests with existing mobility 		
Indicators (KPI)	Number of users		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Provincial Administration, private sector operators (project operators)	
	Sub	DoT, DPT	
	Relevant Organizations	-	
Main Actions [Key Player]	<ol style="list-style-type: none"> Study of feasible forms of mobility (from regulatory and demand perspectives) [Provincial Administration] Development of hardware and software infrastructure for the introduction of shared mobility [Provincial Administration, private sector operators (business operators)] Operation of pay-as-you-go shared mobility [Private sector operators (business operators)] Monitoring of operations [Provincial Administration] Data accumulation and disclosure in data platform [DPT] 		
Fund Source Business Model	<p>Since this is a highly public project that will contribute to the promotion of tourism in Siem Reap, and the amount of investment is relatively small, the initial investment is expected to be made with the Provincial Administration's own funds, but ODA funds may be considered as part of the technical cooperation scheme if necessary.</p> <p>It is assumed that a user fee will be collected from tourists using the service to cover the operation and maintenance costs.</p>		
	Initial Cost	Provincial Administration funds (ODA funding support is also assumed) (Cost for reference: USD 2,500 (market price of shared e-bikes))	
	O&M Cost	Operation and maintenance costs Usage fees from tourists using the service	
Data Management	<ul style="list-style-type: none"> Usage status (location information, etc.) 		

4) Project T-04: MaaS Introduction

Project T-04		MaaS Introduction	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	10. Need to improve convenience of tourist behavior		
Objective	Improving the convenience of tourists' transportation		
Project Goal	MaaS will allow tourists to choose from multiple means of transportation and make reservations and payments on a single platform.		
Target Area	All		
Data Management	<ul style="list-style-type: none"> Usage status (personal attributes, number of reservations, location information, etc.) 		
Issues to be Solved	<ul style="list-style-type: none"> Adjustment of interests with existing mobility 		
Indicators (KPI)	Number of users		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Provincial Administration, private sector operators (system developers)	
	Sub	Private sector operators (various transport mode operators, travel agencies), DPT	
	Relevant Organizations	-	
Main Actions [Key Player]	<ol style="list-style-type: none"> 1. Planning and study of tourism MaaS development [Provincial Administration] 2. Coordination with stakeholders [Provincial Administration] 3. Tourism MaaS system development [Private sector (system developer)] 4. Arrangement of transportation modes to be registered [Private sector (each transportation mode operator)] 5. Promotion to users [Provincial Administration, private operators (system developers)] 6. Operation of the system [Private operator (system developer)] 7. Data accumulation and disclosure on the data platform [DPT] 		
Fund Source Business Model	The private sector, which will be the main implementer of the system, is expected to contribute its own funds for initial investment and operation and maintenance costs.		
	Initial Cost	Private sector operator's own funds (Cost for reference: USD 100,000 (application development cost))	
	O&M Cost	Private sector operator's own funds (collection of usage fees from service users)	
Data Management	<ul style="list-style-type: none"> Usage status (personal attributes, number of reservations, location information, etc.) 		



Source: JICA Survey Team

Figure 3.19: Image of MaaS Introduction

5) Project T-05: Contactless Payment Development with QR Codes

Project T-05		Contactless Payment Development with QR Codes	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	10. Need to improve convenience of tourist behavior		
Objective	To make local payment procedures smoother and purchasing behavior more stress-free.		
Project Goal	To introduce a contactless local electronic payment system and promote electronic payment in the city.		
Target Area	All		
Data Management	<ul style="list-style-type: none"> Information on purchasing 		
Issues to be Solved	<ul style="list-style-type: none"> - 		
Indicators (KPI)	Number of uses		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Provincial Administration, private sector operators (system developers)	
	Sub	Private sector operators (each store operator)	
	Relevant Organizations	-	
Main Actions [Key Player]	<ol style="list-style-type: none"> 1. Planning and study of a contactless payment system [Provincial Administration] 2. System development [Private sector (system developer)] 3. Explain the system to local stores [Provincial Administration] 4. Operation the system [Private sector operators (system developer)] 5. Data accumulation and disclosure on the data platform [DPT] 		
Fund Source Business Model	It is assumed that the private sector (system developer) will cover the initial investment costs with its own funds and the fees generated at the time of settlement will be used for the operation and maintenance costs.		
	Initial Cost	Private sector operator's own funds	
	O&M Cost	Settlement fees	
Data Management	<ul style="list-style-type: none"> Information on purchasing 		

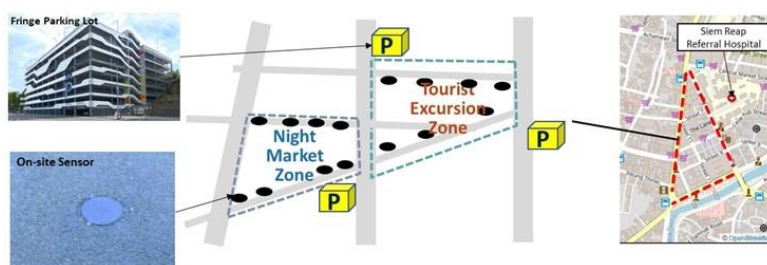
6) Project T-06: Enhancement of Local Tourism Experience using AR

Project T-05		Enhancement of Local Tourism Experience using AR	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	11. Need to improve the attractiveness of local experiences at tourist attractions		
Objective	To improve tourists' understanding and satisfaction of tourist attraction at tourist attractions		
Project Goal	AR contents that make the local experience more attractive should be provided at each tourism spot.		
Target Area	All		
Data Management	<ul style="list-style-type: none"> Number of views 		
Issues to be Solved	<ul style="list-style-type: none"> Coordination of interests with existing tourist guides, etc. 		
Indicators (KPI)	Number of views		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	DoT, APSARA National Authority, private sector operators (operators of various tourist facilities)	
	Sub	Private sector operators (virtual content developer)	
	Relevant Organizations	-	
Main Actions [Key Player]	<ol style="list-style-type: none"> Planning of virtual contents (including AR) [DoT, APSARA National Authority, private sector operators (each tourism facility operator)] Development of hardware infrastructure (e.g. QR code signs) for access to virtual contents [DoT, APSARA National Authority, private sector (operators of tourist facilities)] Establishing, disseminating, and developing rules for the use of virtual contents [DoT, APSARA National Authority] 		
Fund Source Business Model	The investment will be recovered by selling the virtual contents to local tourists.		
	Initial Cost	APSARA National Authority, private sector (each tourist facility operator) (Cost for reference: USD 1,500 (initial demonstration application development cost))	
	O&M Cost	APSARA National Authority, private sector (each facility operator) (to be covered by revenue from tourists)	
Data Management	<ul style="list-style-type: none"> Number of views 		

(3) Smart Mobility

1) Project M-01: Official Parking System Introduction

Project M-01		Official Parking System Introduction	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	12. Need for comfort against traffic congestion and on-street parking		
Objective	To coexist tourism and local life with smart technologies for attractive and easy tourism		
Project Goal	Installing official parking system around Pub Street and other streets which have a lot of on-street parking vehicles in Siem Reap City		
Target Area	City Area		
Data Management	<ul style="list-style-type: none"> Monitoring of on-street parking behavior Integration of the processes from parking reservation to payment by the parking system equipped with monitoring and online payment 		
Issues to be Solved	<ul style="list-style-type: none"> Instituting a law/system regarding billing system on street parking Selecting the operator of the parking system Considering the area and time for on-street parking Securing lands for off-street parking for parking demand that will not be able to be handled by street parking 		
Indicators (KPI)	No. of illegal on-street parking vehicles, Satisfaction of the drivers and pedestrians		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	DPWT, Provincial Administration	
	Sub	Private Business (Parking lot operator)	
	Relevant Organizations	Provincial Police, Siem Reap City	
Main Actions [Key Player]	<ol style="list-style-type: none"> Formulation and enforcement of street parking fee system, formulation and operation of toll system (designation of special zones for roads around Pub Street, etc.) [Provincial Administration] Designation and marking of toll street parking lots [Road Manager (DPWT, Provincial Administration)] Contract form and operator selection of street parking operator [Provincial Administration] Installation of parking sensors on roads (designated special zones) around Pub Street [Parking lot operator] Street parking fee collection business and providing the fullness/emptiness information of the parking [Parking lot operator] 		
Fund Source Business Model	Surplus areas of road space will be utilized effectively and illegal parking that impedes road traffic and roadside use will be prevented. The fee-based system will be introduced for the purpose of utilizing on-street parking lots while covering management costs. The business model covers management costs including the introduction of various equipment, recovery of initial investment costs for system development, maintenance and repair of equipment, and human resources. Regarding setting the charges, it is necessary to consider the fees of parking lots operated by private companies in the surrounding area. It is also necessary to set the parking fee in consideration of the business feasibility considering the payback period.		
	Initial Cost	Covered by the parking lot operator (collection of funds with a part of parking fee income) (Cost for reference: USD 1,000,000 (for 140 lots in Sivatha street and 2 Thnou street))	
	O&M Cost	Parking fee income, Compensation from Tourism Development Fund (if needed)	
Data Management	<ul style="list-style-type: none"> Analyze the parking space demand and the candidate sites for additional installation by collecting the fullness/emptiness information of the parking lot 		



Source: JICA Survey Team

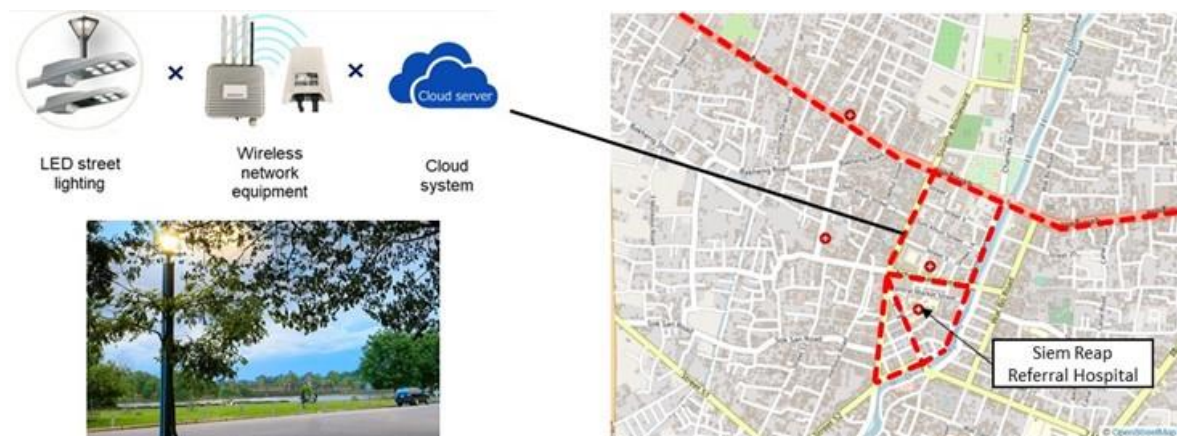
Figure 3.20: Image of Short-term Actions for Official Parking System Introduction

2) Project M-02: Road Condition Monitoring

Project M-02		Road Condition Monitoring	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	13. Need for optimized road maintenance 15. Need for more safety against risks of traffic accidents and crimes		
Objective	Ensuring the quality of road conditions and structuring systematic and efficient road maintenance plan.		
Project Goal	Ensuring the required road quality at the minimum required cost.		
Target Area	Main: City Area, Heritage Area / Sub: Tonle Sap Area		
Data Management	<ul style="list-style-type: none"> Automatic road condition data collection and saving in image files with date and location log Automatic detection and classification of road conditions with AI Using for maintenance planning as actual records 		
Issues to be Solved	<ul style="list-style-type: none"> Finding a collaborator for data acquisition (just set onboard smartphone or dashcam), Increasing road coverage rate of data collection Securing data processing cost 		
Indicators (KPI)	Balance between road quality and maintenance cost (efficiency)		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	DPWT, Provincial Administration, APSARA National Authority	
	Sub	Private Business (Application service provider)	
	Relevant Organizations	Land Transportation Operators (TTA etc.)	
Main Actions [Key Player]	<ol style="list-style-type: none"> Setting the specifications of evaluation items or survey frequency or so for evaluating road surface condition. [Each road management organization: DPWT led] Securing budget for road surface survey [Each road management organization] Adjustment and securing of organizations (Road patrol cars, Siem Reap provincial government-owned vehicles, tuk-tuk, buses, etc.) equipped with application-equipped smartphones and dashcams. [Provincial Administration] Selection of application service provider to grasp road surface conditions [Application service provider] Calibration of survey results by application [DPWT, Application service provider] Data collection, accumulation of status survey results, and data provision [Application service provider] Calculation of road maintenance and repair costs, formulation of long-term repair plans [Each road management organization] 		
Fund Source Business Model	Each road manager will install a smartphone/dashcam with an application on the vehicle that he/she is driving on a daily basis. At any given time, the application collects the road condition data, which investigates and evaluates instead of securing technical inspection and evaluation personnel. Since the existing application will be used, the system operation can be started by calibrating the road space in Siem Reap. Therefore, it is a business model that can reduce the system construction period and the initial investment cost.		
	Initial Cost	Part of the annual road maintenance budget (initial setting cost, a small amount for machine learning of image processing tailored to the site) (Cost for reference: USD 200,000 estimation using existing platforms)	
	O&M Cost	Part of the annual road maintenance budget	
Data Management	<ul style="list-style-type: none"> Monitoring of detected damages, identification of damage type Preliminary estimation of road repair costs Sharing the information on road damage status between road managers and residents 		

3) Project M-03: Street Lighting Improvement

Project M-03		Street Lighting Improvement	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	15. Need for more safety against risks of traffic accidents and crimes		
Objective	Providing safe walking environment at night for pedestrians including international tourists		
Project Goal	Multi-functionalization of street lighting by integrated management with CCTV, environmental sensor, and parking sensor		
Target Area	Main: City Area / Sub: Heritage Area		
Data Management	<ul style="list-style-type: none"> Monitoring the data of meteorology, traffic condition, level of river, etc. 		
Issues to be Solved	<ul style="list-style-type: none"> Selecting the provider of telecommunication equipment and system Securing of communication capability 		
Indicators (KPI)	Number of street crimes, Satisfaction of residents and tourists about safety		
Short Term Actions (Priority Projects targeting 2025)			
Implementation Body	Main	DPWT	
	Sub	DPT, Private Business (Street lighting provider, Sensor provider, and Telecommunications service provider)	
	Relevant Organizations	Provincial Police, Provincial Administration	
Main Actions [Key Player]	<ol style="list-style-type: none"> Determination of street lighting installation section and specifications on the road around Pub Street and on NR6 [DPWT] Installation of the sensors attached to the street lighting [Street lighting provider, Sensor provider] Connection with telecommunication equipment [Telecommunications service provider] Accumulation of various data on the data platform and opening the data to public [DPT] 		
Fund Source Business Model	Street lightings, which have a function of linking with communication devices equipped with various sensors, are a business that enables real-time monitoring by supplying power and communication. It uses LED lighting, which is also environmentally-friendly and has a function to constantly acquire data. It is also a business model that meets such diverse monitoring needs. Since the power supply of each sensor can be shared, the whole budget will be reduced than if the sensors are installed by each.		
	Initial Cost	Road safety management budget of DPWT and Siem Reap City, National budget (38 Road Construction Project)	
	O&M Cost	Part of the annual road maintenance budget	
Data Management	<ul style="list-style-type: none"> Efficient management with a central management system (CMS) for understanding power consumption and fault locations Collecting and aggregating some sensor information 		

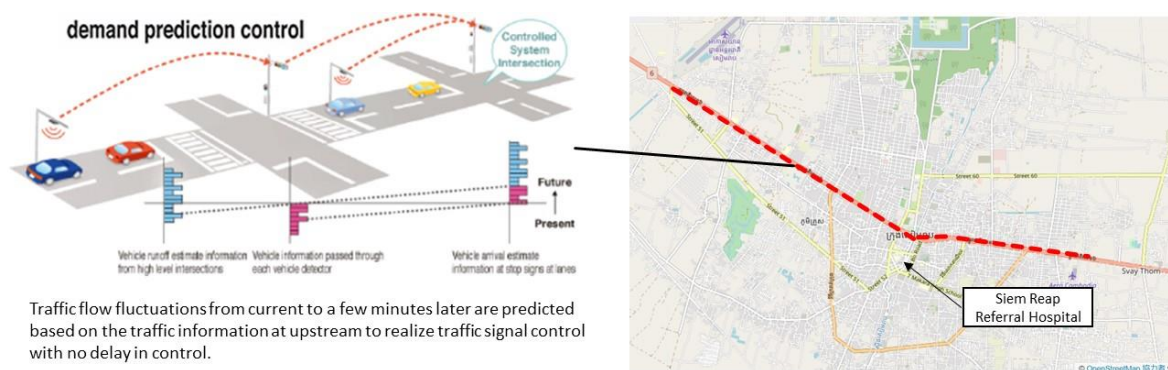


Source: MinebeaMitsumi

Figure 3.21: Image of Short-term Actions for Street Lighting Improvement

4) Project M-04: Traffic Signal System Improvement

Project M-04		Traffic Signal System Improvement	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	12. Need for comfort against traffic congestion and on-street parking 6. Need for improvement of hardware and ICT circumstances		
Objective	Improvement traffic flow for supporting tourist destination value-up and economic growth.		
Project Goal	Optimized traffic flow according to traffic demands.		
Target Area	Main: City Area, Heritage Area / Sub: Tonle Sap Area		
Data Management	• Monitoring relationship between traffic flow, traffic demand, and traffic light's phases		
Issues to be Solved	• Installation of new traffic lights with function of traffic counting and automatic phase control through interactive communication		
Indicators (KPI)	Traffic congestion rate, traffic flow capacity		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	DPWT	
	Sub	Siem Reap City, Private Business (Traffic signal and signal control system developer)	
	Relevant Organizations	Provincial Police	
Main Actions [Key Player]	1. Determining the target traffic signals/zone to network traffic signals [DPWT] 2. Procurement of traffic signal linkage equipment, signal control, traffic control, etc. [DPWT] 3. Installation of traffic signal linkage equipment, signal control, traffic control, etc. [Traffic signal and signal control system developer] 4. Operation of traffic signal linkage equipment, signal control, traffic control, etc. [DPWT]		
Fund Source Business Model	The amount of cost varies depending on the scale of both traffic signals and control systems. However, they are positioned as public investments due to the nature of the equipment and functions. Since it is difficult to secure profits from these traffic control systems themselves, the model is generally implemented as public investment.		
	Initial Cost	Funding for public investment (DPWT, Provincial Administration, Siem Reap City, APSARA National Authority) Official Development Assistance (Cost for reference: USD 15,000,000 (ODA grant amount for)the development of traffic management system in Phnom Penh with 115 intersections with traffic signals))	
	O&M Cost	Funding for public investment (DPWT, Provincial Administration, Siem Reap City, APSARA National Authority)	
Data Management	• Monitoring traffic flow, traffic demand, and signal display		

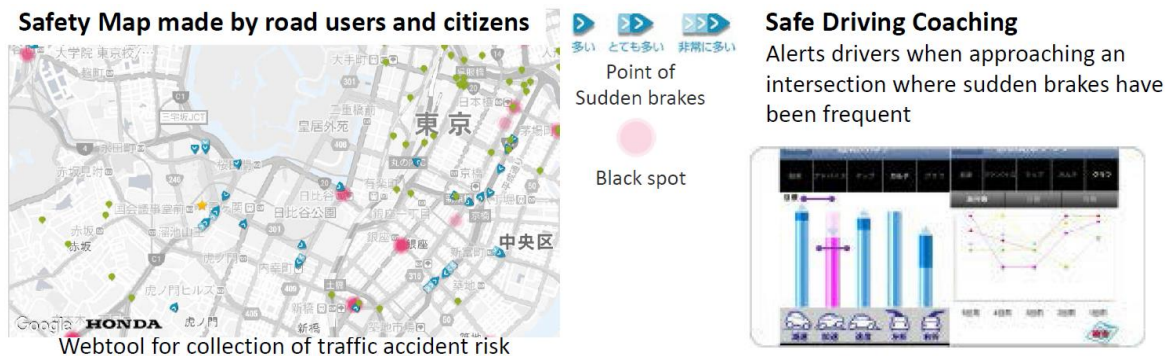


Source: Sumitomo Electric System Solutions and JICA Survey Team

Figure 3.22: Image of Short-term Actions for Traffic Signal System Improvement

5) Project M-05: Safety Driving and Traffic Safety Management Improvement

Project M-05	Safety Driving and Traffic Safety Management Improvement	
Outline of the Project (Long-term goals targeting 2035)		
Existing Problem	15. Need for more safety against risks of traffic accidents and crimes	
Objective	Improvement traffic safety management and driving for safe community and tourist destination.	
Project Goal	Safe community and safe and walkable tourist destination	
Target Area	Main: City Area, Heritage Area / Sub: Tonle Sap Area	
Data Management	<ul style="list-style-type: none"> Identifying and sharing traffic accident black spots Analyzing causes of traffic accidents Evaluation of individual driver's driving behavior and improvement support of drivers for safety driving 	
Issues to be Solved	<ul style="list-style-type: none"> Finding a collaborator for data acquisition (just set onboard smartphone or dashcam with 3D accelerate sensor), increasing road coverage rate, and securing data processing cost. 	
Indicators (KPI)	Number of traffic accidents or improvement black spots	
Short-term Actions (Priority projects targeting 2025)		
Implementation Body	Main	Provincial Police
	Sub	Private Business (Service provider)
	Relevant Organizations	DPWT, Siem Reap City, APSARA National Authority, DPT
Main Actions [Key Player]	<ol style="list-style-type: none"> Formulation of items for specifying traffic incidents, data acquisition plans, and plans for reflection on countermeasure projects [DPWT, Provincial Administration] Securing and arranging cooperators for installation of the application and drive recorder [Provincial Administration] Installation of application service for collection of driving behavior [Service provider] Data collection, accumulation of status survey results, and data provision [Service provider] Accumulation of various data on the data platform and opening the data to public [DPT] Holding traffic safety training for drivers [Provincial Police] 	
Fund Source Business Model	A smartphone/dashcam equipped with an application will be installed in vehicles that are driven on daily basis so that traffic managers can identify potential traffic unsafe points and preventive measures. And it acquires information on traffic hazards by constantly collecting driving behavior data. Eventually, that information will be used to select areas for consideration of countermeasures and to disclose the information to citizens to encourage traffic safety actions. The business model is to purchase an in-vehicle device, data analysis, and display system from an application provider as an initial cost, and pay the annual system usage fee by the administration. Regarding the vehicles for data collection from passenger transport business, they will be requested to cooperate at a certain rate.	
	Initial Cost	A part of the road safety management budget (Cost for reference: USD 500,000 (including application development and equipment cost))
	O&M Cost	A part of the road safety management budget
Data Management	<ul style="list-style-type: none"> Identifying dangerous points/areas of traffic accidents and sharing information Analysis of causes of traffic accidents Analysis of times when traffic accidents occur frequently 	



Source: Honda

Figure 3.23: Image of Short-term Actions for Safety Drive Improvement

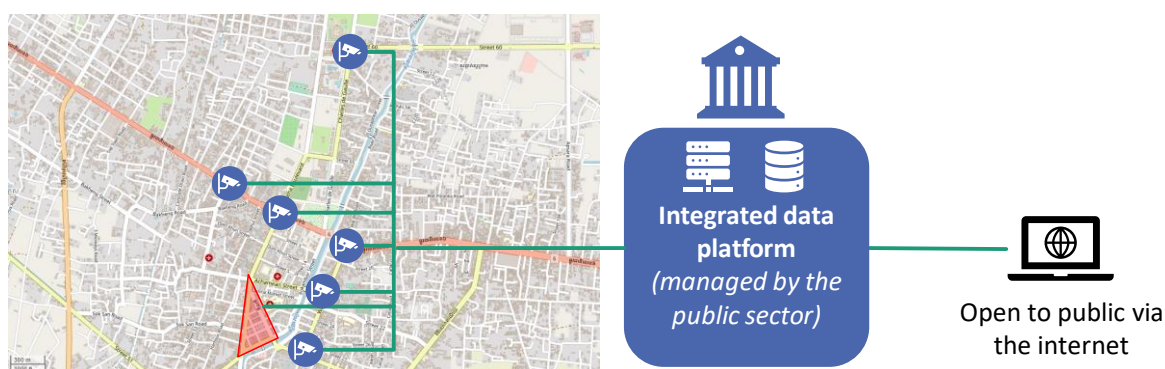
6) Project M-06: Promotion of Introduction of EVs

Project M-06		Promotion of Introduction of EVs	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	14. Need for clean air and environmentally-friendly mobility		
Objective	Improving environmental levels and promoting sustainable tourist destination.		
Project Goal	Replaced to electrified vehicles (EV) in Siem Reap		
Target Area	Main: Heritage Area / Sub: City Area, Tonle Sap Area		
Data Management	<ul style="list-style-type: none"> Monitoring EVs operation Monitoring driving recording data (route, trip length, velocity, etc.) and energy consumption data Planning efficient charging spots with charging schedule 		
Issues to be Solved	<ul style="list-style-type: none"> Stabilization of electric power supply for charging spots Formulation of the policy for decarbonization and the overall strategy for introduction of various types of EVs (e-bus, e-bike, EV tuk-tuk, etc.) Promotion of installation of charging spots with subsidy Introduction of new pricing plan for EV tuk-tuk and EV taxi Development of affordable EV tuk-tuk for driver and introduction of loan/subsidy for purchase Adjustment of stakeholder's opinion (TTA, Grab, PassApp, etc.) 		
Indicators (KPI)	Usage rate of EVs, Usage rate of traveler's travel kilometers		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Provincial Administration	
	Sub	APSARA National Authority, TTA, Private Business (Energy company, EV provider, Financial institution)	
	Relevant Organizations	MOE, UNESCO	
Main Actions [Key Player]	<ol style="list-style-type: none"> Formulation of policy for promotion of EV introduction [Provincial Administration] Introduction of charging spots and EV for PoC [Provincial Administration] Monitoring of EV tuk-tuk using subsidies, convenience evaluation, survey of willingness to pay by domestic and foreign tourists [Provincial Administration] Introduction of EV as a business [EV provider] 		
Fund Source Business Model	It promotes the replacement of existing fossil fuel-based vehicles with EVs. If there is a gap between the prices of EVs and fuel vehicles, the subsidies from the Provincial Administration and incentives for car loans should be introduced. It encourages transportation companies to replace their vehicles with EVs. Initial maintenance of charging equipment and equipment for replacing storage batteries will be installed with public funds from the Provincial Administration, etc. However, subsequent maintenance cost will be covered by the charging fees collected from end-users who use EVs.		
	Initial Cost	Transport operator burden, Introduction subsidy, Provincial Administration (Cost for reference: USD 2,000 (market price of a EV tuk-tuk))	
	O&M Cost	User burden (passed on to the usage fee of passengers and logistics end user)	
Data Management	<ul style="list-style-type: none"> Monitoring of operation status of EVs Monitoring of driving recording data (route, trip length, velocity, etc.) and energy consumption data Efficient charging facility placement and charging schedule planning 		

(4) Smart Security and Safety

1) Project S-01: CCTV System Introduction

Project S-01		CCTV System Introduction	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	15. Need for more safety against risks of traffic accidents and crimes 6. Need for improvement of hardware and ICT circumstances 7. Need for multi-sectoral data sharing and utilizing 8. Need for open data system, data security, and regulations		
Objective	To utilize CCTV cameras effectively to reduce crime and visualize the street environment for all people.		
Project Goal	Ontime video images with necessary information of main areas of Siem Reap City are disclosed, leading to tourists' satisfaction and reduction of street crime.		
Target Area	City Area		
Data Management	<ul style="list-style-type: none"> Management, analysis, and disclosure of all public CCTVs under a unified system (with consideration of privacy issues) 		
Issues to be Solved	<ul style="list-style-type: none"> Integration and connection of CCTV systems introduced by different departments 		
Indicators (KPI)	No. of CCTV cameras in operation and open to public		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Provincial Administration	
	Sub	Provincial Police, DPT, Private Business (System Provider)	
	Relevant Organizations	DPWT	
Main Actions [Key Player]	<ol style="list-style-type: none"> Data monitoring system development for existing CCTVs (including 6 for traffic monitoring and 20 for street environment monitoring in the Pub Street area) [Private Business] Development for an operation and monitoring structure and system for security maintenance [Provincial Police] System operation and maintenance [Private Business] Consideration of additional CCTV installation [Provincial Administration] Data processing system development for privacy protection [Private Business] Accumulation and disclosure of processed data to the data platform [DPT] 		
Fund Source Business Model	Since the initial cost is relatively small, funding from the Provincial Administration is assumed, although ODA funding through the technical cooperation scheme is also subject to be considered. Collecting the initial cost and O&M cost is assumed to be accomplished via the tourism promotion fund.		
	Initial Cost	Provincial Administration (ODA funding also subject to be considered) (Cost for reference: USD 3,000 (for 1 camera installation))	
	O&M Cost	Tourism promotion fund	
Data Management	<ul style="list-style-type: none"> Input of video data to the data platform Data processing for privacy protection 		



Source: JICA Survey Team

Figure 3.24: Image of Short-term Actions for CCTV Camera Introduction

2) Project S-02: Flood Warning System Enhancement

Project S-02		Flood Warning System Enhancement	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	16. Need for more safety against disasters (fire, flood, etc.) 8. Need for open data system, data security, and regulations		
Objective	To enable disaster early warning to be informed widely to citizens and international tourists.		
Project Goal	Disaster early warning is widely informed to citizens and international tourists		
Target Area	City Area, Tonle Sap Area		
Data Management	Prompt data collection and distribution regarding natural disasters from various sources		
Issues to be Solved	<ul style="list-style-type: none"> Lack of data collection platform of natural disaster warnings Lack of efficient data source for natural disaster warnings 		
Indicators (KPI)	<ul style="list-style-type: none"> Number of early warnings Number of people receiving the early warnings 		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Provincial Administration	
	Sub	NCDM	
	Relevant Organizations	Implementation bodies of tourist apps	
Main Actions [Key Player]	<ol style="list-style-type: none"> Repair of water gauges for the early warning information to be transmitted in Siem Reap in EWS1292 [NCDM] Development of a data conversion system for the early warnings transmitted in EWS1292 to be displayed in other media [Provincial Administration] Display of early warnings in tourist apps, etc. [Implementation bodies of tourist apps] 		
Fund Source Business Model	Since the initial cost is relatively small, funding from the Provincial Administration is assumed, although ODA funding through the technical cooperation scheme is also subject to be considered. Collecting the initial cost and O&M cost is assumed to be accomplished via the tourism promotion fund.		
	Initial Cost	Provincial Administration (ODA funding also subject to be considered) (Cost for reference: USD 100,000 (system development cost))	
	O&M Cost	Tourism promotion fund	
Data Management	<ul style="list-style-type: none"> Input of video data to the data platform Data processing for privacy protection 		



Source: JICA Survey Team

Figure 3.25: Image of Short-term Actions for Flood Warning System Enhancement

3) Project S-03: Fire Alarm System Installation

Project S-03	Fire Alarm System Installation	
Outline of the Project (Long-term goals targeting 2035)		
Existing Problem	15. Need for more safety against disasters (fire, flood, etc.) 6. Need for improvement of hardware and ICT circumstances	
Objective	To inform the occurrence of fire to people that may be affected.	
Project Goal	Immediate evacuation and initial firefighting are enabled by the early warning of fire	
Target Area	City Area	
Data Management	Prompt data collection and distribution regarding fire from various fire alarms	
Issues to be Solved	<ul style="list-style-type: none"> Lack of fire alarms in the city Lack of networks among multiple fire alarms 	
Indicators (KPI)	<ul style="list-style-type: none"> Number of fire alarms Number of fire alerts 	
Short-term Actions (Priority projects targeting 2025)		
Implementation Body	Main	Provincial Administration, Provincial Police
	Sub	Individual real estate owners, Private Business (system provider)
	Relevant Organizations	-
Main Actions [Key Player]	<ol style="list-style-type: none"> Formulation of fire alarm installation plan [Provincial Administration, Provincial Police] Explanation to stakeholders (local residents, etc.) [Provincial Administration] Installation of fire alarms in fire vulnerable areas in the city center (Pub Street area) [Private Business (fire alarm manufacture)] Training and educational activity on rapid evacuation and initial fire suppression using information from fire alarms [Provincial Administration, Provincial Police] 	
Fund Source Business Model	The initial investment is expected to be made with the state government's own funds because the investment amount is relatively small. If necessary, ODA funds will be considered as part of TC scheme.	
	Initial Cost	Provincial Administration (ODA funding also subject to be considered) (Cost for reference: USD 3,000 (market price of a fire alarm system installation for apartments in Japan))
	O&M Cost	Tourism development fund
Data Management	-	

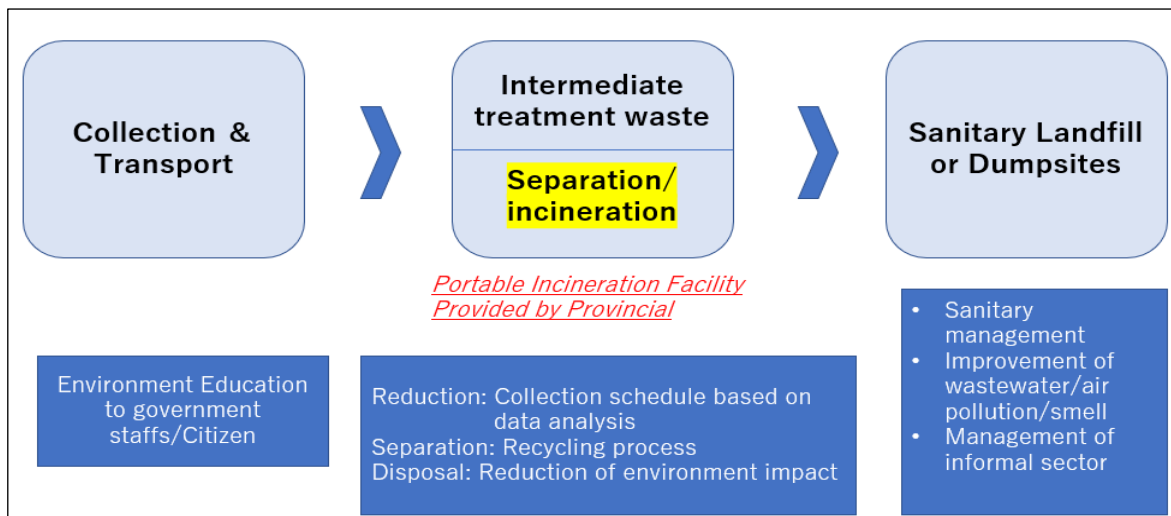
4) Project S-04: PR for Safety Improvement

Project S-04		PR for Safety Improvement	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	15. Need for more safety against risks of traffic accidents and crimes 16. Need for more safety against disasters (fire, flood, etc.) 8. Need for open data system, data security, and regulations		
Objective	To improve the public relations of the police and notify information on crime/traffic accidents.		
Project Goal	Daily information on crime and traffic accidents are shared to citizens		
Target Area	All		
Data Management	Prompt data collection and distribution regarding fire from various fire alarms		
Issues to be Solved	<ul style="list-style-type: none"> Lack of on-time information sharing system in the police Lack of information providing platform to citizens 		
Indicators (KPI)	<ul style="list-style-type: none"> Number of citizens accessing the information provided 		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Provincial Police	
	Sub	Private Business (system provider)	
	Relevant Organizations	-	
Main Actions [Key Player]	<ol style="list-style-type: none"> Establishment of a system for centralized collection and management of daily crime and traffic accident-related information within the Provincial Police [Provincial Police] Development of tools and systems for disseminating crime and traffic accident-related information [Private Business (system providers)] Dissemination of the above information on crime and traffic accidents through the Provincial Police and Provincial Administration web pages and tourism applications [Provincial Police] 		
Fund Source Business Model	The investment amount is relatively small. The initial investment is expected to be made by the Provincial Police. If necessary, ODA funds will be considered as part of the TC scheme. Since the operation and maintenance costs are also very small, the Provincial Police is expected to contribute their own funds.		
	Initial Cost	Provincial Police (ODA funding also subject to be considered)	
	O&M Cost	Provincial Police	
Data Management	<ul style="list-style-type: none"> Development of basic data system to collect and disseminate basic information on crime and traffic accidents 		

(5) Smart Waste Management

1) Project W-01: Solid Waste Management System Improvement

Project W-01		Solid Waste Management System	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	17. Need for enlightenment towards environmentally friendly actions 18. Need for enforcement of the public initiative		
Objective	To change citizen awareness.		
Project Goal	Reduction of garbage from markets, hotels, and houses, and classification of garbage		
Target Area	City Area		
Data Management	Measurement of garbage volume in each household and Angkor Wat area for effective collection system		
Issues to be Solved	<ul style="list-style-type: none"> • Coordination with existing concessionaire company • Business model for recycling • Support to low-income households 		
Indicators (KPI)	<ul style="list-style-type: none"> • Garbage volume • Percentage of recycle and number of campaigns 		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Provincial Administration, DoE	
	Sub	Model district	
	Relevant Organizations	MoI, MoE, Citizen	
Main Actions [Key Player]	<ol style="list-style-type: none"> 1. To select and discuss solid waste management systems (collection/disposal/fee collection) [DoE, Model District] 2. Planning of implementation method and management system, explanation and consensus to citizen [Provincial Administration, DoE, Model District] 3. Implementation of solid waste management system (collection/disposal/fee collection) [Model District] 4. Introduction of environmental education and guidance to household to reduce waste and recycling [Model District] 		
Fund Source Business Model	Apply for the JICA Grassroots Grand Aid Project (Regional Revitalization Special Frame) and build a management system. The equipment and facilities will be utilized in the grassroots program, and maintenance and operating funds will be covered by fee collection or Provincial Administration budget.		
	Initial Cost	Provincial Administration (ODA funding also subject to be considered such as JICA GGA) (Cost for reference: USD 500,000 (installation by JICA GGA))	
	O&M Cost	Fee collection from users	
Data Management	<ul style="list-style-type: none"> • Management of waste volume, waste quality, collection route, collection rate, percentage of recycling. 		



Source: JICA Survey Team

Figure 3.26: Solid Waste Management System

2) Project W-02: Garbage Collection IoT Installation

Project W-02		Garbage Collection IoT Installation	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	18. Need for enforcement of the public initiative		
Objective	To collect 100% of the waste on households and public areas.		
Project Goal	Installation of sensor garbage box in group areas and public areas to collect waste and also implementing the garbage separation.		
Target Area	City Area, Heritage Area		
Data Management	<ul style="list-style-type: none"> • Measurement of garbage volume roads and parks along Siem Reap River. • Visualization of garbage truck routes. 		
Issues to be Solved	<ul style="list-style-type: none"> • Citizen and tourist awareness (Environmental education) • Coordination between private collection companies and the Provincial Administration 		
Indicators (KPI)	<ul style="list-style-type: none"> • Cleanliness of public area • Reduction of illegal dumping Collection truck route 		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	City Government, APSARA National Authority	
	Sub	Concessionaire (GAEA) Provincial Administration, DoE, Selected communes	
	Relevant Organizations	MoI, MoE	
Main Action [Key Player]	<ol style="list-style-type: none"> 1. Preparation of waste management plan along the Siem Reap River. [City Government, APSARA National Authority] 2. Explanation of implementation method and waste management plan to communes to make consensus. [City Government, Communes, Concessionaire] 3. Sensor will be installed in the garbage box to clarify the volume. [City Government, Concessionaire] 4. Implementation of waste separation [Concessionaire] 5. A sensor that can measure the volume inside the garbage box to keep the data [Concessionaire] 		
Fund Source Business Model	Large-scale budget is not required for waste disposal (separation, etc.) and appropriate management in this proposal, it can be realized by changing the awareness of the parties concerned and implementing it. The sensor will be budgeted by the Provincial Administration and maintenance and operating funds will be covered by fee collection. Government shall make an effort to explain its purpose it for GAEA and APSARA National Authority to obtain financial support. It is also necessary to make adjustments to get support from donors.		
	Initial Cost	Provincial Administration (Cost for reference: USD 200 (installing sensors to garbage trucks per truck), USD 100,000 (software development cost))	
	O&M Cost	Fee collection from users	
Data Management	<ul style="list-style-type: none"> • Waste volume, achievement of waste separation, collection route, clean index, ratio of fee collection 		

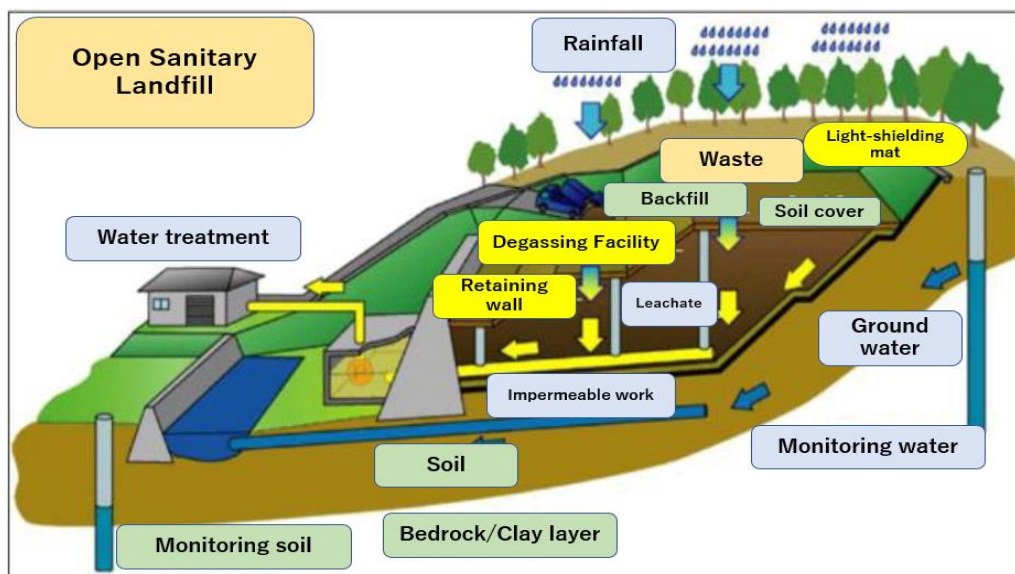


Source: JICA Survey Team

Figure 3.27: Image of Garbage Collection IoT Installation Project

3) Project W-03: Landfill Management

Project W-03	Landfill Management	
Outline of the Project (Long-term goals targeting 2035)		
Existing Problem	19. Need for engineering of infrastructure	
Objective	To develop a landfill with sanitary environmental management	
Project Goal	Establishment of sanitary landfills instead of existing dumping sites	
Target Area	City Area	
Data Management	<ul style="list-style-type: none"> Assessment of various items related to solid waste management such as ratio of waste separation/recycling Environmental standard value Fee collection 	
Issues to be Solved	<ul style="list-style-type: none"> Location of landfill Environmental standard value to be cleared 	
Indicators (KPI)	Garbage volume, conversion ratio of recycle and environmental standard value	
Short-term Actions (Priority projects targeting 2025)		
Implementation Body	Main	Provincial Administration
	Sub	DoE, MoE, CDC
	Relevant Organizations	MoI, Concessionaire (GAEA), Donors, Private Business
Main Action [Key Player]	<ol style="list-style-type: none"> Discussing for the management of the landfill [Provincial Administration, GAEA, APSARA National Authority] Preparation of implementation plan and request form for sanitary landfill [Provincial Administration, GAEA, APSARA National Authority] Design and construction of the sanitary landfill that comply with the environmental standards [Provincial Administration, Donors] Plan for appropriate operation and management of sanitary landfill [Private Business] 	
Fund Source Business Model	A facility that combines landfills and related ancillary facilities can appropriately store waste and make it stable biologically, physically, and chemically based on environmental standards that do not hinder the preservation of the living environment. Facility will be constructed and operated by provincial (donors) or private company. Emphasis will be placed on the acceptance of non-general waste such as construction by-products, factory / agricultural waste, etc., so that the operator can collect the processing costs from the person who generated the waste. The Provincial Administration will set out preferential policies for recycling and promote recycling projects as soon as possible.	
	Initial Cost	Public budget (Provincial Administration, Donors) (Cost for reference: USD 20,000,000 (example of a 8 ha construction by ADB))
	O&M Cost	Public budget (Annual budget from Provincial Administration or concession or private fund)
Data Management	<ul style="list-style-type: none"> Environment standard rate, Ratio of recycle and fee collection 	



Source: JICA Survey Team

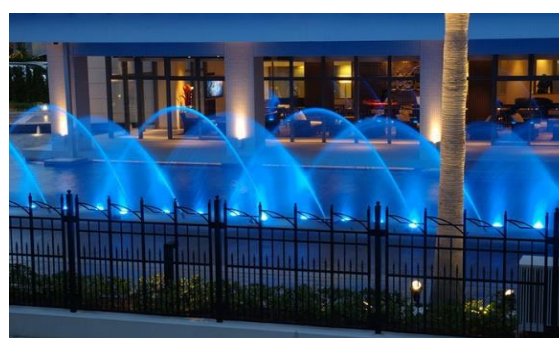
Figure 3.28: Sanitary Landfill

4) Project W-04: Water Quality Improvement

Project W-04		Water Quality Improvement	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	18. Need for enforcement of the public initiative		
Objective	To improve the public water quality based on environment standard		
Project Goal	Establishment of monitoring system		
Target Area	City Area		
Data Management	Assessment of Chemical Oxygen Demand (hereinafter referred to as COD), Biochemical Oxygen Demand (hereinafter referred to as BOD) and odor value		
Issues to be Solved	<ul style="list-style-type: none"> Untreated miscellaneous wastewater flows into the public water area 		
Indicators (KPI)	<ul style="list-style-type: none"> COD and BOD figure 		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Private Business, Provincial Administration	
	Sub	DPWT	
	Relevant Organizations	DoT, DPT	
Main Action [Key Player]	<ol style="list-style-type: none"> Monitoring for water quality and odor of Siem Reap River using sensor. [DPWT] Development of water quality improvement plan and spatial planning along Siem Reap River [Provincial Administration, DPWT, Private Business] Implementation of Siem Reap River water quality improvement [DPWT, Private Business] Implementation of spatial planning [Provincial Administration, DoT, Private Business] Data storage and publication on data platforms [DPT] 		
Fund Source Business Model	Water quality monitoring is important as a tourist city in the maintenance plan after restoration work for Siem Reap River that is currently being implemented. In order to make the riverfront one of the places to attract tourists from the viewpoint of landscape and revetment maintenance, the Provincial Administration shall strive to conserve water quality by artificially creating a flow in Siem Reap River. The facilities will be discussed about national budget from MOT and Provincial Administration or utilization of donors' fund. If it is possible, Provincial Administration shall create the tourism development fund for maintenance.		
	Initial Cost	Public budget (Provincial Administration, MOT, Donors (Cost for reference: USD 2,000/km (bank construction), USD 100,000/km (installation of water purification system), USD 50/m ³ (water purification material), USD 100,000 (software development cost))	
	O&M Cost	Public budget (Provincial Administration, earmarked fund)	
Data Management	<ul style="list-style-type: none"> Management of COD, BOD and odor value, Number of tourists 		



Source: MLMUPC



Source: Photock

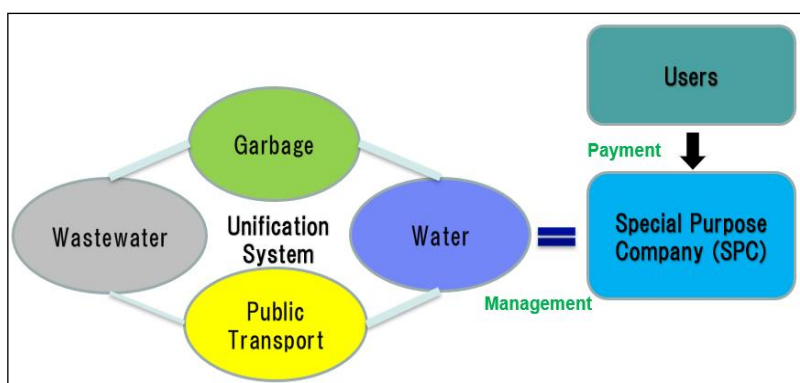
Figure 3.29: Images of Utilization of Waterfront

5) Project W-05: Wastewater Facility System Improvement

Project W-05		Wastewater Facility System Improvement	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	19. Need for engineering of infrastructure		
Objective	The sewage line and treatment facility will be enhanced, and a maintenance system will be established.		
Project Goal	To develop the maintenance system for wastewater sector to achieve the long-life plan and crisis management. (Creating a database for pipeline information)		
Target Area	City Area		
Data Management	<ul style="list-style-type: none"> Updating wastewater lines inventory book Upstream and downstream tracking information 		
Issues to be Solved	<ul style="list-style-type: none"> How to update the inventory book Willing to pay wastewater fee 		
Indicators (KPI)	<ul style="list-style-type: none"> Ration of payment from household and company Annual maintenance plan 		
Short-term Actions (Priority projects targeting 2025)			
Implementation Body	Main	Provincial Administration, MPWT	
	Sub	DPWT	
	Relevant Organizations	Donors	
Main Action [Key Player]	<ol style="list-style-type: none"> Development of the maintenance management system for drainage pipes [DPWT, Provincial Administration] Accumulation of data on existing drainage pipes and monitoring of drainage capacity [DPWT] Planning and financing for new sewage treatment plant [Provincial Administration, MPWT] Construction of new sewage treatment plant 		
Fund Source Business Model	Lack of capacity for sewage treatment has already been clarified in the data, and expansion and new construction are urgent issues. To build a facility larger than the current size, it is necessary to request funds from donors. However, when considering financial assistance for construction, donors will require MPWT to have a maintenance and treatment plant operation system in place, and management training and fee collection system will be essential.		
	Initial Cost	Public budget (Donors) (Cost for reference: USD 48,000,000 (WWTP of the same capacity of the existing one), USD 13,000,000 (sewage pipes of the same capacity of the existing one))	
	O&M Cost	Public budget (DPWT)	
Data Management	<ul style="list-style-type: none"> Management of volume of wastewater, sanitation water, and treatment Ratio of fee collection 		

6) Project W-06: Public Utilities Charging Unification

Project W-06		Public Utilities Charging Unification	
Outline of the Project (Long-term goals targeting 2035)			
Existing Problem	17. Need for enlightenment towards environmentally friendly actions 18. Need for enforcement of the public initiative		
Objective	To establish a centralized collection system of utility charges to improve the convenience of citizens and to improve administrative efficiency.		
Project Goal	To develop the unification system for public utilities service charge		
Target Area	City Area (main), Tonle Sap Area (sub)		
Data Management	<ul style="list-style-type: none"> Ratio of fee collection Balance statement 		
Issues to be Solved	<ul style="list-style-type: none"> Collection of fees commensurate with the maintenance budget Citizen's willingness to pay against public utilities charge 		
Indicators (KPI)	<ul style="list-style-type: none"> Balance sheet and statement Ratio of payment 		
Short Term Actions (Priority Projects targeting 2025)			
Implementation Body	Main	Provincial Administration, Special Purpose Company (SPC)	
	Sub	-	
	Relevant Organizations	MPWT, DPT	
Main Action [Key Player]	<ol style="list-style-type: none"> Data collection and evaluation of current situation and consideration of new system [Provincial Administration, Water Supply Authority, Waste collector, MPWT] Composition of SPC [Water Supply Authority, Waste Collector] Collection / monitoring system development [SPC] Utility charge collection, status monitoring [SPC] Data storage and disclosure to data platforms [DPT] 		
Fund Source Business Model	Development and operation of a toll system that integrates water and sewage, utility charges for waste, etc. Initial investment (software development) and operating funds will be provided by private companies or SPC (composed of the Provincial Administration and public authorities and private company). In the future, the expansion into electric power and public transportation will be explored.		
	Initial Cost	SPC	
	O&M Cost	SPC	
Data Management	<ul style="list-style-type: none"> Ratio of fee collection Quarterly Balance sheet and Profit and Loss 		



Source: JICA Survey Team

Figure 3.30: Utility Charge Unification System

3.4 Implementation Measures

3.4.1 Ease of Launching Priority Projects

The table below summarizes the ease of starting each of the 24 priority projects proposed. The evaluation of the ease of starting was mainly judged by the following indicators.

- Low initial investment
- The maturity of commercialization is high, or there is a business operator with high interest.
- High interest of the provincial administration and few stakeholders needing coordination

Table 3.16: Organized ease of initiation for priority project groups

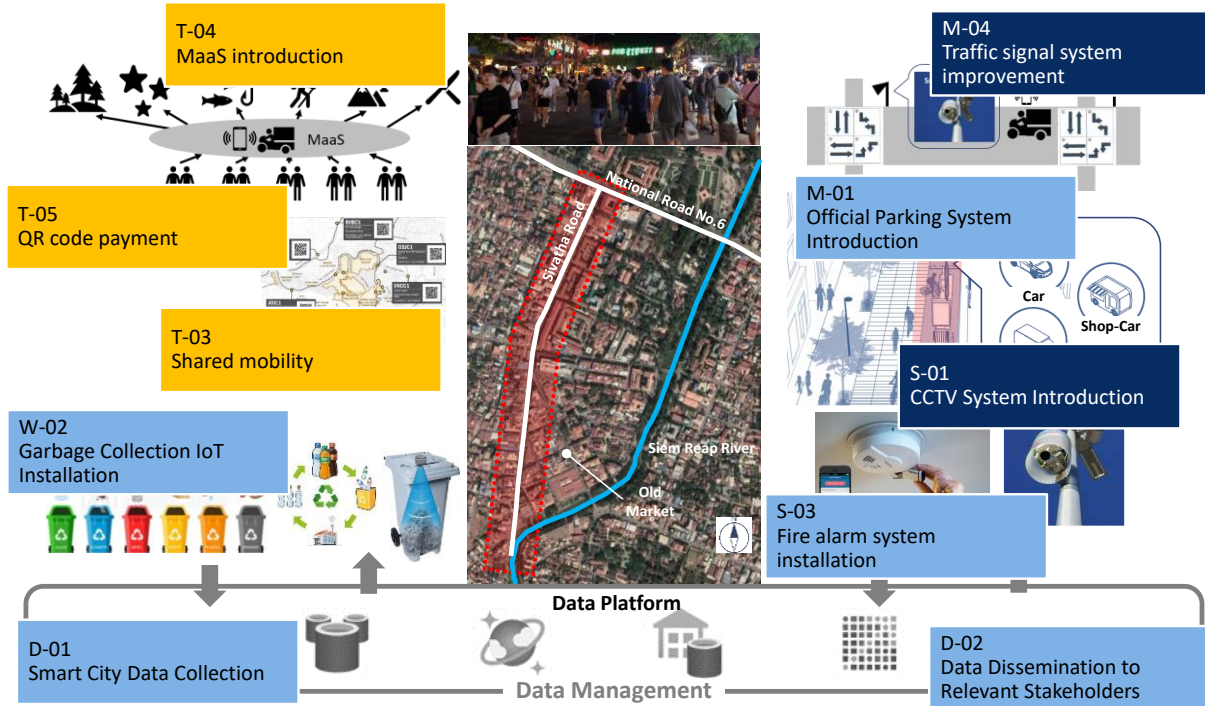
Project	Quick Start	Remarks
D-01 Data collection	○	Initial investment is small. Interest of the provincial administration is high.
D-02 Open data		—
T-01 Promotion	○	There are private businesses that are making similar efforts.
T-02 Tourism platform	○	There are private businesses that are making similar efforts.
T-03 Sharing mobility		—
T-04 Tourism MaaS	○	JETRO demonstration project is under development; Interest of the provincial administration is high.
T-05 QR code		—
T-06 Virtual contents	○	Interest of private companies is high.
M-01 Parking system	○	Interest of the provincial administration is high.
M-02 Road monitoring	○	Initial investment is small.
M-03 Streetlights	○	Scheduled to be developed in the 38 Road Construction Project.
M-04 Traffic signals		—
M-05 Safety drive	○	Initial investment is small.
M-06 EV promotion		—
S-01 CCTV	○	Scheduled to be developed in the 38 Road Construction Project. Interest of the provincial administration is high.
S-02 Flood EWS		—
S-03 Fire alarm	○	Initial investment is small.
S-04 Public relations	○	Initial investment is small.
W-01 Waste management	○	Based on existing solid waste management.
W-02 IoT garbage box	○	Initial investment is small.
W-03 Landfill		—
W-04 Water quality		—
W-05 Facility systems		—
W-06 Charging unification		—

Source: JICA Survey Team

In order to improve the capacity of government agencies to realize the roadmap, it is necessary to actually promote and operate individual projects and to laterally deploy the lessons learned in the implementation of other projects. Therefore, in order to realize the roadmap, the policy is to start implementing priority projects that are easy to start, and to build a cycle of agile development in which lessons are learned at an early stage and feedback is provided.

3.4.2 Priority Areas for Implementation

In addition, in order to effectively implement priority projects, it will be effective to limit the areas for concentrated investment, promote the smart city projects to citizens and tourists, and visualize the effects of the projects. For this reason, the city center, where urban issues are concentrated, will be set as the target area, and the policy will be to introduce various projects as a package on a priority basis.



Source: JICA Survey Team

Figure 3.31: Image of Introduction of Project Package to City Center Area

3.4.3 Financing

For priority projects that cannot directly collect usage fees from end users, measures are needed to raise not only the initial investment but also the operation and maintenance costs.

For priority projects that involve public budget investment, it is necessary to clarify the division of roles among the organizations in the Smart City Committee. After this, the provincial departments should make necessary budget requests to the ministry. On the other hand, if the division of roles cannot be clarified, or if the project involves a very large amount of investment, the Smart City Committee can be expected to make budget requests through the national Smart City Coordination Committee.

For projects that do not involve direct public budget investment, ways to raise funds through a fund where citizens and tourists that benefit from the project can indirectly contribute to the cost shall be considered. In considering this option, clarifying the purpose of the fund and the priority projects that need to be funded is necessary before discussing the financial sources and fund management methods. The following options may be considered for the fund's financial sources, but as mentioned above, adjustments must be made after discussions with relevant stakeholders.

Table 3.17: Fund Resource Examples

Source	Outline	Examples in Tourism Cities
Entry ticketing	Tourists are charged entry fees for designated areas and tickets are supplied. A portion of the entry ticket fee is contributed to the fund. Since entry ticketing for AAP is already conducted, this source shall be difficult to implement in Siem Reap.	<ul style="list-style-type: none"> Angkor Heritage Site Hoi An (Vietnam)
Car parking fee	Car entry is prohibited in designated areas and car parking fees from a toll car park outside the designated area are collected. A portion of the car parking fee is contributed to the fund.	<ul style="list-style-type: none"> Shirakawa-Go (Japan)
Attraction ticketing	Fees are collected for river cruises, museum exhibits, etc. A portion of the fee is contributed to the fund.	<ul style="list-style-type: none"> Vigan (Philippines)
Accommodation fees	A portion of hotel accommodation fees in designated areas is contributed to the fund.	<ul style="list-style-type: none"> Old Havana (Cuba)

Source	Outline	Examples in Tourism Cities
Other fees	Tourists visiting the city will be charged an “environmental conservation fee”, “SDGs fee”, “smart service fee”, etc., as a contribution to environmental improvement in the city, which will be used as fund money.	

Source: JICA Survey Team

The fund management may be organized under the industry-academia-government-community platform but is subject to further discussion.

3.4.4 Triggers for Promoting Priority Projects

As described above, various triggers are required in advancing agile development and introduction of priority projects. Examples of current promotion support measures for the implementation of priority projects are summarized below.

(1) Smart JAMP (Ministry of Land, Infrastructure, Transport and Tourism)

As mentioned in Section 2.2.2, as part of the Smart JAMP Scheme, a pre-FS study on “S-01: CCTV System Introduction” and “D-01: Integrated Data Collection and Analysis” is scheduled to be conducted until March 2022. Through this survey, the basic specifications and feasibility of the project (technical aspects, economic efficiency, etc.) will be verified.

(2) Asian DX Promotion Project in Japan and ASEAN (JETRO)

As mentioned in Section 2.2.2, the PoC of “T-04: MaaS Introduction” is scheduled to be implemented by January 2023 as part of JETRO's “Asia DX Promotion Project in Japan-ASEAN”. Through this PoC, detailed studies are expected to be conducted towards the full-scale introduction of the priority project.

(3) 38-Road Construction Project (Cambodian Government Funding)

In the 38 Road Construction Project, that is currently ongoing with the Cambodian government's own funds, construction is underway not only for road widening but also for the installation of streetlights, traffic signals, and a surveillance camera system. “M-01: Official Parking System Introduction”, “M-03: Street Lighting Improvement”, “M-04: Traffic Signal System Improvement”, “S-01: CCTV System Introduction”, “W-04: Water Quality Improvement”, etc. are expected to be partially implemented as part of the 38 Road Construction Project. After the completion of the 38 Road Construction Project, it will be necessary to revise the project content and conduct detailed studies.

(4) Technical Cooperation Project (JICA)

A JICA technical cooperation project, “Project for Capacity Development to Promote Smart City in Siem Reap”, is scheduled to be implemented with the following aims:

- Aim 1: The “Smart City Approach” is formulated, and the cooperation structure among relative organizations is established.
- Aim 2: The implementation process of the “Smart City Approach” is established through trial implementation of urban solutions.
- Aim 3: The monitoring and evaluation system of the “Smart City Approach” is established.

Priority projects are expected to be implemented in the trial implementation of urban solutions mentioned in Aim 2.

3.4.5 Monitoring and Evaluation System

The International Organization for Standardization’s ISO 37122:2019 (Sustainable cities and communities - Indicators for smart cities) and the Organization for Economic Cooperation and Development’s OECD Smart City Measurement Framework have been developed as indicators for evaluating cities from a smart city perspective. These are considered to be universal indicators that can

be applied to any city. However, the Smart City Roadmap for Siem Reap is currently specific to some sectors, including the tourism sector. Therefore, it is preferable to monitor and evaluate the progress of this roadmap independently, while referring to these existing indicators.

The following indicators can be considered for monitoring the implementation of the roadmap. All of these indicators will be finalized based on the discussions within the Smart City Committee.

(1) Key Goal Indicators

Key goal indicators shall be set for the three sectors in the administrative approach and the four sectors in the sectoral approach. The table below shows examples of possible key goal indicators.

Table 3.18: Examples of Possible Key Goal Indicators

Sector	Basic Policy	Key Goal Indicators
Administrative organizations	Open collaboration	Number of discussions held in the Smart City Committee
Legal systems and business support	Promotion of smart business	New business permission related to smart city
Data management	Utilization of valuable data	Amount of utilized and disclosed data
Smart tourism	More convenient and satisfactory tourism	Number of tourists, number of repeaters
Smart mobility	More sustainable, safe, and convenient mobility systems	Number of traffic accidents, number of traffic jams, rate of EVs
Smart security	Basic security as a safe international tourist destination	Number of crimes, number of fatalities caused by fire, number of fatalities caused by natural disasters
Smart waste management	Healthy and sanitary urban environment	Turbidity of Siem Reap River, amount of solid waste

Source: JICA Survey Team

In addition to these, monitoring the QoL of citizens or satisfaction of tourists through questionnaire survey every five years to randomly sampled testers shall be considered.

The key goal indicators shall be monitored and evaluated approximately every five years, and shall be used as a reference when reviewing the roadmap. It will also serve as reference information for the formulation of the next short-term actions.

(2) Key Performance Indicators

While the key goal indicators are indicators to measure the degree of achievement of the basic policy, key performance indicators are indicators to measure the degree of achievement of the actions to be taken in the roadmap. The achievement of the main actions of the 24 priority projects listed in Section 3.3.3 shall be assessed approximately once a year using a checklist. Based on the progress of the short-term actions, the content of the short-term actions shall be reviewed every five years.

Chapter 4 Survey Activities and the Implementation of the Pilot Project

4.1 Consensus Building and Interviewing

4.1.1 Organization of Steering Committees

The steering committees were held as follows to share the results of this survey and build consensus.

Table 4.1: Steering Committees

	Date	Venue	Subject
1st	March 2, 2020	On-site	· Outline of the project
2nd	October 16, 2020	Online	· Current conditions, issues, and the smart city roadmap
3rd	February 16, 2021	Online / On-site (hybrid)	· Smart city roadmap and priority projects
4th	August 30, 2021	Online	· Results of the business contest · COVID-19 recovery roadmap
5th	November 10, 2021	Online / On-site (hybrid)	· Smart city roadmap and its administrative approach
6th	December 27, 2021	Online / On-site (hybrid)	· PoC implementation report · Final approval on the smart city roadmap

Source: JICA Survey Team

(1) 1st Steering Committee

The 1st Steering Committee was held on March 2, 2020. Information of this meeting is as below.

Table 4.2: Information of the 1st Steering Committee

Date/Time	March 2, 2020 10:30~12:30 (Cambodia Time)
Venue	Meeting Room in Siem Reap Provincial Hall
Chairperson	Governor (H.E. Mr. Tea Seiha)
Attendees	Siem Reap Provincial Administration, APSARA National Authority, Provincial departments, Siem Reap City, JICA, Embassy of Japan in Cambodia, Consulate of Japan in Siem Reap, JICA Survey Team, JICA senior volunteer
Discussion Points	· Outline of the project

Source: JICA Survey Team

(2) 2nd Steering Committee

The 2nd Steering Committee was held on October 16, 2020. Information of this meeting is as below.

Table 4.3: Information of the 2nd Steering Committee

Date/Time	October 16, 2020 9:30~11:30 (Cambodia Time)
Venue	Meeting Room in Siem Reap Provincial Hall, Zoom
Chairperson	Deputy Governor (H.E. Ly Samrith)
Attendees	Siem Reap Provincial Administration, Provincial departments, Siem Reap City, JICA, Embassy of Japan in Cambodia, MLIT, JICA Survey Team
Discussion Points	Current conditions, issues, and the smart city roadmap

Source: JICA Survey Team

(3) 3rd Steering Committee

The 3rd Steering Committee was held on February 16, 2021. Information of this meeting is as below.

Table 4.4: Information of the 3rd Steering Committee

Date/Time	February 16, 2021 9:00~11:30 (Cambodia Time)
Venue	Meeting Room in Siem Reap Provincial Administration, Zoom
Chairperson	Governor (H.E. Mr. Tea Seiha)
Attendees	Siem Reap Provincial Administration, APSARA National Authority, Provincial departments, Siem Reap City, JICA, Embassy of Japan in Cambodia, MLIT, JICA Survey Team
Discussion Points	Smart city roadmap and priority projects

Source: JICA Survey Team

(4) 4th Steering Committee

The 4th Steering Committee was held on August 30, 2021. Information of this meeting is as below.

Table 4.5: Information of the 4th Steering Committee

Date/Time	August 30, 2021 8:30~9:30 (Cambodia Time)
Venue	Meeting Room in Siem Reap Provincial Administration, Zoom
Chairperson	Governor (H.E. Mr. Tea Seiha)
Attendees	Siem Reap Provincial Administration, APSARA National Authority, Provincial departments, Siem Reap City, JICA, Embassy of Japan in Cambodia, JICA Survey Team
Discussion Points	Results of the business contest and the COVID-19 recovery roadmap

Source: JICA Survey Team

(5) 5th Steering Committee

The 5th Steering Committee was held on November 10, 2021. Information of this meeting is as below.

Table 4.6: Information of the 5th Steering Committee

Date/Time	November 10, 2021 14:00~16:00 (Cambodia Time)
Venue	Meeting Room in Siem Reap Provincial Administration, Zoom
Chairperson	Deputy Governor (H.E. Ly Samrith)
Attendees	Siem Reap Provincial Administration, APSARA National Authority, Provincial departments, Siem Reap City, JICA, JICA Survey Team
Discussion Points	Smart city roadmap and its administrative approach

Source: JICA Survey Team

(6) 6th Steering Committee

The 6th Steering Committee was held on December 27, 2021. Information of this meeting is as below.

Table 4.7: Information of the 6th Steering Committee

Date/Time	December 27, 2021 09:30~12:00 (Cambodia Time)
Venue	Meeting Room in Siem Reap Provincial Administration, Zoom
Chairperson	Governor (H.E. Mr. Tea Seiha)
Attendees	Siem Reap Provincial Administration, APSARA National Authority, Provincial departments, Siem Reap City, JICA, MLIT, JICA Survey Team
Discussion Points	PoC implementation report, and the final approval on the smart city roadmap

Source: JICA Survey Team

4.1.2 Working Group Meetings

Working group meetings were held as follows. Separately, individual meetings with the departments in charge of each sector were set, which are summarized in Section 4.1.3.

Table 4.8: Working Group Meetings

Name of meeting	Date	Contents
1st Working Group Meeting	September 2020 (Individual meetings)	Current situations and issues
2nd Working Group Meeting	February 24, 2021	Smart city roadmap and pilot project
3rd Working Group Meeting	May 12, 2021	Business contest
4th Working Group Meeting	June 4, 2021	COVID-19 recovery roadmap
5th Working Group Meeting	October 13, 2021	PoC plans
6th Working Group Meeting	October 20, 2021	Smart city roadmap and its administrative approach
7th Working Group Meeting	December 15, 2021	Overall smart city roadmap

Source: JICA Survey Team

4.1.3 Meetings and Interviews

(1) Public Institutions, Academic and Business Organizations

The table below shows the activity records of meetings with public institutions, academic and business organizations, etc.

Table 4.9: List of Activity Records of Meetings (Public Institution, Academic/Business Organization)

Date	Interviewee	Discussion Points
2020/03/02	Siem Reap Provincial Administration and related organizations	• The 1st Steering Committee
2020/03/02	APSARA National Authority	• Outline of the study
2020/03/03	CJCC	• Outline of the study • Activities of CJCC
2020/03/03	JETRO	• Outline of the study
2020/03/03	JICA Cambodia Office	• Outline of the study
Survey interruption due to the global epidemic of COVID-19 (mid-March to the end of May 2020)		
2020/06/04	Siem Reap Provincial Administration	• Outline and schedule of the study
2020/06/05	JBAC	• Outline of the study
2020/06/15	CJCC	• Outline and schedule of the study • Activities of CJCC • Business contest and pilot project to be conducted in this study
2020/06/19	JICA Cambodia Office	• Outline and schedule of the study
2020/07/06	CJCC	• Outline and schedule of the study
2020/07/09	Siem Reap Provincial Administration	• Setup of the project office
2020/07/10	Cambodian Institute for Urban Studies	• Outline and schedule of the study • Smart city-related activities in Cambodia
2020/07/21	DPWT	• Mobility issues
2020/07/28	DoT	• Tourism issues
2020/07/29	DPWT	• Outline and schedule of the study • Mobility issues
2020/08/05	Siem Reap Provincial Administration	• General information of Siem Reap Province
2020/08/05	Siem Reap Provincial Police Headquarters	• Security issues
2020/08/11	DPWT	• Mobility issues
2020/08/12	APSARA National Authority	• Tourism issues
2020/08/12	Siem Reap Provincial Administration	• Mobility issues
2020/08/12	CJCC	• Business startup environment of Cambodia
2020/08/14	DPT	• Data management and telecommunication issues
2020/08/24	Siem Reap Provincial Police Headquarters	• Outline and schedule of the study • Security issues
2020/08/25	DoT	• Outline and schedule of the study • Tourism issues
2020/08/26	DoE	• Waste issues
2020/08/28	DoE	• Waste issues
2020/09/04	Siem Reap Provincial Administration	• Progress of the survey
2020/09/14	Siem Reap Provincial Police Headquarters	• Progress of the survey
2020/09/22	DoT	• Progress of the survey
2020/09/25	Siem Reap Provincial Administration	• Progress of the survey
2020/10/06	Siem Reap Provincial Administration	• Progress of the survey • Outline and schedule of the COVID-19 impact assessment survey
2020/10/16	Siem Reap Provincial Administration and related organizations	• 2 nd Steering Committee
2020/10/23	DPWT	• Progress of the survey
2020/10/23	DPT	• Progress of the survey
2020/11/06	Siem Reap Provincial Administration	• Outline and schedule of the COVID-19 impact assessment survey
2020/11/06	CJCC	• Schedule of the seminar and business contest

Date	Interviewee	Discussion Points
2020/11/12	Siem Reap Provincial Administration	• Outline and schedule of the COVID-19 impact assessment survey
2020/11/12	MLIT	• Progress of the survey
2020/11/12	Arup (World Bank Consultant)	• Outline of the survey • Outline of the World Bank project in Siem Reap
2020/11/27	CJCC	• Schedule of the seminar and business contest
2020/12/03	APSARA National Authority	• Progress of the survey
2020/12/11	Siem Reap Provincial Administration	• Progress of the COVID-19 impact assessment survey
2020/12/11	CJCC	• Schedule of the seminar and business contest
2020/12/21	MPT	• Data management and telecommunication issues
2020/12/25	Cambodian Institute for Urban Studies	• Schedule of the seminar and business contest
2021/01/06	Deputy Governor of Siem Reap Provincial Administration	• Progress of the survey
2021/01/06	APSARA National Authority	• Progress of the survey
2021/01/06	DoT	• Progress of the survey
2021/01/06	DoE	• Progress of the survey
2021/01/06	DPT	• Progress of the survey
2021/01/06	DPWT	• Progress of the survey
2021/01/11	Angkor Enterprise	• Progress of the survey
2021/01/11	JETRO	• Seminar and business contest
2021/01/13	APSARA National Authority	• Tourism issues • Organizational structure of the Smart City Committee
2021/01/25	DPWT	• Mobility issues
2021/02/02	Siem Reap Provincial Administration	• Seminar and business contest
2021/02/10		Phnom Penh Seminar
2021/02/16	Siem Reap Provincial Administration and related organizations	• 3rd Steering Committee
2021/02/17		Explanation of the Business Contest to Japanese Companies
2021/02/24	Siem Reap Provincial Administration	• Working group on priority projects
2021/05/10	Siem Reap Provincial Administration	• Business contest evaluation
2021/05/12	Siem Reap Provincial Administration	• Working group on the business contest evaluation and the COVID-19 impact assessment survey
2021/06/03	Siem Reap Provincial Administration	• COVID-19 recovery roadmap
2021/06/04	Siem Reap Provincial Administration	• Working group on the COVID-19 recovery roadmap
2021/06/14	Siem Reap Provincial Administration	• Business contest evaluation
2021/07/06	Siem Reap Provincial Administration	• Progress of the survey
2021/08/24	Siem Reap Provincial Administration	• Quarantine systems of COVID-19
2021/08/30	Siem Reap Provincial Administration and relative organizations	• 4th Steering Committee
2021/09/10	Siem Reap Provincial Administration	• Progress of the survey
2021/09/10	DPWT	• Progress of the survey
2021/09/10	DoT	• Progress of the survey
2021/09/10	DPT	• Progress of the survey
2021/09/14	Siem Reap Provincial Administration	• Progress of the survey
2021/09/17	Siem Reap Provincial Administration	• Progress of the survey
2021/09/20	Siem Reap Provincial Administration	• Progress of the survey
2021/09/22	JICA Cambodia Office	• Progress of the survey
2021/09/23	Embassy of Japan in Cambodia	• Progress of the survey
2021/09/23	CJCC	• Progress of the survey
2021/10/01	Siem Reap Provincial Administration	• Publication of the business contest result
2021/10/11	Siem Reap Provincial Administration	• Details of the PoC plans
2021/10/12	Siem Reap Provincial Administration	• Administrative matters of the roadmap
2021/10/13	Siem Reap Provincial Administration and relative organizations	• Working group on the PoC plans
2021/10/13	Siem Reap Provincial Administration	• PoC plans
2021/10/13	Siem Reap Provincial Police Headquarters	• Data management related to security
2021/10/13	DPT	• Data management
2021/10/14	DoT	• Data management related to tourism
2021/10/14	DPWT	• Data management related to mobility

Date	Interviewee	Discussion Points
2021/10/20	MoT	• Tourism Development Master Plan Siem Reap 2021-2035 (seminar attendance)
2021/10/21	Siem Reap Provincial Administration	• PoC plans
2021/10/21	Siem Reap Provincial Administration, DPWT, EDC	• PoC plans (site survey)
2021/10/22	Siem Reap Provincial Administration	• PoC plans
2021/10/25	Siem Reap Provincial Administration	• PoC plans • Seminar schedules
2021/11/10	Siem Reap Provincial Administration and related organizations	• 5th Steering Committee
2021/11/22	Siem Reap Provincial Administration	• PoC implementation
2021/11/23	Siem Reap Provincial Administration	• Seminar organization
2021/11/23	Siem Reap Provincial Administration	• PoC implementation
2021/11/23	DPWT	• PoC implementation
2021/11/25	Siem Reap Provincial Administration	• PoC implementation
2021/11/29	Siem Reap Provincial Administration and related organizations	• Siem Reap seminar
2021/12/03	Siem Reap Provincial Administration	• Awarding of the business contest
2021/12/06	Siem Reap Provincial Administration	• Report of the PoC implementation
2021/12/09	APSARA National Authority	• Overall Smart City roadmap
2021/12/15	Siem Reap Provincial Administration and relative organizations	• Working group on the overall roadmap approval and result of the PoC
2021/12/27	Siem Reap Provincial Administration and relative organizations	• 6th Steering Committee

Source: JICA Survey Team

(2) Private Business

Table shows activity records such as meetings with individual private business that have smart technologies and business plan.

Table 4.10: List of Activity Records of Meetings (Individual private sector operators)

Date	Name of Company	Target Sector	Technology
2020/08/25	MinebeaMitsumi	Mobility/Security	• Smart streetlight • Surveillance camera • Wireless network
2020/08/28	GAEA	Environment	• Waste treatment plant
2020/09/02	Sumitomo Electric Industries	Mobility	• Traffic control system
2020/09/02	Mitsubishi Corporation	Mobility	• Traffic control system
2020/12/02	Osja Studio	Tourism	• Online contents
2020/12/03	Mitsubishi Corporation	Mobility	• Traffic control system
2021/01/13	Plan-B	Tourism	• People flow detection beacon • Tourism website
2021/01/20	Koa Corporation	Environment	• Integrated waste management system
2021/01/25	Sonatra Carling., Ltd	Mobility	• Smart parking system
2021/01/25	RBC Consultant co., Ltd	Environment	• Water quality improver
2021/01/25	Spacianet	Data Management	• Data platform
2021/01/27	MinebeaMitsumi	Mobility/Security	• Smart streetlight • Surveillance camera • Wireless network
2021/01/27	Sonatra Carling., Ltd	Mobility	• Smart parking system
2021/01/29	RBC Consultant co., Ltd	Environment	• Water quality improver
2021/01/30	Koa Corporation	Environment	• Integrated waste management system
2021/02/01	Spacianet	Data Management	• Data platform
2021/02/01	MinebeaMitsumi	Mobility/Security	• Smart streetlight • Surveillance camera • Wireless network
2021/04/14	Spacia Net	Waste	• Water quality improver
2021/04/27	Asian Gateway	Mobility	• Electric motorcycle
2021/04/27	LASTMILE WORKS	Tourism	• VR

Date	Name of Company	Target Sector	Technology
2021/05/27	JPT	Mobility	• Smart parking system
2021/06/08	MinebeaMitsumi	Mobility	• Smart streetlight • Surveillance camera • Wireless network
2021/06/17	JPT	Mobility	• Smart parking system
2021/06/17	Asian Gateway	Mobility	• Electric motorcycle
2021/09/06	Asian Gateway	Mobility	• Electric motorcycle
2021/09/07	JPT	Mobility	• Smart parking system
2021/09/08	Hitachi	Waste	• Optimization of waste collection routes
2021/09/16	Asian Gateway	Mobility	• Electric motorcycle
2021/09/22	Mitsubishi Corporation	Mobility	• Traffic control system
2021/10/05	Toyota Tsusho	Mobility	• MaaS
2021/10/06	Asian Gateway	Mobility	• Electric motorcycle
2021/10/06	JPT	Mobility	• Smart parking system
2021/10/20	JPT	Mobility	• Smart parking system
2021/10/21	JPT	Mobility	• Smart parking system
2021/10/22	JPT	Mobility	• Smart parking system
2021/10/29	timelooper	Tourism	• VR
2021/11/04	Sumitomo Electric Industries	Mobility	• Traffic control system
2021/11/12	PASCO	Others	• GPS-based control station
2021/11/17	MinebeaMitsumi	Mobility/Security	• Smart streetlight • Surveillance camera • Wireless network
2021/11/22- 2021/12/06	JPT	Mobility	• Smart parking system
2021/12/09	Spacianet	Data management	• Data platform

Source: JICA Survey Team

4.2 Business Contest and the Selection of the Pilot Project

The business contest was held to award business ideas using smart technologies and solutions that contribute to the realization of the smart city of Siem Reap and the solution of urban problems.

A total of 13 business ideas will be proposed, and 2 projects were awarded for both the project award and the PoC award. The PoC will be held from November to December 2021.

4.2.1 Procedures

(1) Outline of the Business Contest

The business contest was held as follows for the purpose of commending business ideas using smart technologies and solutions that contribute to the smart city of Siem Reap and urban problems. This is expected to accelerate the commercialization of smart cities with the participation of private businesses.

Table 4.11: Outline of the Business Contest

Organizer	Siem Reap Provincial Administration, JICA Survey Team
Invited Contents	<p>Business ideas using smart technologies and solutions that contribute to making Siem Reap a smart city and solving urban issues.</p> <p>Applications were accepted from a wide range of sectors, but applicants were informed at the time of the call that the following urban issues in Siem Reap were expected to be solved.</p> <p>[General Theme]</p> <ul style="list-style-type: none"> Administrative services, infrastructure development and management are important to improve citizens' satisfaction. Please propose measures to improve or increase efficiency using smart technology. COVID-19 has worsened the livelihood and comfort of Siem Reap citizens. Please propose ways to overcome this impact by using smart technologies and solutions. In addition to the above, if there are any other problems or issues facing Siem Reap, please point them out and propose ways to improve them using smart technologies and solutions. <p>[Specific Theme]</p> <ul style="list-style-type: none"> [Tourism] Due to the new coronavirus, the number of tourists visiting the area directly has been drastically reduced. Please propose a business/idea for a tourism service that can be enjoyed remotely and makes people want to visit Siem Reap. [Mobility] [Security] The means of transportation in Siem Reap are limited, and the comfort and safety of users are not sufficient. Please propose measures to improve the comfort and safety of transportation. [Mobility] [Security] In the city center, the comfort of walking space for citizens and tourists is impaired by parked and passing vehicles. Please propose measures to improve the comfort of road space in the city center. [Tourism][Security] Siem Reap is an international tourist city and attracts many tourists. Please propose measures to make it safer and more secure for tourists. [Waste] Illegal dumping is taking place in the city, and it is spoiling the comfort of citizens and tourists. Please propose measures to reduce the amount of such waste and to improve the appearance and comfort of the city. [Waste] The Siem Reap River, which runs through the city center, is seriously polluted by sewage flowing into it. Please propose measures to improve the waterfront space of the Siem Reap River so that tourists and citizens can enjoy it.
Type and Number of Awards	<ul style="list-style-type: none"> Project Award: Business ideas that meet the above criteria PoC Award: Business ideas that should be implemented as a PoC.
How to Select Awards	<ul style="list-style-type: none"> Judging by the working group and the JICA Survey Team Approval of the screening results by the 4th Steering Committee

Source: JICA Survey Team

The schedule from the start of inviting applications to the implementation of PoC is as follows.

Table 4.12: Schedule of Business Contest

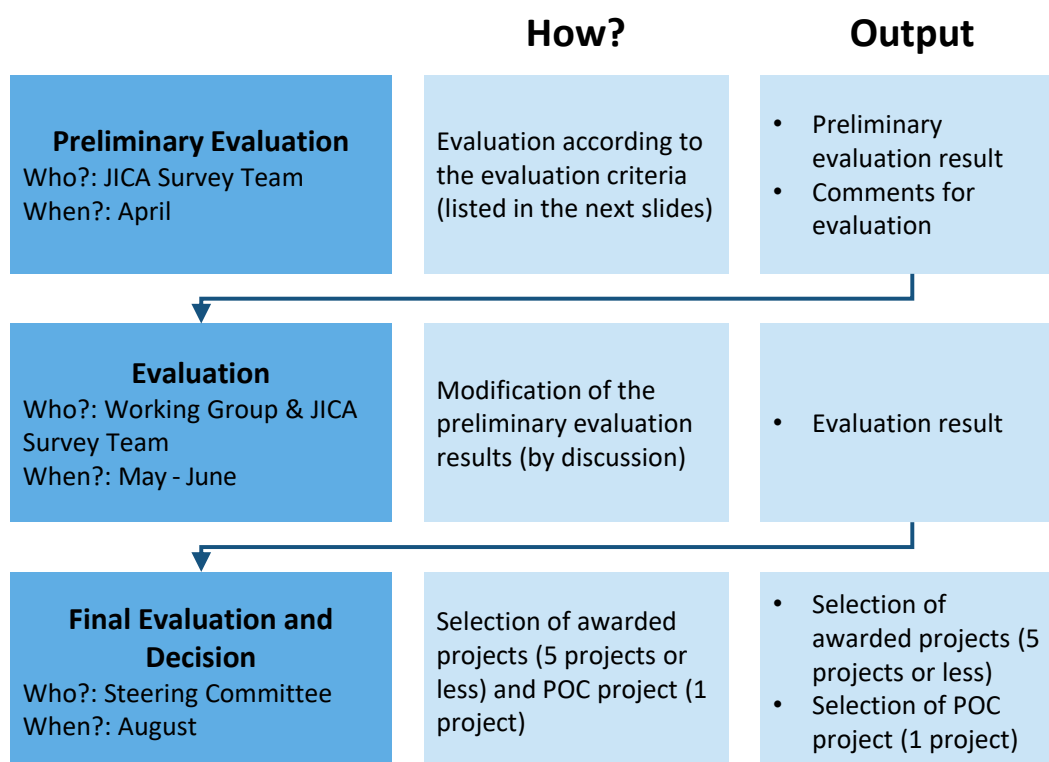
No.	Phase	Expected Date	Remarks
1	Announcement of Business Contest	End of January 2021	Announcement shall be done during the seminar in Phnom Penh (online)
2	Application period	End of January – End of March 2021	

No.	Phase	Expected Date	Remarks
3	Evaluation	April - August 2021	
4	Evaluation Approval	August 2021	In the 4th Steering Committee
5	Awarding	May – June 2021	Awarding shall be done during the seminars in Siem Reap and Tokyo (online)
6	Implementation of the pilot project (PoC)	November – December 2021	Implementation of PoC by the one selected for award

Source: JICA Survey Team

(2) Application and Evaluation

The evaluation of application ideas was carried out according to the following flow and evaluation criteria:



Source: JICA Survey Team

Figure 4.1: Flow of Evaluation of Ideas

The applicants submitted the necessary information to the JICA Survey Team and Siem Reap Provincial Administration as follows according to the application documents:

Table 4.13: Information to be Submitted in the Business Contest

Form of Submission	Items
Application Form (Excel)	Name of team
	Name of team leader
	E-mail address of team leader
	Mobile Phone of team leader
	Date of birth of team leader
	Name of team leader's company/organization
	Website of team leader's company/organization
	Number of staff(s) of the team
	Name of business/idea
	Type of business/idea
	Brief explanation of the business/idea
	Sales model

Form of Submission	Items
	Expected main customer
	Status of launch of the business/idea
	Date of launch of the business/idea
	MoC registration status of the company
	MoC registration date of the company
Free (PDF)	Vision and mission
	Targets and markets
	Technology and solution
	Business model
	Team
	Motivation and request for the contest

Source: JICA Survey Team

The evaluation criteria are as below. Different evaluation criteria were used for the project award and for the PoC award.

Table 4.14: Evaluation Criteria for the Project Award

Item	Points	Evaluation Point
Vision / Mission	5	<ul style="list-style-type: none"> Whether it accurately capture the urban challenges of Siem Reap Whether it is a problem that should be solved for Siem Reap?
Target / Market	5	<ul style="list-style-type: none"> Whether the project will benefit citizens/tourists Whether there are specific benefits to be gained from the project
Technology / Solution	5	<ul style="list-style-type: none"> Whether it is the technology/solution expected to contribute to solving the problem Whether the technology is new in Cambodia and in the sector Whether the technology is feasible and sustainable in Cambodia Whether there is a possibility of combination with other technologies and synergistic effects
Business Model	5	<ul style="list-style-type: none"> Whether the technology is feasible as a business Whether the model promotes local economic benefits, employment, and effective use of resources Whether it will bring benefits to the local industry and lead to its expansion
Team	5	<ul style="list-style-type: none"> Whether the proposed business entity has the ability to carry out the project Whether it seeks to establish effective partnerships with various actors in the region Whether it has the potential for industry-government-academia collaboration
Motivation / Expectations for the Contest	5	<ul style="list-style-type: none"> Whether the project body have the determination to complete the project Whether the project is a proposal that the Siem Reap Provincial Administration would like to support

Source: JICA Survey Team

Table 4.15: Evaluation Criteria for the PoC Award

Items	Points	Evaluation Points
Quickness	5	<ul style="list-style-type: none"> Whether the project is ready to start immediately after selection Whether the proposed entity has the ability to carry out the project
Feasibility	5	<ul style="list-style-type: none"> Whether the business plan is based on realistic assumptions and is highly feasible Whether the business plan is realistic and feasible Whether the technology is feasible and sustainable in Cambodia Whether it is possible to solve the problem in the short term
Appeal	5	<ul style="list-style-type: none"> Whether the project proponent has the determination to complete the project Whether it shows the effect of implementation as a PoC

Source: JICA Survey Team

(3) Announcement of the Business Contest

1) Announcement in the Phnom Penh Seminar

The JICA Survey Team announced the outline of the business contest in the Phnom Penh seminar held on February 10, 2021.

2) Announcement to Japanese Companies

The JICA Survey Team held an explanation meeting to Japanese companies on February 17, 2021.

Table 4.16: Overview of the Explanation Meeting to Japanese Companies

Date/Time	February 17, 2021 16:30-17:30 (Japanese time)
Venue	Online (Microsoft Teams)
Participants	Total 164 applied via the following organizations: <ul style="list-style-type: none"> • Japan Association for Smart Cities in ASEAN (JASCA) • Japanese Business Association of Cambodia (JBAC)
Agenda	<ul style="list-style-type: none"> • [JICA] Opening remarks • [JICA Survey Team] Introduction of this survey • [JICA Survey Team] Introduction of Business Contest • [All participants] Question and answer session

Source: JICA Survey Team

3) Announcement on Facebook

On February 7, 2021, a Facebook page²³ for this business contest was launched, and it has around 100 followers. Application forms are disclosed on this Facebook page.

4.2.2 Results

(1) Applied Ideas

13 business ideas were applied to the business contest.

Table 4.17: List of Applications

No.	Sector	Outline
1	Tourism	VR tourism tool
2	Tourism	E-tourism platform
3	Mobility	Smart parking system
4	Mobility	Illegal parking warning system
5	Mobility	Smart streetlights
6	Mobility	Smart scooter sharing service
7	Security	CCTV camera with solar power system
8	Security	Natural disaster warning system
9	Waste	Wastewater purification
10	Others	Smart energy breaker
11	Others	Sterilization of COVID-19 by photocatalytic water spray
12	Others	Virtual teleconference system
13	Others	Walkie-talkie app

Source: JICA Survey Team

(2) Result of Evaluation

According to the evaluation process described in Section 4.2.1, in the 4th Steering Committee held on August 30, 2021, the two projects listed below were awarded for the project award and for the PoC award.

²³ <https://web.facebook.com/Business-and-Idea-Competition-for-Smart-City-Siem-Reap-347308146423499>

Table 4.18: Awarded Business Ideas

No.	Sector	Team Name	Outline	Remarks
3	Mobility	Japan Parking Technology (JPT)	Smart parking system	Wins the seed money for PoC as first prize
6	Mobility	Asian Gateway	Smart scooter sharing service	Conducts PoC without monetary incentives as runner up

Source: JICA Survey Team

(3) Announcement of Results

1) Announcement in the Tokyo Seminar

The JICA Survey Team announced the result of the business contest in the Tokyo seminar held on November 24, 2021. The awarded companies explained the business outline in the seminar.

2) Announcement in the Siem Reap Seminar

The JICA Survey Team announced the result of the business contest in the Siem Reap seminar held on November 29, 2021. The awarded companies explained the business outline in the seminar.

4.3 Seminars

Seminars have been held as below to inform private companies and donors of urban issues in Siem Reap and the concept of smart cities.

Table 4.19: List of Seminars

Date		Venue	Type	Material
Period 1	February 10, 2021	Phnom Penh	On-site/ Online (hybrid)	<ul style="list-style-type: none"> • Introduction of urban issues and the smart city roadmap • The Business Contest
Period 2	November 24, 2021	Tokyo	Online	<ul style="list-style-type: none"> • Introduction of urban issues and the smart city roadmap • Results of the Business Contest
	November 29, 2021	Siem Reap	Online	

Source: JICA Survey Team

4.3.1 Seminars in Period 1

The Phnom Penh Seminar was held on February 10, 2021 as follows:

Table 4.20: Overview of the Phnom Penh Seminar

Date/Time	February 10, 2021 9:00-12:00 (Cambodian time)
Venue	CJCC Kizuna Hall, Online (Zoom)
Participants	Total 52
Agenda	<ul style="list-style-type: none"> • [Siem Reap Provincial Administration] Opening remarks • [JICA Survey Team] Introduction of this survey • [JICA Survey Team] Introduction of Business Contest • [Companies / academics related to smart city] Introduction of activities • [JICA] Closing remarks

Source: JICA Survey Team

Seminar on Business and Idea Competition for Smart Siem Reap

10th February 2021 @9:00AM-12:00AM (Online)



JICA and Siem Reap Provincial Government is preparing a roadmap for Smart City in Siem Reap in 2020-2021.

In this process, collaboration between private-public-academia is emphasized and these three players' involvement is expected through Business and Idea Competition. The Event serves as an explanation of Smart City Project, opening announcement of Business and Idea Competition applications (until end March 2021).

09:00 Introduction JICA Survey Team	10:50 [Guest Presentation] Smart City related Activities in Cambodia Dr. Makathy Tep (Cambodian Institute for Urban Studies, CIUS)
09:10 Opening Remarks Mr. Sok Thol (Siem Reap Provincial Hall)	11:10 [Guest Presentation] V-Tuber Guide Mr. Tomohiro Okuda (OSFCP CO LTD)
09:20 Smart City Siem Reap Project + Q&A JICA Survey Team	11:30 [Guest Presentation] Traffic Management System in Phnom Penh Mitsubishi Corporation Sumitomo Electric Industries, Ltd
09:50 Business Plan Contest Announcement + Q&A JICA Survey Team	11:50 Closing Remarks JICA

[CONTACT] scsr-competition@googlegroups.com
[REGISTRATION] <https://enforum.cjcc.edu.kh/home>



Source: JICA Survey Team

Figure 4.2: Announcement Material of the Phnom Penh Seminar

4.3.2 Seminars in Period 2

(1) Tokyo Seminar

The Tokyo Seminar was held on November 24, 2021 as follows:

Table 4.21: Overview of the Tokyo Seminar

Date/Time	November 24, 2021 11:00-13:00 (Japanese time) / 09:00-11:00 (Cambodian time)
Venue	Online (Zoom)
Participants	Total 52 (62 application of attendance)
Agenda	<ul style="list-style-type: none"> • [Siem Reap Provincial Administration] Opening remarks • [JICA Survey Team] Introduction of the smart city roadmap • [JICA Survey Team] Results of Business Contest • [Awarded Companies of the Business Contest] Introduction of the business idea • [JICA] Closing remarks

Source: JICA Survey Team

In the question-and-answer session, from the participants, questions were raised on the possibility of integration of sectors not mentioned in the sectoral approach of the smart city roadmap (specifically the healthcare sector and the energy sector).

シエムリアップ スマートシティセミナー



Online (Zoom)

前回2020年2月に開催したセミナーでは、シエムリアップのスマートシティ実現に向けたロードマップの概要をご説明し、ビジネスコンテストの募集を行いました。
 今回のセミナーでは、シエムリアップの現在の状況や更新したロードマップをご紹介するとともに、ビジネスコンテストの結果を発表します。

日本時間
2021. **11.24** Wed.
11:00-12:45
/
カンボジア時間
9:00-10:45

目的

- シエムリアップにおける課題およびスマートシティのコンセプト等の周知

タイムテーブル (日本時間/カンボジア時間)

11:00/9:00	□	開会挨拶 (シエムリアップ州政府)
11:10/9:10	□	JICA調査活動内容紹介 <ul style="list-style-type: none"> ・ シエムリアップにおけるスマートシティの取組み ・ スマートシティ実現に向けたロードマップの紹介
11:30/9:30	□	ビジネスコンテスト概要・表彰事業紹介 <ul style="list-style-type: none"> ・ 「Smart Parking System」 (登壇者:JPT) ・ 「Smart Scooter Sharing Service」 (登壇者:Asian Gateway)
12:10/10:10	□	国交省Smart JAMP シエムリアップ 活動内容紹介 <ul style="list-style-type: none"> □ Q&A
12:35/10:35	□	閉会挨拶 (JICA)

主催

- シエムリアップ州政府・JICA

参加申込方法

- 右記QRコードもしくは下記リンクよりお申し込みください。
URL: <https://forms.gle/ocBKYPgRCaSzV74PA>
- 申込締切: 2021年11月19日(金)

ご質問・ご要望がございましたら下記までご連絡ください。

- 連絡先: セミナー事務局 日本工営株式会社 広田瞳子 (a9510@n-koei.co.jp)



Source: JICA Survey Team

Figure 4.3: Announcement Material of the Tokyo Seminar

(2) Siem Reap Seminar

The Siem Reap Seminar was held on November 29, 2021 as follows:

Table 4.22: Overview of the Siem Reap Seminar

Date/Time	November 29, 2021 10:00-12:00, 14:00-16:00 (Cambodian time)
Venue	Online (Zoom)
Attendance	Total 110
Agenda	<ul style="list-style-type: none"> • [Siem Reap Provincial Administration] Opening remarks • [JICA Survey Team] Introduction of the smart city roadmap • [JICA Survey Team] Results of Business Contest • [Awarded Companies of the Business Contest] Introduction of the business idea • [CJCC] Introduction of the CJCC Accelerator Program • [Companies related to smart city] Introduction of activities • [JICA] Closing remarks

Source: JICA Survey Team

In the question-and-answer session, interests and concerns were raised from the participants on the smart parking project, the telecommunication environment in AAP, main challenges in the smart city roadmap, etc.

Seminar for Smart City in Siem Reap



Online (Zoom)

Siem Reap Provincial Administration, JICA*, and MLIT** are working to realize a smart city in Siem Reap. As part of these activities, an online seminar will be held to share information on Smart City.

*Japan International Cooperation Agency / **Ministry of Land, Infrastructure, Transport and Tourism of Japan

2021. **11.29** Mon. AM **10:00-12:00** / PM **14:00-16:00**

Expected Participants

- Officers of Siem Reap Provincial Administration and provincial departments
- Private Business
- Anyone who is interested in Smart City of Siem Reap

Agenda

AM	10:00 <input type="checkbox"/> Opening Remarks [Siem Reap Provincial Administration] 10:10 <input type="checkbox"/> Introduction of Roadmap for Smart City <input type="checkbox"/> Announcement of the Results of the Business Contest • Introduction of Awarded Businesses [JPT, Asian Gateway] 11:35 <input type="checkbox"/> Introduction of the CJCC ACCELARATOR PROGRAM [Cambodia-Japan Cooperation Center] 11:50 <input type="checkbox"/> Q&A
PM	14:00 <input type="checkbox"/> Introduction of Activities of MLIT 14:10 <input type="checkbox"/> Speech from Business Organizations [Cambodia Chamber of Commerce, Japanese Business Association of Cambodia] 14:30 <input type="checkbox"/> Introduction of Examples of Smart City Technologies 15:30 <input type="checkbox"/> Q&A 15:40 <input type="checkbox"/> Closing Remarks [Siem Reap Provincial Administration, JICA, MLIT, Embassy of Cambodia in Japan]

Host

- Siem Reap Provincial Administration / JICA / MLIT

Register and Contact

- The meeting link will be shared in the Telegram group before the seminar. Please scan the QR code to register.
- Contact: a9510@n-koei.co.jp (English) / mk.veng@outlook.com (Khmer)



Source: JICA Survey Team

Figure 4.4: Announcement Material of the Siem Reap Seminar

4.4 Pilot Project (PoC)

2 projects awarded in the business contest conducted their PoC during the survey period. Of the 2 projects, JICA Survey Team conducted monitoring of the Smart Parking Project.

Table 4.23: Awarded Business Ideas

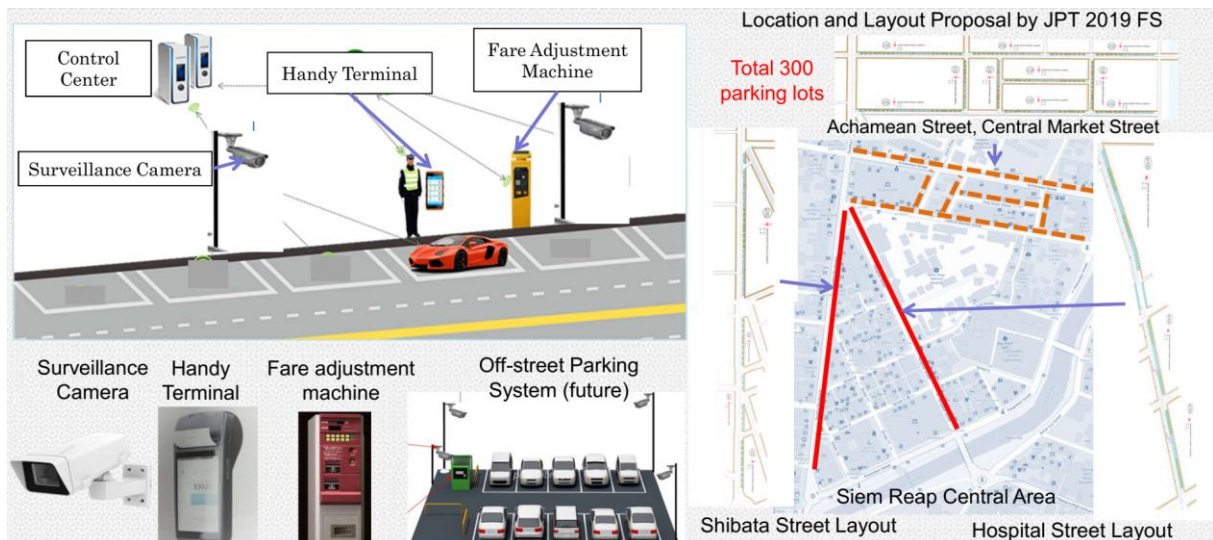
No.	Sector	Team Name	Outline	Remarks
3	Mobility	Japan Parking Technology (JPT)	Smart parking system	Wins the seed money for PoC as first prize
6	Mobility	Asian Gateway	Smart scooter sharing service	Conducts PoC without monetary incentives as runners up

Source: JICA Survey Team

4.4.1 Smart Parking System

(1) Outline of the Business Idea

According to JPT, this business aims to reduce illegal parking and mitigate traffic congestion by installing on-street smart parking system using smart technologies such as surveillance cameras and communication technology in the center of Siem Reap City. This business also contributes to produce safe, secure attractive area and sustainable job opportunities. The smart parking system will be built up to one smart system by utilizing the existing smart devices and know-how. The main smart technologies applied are surveillance cameras, handy terminals, fare adjustment machine, and communication network.



Source: JPT

Figure 4.5: Outline of the Smart Parking System

(2) Outline of the Pilot Project

1) Objective

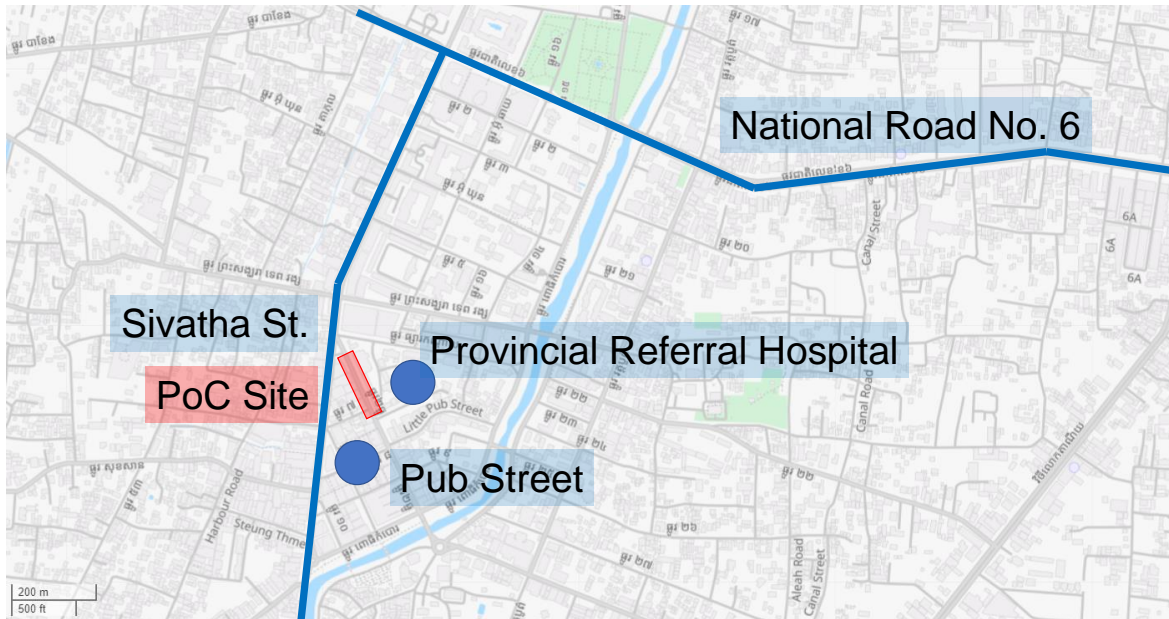
The PoC will conduct a pilot project on the parking operation and maintenance methods (surveillance cameras, operations maintenance methods, cleaning activities by parking staffs) that are part of the smart parking system. Through the implementation of the PoC, the Siem Reap Provincial Administration is expected to deepen its awareness of the merits of the operation and maintenance method of the smart parking system. The parking users and local shoppers are also expected to understand the merit of on-street public parking. Specifically, the PoC checks the following items:

- Confirmation of surveillance camera performance
- Acquisition of teacher data required for car plate number recognition AI system

- Confirmation of the business performance of the parking manager
- Understanding the acceptability for parking lot users of paid parking lots
- Understanding the acceptability for government agencies, traffic police, and local residents of the development of street parking lots

2) Target

The target area of the PoC is on 2 Thnou Street, from the intersection with Sivutha Street to the main entrance of Siem Reap Provincial Referral Hospital.



Source: JICA Survey Team

Figure 4.6: Map of the Pilot Project Site



Source: JICA Survey Team

Figure 4.7: Pilot Project Site (Before Implementation)

3) Schedule

The schedule is as below. The pilot project was conducted from November 28 to December 4, 2021.

Table 4.24: Schedule of the Pilot Project

Items		October	November	December
Preparation in Japan	Travel preparation for Japanese experts			
	Procurement of equipment			
Prior coordination				

Items		October			November			December		
Onsite activity	Preparation									
	Installation									
	Implementation									
Analysis of Results										

Source: JICA Survey Team

(3) Implementation Bodies

The following shows the roles each body played in the implementation of the pilot project:

- JPT
 - Proposal of the business concept
 - Study on the project site
 - Procurement of equipment
 - Installation of equipment
 - Procurement and management of personnel for parking site management
- Siem Reap Provincial Administration
 - Coordination for the public side
 - Study on the project site
 - Decision on the implementation date
 - Monitoring of the equipment installation
 - Monitoring of the pilot project implementation
 - Consultation for full-scale business launch
- DPWT
 - Study and decision on the project site
- EDC
 - Study on the project site
 - Decision on the electricity source
 - Monitoring of the equipment installation
- Siem Reap Provincial Police
 - Traffic organization during the installation work

(4) Preparation and Implementation

The overall flow of the preparation and implementation of the PoC is as follows:

Table 4.25: Overall Flow of Preparation and Implementation of the PoC

Date	Items	Notes
August 30	Approval of the business contest results	• Approved by the governor in the 4th steering committee
September	Detailed discussion of the PoC plan	• Discussion and revision with JPT and the JICA Survey Team
October 13	PoC working group	• Presentation of the PoC plan from JPT
October 21	1st site inspection and meetings	• Site inspection with Siem Reap Provincial Administration and related provincial departments • Individual meetings with Siem Reap Provincial Administration and related provincial departments
November 22 - 25	2nd site inspection and meetings	• Site inspection with Siem Reap Provincial Administration and related provincial departments • Individual meetings with Siem Reap Provincial Administration and related provincial departments • Negotiation with surrounding business operators
November 26 - 27	Construction	• Installation of cameras and marking for the car parking lots
November 28 - December 4	Implementation	• Management of the parking space by JPT

Source: JICA Survey Team

1) PoC Working Group

The PoC working group related to the smart parking system project was held on October 13, 2021.

Table 4.26: Overview of the PoC Working Group

Date/Time	October 13, 2021 10:45-12:10 (Cambodian time)
Venue	Online (Zoom)
Chairperson	Director of the Division of Public Relations and International Cooperation (Mr. Kosal Makarapiseth)
Participants	Siem Reap Provincial Administration, DPWT, DPT, EDC, Provincial Police, Siem Reap Municipal Administration, JICA Survey Team

Source: JICA Survey Team

In this meeting, the participants agreed on the general schedule and division of roles. Also, the discussion on the amount of electricity required for PoC implementation, possible conflicts with the ongoing 38 Road Construction Project, the pros and cons of collecting fees during PoC implementation, and the handling of equipment after PoC implementation took place.

2) Individual Meetings Phase 1

From October 21 to 22, 2021, individual meetings were held between JPT and related organizations for the preparation.

Table 4.27: Individual Meetings Phase 1

Interviewee	Contents of Discussion
Siem Reap Provincial Administration Director of Public Relations and International Cooperation Division (Mr. Kosal Makarapiseth)	<ul style="list-style-type: none"> • PoC site • Surveys to be conducted during the PoC
Siem Reap Provincial Administration Director of Planning and Investment Division (Mr. Tip Piseth)	<ul style="list-style-type: none"> • Procedures for full-scale business launch
Director of DPWT (Mr. Ky Vyrin)	<ul style="list-style-type: none"> • PoC site • Possibilities of conflict with the 38 Road Construction Project

Source: JICA Survey Team

3) Site Survey Phase 1

On October 21, 2021, a site survey was conducted by the Siem Reap Provincial Administration, DPWT, EDG, and JPT at the site where the PoC will be implemented. In the site survey, the participants confirmed the space that can be shared as the parking lot, discussed the location of the surveillance cameras, and discussed about the candidate shops that will provide the electricity.



Source: JICA Survey Team

Figure 4.8: Site Survey Phase 1

4) Individual Meetings Phase 2

From November 22 to 23, 2021, individual meetings were held between JPT and related organizations for the preparation.

Table 4.28: Individual Meetings Phase 2

Interviewee	Contents of Discussion
Siem Reap Provincial Administration • Administrative Director (Mr. Sok Thol) • Director of Public Relations and International Cooperation Division (Mr. Kosal Makarapiseth) • Director of Planning and Investment Division (Mr. Tip Piseth) • Director of Intersectoral Division (Mr. Eung Sophean)	• PoC implementation period (final agreement) • PoC site (final agreement) • PoC preparation (negotiation with surrounding shops)
Director of DPWT (Mr. Ky Vyrin)	• PoC preparation (installation work)

Source: JICA Survey Team

5) Site Survey Phase 2 and Equipment Installation

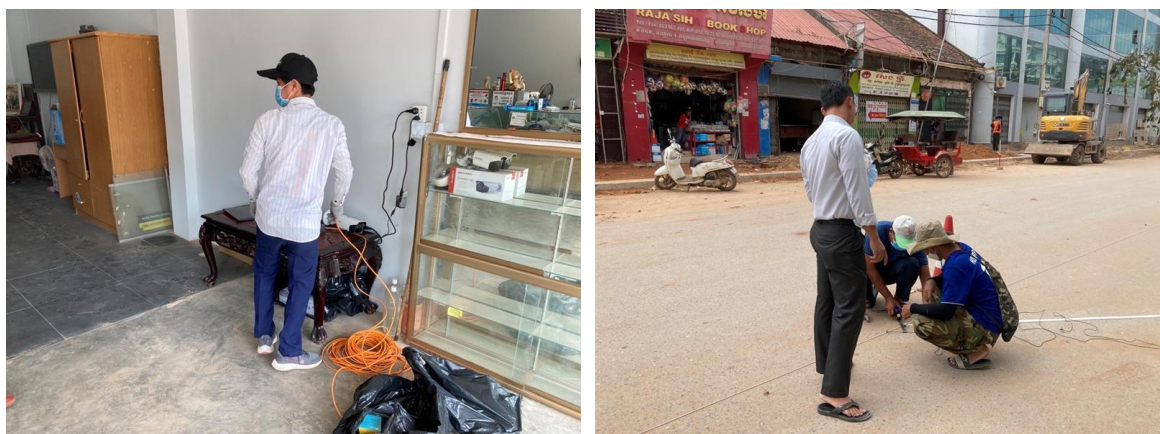
On November 25, 2021, a site survey was conducted by the Siem Reap Provincial Administration and JPT. In the site survey, the final confirmation of the impact of the 38 Road Construction Project was examined. Negotiations were also made with the shops that will provide electricity and place for the installation of the surveillance cameras and monitors.



Source: JICA Survey Team

Figure 4.9: Site Survey Phase 2

On November 26 to 27, 2021, the installation of surveillance cameras and marking of parking lot space were conducted. The personnel hired by JPT conducted the work, while Siem Reap Provincial Administration monitored the work.



Source: JICA Survey Team

Figure 4.10: Installation Work

(5) Results

1) Parking Management and Operation

Below shows the number of cars using the parking space per day. 243 vehicles were used in total over the seven days, an average of 34.7 vehicles per day. The average parking time was 2 hours and 16 minutes. Since there were 17 parking squares, the average turnover rate was 2.04.

Table 4.29: Usage of the Parking Lots

Date		Number of cars used	Average time of usage (h:mm)
2021/11/28	Sun	24	2:36
2021/11/29	Mon	40	2:36
2021/11/30	Tue	46	2:11
2021/12/01	Wed	42	2:23
2021/12/02	Thu	35	2:02
2021/12/03	Fri	31	1:57
2021/12/04	Sat	25	1:41

Source: JPT

The distribution of parking time is shown in the table below. 31% parked for less than 30 minutes, 15% parked for 30 minutes to 1 hour, and 46% parked for a relatively short time. On the other hand, 12% of the vehicles parked for more than 5 hours were the vehicles of the owners and employees of the stores along the road.

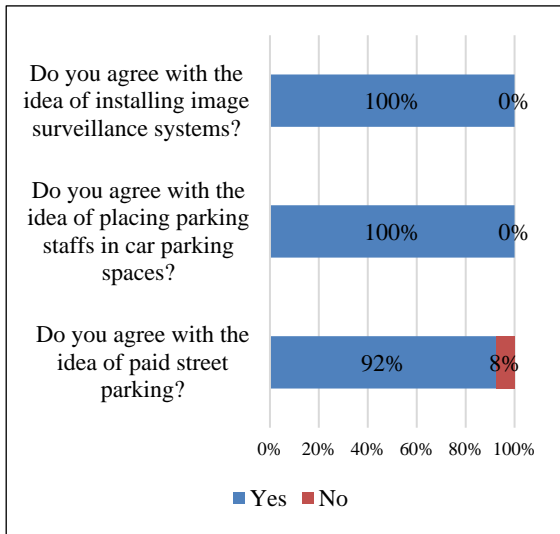
Table 4.30: Distribution of Parking Time

Parking Time (h:mm)	Number of cars	Ratio
0:00~0:30	76	31%
0:30~1:00	36	15%
1:00~2:00	41	17%
2:00~3:00	25	10%
3:00~4:00	36	15%
5:00~	29	12%

Source: JPT

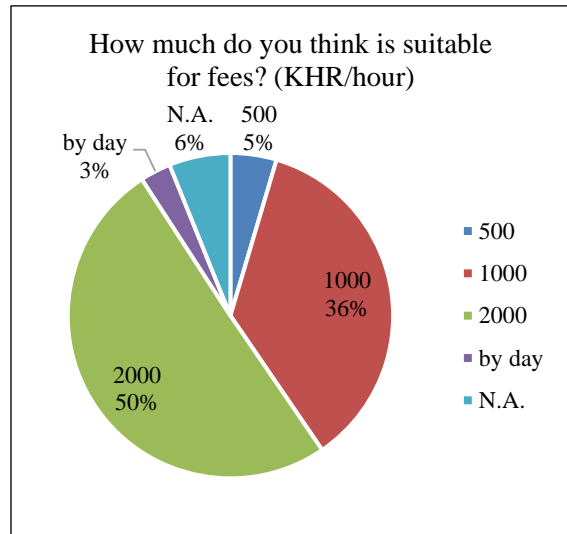
2) Questionnaire Survey

A questionnaire survey of parking facility users was conducted to understand their intentions regarding parking management systems. The results of the questionnaire are shown in the figures below. Parking lot users were generally positive about the introduction of surveillance cameras, management by parking supervisors, and paid street parking. The parking fees considered reasonable were 2000 KHR/hour (35%) and 1000 KHR/hour (47%).



Source: JPT (N=131)

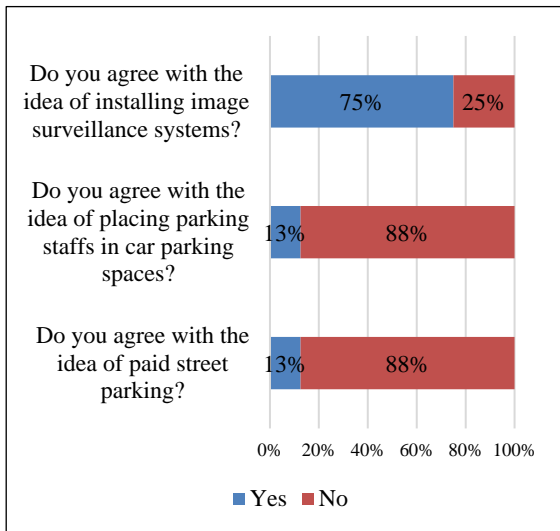
Figure 4.11: Results of the Questionnaire to Users (1)



Source: JPT (N=131)

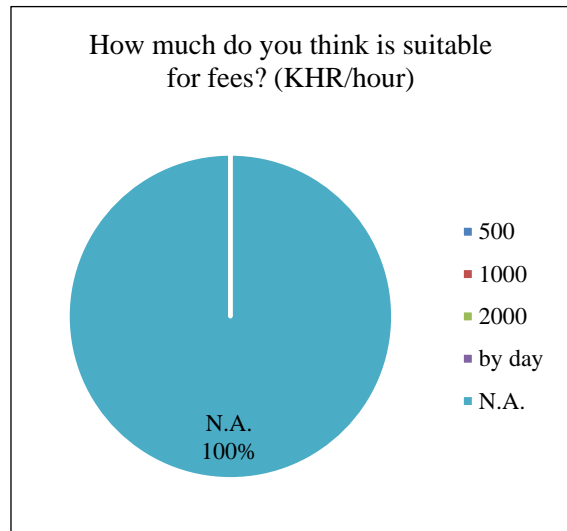
Figure 4.12: Results of the Questionnaire to Users (2)

The same questionnaire was also conducted to 8 shops along the road. The results of the questionnaire are shown in the figures below. 6 shops agreed on the introduction of surveillance cameras, but 7 stores disagreed on the introduction of parking by a parking manager or toll parking, and all stores denied setting a fee of 2,000 KHR/hour.



Source: JPT (N=8)

Figure 4.13: Results of the Questionnaire to Shops (1)



Source: JPT (N=8)

Figure 4.14: Results of the Questionnaire to Shops (2)

Parking users are positive about the introduction of pay parking on the street and are willing to pay 1000-2000 KHR/hour for parking. According to JPT, drivers in Siem Reap City are willing to pay for parking, compared to their experiences in other countries, where drivers are mostly against the introduction of paid parking.

On the other hand, shops along the roadside are opposed to paid on-street parking. This is because they tend to park for a long time on the road in front of their stores and use it as a commuter parking lot or garage. The following measures have been taken in many cities to address this issue.

- Setting special rates for vehicles related to shops and offices (daily and long-time discounts)
- Establishing free or low-cost large-scale parking lots in the neighborhood

3) Challenges faced during the PoC Implementation

i) Determination of Pilot Project Sites and Prior Coordination with the Road Construction Period

In the pilot project area, road construction of the 38-road construction project was in progress, and JPT had requested the provincial administration in advance to complete the road construction before the start of the PoC. However, since the road construction was a direct work of MPWT, the provincial administration and DPWT could not coordinate the work. Therefore, even during the implementation of the pilot project, the road works were carried out and there was not enough parking demand.

ii) Securing Power for Equipment

Initially, it was planned to secure power directly from EDC to supply electricity for surveillance cameras and recording equipment. However, it turned out that it would take time for private companies to apply for and receive permission to use EDC power, and that it would be costly to procure the necessary power meters and install power connections. In this PoC, the solution to this problem was to procure electricity from roadside stores. As power supply is essential for smart technology, the time and cost involved in the process is expected to be a major obstacle.

iii) On-site Presence of the Provincial Administration and Traffic Police

The PoC implementation plan called for the presence of provincial administration officials and traffic police officers during the pilot project, but the actual on-site presence was only one day for preparation and one day for the implementation (first day only). Through this PoC, it was planned to understand the receptivity of public agencies and traffic police to the development of on-street parking facilities, but this objective was not achieved.

iv) Information on Business Licenses and Business Contracts for Parking Projects

In order to implement an on-street parking project, it is necessary to obtain a project permit from the provincial administration and sign a project contract. However, currently there is no department within the provincial administration that serves as a contact point for these, and it was found that direct negotiations with the governor are required. The procedures were opaque, and JPT was unable to obtain any information on the procedures.

(6) Lessons Learnt

1) Clarification of the Division in Charge

It is recommended to create a division within the provincial administration that is in charge of smart city policies including parking policies. In order to implement an on-street parking project, it is necessary to obtain a project permit from the provincial administration and sign a project contract. The procedures are unclear, and clarification of the procedures is necessary for active private sector cooperation in the future.

2) Planning of relevant Plans (Parking Policy and Parking Lot Development Plan)

On-street parking on roads in the center of Siem Reap City have been managed in three categories, which are allowed parking, prohibited parking, and odd/even days. In addition, in front of large markets, parking lots for visitors are secured and operated by the market association. Although individual parking facilities are secured in the city center and markets, there is a lack of citywide policies on parking, parking maintenance, and parking enforcement, and parking policies and plans need to be formulated.

3) Development of related Legal Systems

In Cambodia, the only relevant law on parking is the Law on Road Traffic, which stipulates the sections of roads where parking is prohibited. However, the law only specifies parking areas from the perspective of vehicular traffic, and there is no provision on policy and maintenance of on-street and off-street parking areas. In Japan and other countries, laws such as the Law on Car Parking have been developed under the basic laws such as the Law on Road Traffic to facilitate traffic in cities. It is hoped that Cambodia will enact a law on car parking soon.

In addition, in this pilot project, the use of roads as garages was found, where vehicles belonging to nearby shopkeepers and employees park for long periods of time. Using the road as a garage is a private occupation of public space, which is undesirable from the perspective of fairness in the use of public space. Therefore, it is necessary to develop not only the Law on Car Parking but also laws related to garages and “mandatory parking lots which define the place where cars are to be parked.

4) Appropriate Operation of relevant Legal Systems (such as Control and Guidance of Illegal Parking by the Traffic Police)

Although parking on the sidewalks of roads in Cambodia is prohibited under the Law on Road Traffic, the sidewalks are customarily occupied by shopkeepers and homeowners along the roads, and there is no enforcement or guidance by the traffic police.

In Siem Reap, the 38 road construction project is underway, and the sidewalks are being raised to create roads where sidewalk parking is practically not allowed. There are plans to mark the roads with parking spaces to allow on-street parking, but it is not clear how this will be implemented. When sidewalks are being built, they are being cut down to allow vehicles to enter and exit stores and residential entrances. If no guidance or enforcement is given regarding parking, sidewalks and streets may be used as parking areas.

5) Development of Basic Infrastructure (such as Road and Communication Infrastructure) as a Precondition for Smart Cities

In order to develop smart city projects that include on-street parking, it is necessary to develop the basic infrastructure of roads, sidewalks, and communications in advance. However, the development of such basic infrastructure is not sufficient, and it is necessary to develop basic infrastructure based on the premise of smart city development (in the case of smart parking lot development, sufficient road width, sidewalks and bollards that do not allow parking, handholes and conduits for communication lines, etc.).

4.4.2 Smart Scooter Sharing

(1) Outline of the Business Idea

This project aims to promote the use of the Gogoro electric scooter in Siem Reap. Gogoro is powered by batteries, which can be recharged at battery stations. The Gogoro scooters are equipped with several sensors including GPS, which will enable the collection of big data related to traffic through the widespread use of Gogoro scooters.

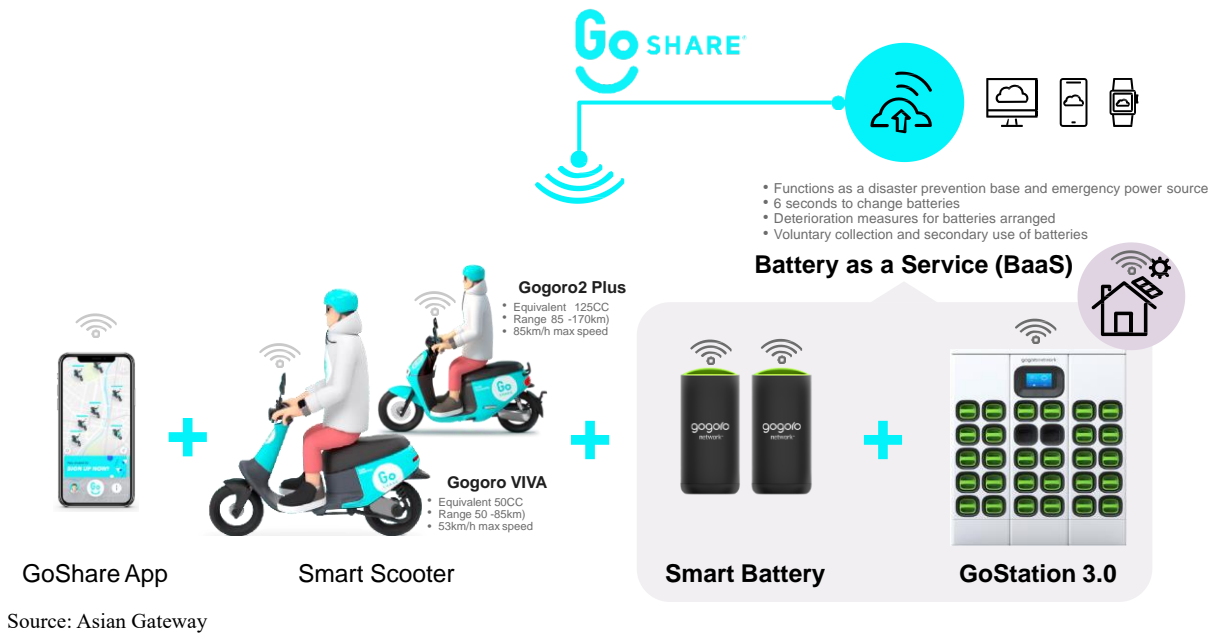


Figure 4.15: Outline of the Smart Scooter Sharing

(2) Outline of the Pilot Project

In the pilot project, two Gogoro scooters are planned to be leased to microfinance companies located in Siem Reap. The testers are planned to test the usability of the scooter.

Chapter 5 Conclusion

5.1 Lessons Learnt through this Survey

Based on the results of this study up to the previous chapter, the following is a summary of the operational and technical lessons learned through the implementation of this study, including recommendations and points to note for the future technical cooperation project, which is expected to be launched for the assistance of the implementation of the Smart City Roadmap proposed in this survey.

5.1.1 Operational Lessons Learnt through this Survey

(1) Administrative Structure of Siem Reap

Through the discussions in this survey, the direction of building a system to promote smart cities in the provincial administration was indicated, and the provincial administration is considering and preparing two types of systems to achieve this. One is to expand the functions of the existing smart city committee by adding members, and the other is to establish a smart city promotion division in the provincial administration. The provincial administration has already started coordinating with the Ministry of Interior on these matters, but the establishment of this structure will be the key to the provincial administration's promotion of smart cities, and it is essential to monitor the situation closely and provide support and advice as necessary.

(2) Capacity and Understanding of the Provincial Administration Officers

In this study, JICA Survey Team was able to understand the composition, number of people, and responsibilities of the relevant departments in Siem Reap, but was not able to assess the capacity and budget of each department to promote smart cities. In addition, working groups was set up under the steering committee to conduct this survey, but due to the impact of COVID-19, it had to be conducted mainly online, and was forced to coordinate with individual departments instead of holding meetings all at once. Due to working remotely, communication among the provincial administration officers and international experts of the JICA Survey Team did not function well when international experts were not allowed to work in Cambodia. It is essential to foster understanding of the basic concept of smart cities and the roadmap among the provincial administration officials, who shall take the initiative in implementing the smart city roadmap. For this reason, it is necessary to raise the level of understanding within the public sector by distributing materials and holding lectures and workshops for provincial administration officials.

(3) Monitoring and Reviewing the Roadmap

In the smart city roadmap, the target year is set to 2035, which is in line with relevant plans, and priority projects are set to start within five years for the time being. However, smart cities are expected to incorporate cutting-edge and innovative smart technologies, including but not limited to ICT. The Siem Reap provincial governor commented at the 6th steering committee meeting in December 2021 that the target year may need to be set shorter. At the time of this report, the target year is set at 2035, but it is important to understand here that this roadmap is not a fixed plan, but rather a flexible plan that will be reviewed through the PDCA cycle, keeping an eye on changes in urban issues, social conditions, and technological innovations. To achieve this, it is important to set up monitoring indicators to evaluate the measures and projects, and to create a system that enables the functioning of committees to make decisions based on the evaluation.

(4) Business Environment

In promoting smart cities, it is important to attract private businesses and create an environment that facilitates business development by private companies. In general, Cambodia is said to have relatively lax regulations that make it easy for the private sector to conduct business. Also, it is expected that the new investment law, which was issued in October 2021, will provide a tailwind for the registration of

businesses. On the other hand, to promote a smart city in Siem Reap based on the proposed roadmap, it will be necessary to create a technical mechanism for collaboration, such as common interfaces and data coordination, after attracting private businesses that agree with the aim of the roadmap. Specific consultations and adjustments will be necessary in the future to determine how to incorporate the new approach of smart city projects into the current system of approval procedures.

(5) Funding

For the provincial administration to take the initiative in promoting this roadmap, and to accumulate and disseminate data, funds will be required for development and operation. Obtaining financial assistance such as ODA is an option. However, Siem Reap is characterized by its potential as an international tourist city that can reach over 4 million tourists annually. Although an entry fee is already charged to enter the World Heritage Angkor Archaeological Park, it may be possible to gain the understanding and cooperation of tourists, especially those from overseas, in promoting efforts to reduce environmental impact, tackle climate change issues, and address the SDGs through the smart city, and to collect cooperation fees may be a possible choice worth considering. There are various ways to raise funds, and it shall take time and effort to coordinate them, but continuous review and adjustment is important.

(6) Relationships with the Central Government and Other Cities

In this study, one of the issues is that the JICA Survey Team could not sufficiently approach the central government due to restrictions on traveling caused by COVID-19. In promoting smart city, it is presumed that consultation and coordination with the central government will become more important, due to the possibility of handling big data. In addition, JICA Survey Team has not been able to fully understand the trends of the Smart City Coordination Committee of the central government, which was established in February 2021, and it is necessary to follow up with the committee and provide information or request support if needed. On the other hand, it is hoped that horizontal cooperation with Phnom Penh and Battambang, which have been selected as pilot cities by ASCN, will mutually stimulate each other's activities.

(7) Relationships with Academic Institutions

In this study, the JICA Survey Team could not reach the point to identify the leading academics and academic institutions related to smart cities in Cambodia. Aside from the elemental technologies, it is believed that there is a lack of academic accumulation in Cambodia regarding the planning and implementation of a cross-sectoral smart city. On the other hand, the names of several academics who may be able to collaborate with in the future are mentioned in the report. For the implementation of a smart city in Siem Reap, rather than asking for advice from academics, perhaps a more appropriate stance would be to work together with them through a trial-and-error process. In any case, academic approaches are important in evidence-based policy making, where data is analyzed and evaluated, and then utilized in policy making in the next step. It is hoped that a phased approach to collaboration between the public sector and academic institutions will be developed in the future.

(8) Coordination and Collaboration in the Japanese Side (MLIT etc.)

Japan's MLIT is conducting a study for Siem Reap based on the Smart JAMP scheme in 2021, in parallel with this study. It is conducting a pre-FS study for six of the priority projects identified in the roadmap prepared in this study. As these studies are smart city studies supported by the Japanese government, the steering committee and other major meetings and seminars were held jointly by JICA and MLIT. In addition, a pilot project supported by JETRO is being implemented in Siem Reap in the same year. The purpose of these projects is to promote smart cities in Siem Reap (solving urban issues through it), and since all of the activities are supported by the Japanese government, it is important to continue to share information and exchange opinions with each other to provide support for integrated and efficient initiatives.

(9) Formulation and Implementation of a Smart City Approach

For the roadmap proposed in this study to function effectively in the future, it is important to build a system of cooperation between the public and private sectors for the promotion of smart cities, and to improve the capacity of related organizations through support. To this end, based on the roadmap, it is necessary to develop a process to solve existing problems and achieve better urban management through the appropriate use of smart technologies, involving stakeholders such as public institutions, private companies, academia, and citizens and tourists, and to establish the process through trial and implementation. There are expectations for JICA's technical cooperation projects to support this in the future.

5.1.2 Technical Lessons Learnt through this Survey

(1) Target Sector

The target sectors for this study were defined from the beginning as tourism, mobility, waste, and security based on the request of the Siem Reap Provincial Administration. It is obvious that these are the major urban issues to be solved by smart technologies, and based on the roadmap, issues on these sectors shall be solved first. On the other hand, the vision, concept, and operational approach of the roadmap are not limited to these sectors, and it is desirable that the implementation of smart cities be carried out with a flexible stance, always keeping in mind the expansion to other sectors, for example, by accepting proposals from the private sector in a wide range of sectors.

(2) Target Area

In this study, "city area", "heritage area", and "Tonle Sap area" were selected as the target areas, but the actual main target area was the city area, because the provincial administration being the main counterpart. The main reasons for this are that the APSARA National Authority oversees the heritage area, and the provincial administration is unable to take the initiative in this area. Also, the Tonle Sap area is not concentrated as a tourist and residential area and the issues related to the target sector are less seen compared to the urban area. However, the APSARA National Authority has shown a great deal of understanding and cooperation in this survey. Therefore, in the future implementation phase, it is desirable to expand the project to the entire Siem Reap area in cooperation with APSARA National Authority and other organizations.

(3) Data Management

In this study, no expert for data management was formally assigned, and current situation analysis and technical aspects in the roadmap were insufficient in this field. In general, the current communication and data infrastructure environment of the public sector is not sufficient to promote smart cities in Siem Reap. DPT does not operate an information management system for the entire government and does not have sufficient capacity to strongly promote smart cities in the province. Data centers and platform systems are also needed. For example, data centers need to be discussed, examined, and developed as soon as possible, including whether they should be on the cloud or on-premises.

(4) Upper-level and Related Plans, Development Frames

In this roadmap, the development frame is not directly studied, but data of upper-level and related plans were referred to as given conditions. However, since many of these plans were formulated before the impact of COVID-19, and the impact of COVID-19 is still ongoing at the time of submission of this report, it is necessary to review them based on the post COVID-19 situation. Regarding the tourism demand forecast, the number of tourists is estimated to be 4.26 million in 2019, 1.1 million in 2020, and 11.35 million in 2035, which is a large discrepancy from the future estimate before COVID-19. Considering one of the characteristics of smart cities, which is to collect, accumulate, and analyze data for use in planning, it is necessary to create a system that can flexibly respond to the needs by utilizing data in the implementation phase of the future roadmap.

(5) Priority Projects

A total of 24 priority projects was proposed in this roadmap, which are expected to be launched within the next five years. Of these, 22 priority projects have been selected from the four target sectors. In this study, we have summarized the implementing bodies, main actions, fund sources, and business models for these projects, but further study is needed for actual implementation. Particularly, it is essential for the private sector to take the initiative for private sector projects. It is expected that the private sector will be invited to participate in business contests, as was done in this study, and that efforts will be made to move the project forward without being limited to public funding.

(6) Business Contest and Pilot Projects

In this study, seminars were held online, and a business contest was conducted. In the business contest, 13 applications were received, mainly from Japanese companies, and two of them were awarded after the selection and evaluation process with the approval by the steering committee. There were no serious problems with the process itself, but the decision-making process within the provincial administration delayed due to COVID-19, which forced a major change in the schedule. Although the team proceeded with the implementation of the pilot project for two commendable projects, only one project (JPT's smart parking project) was completed and followed up within this study. In the future, it is expected that the public sector will continue to support the implementation of such private sector projects, but it is also important for the public sector to understand the appropriate roles of the public and private sectors in public services (such as illegal parking), the decision-making process for providing public services through public-private partnership (such as administrative decision to charge fees for the service), data collaboration measures (such as providing sensor data to the government), and measures to support private businesses that contribute to the public (such as contributing to climate change countermeasures).

(7) Recovering from COVID-19

In February 2021, this study summarized the results of the COVID-19 impact assessment survey and proposed a roadmap for recovery. However, as of January 2022, at the time of submitting this report, the global situation surrounding COVID-19 has not improved, and the impact of the new Omicron variant is raging. As the battle against COVID-19 continues and in the uncertain future, while considering the proposed roadmap, based on the concept of smart cities, it is important to be flexible and take advantage of the ICT and innovative technologies that smart technologies possess, as well as the innovative ideas of the private sector.

(8) 38 Road Construction Project

In November 2020, with a budget of about 150 million USD from the central government, the 38-road construction project was launched in Siem Reap. It can be evaluated as a positive project that takes advantage of the situation where the number of tourists decreased drastically after COVID-19. Since the 38-road construction project includes not only road construction, but also drainage, communication, signaling, and CCTV maintenance, which overlap with many of the priority projects proposed in this roadmap, it is necessary to consider the specific details of the 38-road construction project (such as system specifications, operational entities, and methods, etc.) before proceeding the implementation of the priority projects.

(9) New Airport Construction Project

As mentioned in this report, a project to build a new airport, scheduled to open in 2023, is underway. However, limited information is available to the public. Since an airport is a large-scale facility and has a significant impact on human flow and logistics, it is necessary to monitor the progress of the project in the future.

5.2 Summary of the Survey

The purpose of this study, “Data Collection Survey on Urban Improvement in Siem Reap City in the Kingdom of Cambodia” is to review the existing plans for urban development in Siem Reap City, identify the current situation, analyze and sort out the problems, and study the solutions to these urban issues, including advanced methods and technologies symbolized by smart cities. The study started in February 2020 and was scheduled to be completed in January 2021 according to the original contract, but due to the interruption of about three months caused by COVID-19, it ended up taking about two years until February 2022. This study consisted of five main tasks: “Reviewing”, “Envisioning”, “Planning”, “Networking”, and “Action Launching”.

This study was carried out with the Siem Reap Provincial Administration as the main counterpart, and a steering committee chaired by the provincial governor was formed as the decision-making body to build consensus. The steering committee held a kick-off meeting in March 2020, and the 6th and final meeting was held in December 2021. The committee reached a basic agreement on the proposed roadmap and reported the results of the project launch (pilot project). An additional contract was agreed in October 2020 to conduct the COVID-19 impact assessment survey and propose a roadmap for recovery in response to the severe impact of COVID-19 in Siem Reap.

The Angkor Archaeological Park, registered as a UNESCO World Heritage Site, is a world-renowned heritage site and a popular tourist destination. The number of tourists has been steadily increasing, attracting around 5.87 million tourists annually (2018), which is equivalent to about 24 times the population, which is around 245,000 (2019). However, in the following year, the number of annual tourists dropped to around 4.26 million (2019), and in the year after that, the number plummeted to around 1.1 million due to the enormous impact of COVID-19. Since the beginning of this study, it has been noted that the problems in the tourism sector are that tourists are concentrated in some parts of the Angkor Archaeological Park, while other tourist spots are underdeveloped and not well recognized by tourists in general, and that various tourism experiences are not sufficiently provided or recognized to secure long-term visitors and repeat visitors. However, in response to COVID-19, there is a need to develop new measures for the recovery of the tourism sector. The smart city “SIEM REAP SMART” could be the catalyst for this recovery and considered as the implementation of the smart city roadmap.

The consultant team engaged in this study consisted of a diverse group of 8 experts (6 added by the additional contract totaling 14) from the joint venture of Nippon Koei and ALMEC Corporation. The team conducted intermittent surveys for around 27 M/M to understand the current situation, sort out the issues, and propose the roadmap. The team submitted the Interim Report in August 2020, the Interim Report 2 in December 2020, the Interim Report 3 in June 2021, the Draft Final Report in December 2021, and the final report in January 2022. As for the COVID-19 impact assessment survey mentioned above, the preliminary report was submitted in November 2020 and the final report in February 2021. The main outcome of this final report is a smart city roadmap, which was basically agreed upon by the steering committee held in December 2021 and is now awaiting implementation.

As already mentioned in the previous section of this chapter, we have summarized lessons, challenges, and recommendations for the future. JICA is planning to start a technical cooperation project “Project for Implementation of the Smart City Approach to Solve Urban Issues in Siem Reap” from March 2022, where the finalization of the roadmap and the launch of activities with the goal of “Implementing a smart city approach to solve urban issues in Siem Reap” is expected. From now on, it is important that the provincial administration, with the cooperation of the JICA project team, takes ownership of the implementation of the roadmap, and that the system, infrastructure, and mechanisms are in place.

We would like to express our deepest gratitude to the Siem Reap Provincial Administration, related organizations, JICA, and other people involved in this study for their cooperation and support in the activities of this study.

January 2022
JICA Survey Team (Nippon Koei Co., Ltd.)
Team Leader: Kuniomi HIRANO

Appendix 1

Data Collection Survey on Urban Improvement in Siem Reap City in the Kingdom of Cambodia

The Basic Survey for Smart City in Siem Reap

February 2020 – February 2022 Japan International Cooperation Agency Nippon Koei Co., Ltd. ALMEC Corporation

Background

Siem Reap City, being the capital city of Siem Reap Province, is a city with the famous Angkor World Heritage site, and regional development based on the tourism industry is needed. In Siem Reap, due to the increased urbanization, rapid change in socio-economic conditions, advance of technology, increase of private investment, and COVID-19, the environment that surrounds Siem Reap has been drastically changing. When attempting to solve the urban problems in Siem Reap City, guiding sustainable urban development, industrial promotion and improvement of the QoL and tourist satisfaction by taking in account of the change of conditions and introducing high-tech solutions need to be considered.

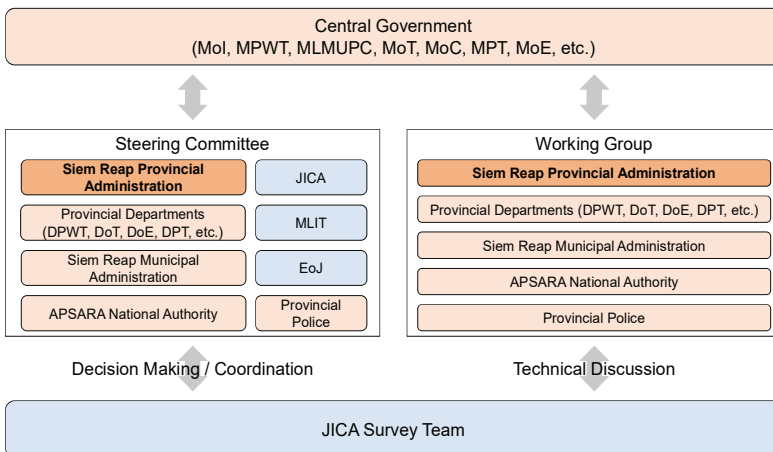
Objectives

Under abovementioned situation, the objectives of the “Data Collection Survey on Urban Improvement in Siem Reap City” is to collect information on urban issues in Siem Reap City, to propose a roadmap for smart city in Siem Reap, and to launch pilot actions of the roadmap including business contests and pilot projects.

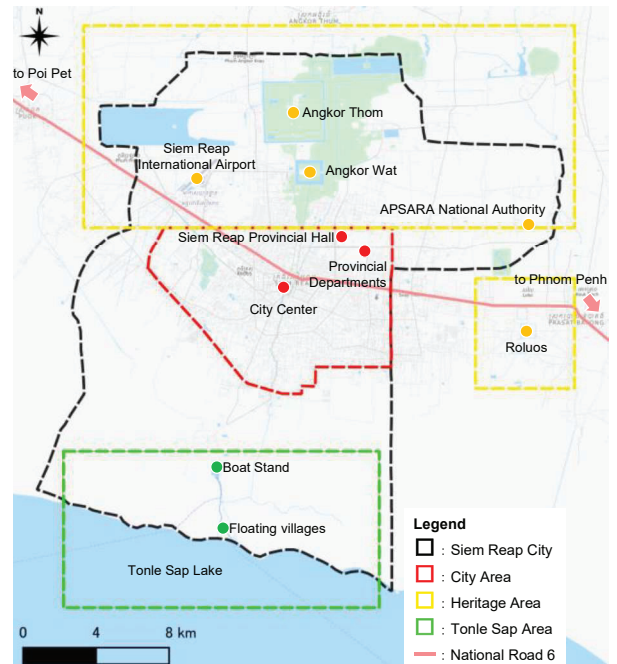
Target Area

Referring to the concerns addressed from the Siem Reap Provincial Administration, the survey area mainly covers city center of Siem Reap City (City Area), in addition to the Angkor Archaeological Park (Heritage Area), and the boat stand area of Lake Tonle Sap (Tonle Sap Area).

Survey Implementation Structure



Survey Implementation Structure



Target Area

Main Target Sector

Referring to the interest of Siem Reap Provincial Administration, the main target sectors of this survey are set as “tourism”, “mobility”, “waste”, and “security and safety”.

Urban Issues

We identified specific issues based on the current status of administrative operations and the four sectors in Siem Reap, and identified a total of 19 major issues as a summary of these issues.

In order to solve these 19 major issues in Siem Reap, this study developed a roadmap for smart city in Siem Reap.

General Administrative Issues

Administrative Organizations	Legal systems Business support	Data management
1. Needs for administrative organization structures for cross-sectoral collaboration	4. Needs to clarify and ease the complex legal procedures	6. Needs for improvement of hardware and ICT circumstances
2. Needs for a smart city promotion unit	5. Needs for active promotion of private smart city business	7. Needs for multi-sectoral data sharing and utilizing
3. Needs for an organizational basis for multi-stakeholder collaboration		8. Needs for open data system, data security, and regulations

Sectoral Issues

Tourism	Mobility	Security	Waste
9. Needs to strengthen promotion as a tourist city	12. Needs for comfort against traffic congestion and on-street parking	15. Needs for more safety against risks of traffic accidents and crimes	17. Needs for enlightenment towards environmentally friendly actions
10. Needs to improve the convenience of tourist behavior	13. Needs for optimized road maintenance	16. Needs for more safety against disasters (fire, flood, etc.)	18. Needs for enforcement of the public initiative
11. Needs to improve the attractiveness of local experiences at tourist attractions	14. Needs for clean air and environmental-friendly mobility	19. Needs for engineering of infrastructure	

19 Major Issues

Urban Issues

Activities

Roadmap for Smart City

With 2035 as the target year, the vision “SIEM REAP SMART” is set up for the realization of Siem Reap’s smart city. Strategic approaches to achieve the vision and concept are also proposed.

In addition, based on the vision and strategic approach, we proposed basic policies and policy directions for administrative and sectoral approach. The overall roadmap summarizing the above is shown in the next page.

Priority Project

In line with the basic policy and the policy directions, several projects were proposed as priority projects. All of them were organized with project outlines (objectives, targets, etc.) from a long-term perspective as well as actions as priority projects from a short-term perspective of 2025.

The Administrative Approach

To promote the smart city roadmap, the roles and collaboration mechanism among four stakeholders including industry (private sectors), public (governments), academic institutions (universities and institutes), and communities (citizens and tourists) are proposed.

The Sectoral Approach

In the “Sectoral Approach”, basic policies are set for target sectors, namely “Smart Tourism”, “Smart Mobility”, “Smart Security and Safety”, and “Smart Waste Management”.

Business Contest and Seminars

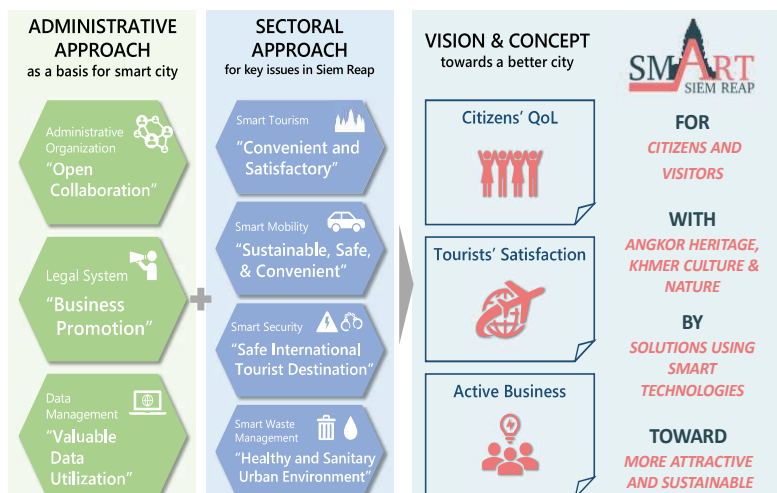
The business contest was held to award business ideas using smart technologies and solutions that contribute to the realization of smart city of Siem Reap and the solution of urban problems. A total of 13 business ideas will be proposed, and 2 projects were awarded for both the project award and the PoC award.

In addition, Seminars have been held as follow to inform private companies of urban issues in Siem Reap and the concept of smart cities.

Date	Venue	Type	Topics
February 10th, 2021	Phnom Penh	On-site/ Online (hybrid)	<ul style="list-style-type: none"> Introduction of urban issues and the smart city roadmap Introduction of the Business Contest
November 24th, 2021	Tokyo	Online	<ul style="list-style-type: none"> Introduction of urban issues and the smart city roadmap Results of the Business Contest
November 29th, 2021	Siem Reap	Online	

Pilot Projects

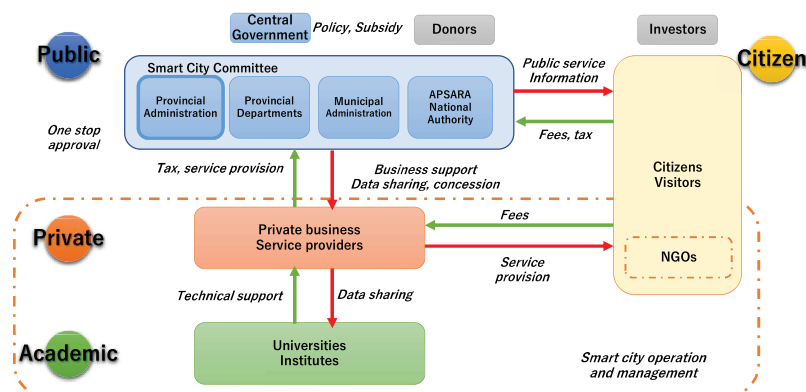
The projects selected as pilot projects are Smart Parking System proposed by Japan Parking Technology Team and Smart Scooter Sharing Service proposed by Asian Gateway. The PoC for Smart Parking System was conducted during this study period.



Strategic Approach to Achieve the Vision and Concept



Plan for Priority Project



Collaboration Mechanism among Stakeholders

The business contest was held to award business ideas using smart technologies and solutions that contribute to the realization of smart city of Siem Reap and the solution of urban problems. A total of 13 business ideas will be proposed, and 2 projects were awarded for both the project award and the PoC award.

In addition, Seminars have been held as follow to inform private companies of urban issues in Siem Reap and the concept of smart cities.

Roadmap for Smart City in Siem Reap

- The Basic Survey for Smart City in Siem Reap -

With 2035 as the target year, the vision is set up for the realization of Smart City in Siem Reap. The vision consists of 4 pillars, namely "FOR", "WITH", "TOWARD", "BY". The 4 pillars support the objective mentioned in the tourism masterplan ("Realize high-quality tourism industry including cultural tourism and sustainable tourism"), as well as promoting the enhancement of the QoL of citizens.

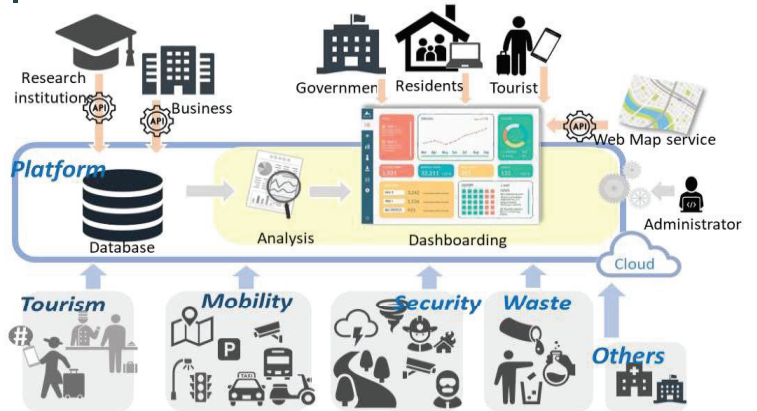
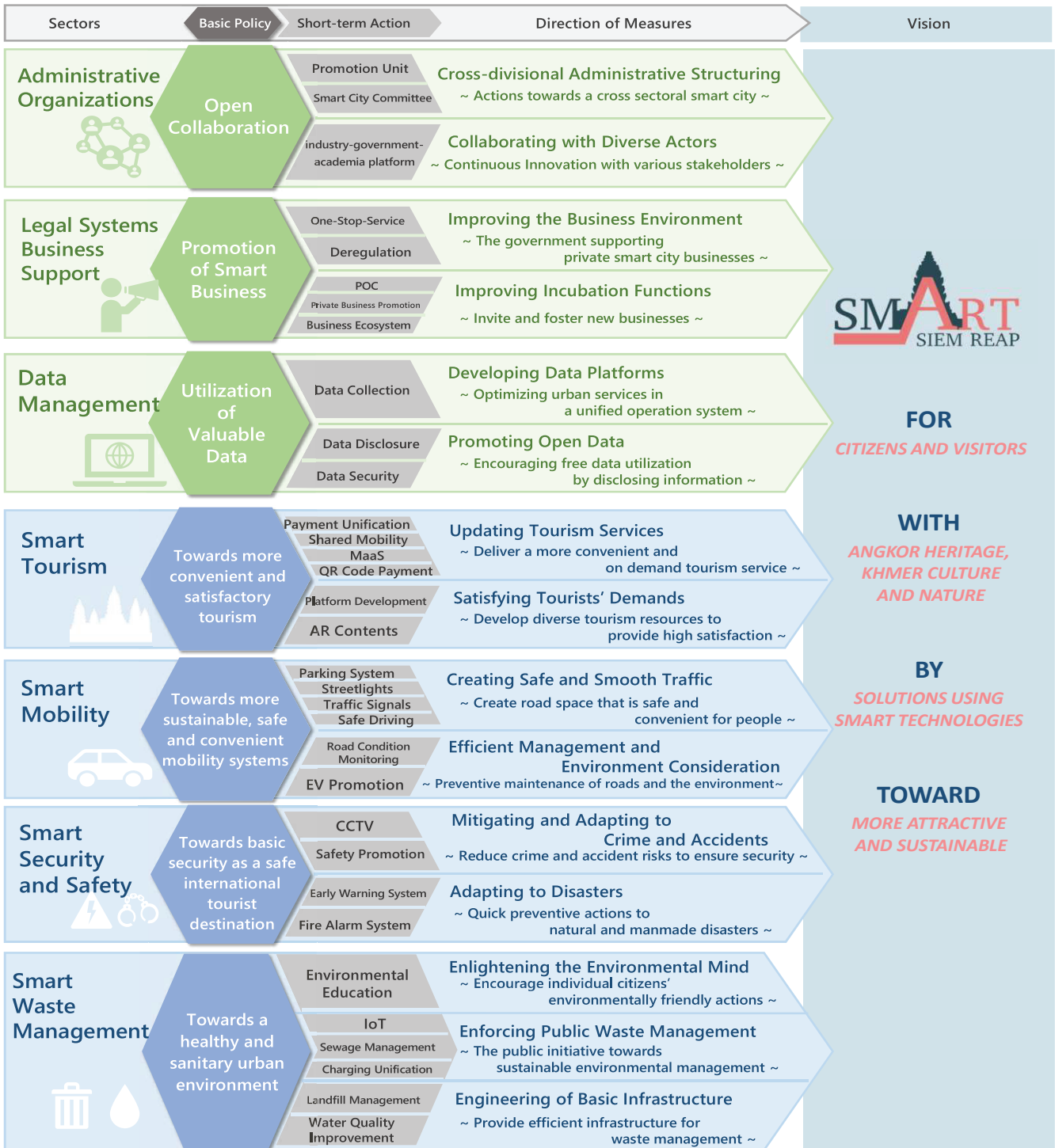


Image of the Data Platform that collects various smart city related data



Data Collection Survey on Urban Improvement in Siem Reap City in the Kingdom of Cambodia

The Basic Survey for Smart City in Siem Reap

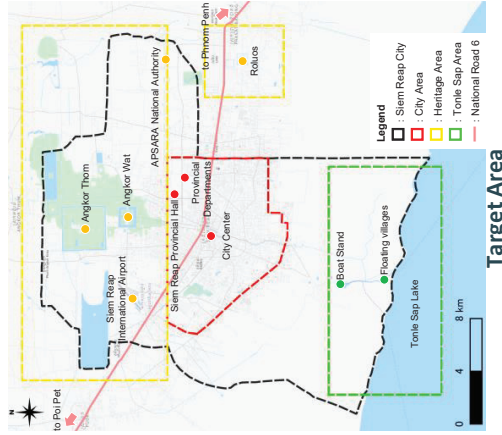
February 2020 – February 2022 Japan International Cooperation Agency Nippon Koei Co., Ltd. ALMEC Corporation

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Target Area

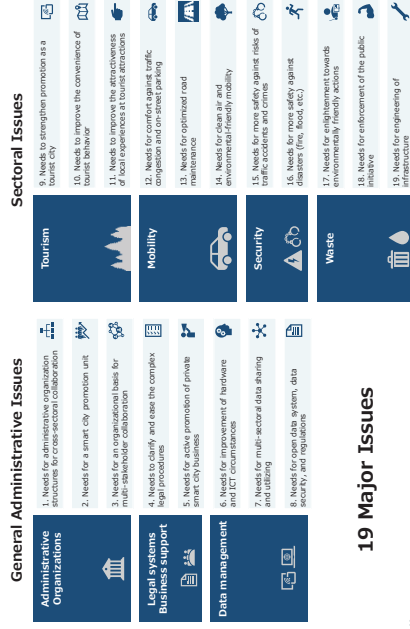
Referring to the concerns addressed from the Siem Reap Provincial Administration, the survey area mainly covers city center of Siem Reap City (City Area), in addition to the heritage area, and the boat stand area of Lake Tonle Sap (Tonle Sap Area).



Main Target Sector

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19 Major Issues

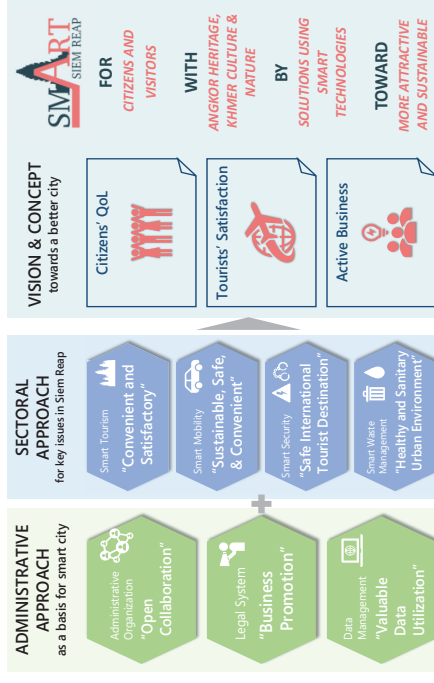


Urban Issues

Activities

Roadmap for Smart City

With 2035 as the target year, the vision “SIEM REAP SMART” is set up for the realization of Siem Reap’s smart city. Strategic approaches to achieve the vision and concept are also proposed. In addition, based on the vision and strategic approach, we proposed basic policies and policy directions for administrative and sectoral approach. The overall roadmap summarizing the above is shown in the next page.

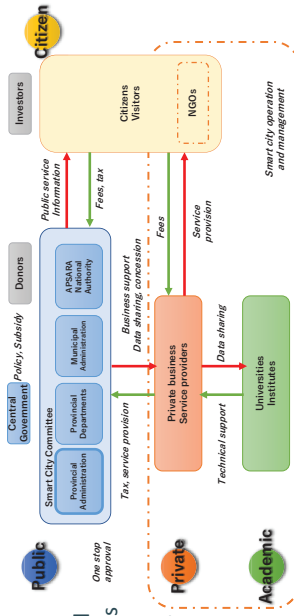


Priority Project

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Pilot Projects

The projects selected as pilot projects are Smart Parking System proposed by Japan Parking Technology Team and Smart Scooter Sharing Service proposed by Asian Gateway. The PoC for Smart Parking System was conducted during this study period.

Appendix 2

COVID-19 Impact Assessment Survey Summary Report (COVID-19 Recovery Roadmap)

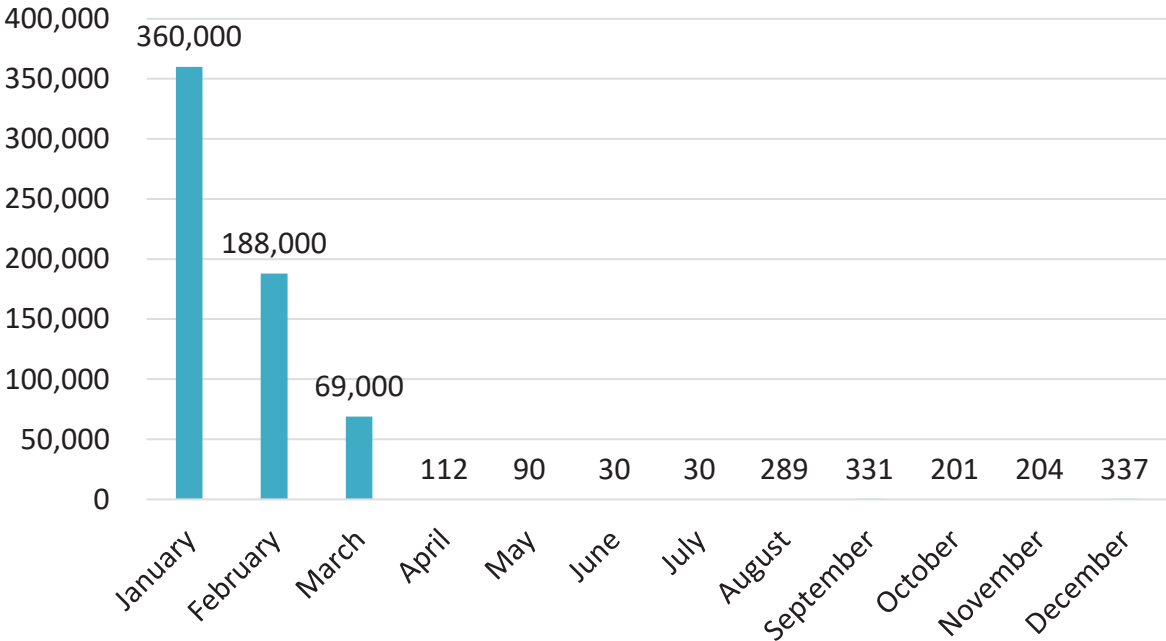
Immediately after the start of this study, a global pandemic of COVID-19 has occurred. In Cambodia, the number of confirmed cases was limited over the past year, although there was a rapid increase in the number of cases from April 2021. On the other hand, the global epidemic of COVID-19 led to restrictions on cross-border travel, and the number of foreign tourists visiting Siem Reap decreased sharply. From this situation, this study will assess the damage COVID-19 has caused to Siem Reap since November 2020, and then propose a roadmap and priority projects for recovery from the damage. The results are fully documented in the "COVID-19 Impact Assessment Survey Full Report", and this part provides an overview of the results.

1. Impacts of COVID-19

While the number of people infected with COVID-19 is increasing worldwide, Siem Reap is causing great damage mainly in terms of economy and industry. Regarding this damage situation, the detailed survey results are reported in the "COVID-19 Impact Assessment Survey Full Report (Submitted in February 2021)". This part gives an overview of the report.

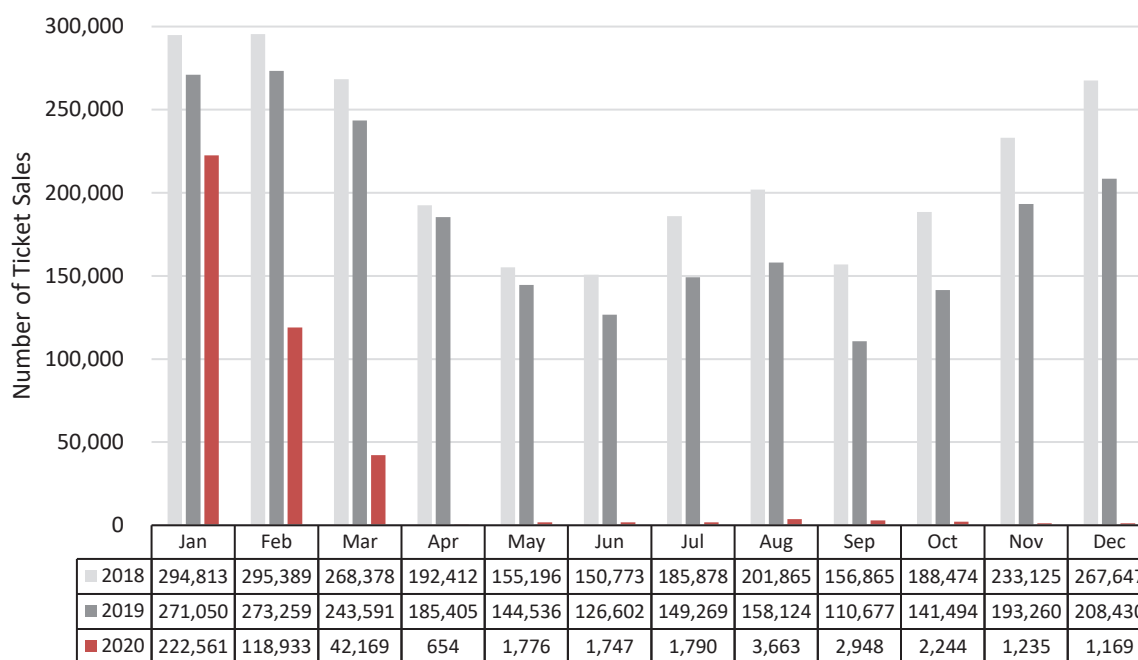
1.1 Decline of tourist arrivals

The needs for the travel industry and hospitality have turned to a great crumble lately. The worldwide reaction to the COVID-19 episode has brought long-term banning on international flights and local restrictions. The number of passengers using Siem Reap International Airport has significantly dropped, up to less than 0.1% in this 10 months. (Figure 1). Also, many tourism related industries, including hotels, guest houses, restaurants, massage stores, and travel agencies were forced to temporarily or permanently close its business (Figure 3, Figure 4, Figure 5, Figure 6).



Source: Cambodia Airports

Figure 1: Number of Passengers using Siem Reap International Airport in 2020

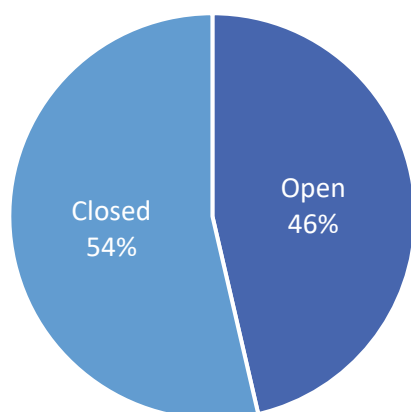


Source: Angkor Enterprise

Figure 2: Number of Ticket Sales of Angkor Ticket of 2018-2020

1.2 Decline of tourism-related industry in Siem Reap due to decrease in tourists

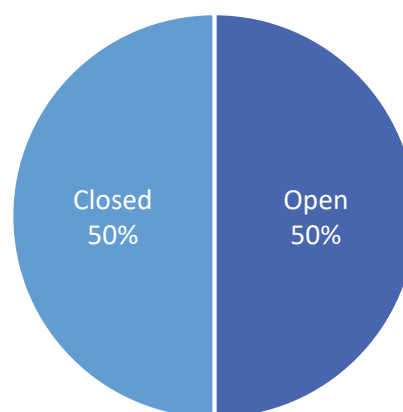
Hotels, guesthouses, restaurants, souvenir shops, and massage shops that were heavily relying on international tourists are suffering the economic depression, and more than half of them are closed as of November 2020.



(As of November 2020)

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

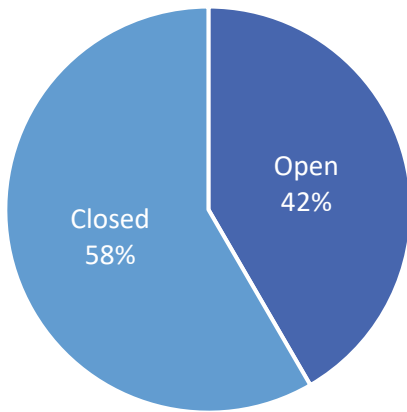
Figure 3: Business Situation of Hotels and Guesthouses in Siem Reap



(As of November 2020)

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

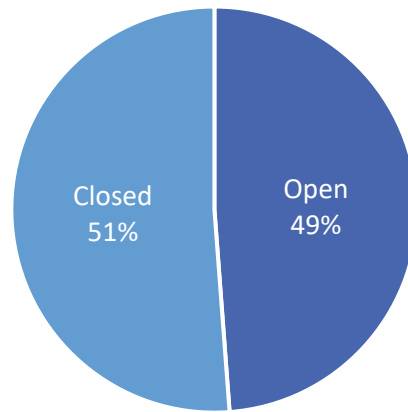
Figure 4: Business Situation of Restaurants in Siem Reap



(As of November 2020)

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 5: Business Situation of Souvenir Shops in Siem Reap



(As of November 2020)

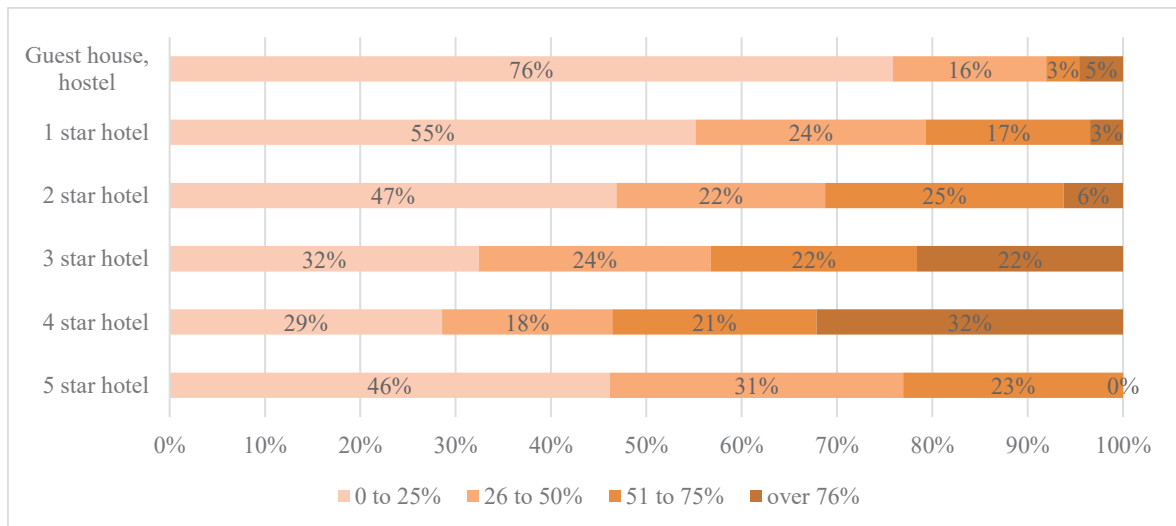
Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 6: Business Situation of Massage Shops in Siem Reap

1.2.1 Impact on tourism-related industries in Siem Reap city

(1) Business Situation

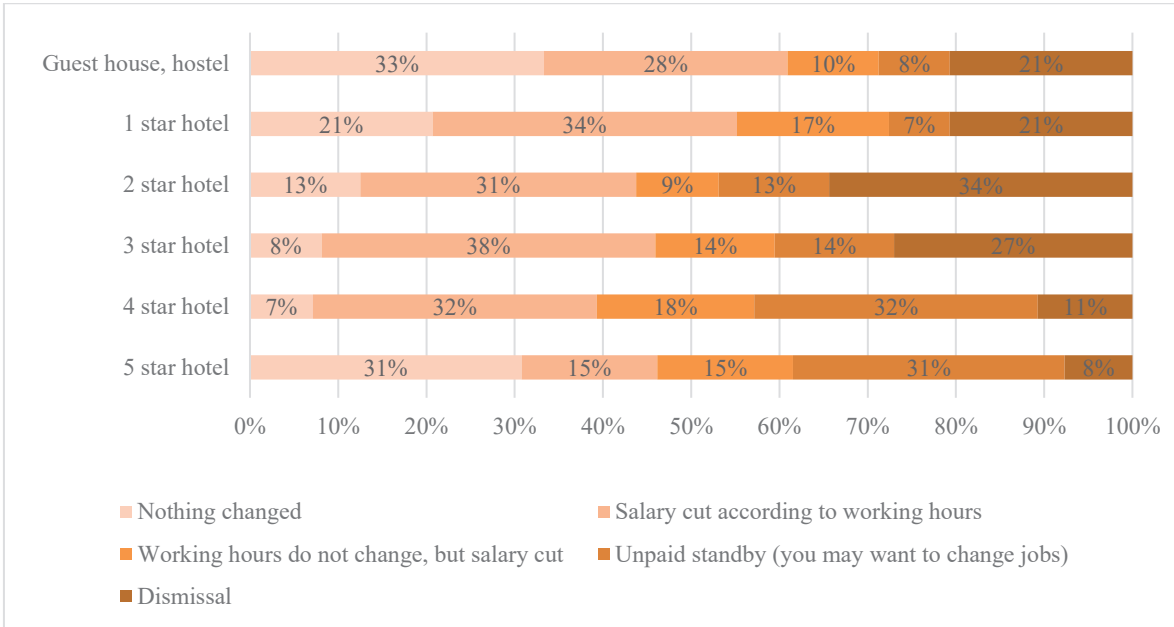
As mentioned above, many stores such as hotels and restaurants in Siem Reap are in trouble due to the influence of COVID-19. According to an interview survey of hotels and guesthouses in operation in January 2021, the number of employees of hotels and guesthouses in Siem Reap has decreased, and the employment situation has deteriorated. Compared to cheap guesthouses, one-star and two-star hotels and five-star hotels funded by large corporations, the deterioration of business conditions of three-star and four-star hotels is more pronounced. It is presumed that the impact of the stay of tourists on hotels of the large class will be greater.



Note: As of January 2021, N=226

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 7: Decrease rate of employees in hotels and guesthouses that are open

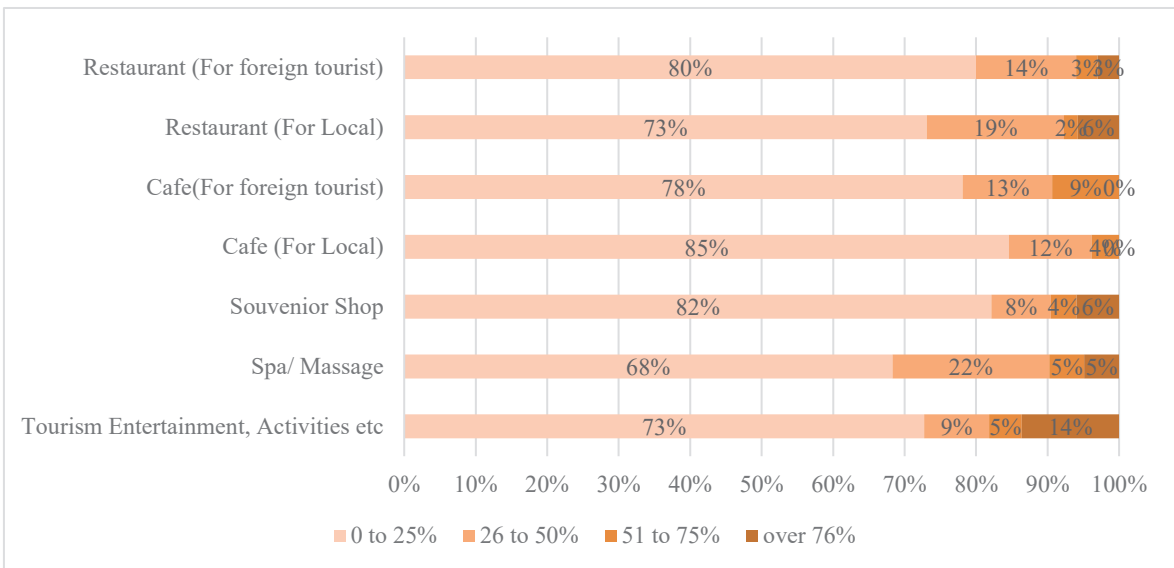


Note: As of January 2021, N=226

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 2.57: Changes in employment status of hotels and guest houses that are open

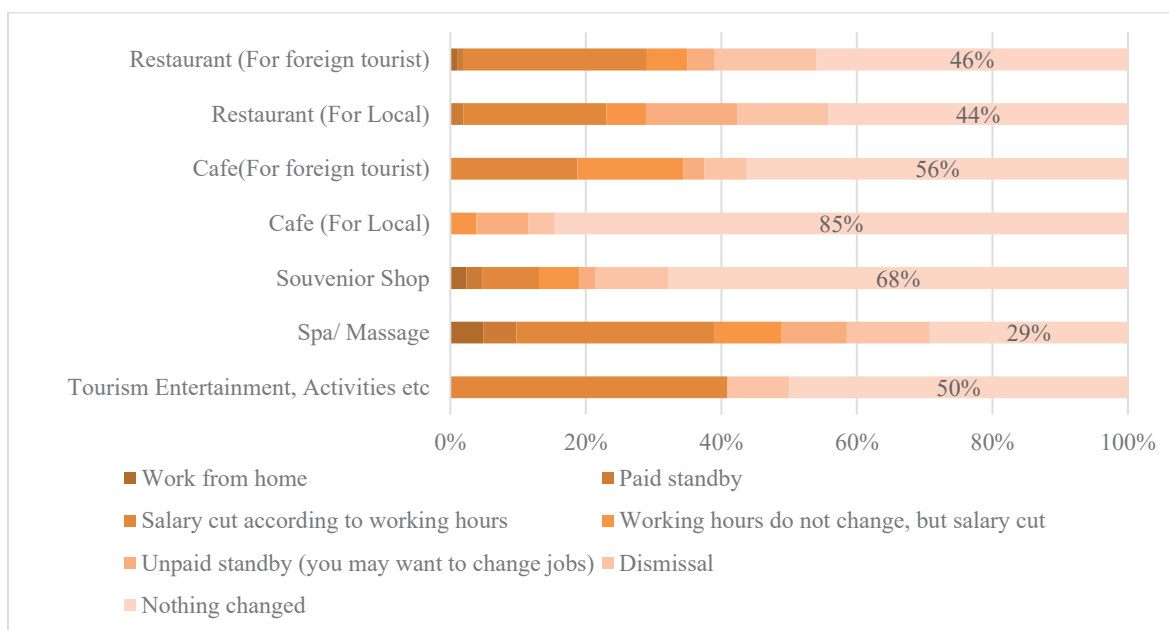
In other industries, although the economic impact is suppressed compared to hotels and guest houses, the business conditions of massage spa stores and souvenir shops, whose main customers are foreign tourists, have deteriorated.



Note: As of January 2021, N=357

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 2.57: Decrease rate of employees in tourism-related industries (excluding hotels and guest houses)



Note: As of January 2021, N=357

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 2.57: Changes in employment status of tourism-related industries (excluding hotels and guest houses)

(2) Price fluctuations

Based on the results of market price surveys in Siem Reap City, which have been conducted three times since November 2020, the outline of the impact on the daily lives of local residents after the expansion of COVID-19 is described.

Table 2.29 compares prices in March 2020 with prices after November 2020. Although there were generally no noticeable changes, “tourism-related” (including accommodation and guide fees) and “housing” (real estate rent) fell sharply.

Table 1: Result of the Market Price Survey by Category

No.	Category	Number of Items	Price ratio [%] (compared to March 2020)		
			November 2020	December 2020	January 2021
1	Tourism-related	21	87%	86%	88%
2	Food	61	103%	104%	103%
3	Housing	6	83%	83%	83%
4	Fuel, light & water charges	3	100%	100%	100%
5	Furniture & household utensils	22	100%	100%	100%
6	Clothing and footwear	4	100%	96%	96%
7	Communication	7	100%	100%	100%
8	Education	10	97%	97%	97%
9	Culture & recreation	24	100%	99%	99%
10	Miscellaneous	4	100%	100%	100%
Total		162	97%	97%	97%

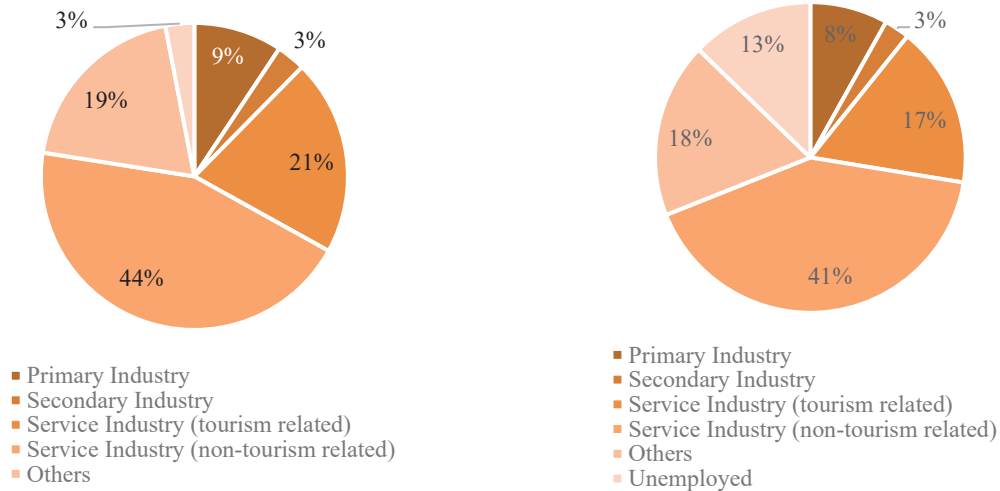
Notes

1. “Tourism-related” include accommodation charges and guide fees
2. “Housing” means rental charges of real estate
3. “Food” sees a slight increase, but it is not a significant increase since the price tend to swing much since before COVID-19

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

1.2.2 Impact on working population

According to a livelihood survey of Siem Reap residents conducted from January 14 to 25, 2021, 17% of household heads were in tourism-related jobs as of January 2021, which was worth about 80% before COVID-19. On the other hand, since about half of tourism-related businesses are already closed, it is estimated that tourism-related workers have already left Siem Reap under the influence of COVID-19.



N=500

Note: "Others" include public servants, architectural jobs, guardsmen etc.

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 1.1 : Job of the Household Head before COVID-19

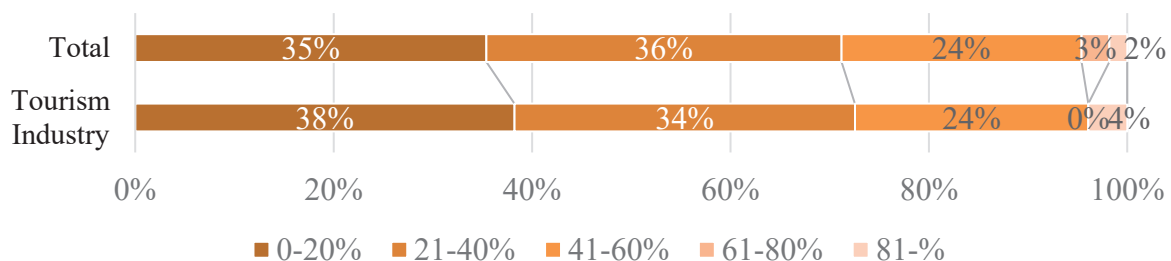
N=500

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 1.2 : Current Job of the Household Head (as of January 2021)

1.2.3 Impact on regional economy

As mentioned above, due to the decrease in tourists, many of the employees engaged in tourism-related work have reduced their salaries or lost their jobs. According to a livelihood survey, household income after COVID-19 has decreased by an average of 66% (Fig. 2.63). In addition, household consumption expenditures are also on a downward trend as household incomes decline, and household expenditures, especially among the poor, are low (Table 2.30). It is estimated that the economic impact on the poor will be greater.



N=500

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 2.57: Household Income (compared to before COVID-19)

Table 2: Comparison of Amount of Consumption per Capita

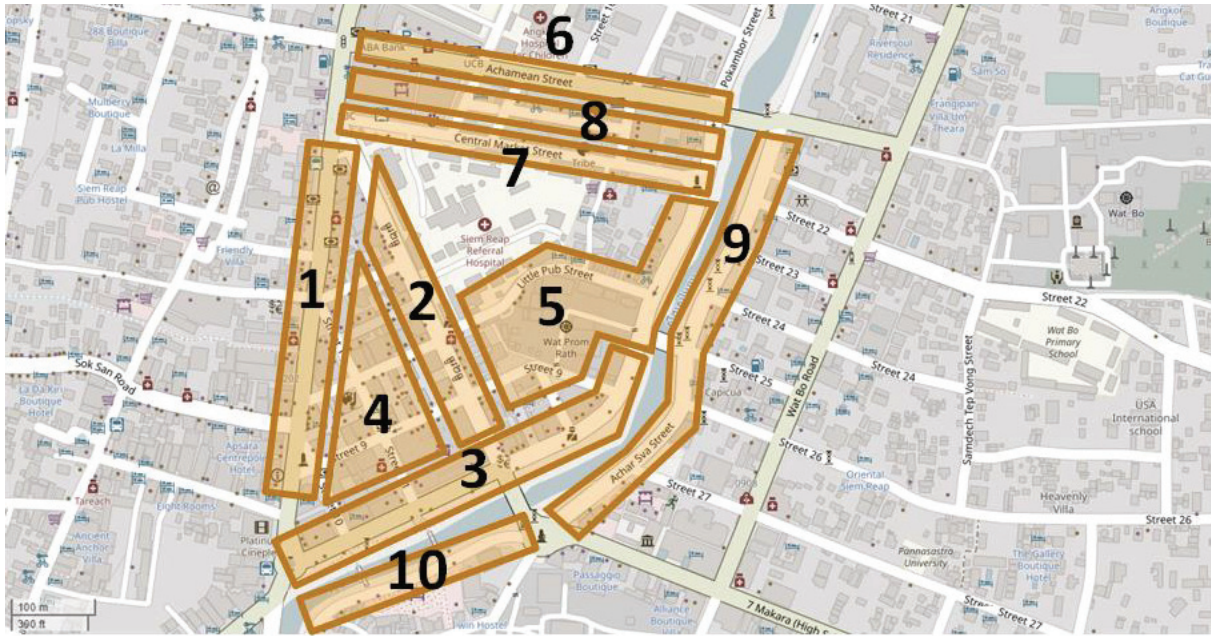
Quintile groups	Value in USD		A/B
	(A) This survey	(B) CSES 2017	
Lowest fifth	36	60	60%
Second fifth	58	92	63%
Middle fifth	79	118	67%
Forth fifth	110	157	70%
Highest fifth	218	309	71%

Notes: The number for CSES 2017 represents “urban areas excluding Phnom Penh”

Source: JICA Survey Team, CSES 2017

1.2.4 Impact on Urban Environment

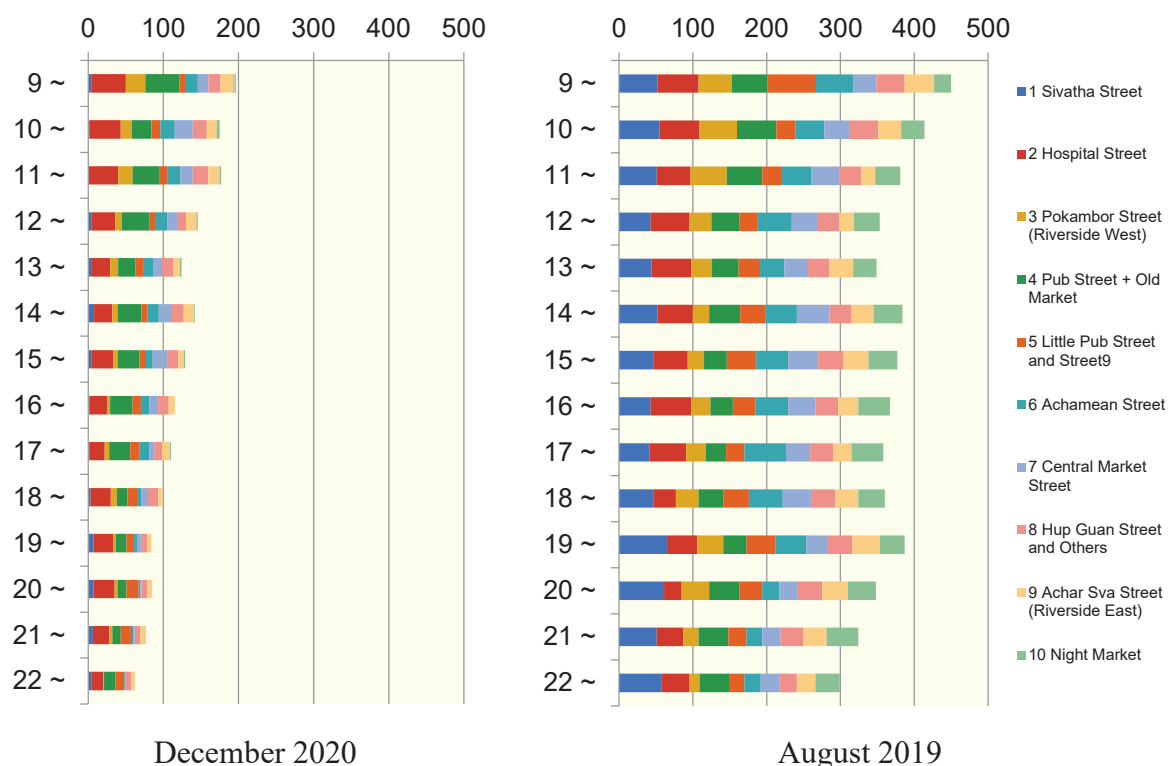
According to a parking survey conducted in December 2020, the amount of on-street parking decreased overall (down 67% on average)¹ due to a significant decrease in tourists.



Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 2.57: Target Area of Parking Volume Survey

¹ Compared to Parking Situation Survey conducted by a private company in August 2019.



Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 2.57: Amount of Parking Volume by Point (December 2020, August 2019)

In addition, according to a traffic survey conducted in December 2020, due to a significant decrease in tourists, traffic volume of Tuk Tuk and buses has decreased at three points (P1. Jayavarman IV Roundabout, P5. Cambodia Asia Bank Intersection, P6. Street 60 Intersection)². In particular, there was a marked decrease in traffic volume of Tuk Tuk at points far from the city center. On the other hand, truck traffic is increasing at some points (P2. Green Feed Dealer Intersection, P3. Apsara Statue Circle, P4. Neakpoan Circle). It is speculated that this is related to 38 Road Construction Project underway in Siem Reap city.

² In order to compare with the traffic volume in 2020 excluding the influence of COVID-19, the traffic volume survey in the Korea Master Plan Survey conducted in 2017 and the traffic volume by JICA senior volunteers dispatched by DPWT in 2016. Based on the results of the quantitative survey, a value adjusted by taking into account the annual travel increase rate (1.22% / year) was calculated and compared with this value.



Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

Figure 2.57: Change of Amount of Traffic Volume by Vehicle Type³

1.3 The travel intentions of potential tourists

According to a questionnaire survey conducted in March 2011 for domestic and foreign tourists, all countries outside Cambodia place the highest priority on infection control in future tourism (Table 2.31).

Table 3: Infectious disease countermeasures required for travel accommodation facilities

	Thailand	Vietnam	China	Japan	Korea	US	UK
Anti-infection measures - tourist site(s)	74%	74%	58%	62%	43%	40%	35%
Anti-infection measures - public transport	71%	55%	62%	65%	32%	34%	23%
Anti-infection measures - accommodation facilities	65%	62%	57%	60%	51%	35%	38%
Anti-infection measures - provision of medical facilities	65%	55%	54%	57%	62%	32%	34%
Anti-infection measures - support for travellers when infected	62%	55%	46%	46%	49%	37%	29%
Statistical information - number of severe cases/deaths	37%	29%	42%	45%	42%	28%	25%
Statistical information - number of infections	42%	42%	46%	48%	54%	31%	28%
Local information - degree of crowdedness at tourist sites	57%	46%	48%	35%	29%	28%	20%
Local information - degree of crowdedness of public transport	45%	45%	43%	31%	20%	25%	22%
Local information - time needed for testing upon entry of the country	51%	49%	45%	35%	34%	22%	20%
Local information - contactless payment methods	32%	28%	28%	32%	22%	11%	9%
Other	0%	2%	0%	3%	0%	0%	5%
None in particular	5%	3%	6%	22%	3%	26%	23%

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

On the other hand, expectations for Siem Reap tourism differed from country to country. Cultural experience was emphasized among domestic tourists, and tourists from China, Japan, and South Korea were interested in historical heritage and food culture (Table 2.32). In order to meet these needs, various tourism services in Siem Reap will be needed in the future.

³ Regarding Point 6, vehicle type is combined to three types for comparing with the result of “JICA SV” survey. Motorbike is shown as “MC (Motorcycle)”, “Tuk Tuk” and “Car, Van” are shown as “LV (Light Vehicle)”, “Bus” and “Truck” are shown as “HV (Heavy Vehicle)”.

Table 4: Preferred Activities during Stay in Cambodia, Siem Reap

	Cambodia	Thailand	Vietnam	China	Japan	Korea	US	UK
Traditional cultural experiences	69%	80%	89%	46%	52%	48%	48%	55%
Historical ruins and buildings	29%	62%	66%	60%	74%	60%	34%	51%
Experiencing food culture/gastronomy	29%	65%	55%	57%	55%	51%	32%	37%
Experiencing/viewing urban culture, modern art etc.	55%	52%	48%	45%	34%	31%	34%	38%
Nature experience	25%	43%	49%	43%	35%	40%	29%	35%
Visit or stay at a resort	31%	31%	38%	38%	26%	29%	28%	22%
Traditional festival/outdoor event	26%	25%	49%	28%	20%	38%	32%	22%
Shopping	20%	22%	40%	32%	28%	22%	26%	32%
Experiencing subculture	20%	46%	31%	35%	15%	15%	23%	17%
Hiking/trekking/climbing	32%	25%	23%	29%	18%	12%	20%	23%
Sustainable travel	45%	18%	34%	14%	12%	18%	14%	22%
Entertainment park visit	31%	15%	25%	34%	14%	17%	18%	23%
Hot spa/health/beauty salon	12%	17%	15%	20%	35%	28%	15%	26%
Unique accommodation experience	17%	14%	34%	18%	12%	20%	15%	11%
Visiting theatre/music performance	18%	14%	18%	9%	9%	9%	23%	14%
Cycling	23%	9%	18%	9%	9%	6%	14%	9%
Sports experience	11%	11%	18%	6%	8%	8%	8%	11%
Watching sports	9%	6%	14%	15%	8%	6%	3%	3%
None in particular	3%	3%	0%	5%	15%	5%	17%	11%
Meeting facilities	8%	5%	2%	0%	2%	2%	2%	0%
Other	0%	0%	2%	0%	0%	0%	0%	0%

Source: JICA Survey Team (Full Report of the COVID-19 Impact Survey)

2. The Roadmap

2.1 Objective

The COVID-19 recovery roadmap aims at the reconstruction of the region based on the stage idea.

2.2 Scenario

We assumed a scenario that goes through the following three phases according to the infection / countermeasure status of COVID-19, and used it as the premise of this roadmap. Of these, Phase 1 and Phase 2 will be dealt with in the recovery roadmap project in this chapter, and Phase 3 will be dealt with in the roadmap for smart city.

Table 5: Scenario of COVID-19 Recovery Roadmap

	Phase 1: with COVID-19	Phase 2: with COVID-19	Phase 3: After pandemic
COVID-19 infection status	<ul style="list-style-type: none"> Community-acquired infection continues Vaccine supply started Forced quarantine for 14 days is required Insufficient measures against infectious diseases 	<ul style="list-style-type: none"> Community-acquired infections have subsided Vaccine spread to some extent Exemption from quarantine by various certifications Infectious disease countermeasures spread 	<ul style="list-style-type: none"> Sedation of global infections Dissemination of vaccines and therapeutic agents Continuation of infectious disease countermeasures
Status and Issues	<ul style="list-style-type: none"> Poverty in citizens' lives due to unemployment, reduced income, etc. The tourism industry is for domestic tourists only, and there are no overseas tourists. 	<ul style="list-style-type: none"> Continuation of financial support for citizens Overseas tourists begin to return Regional industry is still stagnant 	<ul style="list-style-type: none"> No need for financial support to citizens Domestic and foreign tourists return (avoid overtourism)
Aims of Roadmap	<ul style="list-style-type: none"> Emergency financial support (employment / leave compensation, tax incentives, loan interest rate reduction, support money, etc.) Thorough and strengthening of infectious disease countermeasures 	<ul style="list-style-type: none"> Reconstruction of domestic tourism Collaboration and diversification of tourism-related industries Expansion of employment opportunities in the state 	<ul style="list-style-type: none"> Regional promotion with tourism as a lever Promotion of initiatives for smart cities State socio-economic independence

	Phase 1: with COVID-19	Phase 2: with COVID-19	Phase 3: After pandemic
Organization	COVID-19 recovery roadmap (this chapter)		Roadmap for smart city (Chapter3)

Source: JICA Survey Team

2.3 Issues

As of February 2021, due to COVID-19, Siem Reap's main industry, the tourism industry, has been hit hard, and the citywide infection, which had been able to be controlled so far, is gradually spreading. The stagnation of the tourism industry, which had supported the local economy of Siem Reap, has led to the stagnation of related industries (transportation, agriculture, etc.) that mainly marketed tourists, a drastic decrease in employment opportunities, the decline of the city center due to the decrease in tourists and the outflow of labor, the decrease in the exchange population of the province, and the inactivity of the local economy, all of which are part of a negative chain of events. In the reconstruction of Siem Reap, the following four issues are considered to be the main challenges.

(1) Limited infection Measures

Emergency measures for quarantine include increasing the number of tests, but there is a lack of equipment and human resources. There are no medical facilities that can handle hospitalization and surgery. There are a large number of hotels that can serve as quarantine facilities, but the level of service is inequality, and there are still many concerns about attracting international tourists back.

→[Countermeasures against Infectious Diseases] Countermeasures against infectious diseases through the establishment of resilient and sustainable epidemic prevention and sanitation management systems

(2) Drastic Impacts on Tourism Industry

The tourism sector has been severely hit (about half of the businesses have closed, 80% of the hotels have a vacancy rate of 75% or more, and the number of customers in other tourism-related businesses has dropped by about 70%), and those workers in stores, restaurants, and tourist areas are unable to engage in their previous occupations. Many of those working in tourism-related industries used to live in the suburb of Siem Reap City or other districts, and now they are either farming or migrating to the city of Phnom Penh to work. Many of them work in the tourism sector and are facing unemployment and loss of income due to the COVID-19 disaster. Because the number of long-stay visitors is low, income of hotel and guesthouse has not increased (69% of the tickets sold in the heritage area are one-day tickets). (69% of the tickets sold in the heritage area are one-day tickets). They cannot earn direct income from foreign tourists (the number of tickets sold in the heritage area purchased by foreigners has decreased by 99%).

→[Tourism Promotion] Promotion of attractive tourism with the aim of reviving domestic tourism in the short term and international tourism afterwards.

(3) Impacts on Employment and Local Economy

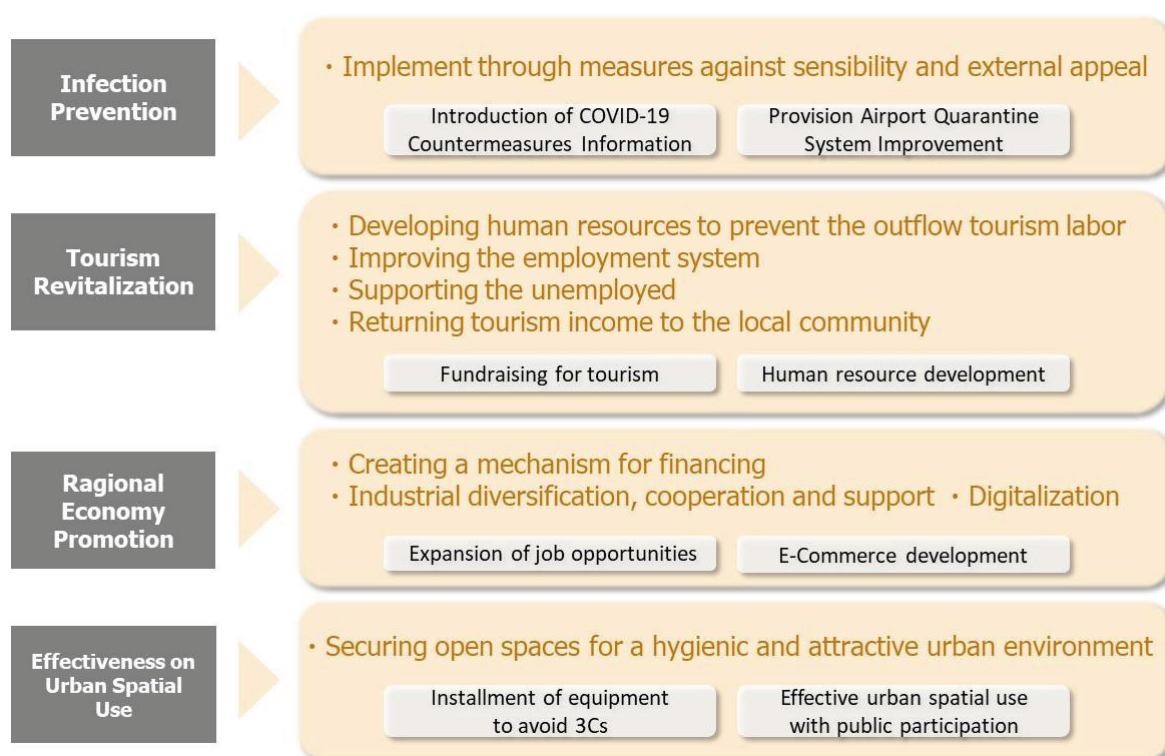
Although the central government is providing financial support, it is not enough to maintain the standard of living (minimum wage of 190 USD/month, unemployment compensation of 40 USD/month from the government and 30 USD/month from the companies, i.e., effectively a maximum compensation of 70 USD/month (about 37%)). According to the results of the livelihood survey, there is insufficient support for businesses that are at risk of losing their jobs. According to the results of the livelihood survey, household income has decreased by 66% on average, and the hollowing out of Siem Reap due to the migration of labor to Phnom Penh and other cities is progressing due to poverty. In addition, many tourism-related workers do not have sufficient skills and are rarely able to engage in highly remunerative skilled labor.

→[Local economic development] Revitalization of local industries for socio-economic development and self-reliance of the entire province.

(4) Inappropriate Urban Infrastructure

Before COVID-19, overtourism had led to the concentration of a large number of tourists in the heritage district, which led to problems of deteriorating infrastructure and environment. Currently, overcrowding has been avoided due to the COVID-19 disaster, and in order to improve the infrastructure that supports tourism resources, infrastructure projects in the city, including the 38 route road construction by the central government and the heritage area infrastructure improvement project by the APSARA Authority, have been implemented, and many people are engaged in these projects, but the quality control is not sufficient. In this way, after pandemic, it does not have a safe and secure urban space to welcome domestic and foreign tourists and make them feel at ease during their stay.

→[Utilization of Urban Space] Utilization of Urban Space for Tourists to Visit, Stay, and Repeat with Peace of Mind



Source: JICA Survey Team

Figure 8: Strategy for Main Issues of COVID-19 Recovery Roadmap

2.4 Roadmap and Priority Project

Table below shows the priority projects for each phase and major issues.

Table 6: Correspondence between major issues and priority projects / management approaches

Pillars of Main Issues	Phase1: with COVID-19 (community acquired infection)	Phase2: with COVID-19 (vaccination dissemination)	Phase 3: after pandemic
Pillar 1: Measures for Infection Prevention	C-01: Installment of Infection Prevention and Sanitary Facilities C-02: Safety standard certification and guideline C-03: Online Education for Infection Prevention	C-04: Introduction of COVID-19 Countermeasures Information C-05: Provision Airport Quarantine System Improvement	<i>(to be proposed in the smart city project)</i>

Pillar 2: Tourism Revitalization	C-06: Fundraising for tourism C-07: Human resource development of the tourism sector	C-08: Tourism farm	
Pillar 3: Regional Economy Promotion	C-09: Expansion of Job Opportunities	C-10: Siem Reap model E-Commerce development	
Pillar 4: Effectiveness on Urban Spatial Use	C-11: Installment of equipment to avoid 3Cs ⁴	C-12: Effective Urban Spatial Use with public participation	

Source: JICA Survey Team

2.4.1 Major Issue 1: Measures for Infection Prevention

(1) Current Status and Issues

- There are concerns about infection from foreigners and migrant workers who have returned to Japan, and it is necessary to take thorough measures against infectious diseases. At the national level, a maintenance system will be built under the initiative of MoH, etc., but Siem Reap requires its own Siem Reap model and its maintenance system, which is especially conscious of the tourism industry.
- Citizens and foreigners are worried that they will not be able to receive certain medical services and services at the time of isolation or infection (they cannot choose the isolation facility by themselves, the isolation measures and services at the isolation facility are different, etc.).
- At private facilities, the service level for infectious disease control is not constant because they can receive the corona countermeasure certification mark just by taking a course.
- Public awareness such as washing hands and wearing masks is fading, and enlightenment and education are not sufficient.

(2) Goal

Implement thorough measures against sensibility and external appeal so that Siem Reap tourism can be appealed to the international market. In addition, to create a system for the general public to live with peace of mind.

(3) Priority Project

Table 7: Priority Projects for Infection Prevention

No.	Name of Projects	Overview
Project C-01	Installment of Infection Prevention and Sanitary Facilities	Install equipment for detecting infectious diseases at airports, disinfection and sterilization equipment at public facilities and large-scale tourist facilities, and water purification tanks at public facilities in rural areas.
Project C-02	Safety standard certification and guideline	Conduct regular patrols of stores and other facilities to ensure thorough countermeasures against infectious diseases.
Project C-03	Online Education for Infection Prevention	Conduct online education and awareness-raising (for medical personnel, private businesses, the general public, and children) by creating electronic manuals and educational materials.
Project C-04	Introduction of COVID-19 Countermeasures	Develop digital tools for hygiene management that contribute to anti-corona measures, conduct commercialization verification of system operation, and collaborate with travel websites.
Project C-05	Provision Airport Quarantine System Improvement	Strengthen the quarantine function of Siem Reap International Airport as a waterfront measure when international tourism is revived.

Source: JICA Survey Team

⁴ Closed spaces with poor ventilation, Crowded places with many people nearby, Close-contact settings such as close-range conversations

2.4.2 Major Issue 2: Revitalization for Attractive Tourism

(1) Current Status and Issues

- The damage to the tourism industry as well as to the industries that depend heavily on tourism (commerce, crafts, and other manufacturing industries) is significant, and in the first instance, it is necessary to create a mechanism to generate economic effects on related industries by mobilizing the tourism industry.
- It will take medium to long term to revive international tourism, including a policy to recover it in 3-4 years. It is necessary to revitalize the domestic tourist market by introducing a business model for the tourism sector that can be adapted to the domestic market after the city is released from the current policy of not accepting any outside tourists due to the expansion of infection.
- The tourism-related human resources do not have sufficient knowledge and experience, and hospitality and other services are inadequate.

(2) Goal

The goal is maintaining tourism income (earning foreign currency) by diversifying tourism content through online and offline activities and developing new tourism destinations with potential, developing human resources to prevent the outflow of tourism labor, improving the employment system and supporting the unemployed, and returning tourism income to the community.

(3) Priority Projects

Table 8: Priority Projects for revitalization for Attractive Tourism

No.	Name of Projects	Overview
Project C-06	Fundraising for tourism	In the purchase type crowdfunding, coupons will be issued and points will be given for online sightseeing. In the donation-type crowdfunding, we will charge the tour fee for tourism revival and heritage preservation.
Project C-07	Human resource development of the tourism sector	Training in hospitality and business manners, expertise in World Heritage sites and regional information, product development, languages, etc., and tourism guidance by trainees will be provided, and an evaluation system will be established.
Project C-08	Tourism farm	Open a tourist farm that combines agricultural experience, employment opportunities for seasonal workers, and community participation, and set up a direct sales outlet to provide consumers with information on production areas and to expand markets.

Source: JICA Survey Team

2.4.3 Major Issue 3: Regional Economy Promotion

(1) Current Status and Issues

- As direct revenue is drastically decreasing due to the sharp decline in the number of tourists and visitors, new means of revenue generation and opportunities to promote investment are needed.
- Tourism-related industries are mainly limited to food and beverage, accommodation, tourist information, souvenirs, massage, etc. With the exception of some NPO activities, opportunities for local industries to benefit from tourism are limited. Therefore, it is necessary to diversify services to meet changing needs, such as delivery and remote/digital services.
- It is not uncommon for the unemployed to temporarily return to rural areas due to seasonal employment, but the migration of the working population from Siem Reap to Phnom Penh could trigger a future hollowing out of the labor market. It is necessary to consider industry project cooperation and Siem Reap government support that will lead to employment opportunities tailored to the employment groups that are likely to flow out.

- Infrastructure development, such as the 38-route road construction currently underway, needs to be linked to opportunities to provide employment opportunities.

(2) Goal

For the recovery and promotion of the local economy in After-Corona, in parallel with the revitalization of the tourism industry, the goal is to create a mechanism for financing, industrial diversification, digitalization, and industrial cooperation and support for the revitalization of local industries.

(3) Priority Project

Table 9: Priority Projects for Regional Economy Promotion

No.	Name of Projects	Overview
Project C-09	Expansion of Job Opportunities	Provide job opportunities through daily employment applications in infrastructure projects, etc., and implement programs to support temporary employment in other industries.
Project C-10	Siem Reap model E-Commerce development	Raise up-front funds including foreign capital through reward-based crowdfunding, raise revolving funds for related industries through the sale of tourism coupons, and build a platform to introduce activities and products of tourism and local industries, etc. and enable commercial transactions.

Source: JICA Survey Team

2.4.4 Major Issue 4: Effectiveness on Urban Spatial Use

(1) Current Status and Issues

- The center of the city does not have enough sanitary and spacious environment where citizens and domestic and international tourists can stay safely.
- Infrastructure development needs to be linked to employment promotion and economic revitalization.
- Most of the tourists travel by group bus or tuk-tuk, but it is necessary to avoid dense traffic and provide circular tourist routes.

(2) Goal

The goal is to avoid dense spaces, discourage over-tourism, secure open spaces for a hygienic and attractive urban environment, promote environmental improvement activities by citizens, and develop infrastructure that contributes to the improvement of the urban environment through central government, local government, private sector, and donor support.

(3) Priority Project

Table 10: Priority Projects for Effectiveness on Urban Spatial Use

No.	Name of Projects	Overview
Project C-11	Installment of Equipment to avoid 3Cs ⁵ .	Installation of sensors to avoid 3Cs, parking at tourist facilities, etc., smart parking management to curb long-time parking in the city center, avoidance of dense parking by monitoring the flow of people with cameras, and provision of information on congestion with an app.
Project C-12	Effective Urban Spatial Use with Pubic Participation	Renovation of open spaces such as the Siem Reap riverfront, creation of liveliness through street furniture and open cafes, and promotion of citizens' litter picking and beautification activities (giving points to those who cooperate).

Source: JICA Survey Team

⁵ Closed spaces with poor ventilation, Crowded places with many people nearby, Close-contact settings such as close-range conversations

Appendix 3

The Basic Survey for Smart City in Siem Reap
Data Collection Survey on Urban Improvement in Siem Reap City
The first Steering Committee

Meeting Information	
Subject	Project Outline, Technical Approach, Work Plan, Sharing the Smart City Images, Expected Support
Venue	Meeting Room in Siem Reap Provincial Government
Date	March 2nd, 2020 10:30~12:30
Material	SC-REP The Basic Survey for Smart City in Siem Reap
Attendees	<p>Cambodia</p> <p>Siem Reap Province : H.E. Mr. Tea Seiha (Governor) Mr. Sok Thol (Director of Administration Division) Mr. Tip Piseth (Director of DPI) Mr. Noun Krisna (Director of DWRM) Mr. Kros Sarath (Director of DOH) Mr. Nom Piseth (Director of DEF) Mr. Tea Kimsoth (Director of DAFF) Mr. Meas Churany (Director of DME) Mr. Pourn Kimly (Director of DOC) Mr. Chea Vuthlong (Director of DIH) Mr. Hy Say (Director of DLMUPC) Mr. Liv Sokhon (Director of DOI) Mr. Sun Kong (Director of DOE) Mr. Ngov Sengkak (Director of DOT) Mr. Ky Virin (Director of DPWT) Mr. Sum Sim (Chief of Telecom Bureau of DPT) Mr. Teng Channat (Deputy General Commissionariat)</p> <p>Siem Reap City : Mr. Noun Puthera (Governor)</p> <p>APSARA Authority : Mr. Sok Soseila</p>
	<p>Japan</p> <p>JICA Headquarters: Ms. Asuka TSUBOIKE (Director)</p> <p>JICA Cambodia Office: Ms. Kaori OKUBO (Representative) Ms. Seng Solady (Program Officer)</p> <p>Embassy of Japan in Cambodia: Mr. Toshikazu TOKIOKA (First Secretary)</p> <p>Consular Office of Japan in Siem Reap: Mr. Naoki MITORI (Counsellor)</p> <p>JICA Survey Team: Dr. Kuniomi HIRANO (Team Leader) Mr. Yukinori AIDA (Project Coordinator)</p> <p>JICA Volunteer: Mr. Shinya TAKASHIMA (DPWT) Mr. Kiyonori AKIHA (DPWT)</p>
Minutes	
<ol style="list-style-type: none"> 1. The Opening Remarks was delivered by H.E. Mr. Tea Seiha, the Governor of Siem Reap Province. 2. The Opening Remarks was also delivered by Ms. Tsuboike, JICA Headquarters. 3. Detailed explanation of the Survey was done by Dr. Hirano, the team leader of JICA Survey Team. 4. Discussions were done as follows; H.E. Mr. Tea Seiha (Governor of Siem Reap Province) <ul style="list-style-type: none"> • The details of this survey will be understood in the future, but we understood and agreed on the 	

method and concept of the entire survey.

Mr. Noun Puthera (Governor of Siem Reap City)

- Siem Reap has various existing plans and projects. In this survey, we would like you to carry out these studies.
- It is important how to create an opportunity in the problem, and the governor often mentions it. I would like you to have such a perspective.
- Tomorrow and the day after tomorrow (on March 3rd and 4th), there will be plenary sessions of the provincial government. I would like the Japanese side to attend if possible.
- There are six future visions as provincial government. In addition to the four fields mentioned by JICA, there are "formation of beauty" and "improvement of illegal residents." As a tourist city, we emphasize on the environmental field. Siem Reap Province has a five-year plan from 2020, which includes river environment improvement and road maintenance. It is also planning to implement a WtE project after 2021 and a waste separation project after 2022.

H.E. Mr. Tea Seiha (Governor of Siem Reap Province)

- The Siem Reap Province plenary session is scheduled on March 3 with the announcements by province and city at a.m., a lecture by the Minister of Environment at p.m., a keynote speech on March 4 at a.m., and Deputy Prime Minister attends at p.m..

Mr. Ngouv Sengkak (Director of DOT)

- I would like the Tourism Master Plan * to be reviewed.
*As additional information from this director during lunch after the Steering Committee, this Tourism Master Plan has been submitted to the central government and can be shared with the JICA Survey Team after approval (estimated late March).

Mr. Tip Piseth (Director of DPI)

- Regarding "mobility", Japanese companies are conducting MaaS business, and provincial government also supports them. I would like that business to be reflected in the plan

Ms. Okubo (JICA Cambodia Office)

- It is important to solve multiple urban issues and combine individual technologies to increase the impact. To this end, we would like the JICA Survey Team to share various activities of each stakeholder.

Mr. Ky Virin (Director of DPWT)

- Siem Reap has many beautiful resources. Currently, in addition to this JICA survey, two JICA projects on sewage treatment are underway.
- Although there are many undeveloped infrastructures such as roads, sewage and drainage, we believe that the inauguration of a new governor will be an opportunity to promote the action of the plan.

Mr. Hy Say (Director of DLMUPC)

- In recent years, the Land Use Master Plan of Siem Reap has been approved by the central government. The central government has directed Siem Reap to eliminate land disputes with landowners by 2021. For this purpose, it is necessary to promote land registration.

Mr. Mitori (Consular Office of Japan in Siem Reap)

- In this survey, we will be able to expect various ideas to come out to the Siem Reap Province. The Embassy of Japan also would like to provide support.

Mr. Meas Churany (Director of DME)

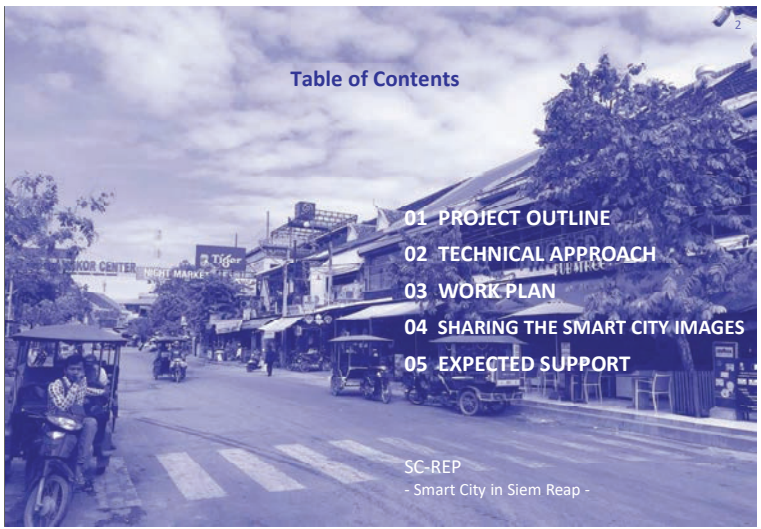
- In the field of energy, we would like to receive the support from Japan on the examination of safety standards for gas stations in the city, and we would also like you to consider it in this survey.
→ Mr. Mitori: I will consider.

5. Closing Remarks was delivered by H.E. Mr. Tea Seiha, the Governor of Siem Reap Province

- The issues mentioned by the JICA Survey Team and those considered by Siem Reap Province are almost the same. I would like you to make proposals from the perspective of how great effects can be created by consolidating technologies.
- Siem Reap Province is also concerned about the shortage of housing and needs to be considered.
- Japan has high environmental awareness and succeeded in post-war reconstruction while retaining good old culture. Please tell us about good manners and garbage separation.
- We have been excavating ground in the suburbs of Siem Reap to secure soil, but there are holes in the excavated area, and we would like to hear your opinions on such land improvement or utilization.



END



01 PROJECT OUTLINE

(1) BACKGROUND

Siem Reap City

- A touristic place with Angkor Archaeological Complex, the World Heritage
- Having intension to develop based on the tourism

ISSUES

- Increase of urban problems (Deterioration of environment, serious traffic jam, increase of crimes)
- Measures are not sufficient
- Decision of the Master Plan (2006), but circumstances changed greatly

ASCN

- Siem Reap and Phnom Penh are selected as pilot cities of the ASEAN Smart Cities Network (ASCN)

Urgent needs of sustainable development of the heritage and improvement of living condition

Opportunity of applying innovative and advanced technologies to solve urban issues

01 PROJECT OUTLINE

(2) OBJECTIVES

Objectives

Proposing and launching actions for total solutions of smart technologies against urban problems of Siem Reap

Main Steps

- Reviewing (understanding of current situation)
- Envisioning (proposal of visions based on issues)
- Planning (proposal of a road map and priority projects)
- Action Launching (Selection and implementation of a pilot project)
- Networking

Survey Period

March 2020 – January 2021 (11 months)

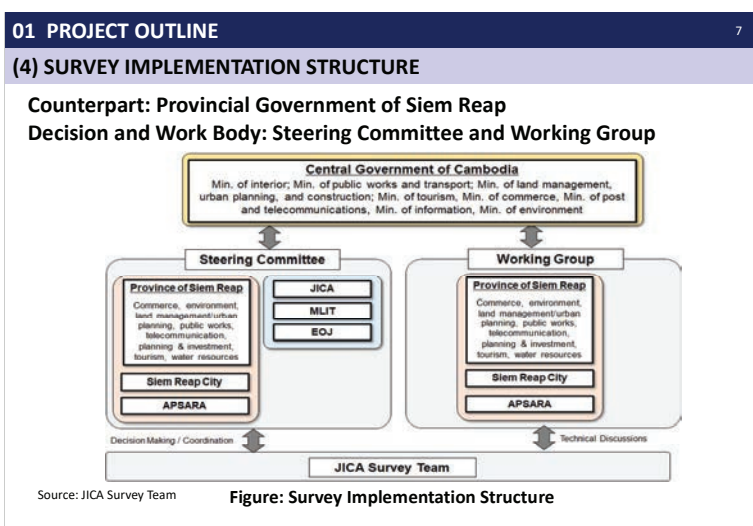
01 PROJECT OUTLINE

(3) TARGET AREA

- City Area
- Heritage Area
- Tonle Sap Lake Area

Source: JICA Survey Team based on the "Land Use Master Plan of Siem Reap, 2035 vision", MLMUPC, 2018

Figure: Survey Area (left) and City Center of Siem Reap (right)



01 PROJECT OUTLINE

(5) MEETINGS AND SEMINARS

1) Steering committee
Reporting, confirming, and getting approval

Meetings	Expected Date	Expected Subject
1 st Steering Committee	March 2020	Presentation and discussion of the Inception Report
2 nd Steering Committee	May 2020	Presentation and discussion of the Interim Report
3 rd Steering Committee	July 2020	Authorization of the pilot project
4 th Steering Committee	December 2020	Progress of the pilot project

Source: JICA Survey Team

01 PROJECT OUTLINE 9

(5) MEETINGS AND SEMINARS

2) Working Group
Discussion on the detailed matters

Meetings	Expected Date	Expected Subject
Working group 1	March 2020	Detailed issues responding to the comments at the Steering Committee
Working group 2	May 2020	
Working group 3	July 2020	
Working group 4	December 2020	

Source: JICA Consultant Team

* TV Meeting (tentative) April, June, August, October 2020

01 PROJECT OUTLINE 10

(5) MEETINGS AND SEMINARS

3) Seminar
Opportunity of collaboration <Academia – Public – Private>

Seminar	Expected Date
Seminar in Siem Reap	Early July, 2020
Seminar in Phnom Penh	Early July, 2020
Seminar in Tokyo	Late July, 2020

Source: JICA Consultant Team

* Second seminars in Siem Reap and Tokyo are tentatively planned in December 2020.

01 PROJECT OUTLINE 11

(6) DELIVERABLES

Deliverables	Expected Submission Date
Inception Report	Mid-March, 2020
Interim Report	Late April, 2020
Draft Final Report	Late July, 2020
Final Report	January, 2021

Source: JICA Consultant Team

01 PROJECT OUTLINE 12

(7) JICA STUDY TEAM MEMBERS

Name	Position
HIRANO Kuniomi	Team Leader / Urban Development
FUKUOKA Kenji	Business Consulting / Smart Technology
HIGO Noriko	Tourism / Project Implementation
YUMITA Kazuo	Environment
UBUKATA Yoshikazu	Transport
KURIMOTO Kai	Security
ABE Tomoko	Organization/Regulation
YANO Atsushi	Data Management
AIDA Yukinori	Coordinator



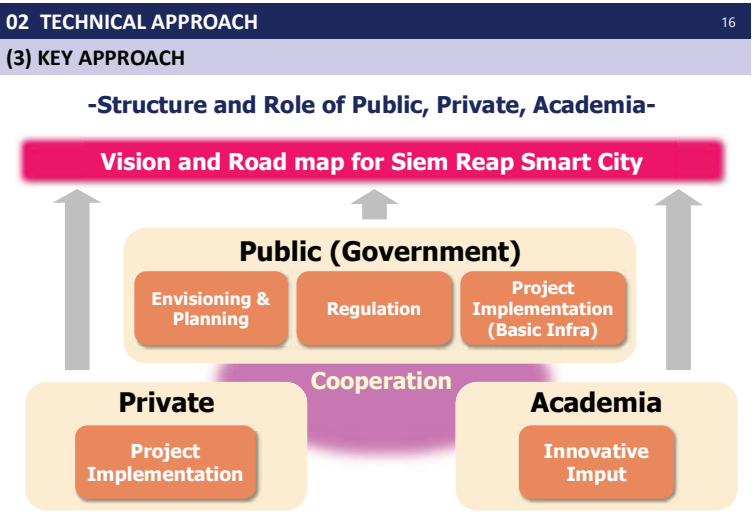
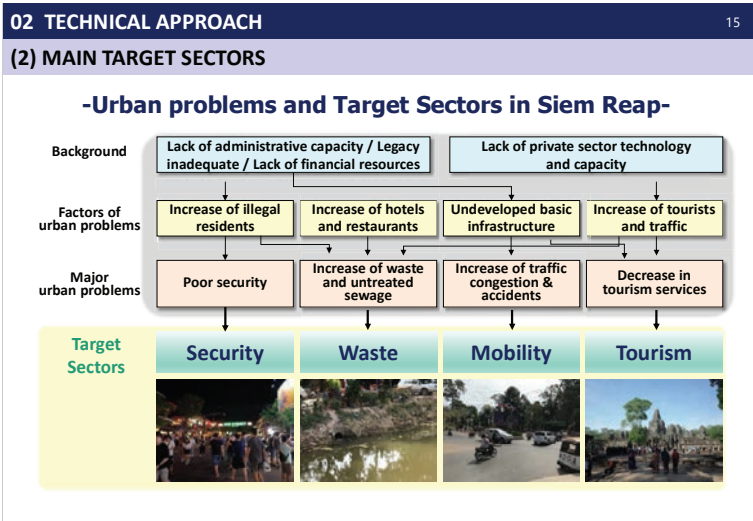
02 TECHNICAL APPROACH 14

(1) WHY SMART CITY?

Smart City is to realize a **Comfortable and Sustainable City** by bringing Smart Technologies

Key Points of Smart City

- Need the Smart Technologies to contribute the **Comfortable Life for Citizens and Tourists**
- Need the Sustainable Tourism Business and the **Business Profit should be provided to Citizen's QoL**
- Need the contribution of **SDGs Achievement** while building the Smart City



(3) KEY APPROACH

-Solution finding by the "Open Innovation"-

Urban Problems in Siem Reap

Want to solve the problems...

Need the Smart Solutions

How to find the solutions...

Do the "Open Innovation"

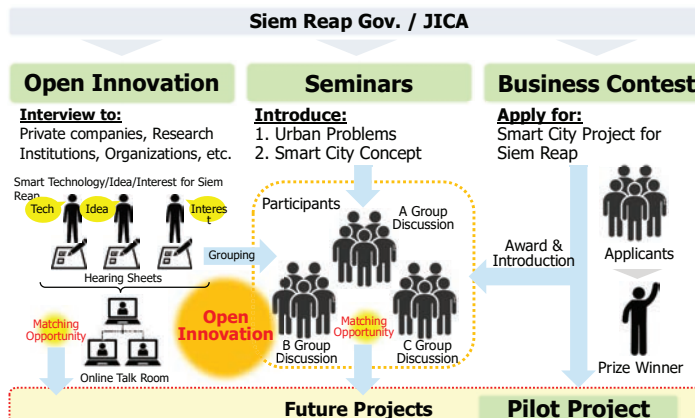
Need a "Total Solution" by Smart Technology for Siem Reap

"Open Innovation" is,
Not only to introduce one technology by one company,
But also to bring a **Total Solution** to solve urban problems.

Key points of the Open Innovation:

1. Need the "Appropriate & Sustainable Technology"
2. Need a "Combination of Technologies" that brings **Synergies, Sustainability, Ripple Effects**

(4) FOUR KEY POINTS OF THE STUDY



(4-1) OPEN INNOVATION

To integrate various Ideas/Technologies and propose the Solutions covering several sectors

Approach

- Interview (Hearing Sheet)**: to record information of companies/research institutions
- Key Graph (correlation diagram)**: to identify potential partners
- Talk Room (chat function)**: to offer chance of interaction among potential partners



Collaboration structure within **industry, government and academia** will be established to **develop a total solution from various viewpoints and knowledge.**

(4-2) SEMINAR

To share and discuss the Urban Problems, Concept and Solutions of Siem Reap Smart City

Seminar

	Place	Date*	Participants
Seminar 1	Siem Reap	Early July, 2020	Government Officers, External Experts, Academic Experts, Winners of the Business Contest, Private Companies (Approx.100 persons)
Seminar 2	Phnom Penh		
Seminar 3	Tokyo	Mid July, 2020	

*Actual date will be negotiable

Program

- 1. Explanation**
 - 1) Urban Problems of Siem Reap
 - 2) Project Priority Sectors
 - 3) Smart City Concept
 - 4) Road Map
- 2. Pilot Project**
 - 1) Awarding of the Business Contest Winners
 - 2) Introduction of the awarded Projects
- 3. Group Discussion**

Discuss the Smart City approach and solutions per sector groups.

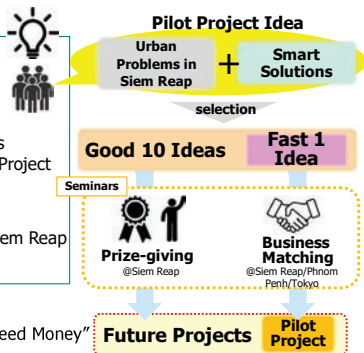


(4-3) BUSINESS CONTEST

To invite widely and evaluate the Ideas solving the Urban Problems of Siem Reap

Process

- 1. Application**
 - >Apply for Pilot Project Ideas
- 2. Selection**
 - >Selection of TEN prize-winning projects
 - >Finalization and approval of ONE Pilot Project
- 3. Prize-giving Ceremony**
 - >Prize-giving ceremony at Seminar in Siem Reap
 - >Business matching at three seminars



Pilot Project
> Start Pilot Project by receiving the "Seed Money"

(4-4) PILOT PROJECT

To understand "Key Points and Lessons" for realizing the Smart City through the Pilot Project

Pilot Project

August 2020 - January 2021 (6 months)

Prize Winner will implement the ONE Pilot project with "Seed Money"

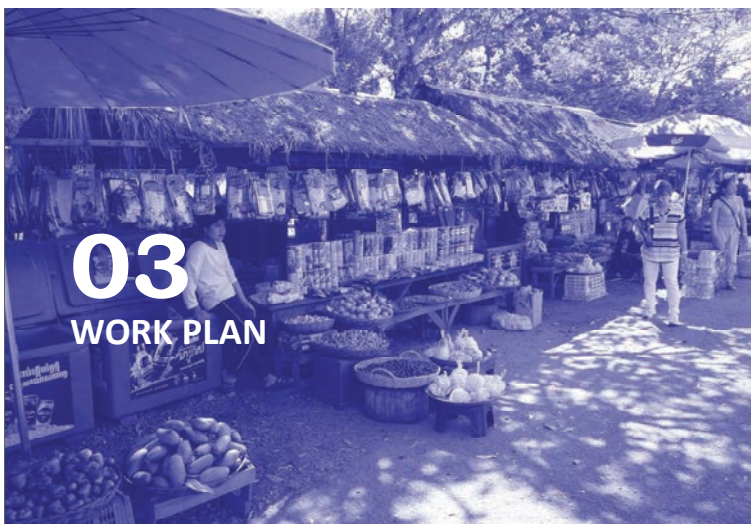
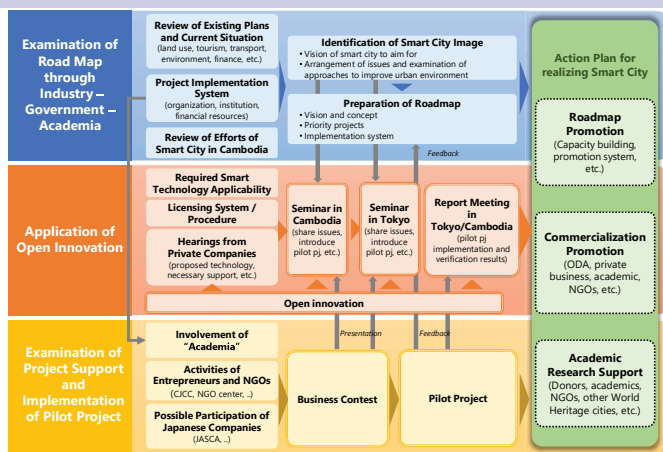
Siem Reap Gov. will mainly monitor the Project and **JICA Study Team will follow up support**

Lessons from Pilot Project

Necessary licensing systems and procedures for smart technologies and **Capacity development of the Siem Reap Gov. (Management of Smart City development)**

Future Projects

(5) WORK FLOW



(1) OVERVIEW OF THE WORK

Main Contents	Work Items
Reviewing	1) Review of Existing Plans and Current Situation
	2) Review of the Smart City Activities in Cambodian and ASEAN Cities
	3) Review of Legal System
	4) Review of Current Implementation Structure
	5) Cooperation of "Public", "Academia", and "Private"
Envisioning	6) Proposal of the Smart City Development Vision
	7) Proposal of the Smart City Development Strategies
Planning	8) Proposal of the Road Map
	9) Proposal of Priority Projects
	10) Proposal of the Action Plan
	11) Proposal of Project Implementation Structure
Action Launching	12) Selection of the Pilot Project
	13) Implementation of Pilot Project
Networking	14) Interview Survey
	15) Open Innovation and Business Contest
	16) Holding Seminars

Source: JICA Survey Team

(2) WORK SCHEDULE

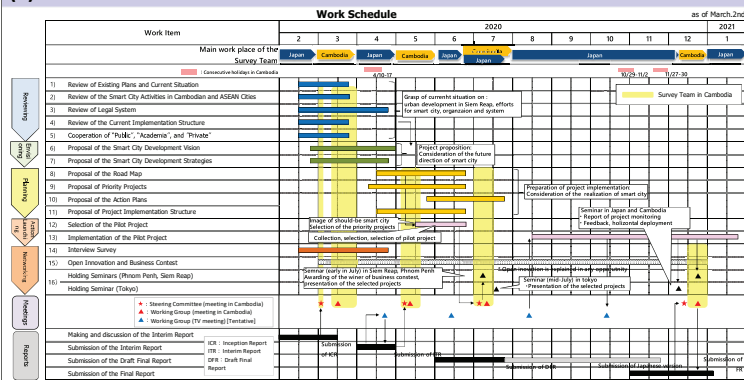


Figure: Work Schedule

Source: JICA Survey Team

*See attachment

(3-1) REVIEWING

- 1) Review of Existing Plans and Current Situation**
 - (i) Review of superordinate plans and related documents
 - Land Use Master Plan of Siem Reap 2035 Vision (MLMUPC, 2018)
 - Touristic master plan,
 - Other related documents
 - (ii) Activities of donors and private sector
 - (iii) Current situation of Siem Reap City
- 2) Review of the Smart City Activities in Cambodian and ASEAN Cities**
 - (i) Phnom Penh, Battambang, and Siem Reap (pilot cities of ASCN)
 - (ii) Implementation system in Cambodian Government for smart city promotion

(3-1) REVIEWING

- 3) Review of Legal System**
 - (i) Review of Cambodian laws, permits and licenses, and procedures relating to urban development and application of new technology
 - (ii) Classify smart city-related issues into:
 - Issues can be implemented within the existing laws and systems
 - Issues can be implemented if they are amended
 - Issues needing new laws and systems
 - (iii) Proposal of necessary legal system for realization of smart city
- 4) Review of Current Implementation Structure**
 - Role demarcation of Provincial Government, APSARA, ministries and other institutions

(3-1) REVIEWING

- 5) Cooperation of "Public", "Academia" and "Private"**
 - Framework: collaboration among Academia - Industry - Government
 - Building up a collaboration system with educational and research institutions

Table: Means of Building "Industry" "Government" "Academia" Collaboration System (draft)

Item	Means (draft)
Public	Cambodia <ul style="list-style-type: none"> ■ Steering committee considered as the future project executing organization
	Japan <ul style="list-style-type: none"> ■ Information sharing with JICA, and Japanese ministries Ministry of Land, Infrastructure, Transport, and Tourism (MLIT); Ministry of Economy, Trade and Industry (METI); Ministry of Internal Affairs and Communications ■ Opinion exchange with the Policy Division, Policy Bureau of MLIT for the future direction
Academia	Cambodia <ul style="list-style-type: none"> ■ Experts/researchers of Cambodian universities Institute of Technology of Cambodia, The University of Cambodia, Royal University of Phnom Penh, etc. ■ Association of the Overseas Students and other organizations to request participation in the business contest
	Japan <ul style="list-style-type: none"> ■ "Academia" network of the Kobe Graduate School of Information Technology ■ Experts/researchers of Japanese universities Waseda University, Sophia University, National Graduate Institute for Policy Studies (GRIPS), etc. ■ Subcommittee for the <Public - Academia - Private> collaboration of overseas urban development of the Japan Society of Urban Planning
Industry	Cambodia <ul style="list-style-type: none"> ■ Participant companies of the Cambodia ICT Award ■ Young Entrepreneurs Association of Cambodian, ■ Local companies
	Japan <ul style="list-style-type: none"> ■ Japanese companies who are interested in the business in Siem Reap ■ Provision of information to 'Cambodia Urban Development and Real Estate Development Platform' ■ Participant companies of the interaction subcommittee of the Society of Urban Planning

Source: JICA Survey Team

(3-2) ENVISIONING

- 6) Proposal of the Smart City Development Vision**
 - (i) Draft vision and concept
 - (ii) Ideal urban service using the smart technology
 - (iii) Merits from smart city
- 7) Proposal of the Smart City Development Strategies**
 - (i) Sectors of important urban problems of Siem Reap
 - (ii) Possibility of the smart technology for solution, approach to multiple sectors, and implementation methods

(3-3) PLANNING

- 8) Proposal of the Road Map**
 - Process and mile stones of realization of smart city vision/concept, for improvement of urban problems of Siem Reap
- 9) Proposal of Priority Projects**
 - (i) Selection viewpoints: implementation period and implementation scheme
 - (ii) Presentation to the Cambodian side including funding and investment scheme
- 10) Proposal of the Action Plan**
 - (i) Support to Cambodian counterpart institution to develop capacity in the project implementation
 - (ii) Target issues of the future Cambodia - Japan cooperation
- 11) Proposal of Project Implementation Structure**
 - (i) Grasp of needs of cooperation between Cambodia and Japan
 - (ii) Building up of the sustainable and functional structure for project operation and management

(3-4) ACTION LAUNCHING

- 12) Selection of the Pilot Project**
 - Selection of some prize-winning projects
 - Finalization and approval of ONE Pilot Project which will be able to implement in short term as a Pilot Project
- 13) Implementation of Selected Pilot Project**
 - Survey Team supervises the contract management, progress monitoring, and inspection of the outputs
 - Compiles lessons learnt and important matters for the future project implementation and supervision by the Cambodian institutions

(3-5) NETWORKING

14) Interview Survey

- (i) Target: Cambodian and Japanese companies who have
 - Smart technology and business plan
 - Intention to run business in Siem Reap

Example of activities of Japanese companies using smart technology

<p>Tourism</p> <ul style="list-style-type: none"> - Log analysis of tourists' action <p>Transport/ Security</p> <ul style="list-style-type: none"> - Transport surveillance camera - Street lights equipped with wires network system <p>Administration/infrastructure management</p> <ul style="list-style-type: none"> - Infrastructure O&M system, fee collection system - Crop cultivation management by drone, road survey, traffic control 	<p>Water supply, wastewater and drainage management</p> <ul style="list-style-type: none"> - Sensor inside water pipe and sewer pipes, road O&M using PBV - Joint pipeline, permeable pavement - Laid sheet that location of underground pipes can be detected from the ground <p>Waste</p> <ul style="list-style-type: none"> - Improvement of final disposal site, mitigation of odor, wastewater treatment - Management of final disposal site business - Plastic recycle
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Source: JICA Survey Team based on the interview with Japanese companies (as of 25th December 2019)

- (ii) Review of applicability of the smart technology and business plan

(3-5) NETWORKING

15) Open Innovation and Business Contest

- (i) Promotion of the open innovation in business contest and other opportunities
- (ii) Selection of a pilot project through open innovation and business contest

Table Means of Open Innovation (draft)

Opportunity	Time	Contents	Expected outputs and effects
Interview for private sector	March – April 2020	<ul style="list-style-type: none"> • Request of filling questionnaire • Sharing information and opinion exchange of the technologies possessed by the target company 	<ul style="list-style-type: none"> • Possibility of technological collaboration between companies
Briefing session in Cambodia and Tokyo	July 2020	<ul style="list-style-type: none"> • Giving award of the business contest • Presentation/introduction of the awarded business plans • Group discussion • Exposition of panels and social gathering 	<ul style="list-style-type: none"> • Promotion of the opinion exchange between private sector and research institutions
Debriefing session in Cambodia and Tokyo (tentative)	December 2020	<ul style="list-style-type: none"> • Introduction of the pilot project and verification of implementation • Discussion, advices and examination for future development of the project <p>*Venue: Siem Reap, Tokyo *Approximately 50 participants per seminar *To be held within the limits of budget</p>	<ul style="list-style-type: none"> • Appeal of participation to the companies interested in the future business development • Promotion of the opinion exchange

Source: JICA Survey Team

(3-5) NETWORKING

Table Means of Business Contest (draft)

Item	Details
Time and action	<ul style="list-style-type: none"> ■ May 2020 : Announcement of collection of applicants (by E-mail, and oral communication) ■ June – July 2020: Selection, matching, finalization of the project, and approval ■ August 2020: Commencement of the project
Framework	<ul style="list-style-type: none"> ■ Designation of priority sectors that contribute to solve urban problems ■ Designation of places having high appealing effect to the people ■ Projects using technological and/or research matching are highly appreciated ■ Introduction of the project supporting schemes for future project implementation
Purpose	<ul style="list-style-type: none"> ■ Selection of total ten projects, giving award, and authorization ■ Donation of the seed money of one million yen, to one of these projects that is identified sufficiently feasible for implementation as pilot project
Target	<ul style="list-style-type: none"> ■ Japanese companies who run business in Cambodia ■ Cambodian companies, OB/OG of overseas students studying in Japan, participants of Cambodia ICT Award, Young Entrepreneurs Association of Cambodian ■ ASEAN companies ■ Research institutions: Universities in Cambodia and Japan
Selection, criteria	<ul style="list-style-type: none"> ■ Mainly by technical criteria (due to the cap of the supporting financial source). ■ Judge: composed of the experts, member of the Working Group, and JICA ■ Select ten projects
Project implementation	<ul style="list-style-type: none"> ■ Ten projects area awarded and authorized by the Governor of the Province in the Seminar (July) ■ Each of ten awarded projects are presented at the seminar ■ Announcement of cooperation and technological matching with the awarded projects ■ Finalization of the project implementation plan of the one pilot project ■ August 2020: Commencement of the pilot project in August 2020

Source: JICA Survey Team

(3-5) NETWORKING

16) Holding Seminars

Table Seminars in Cambodia and Tokyo (draft)

Item	Seminar in Cambodia	Seminar in Tokyo
Time	Early July, 2020	Middle of July, 2020
Venue	<ol style="list-style-type: none"> 1. Siem Reap (meeting room of Provincial Gvt.) 2. Phnom Penh (meeting room in a hotel) 	Tokyo (JICA meeting room)
Participants	Government officers, external experts, academic, winners of the business contest, interested companies (approx. 100 persons)	Government officers, external experts, academic, winners of the business contest, interested companies (approx. 100 persons)
Agenda	<ol style="list-style-type: none"> 1. Urban problems of Siem Reap, vision and concept, priority sectors, and draft road map 2. Awarding of the winner projects of the business contest (given by the Governor of the Province) *Only in Siem Reap 3. Introduction of the awarded projects 4. Group discussion per sector 5. Wrap up of the discussion to share the result of the discussion among the seminar participants *Exposition of panels and social gathering as parallel session 	
Follow-up	The Survey Team requests to the participants to fill the questionnaire sheet on the intension of matching, and supports matching and open innovation as follow-up of the seminar	

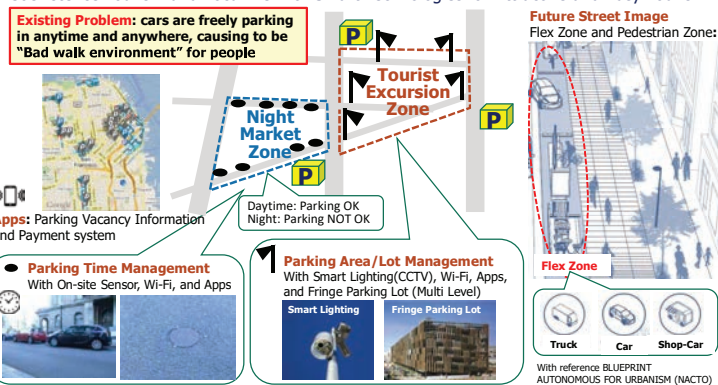
Source: JICA Survey Team



(1-1) MOBILITY IN SIEM REAP

Smart Parking System

Coexistence Tourism and Local life with Smart Technologies for Attractive and Easy Tourism

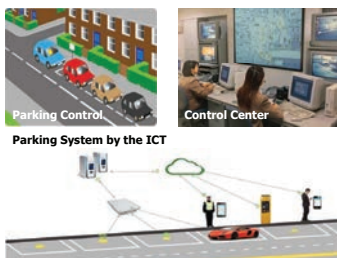


(1-1) MOBILITY IN SIEM REAP

Street Parking Management

Car Parking Control by Management of the Control Center

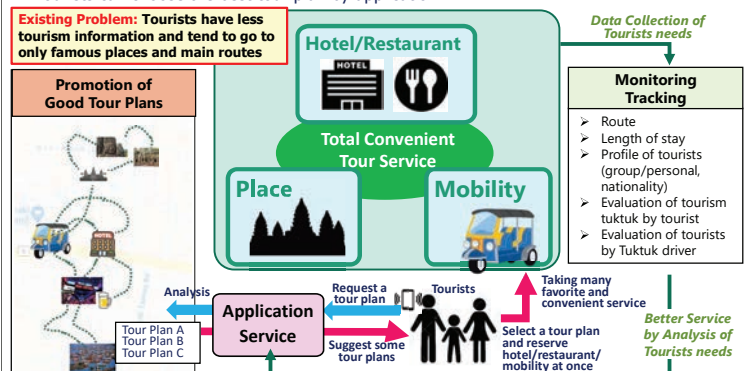
- Development of on-road parking lot (with CCTV camera) & Control center
- Area control, such as enforcement parking & one-way system etc.



(1-2) TOURISM IN SIEM REAP

The Best Tour Planning Service

Tourists can choose the best tour plan by application



(1-2) TOURISM IN SIEM REAP

Smart Tourism Information Providing visual tourism information by ICT solutions

Existing Problem:

- Lack of information decreases tourists' satisfaction
- Inconvenience prevents repeat customers



Solution

QR code to get detailed information on site

Solution

Digital signage to deliver various and latest information

- Available in multiple language
- Efficient to reduce advertising work cost

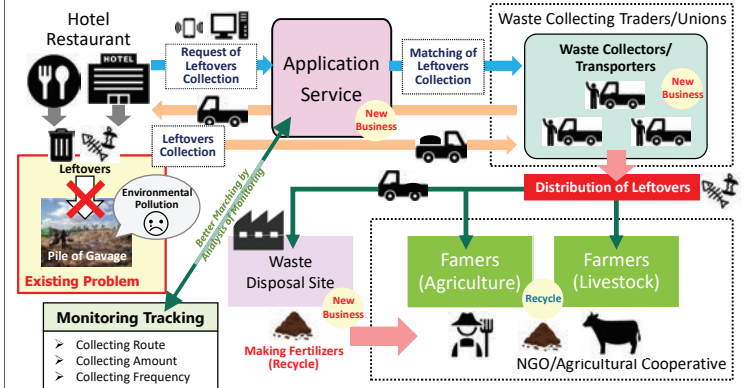
Solution

VR/AR video to deliver local culture and history efficiently

- VR (Virtual Reality): simulated experience that can be similar to or completely different from the real world
- AR (Augmented Reality): technology that superimposes a computer-generated image on a user's view of the real world

(1-3) WASTE IN SIEM REAP

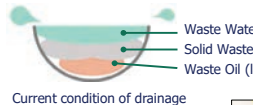
Smart Recycling Project Collecting the Organic Solid Wastes (leftovers) and Recycle them by promoting application service



(1-3) WASTE IN SIEM REAP

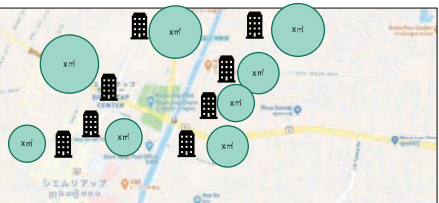
Waste Water Survey Project Survey of the current condition of the waste water and drainages

Existing Problem: drainages in Siem Reap have not been functioned and affected environmental damage



Solution

- Survey Project
- Mapping of large-scaled hotels
 - Estimating amount of waste water from the number of hotel passenger rooms
 - Visualizing the routes of waste water by GIS
 - Confirming condition inside drainages



(1-4) SECURITY IN SIEM REAP

Smart Security Equipment and Service

Existing Problem: Crime to tourists at night time (robbery etc.)

Danger and lower satisfaction of tourists

Smart Solution 1: SMART LIGHTING

Street Lighting + CCTV

- Lighting ON only when
 - Nighttime
 - people are near (auto-sensing by CCTV)

One solution, many effects

- Bright streets
- Crime monitoring
- Parking monitoring
- Tourist activity monitoring
- Less energy consumption

Smart Solution 2: TOURIST APP.

Tourist App.

Information about

- danger on streets
- tourism sites
- Shops and restaurants
- transport services (Tuk Tuk etc.)

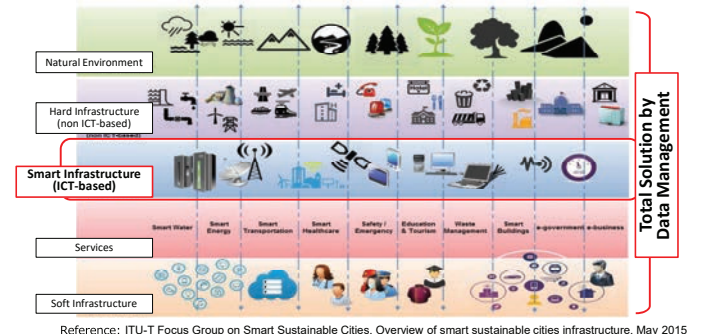
One solution, many effects

- Safety awareness
- Tourism promotion
- Mobility management

(1-5) DATA MANAGEMENT IN SIEM REAP

Smart sustainable CITY by Data Management

"A smart sustainable city is an innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social and environmental aspects".



Reference: ITU-T Focus Group on Smart Sustainable Cities, Overview of smart sustainable cities infrastructure, May 2015

(1-5) DATA MANAGEMENT IN SIEM REAP

- Requirements of World class Smart Infrastructure -

- A Smart Sustainable City is a city that leverages the ICT infrastructure that is
 - ✓ adaptable & agility
 - ✓ reliable
 - ✓ scalable
 - ✓ accessible
 - ✓ secure, safe, resilient
 - ✓ based on 100% GREEN Technologies
- Software-defined Smart Datacenter

Note that a single interoperable ICT infrastructure is essential.

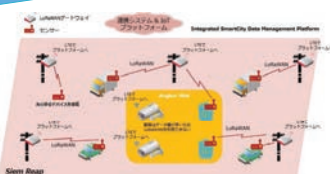
Siem Reap needs to implement HOLISTIC (=TOTAL) approach of DATA MANAGEMENT INFRASTRUCTURE

In traditional approaches to urban development all the infrastructure systems are managed in silos, with limited communication and information sharing among and across government departments and civil society.

(1-5) DATA MANAGEMENT IN SIEM REAP

- the World leading Smart Infrastructure -

- Best solution for A Smart Sustainable City is State of the art "we recommend vertical smart ICT" to enabling "Siem Reap Smart City";
 - "Software Defined datacenter virtualization"
 - +
 - "Modular based green Data Management"
- Software-defined Smart Datacenter



(2) WORLD TREND OF SMART CITY

United Kingdom(UK)
The government will take the initiative to promote the use of ICT to create High-value Work Opportunity and promote Economic Revitalization and Economic Growth.

Denmark
Denmark Government is actively working on climate changes and has adopted Smart Technology to create the Carbon-neutral Environmental City. Denmark is focusing on "energy" and "climate."

Germany
Target of the government is the attracting New Residents and creating New Jobs, the government promotes the revitalization of existing urban areas and the Creation of New Urban Areas. In addition, Industry-Government-Academia initiatives are implementing the project.

Spain
Government is aiming to create innovation for City Management Efficiency, Revitalizing the Industry and raising Work Opportunity, with introducing Foreign Companies' Technologies.

(2) WORLD TREND OF SMART CITY

Australia
Government is aiming to expand the **High-value Digital Market**, to grow the ICT Field, and to promote the Work Opportunity and Industrial Development. It is also called "Sensor City" because it uses many sensors for collecting information.

USA
US Government created the Work Opportunity by building the organization to **develop and manage the Ultra-high-speed Internet** throughout the city. Local government is creating smart city infrastructure to eliminate the digital isolation.

Canada
The **Giant IT Company** is leading and planning to create a **New City** through the introduction of smart infrastructure, rather than redeveloping existing cities where land rights and citizens coordination are hard.

United Arab Emirates (UAE)
Masdar City will work on Energy-saving City measures that use the sunlight and solar heat even in extremely hot environments. Designing the layout and shape of buildings to cut off sunlight and take in wind for cooling. **Introducing New-Tech from Foreign Companies such as EV and Eco-bus.**

(2) WORLD TREND OF SMART CITY

China
With the government cooperation (support of equipment costs), city with a large number of smart functions will be built as if the **Technology Showcase of Chinese Giant IT Companies**. Therefore, only specific areas are becoming a smart.

Japan
MLIT* has launched the advanced Smart City Model 15 Projects in 2019. In the Model Projects, for solution of the urban problems, cities and private companies are cooperating and aiming to build the **Sustainable Cities or Districts to optimize whole city** by using new technologies and managing (planning, maintenance, operation, etc.). *Ministry of Land, Infrastructure, Transport and Tourism of Japan

Developing Countries
Smart City Competition held by Central Government
Central Government holds the **Smart City Competition** and will support funding of the **Smart City** to the Winner State or City. States and Cities will compete and make better ideas, and it activate the entire country.
(Central Government of Thailand, Indonesia and India will certificate 100 Smart Cities)
Leapfrog phenomenon
Developing countries are in the lack of social infrastructure, and it leads to a leapfrog phenomenon in which the **latest technologies are applied more quickly to social infrastructure.**

(3) EXAMPLES IN THE WORLD

Copenhagen Connecting [Copenhagen City, Denmark]

- Improve efficiency throughout the city, by utilizing data, developing infrastructure, and collaborating with various regional organizations while focusing on "Health", "Mobility", "Energy", "Climate", "Citizens", and "Education"
- Aiming to be "the World's First Carbon-neutral Capital" by 2050 as a whole Denmark

Target Area
Entire Copenhagen City and Copenhagen Airport

Solution of Problems

- Formulation of the "Big Data City"
- Management of assets
- Formulation of Sensor platform
- Introduction of the internet to be good cost performance

Technology

Transport

Copenhagen Intelligent Transport Solution (CITS)
Projects aimed at **improving traffic congestion, reducing carbon dioxide emissions, and improving citizen safety**

Energy

Danish Outdoor Lighting Lab (DOLL)
Using office and residential areas as a demonstration test site, installs new lighting solutions from domestic lighting companies. It is equipped with sensors that measure the local temperature and the distribution of pollutants, and also measures information such as road temperature and the dense of air pollutants.

Big data

Hitachi Consulting has collaborated with Living Plan IT and built a single smart platform for collection, integration and unification of data.

For Realization

Fund Raising	Organization
<ul style="list-style-type: none"> Annual City budget is 40 million Euro (2012) Investment from cooperative organizations Subsidy of EU Horizon 2020 Project 	<ul style="list-style-type: none"> Conference: Copenhagen Solutions Lab Public: Copenhagen City Private: Cisco Systems, Hitachi Consulting and other private companies Academia: Technical University of Denmark, other 3 Univs.

(3) EXAMPLES IN THE WORLD

Barcelona 5.0 Smart City [Barcelona City, Spain]

- Project has started since 2000
- 200 projects under 22 programs are underway to utilize **ICT and IoT to improve the efficiency of public services and solve urban issues.**

Target Area
Entire Barcelona City (101.4km²)

Solution of Problems

- Preparation for population decline and management and maintenance for the City
- Revitalizing industries and creating work opportunities by the innovation

Technology

Transport

- Smart parking that collects usage data from sensors installed in city parking and allows users to search and reserve empty parking with a free application
- Bicycle sharing service with 420 stations in the city

Energy Saving

- Water system that automatically and remotely controls watering, fountains, and sewerage systems based on data such as temperature, humidity, wind, and soil conditions obtained from sensors installed in city parks.

Safety Security

- Installing sensors, converts all street lights in the city to energy-saving LEDs. This is the **Controlled Street System that will turn off lights during times of low traffic**, turn on lights in areas where crime is likely to occur and time zones.

For Realization

Fund Raising	Organization	Condition
<ul style="list-style-type: none"> Annual City Budget is 53.7million Euro(2014) Investment from cooperative organizations 	<ul style="list-style-type: none"> Conference: Barcelona City Public: Cisco, GDF Suez, Schneider Electric, etc. Academia: College of Europe, etc. 	<ul style="list-style-type: none"> Development of system infrastructure and network is a prerequisite for the introduction of various technologies. The development is such as sensor platform and wireless LAN networks to grasp the operation status of the project and management of aggregated data, by installing sensors in some points of the city.

(3) EXAMPLES IN THE WORLD

Link NYC [New York City, USA]

- Link NYC replaces more than 7,500 public phones in five districts and provides **public tablets called to Links to access maps, public services, device charging, calls and super fast free public Wi-Fi.**

Target Area
New York City

Solution of Problems

- Creation of work opportunities for citizens
- Startup support for Cooperation
- Isolation of digital society by income inequality
- Internet service price optimization

Technology

ICT

- Elimination of the digital isolation by installing **Link NYC (public tablets)** with functions such as ultra-fast 1Gbps free public Wi-Fi, telephone calls, device charging, city services, maps, etc.

Industry Creation

- Create **hundreds of millions USD in revenue for New York City through an advertising**
- It is also expected to create new full-time jobs for 100 to 150 people in the fields of manufacturing, technology and advertising.

Resilience

- Attaching emergency switch and backup power that can notify to police 24 hours
- Displaying **evacuation instructions and information in case of disaster emergency**

For Realization

Fund Raising	Organization	Precondition
<ul style="list-style-type: none"> Fund raising with advertising revenue using displays The Cost Bridge (consortium) bears all project costs and operation and maintenance 50-55% of income paid to City (500 million USD over 12 years) 	<ul style="list-style-type: none"> Public: New York City Department of Information Technology & Telecommunications (DoITT) Private: City Bridge 	<ul style="list-style-type: none"> Installed Link NYC instead of public phones in New York City (Manhattan, Queens, Brooklyn, Staten Island, Bronx) Installed within a radius of approx. 45m, which is the effective range of Wi-Fi

(3) EXAMPLES IN THE WORLD

Masdar City [Masdar City, UAE]

- Future experimental city in the desert, aiming for **zero carbon dioxide emissions**
- Plan to complete all projects from 2020 to 2025

Target Area

Solution of Problems

- Building a city corresponding to a maximum temperature of 50 degree.
- Realizing a low cost, by adding panels to existing centralized photovoltaic power generation.

Technology

Mobility

- Introduces a public electric vehicle system called Personal Rapid Transit (PRT) developed by the German company "2 Get There" as a way of transportation that does not rely on fossil fuels.

Environmental Sustainability

- It is envisioned as a showcase of a sustainable smart city with zero emissions (zero CO2)

Personal Rapid Transit (PRT)

- No driver electric car** with no steering wheel, no need to drive, and a car that can be fully automated by pressing a switch of destination.

Masdar Wind Tower, the Cooler of the Future

- In September 2010, Masdar City's first project, the Masdar Institute of Science and Technology (MIST), completed its six buildings.
- To minimize the heat from the sun, lower the temperature of living space by combining pillars and creating shades

(3) EXAMPLES IN THE WORLD

ET City Brain [Hangzhou City, China]

- ET City Brain utilizes **all real-time city data and quickly fixes operational deficiencies in the city**, then realizes the optimization of the city's public resources altogether. This will result in numerous breakthroughs in city administration, service, and industrial development.

Target Area
Hangzhou

Solution of Problems

- Eliminate chronic traffic congestion

Technology

Detection of Accident and congestion

- Realizing accidents and congestion, and reduce average processing time

Public transport and dispatch

- Reducing passenger delays and increasing public transport utilization

Other advanced technologies

- Big data computing features that lead in both performance and cost
- Processing data and real-time analysis of large multi-source
- Real-time video recognition and automatic inspection
- Physical architecture of deep neural networks

For Realization

History	Organization	Fund raising
<ul style="list-style-type: none"> China plans to develop a next-generation artificial intelligence development plan in 2017, and aims to create a world-leading company by 2020 by incorporating the world's advanced technologies. Alibaba Group is in charge of smart city field. 	<ul style="list-style-type: none"> Public: Hangzhou City (ISI (Research Institute of Alibaba Group)) Private: Hangzhou City Government owns the expense of surveillance cameras and other measuring devices Alibaba Group analyzes and provides traffic optimization 	

(3) EXAMPLES IN THE WORLD

Semboku Smart City [Akita Pref., Japan]

- In Semboku City, the working-age population has dropped sharply, and the aging rate has reached 41%. It is necessary to improve the productivity of the key industries of agriculture and tourism, to secure transportation for an aging society, and to improve logistics in accordance with mountainous region.
- Build a model case for global innovation by introducing the new technologies such as **AI and robot technology to promote agriculture and tourism, and to transform the industrial structure and ensure the convenience of citizens.**

Target Area
Entire Semboku City

Solution of Problems

- Ensuring movement in mountainous areas
- Use **AI and IoT** to improve productivity and improve logistics efficiency
- Development from pass-through tourist destination to stay-type tourist destination
- Date sharing system obtained from activities

Technology

AI Tech

- Aiming at converting the data of agriculture knowledge and skills, the delivery will be automated by drone in low-density villages.
- Utilizing AI, and remote monitoring by IoT.

Drone

- In order to streamline the delivery of daily items, the delivery will be automated by drone in low-density villages.

Mobility

- Identify issues in auto-driving technology in poor-conditioned areas
- Examining the mobile services using space in no-driver vehicles from hot spring water for drones.

For Realization

History	Organization
<ul style="list-style-type: none"> Approx. 80% of Semboku City is forested, and 80% of that forest is national-owned forest. In various activities, needs permission from the Forestry Authority, the Ministry of the Environment, and the Agency for Cultural Affairs. Semboku City has been negotiating to government for various deregulations, and was designated as a national strategy area in August 2015. 	<ul style="list-style-type: none"> Conference: Semboku City Policy Council Public: Semboku City Private: RIEA Research Institute Corporation, Hokuto Bank, Akita Bank Academia: Tokyo Univ., Chiba Univ.

Management of Smart City

(3) EXAMPLES IN THE WORLD

Kashiwa-no-ha Smart City [Chiba Pref., Japan]

- With the opening of the Tsukuba Express in 2005, land readjustment projects and development by private companies were carried out
- Recently, strong connection between facilities have been added to the three themes of "Environment Symbiosis City", "Healthy Long Life City" and "Creating New Industries City"

Target Area

2km radius from Kashiwa-no-ha Station



Solution of Problems

- Reduction of environmental load
- Creating a living environment where can live healthy in the future
- Promotion of accumulation of new industries
- Strengthening connections between facilities

Technology

- Energy**
 - Operation of Area Energy Management System (AEMS) using BEMS, HEMS, smart grid, smart center, etc.
 - Use of renewable and unused energy
- Health/Medical**
 - Development of facilities such as health support in commercial facilities
 - Visualization of health status using wristband type life recorder etc.
- Industry Creation**
 - Development of the largest co-working space in Japan by private company
 - Establishment of a venture support organization in which research institutions, governments, private companies, and individual experts work together
- Mobility**
 - Introduction of an autonomous driving bus (test operation started in FY2018)
 - Visualization and monitoring of surrounding traffic (monitoring started in 2020)
- Data Management**
 - Building a system that can utilize data across some fields by linking public and private platform

For Realization

- Fund Raising**
 - Development by private companies
 - Smart City Demonstration Survey Budget for MIT (Advanced Model Project)
- Organization**
 - Conference: Kashiwa-no-ha Smart City Consortium (Urban Design Center Kashiwa, Mitsui Real Estate, Kashiwa City)
 - Public: Kashiwa City (city planning, licensing, etc.)
 - Private: Mitsui Real Estate: Project Leader, Development of large-scale commercial and residential; Private Companies (Hitachi, etc.): Overall planning and building a model business for each technology
 - Academia: Tokyo Univ., Chiba Univ.
- Condition**
 - Before development, the site is undeveloped. Some of the former sites were owned by private companies
 - Universities and research institutes are located nearby and technical assistance is available
 - Railroad opens, demand for private development rises

(3) EXAMPLES IN THE WORLD

Fujieda ICT Consortium [Shizuoka Pref., Japan]

- Aiming to form the **Next-generation Smart Compact City as a model of regional regeneration compact city**
- A cooperation agreement was concluded with SoftBank in 2016, and joint promotion of education centered on ICT and robots is underway. Also, dedicated IoT communication infrastructure has been established throughout the city, and joint research and experiments on the use of IoT in local industries and public services are underway.

Target Area: entire Fujieda City



Solution of Problems

- Safe and high value living and tourism exchange
- Urban disaster prevention measures and sustainability of lifelines
- A working environment where can flexibly work
- Improve industrial productivity and develop human resources
- Development of social infrastructure and mobility support using IoT

Technology

- Data Platform**
 - Link between platforms and each data can be used across
 - One-stop data acquisition among public and private
- Recognizing Road Surface Condition**
 - Understand and manage facility conditions based on data from acceleration sensors and on-board cameras of public cars
- Human Movement Analysis**
 - Analyze based on human movement data of mobile phones and share cycle / on-demand traffic, and use it for tourism and industrial revitalization
- Priority Repair of Roads**
 - Image data is processed by AI, and roads with large traffic are repaired preferentially in cooperation with human movement analysis data
- Security for Kids**
 - Provision of child watching services using location information device data, etc.

For Realization

- Fujieda ICT Consortium**
 - Secretariat: Fujieda City, Softbank, Member Companies
- Increasing tax-income, work opportunity, population**
 - Activation of Fujieda Industry ICT Solution
- Activate all Fujieda Industries**
 - Based on the Industry, Academic, Science, Public
- Main Activities in FY 2019**
 - Demonstrative experiment of visualizing the human movement by specific locations of on demand traffic, mobile phone carriers, and share cycles
 - Demonstrative experiment of on-demand traffic in a specific area in cooperation with private companies

(4) SUMMERY

World Trend of Smart Cities

Adding the High-value to the Cities
 "Add High-value" and "Making a Difference" to be more attractive from other cities. ex) improving the environment and digital access

Upgrading the Local Industry
 Create an Agglomeration Area for Advanced Industries and promote work opportunity. It is sometimes used as a Technology Showcase for Local Industries.

Applying Low Cost and Easy Development
 Introduce Smart Software which is low cost than hardware, and green field is suitable to use ICT in urban development field, in terms of the cost efficiency

Introducing the New Technology of Foreign Capital
 Major cities in developed countries have a higher investment power, and some major global companies are leading the cities and investing new technology.

Direction of the Smart City in Siem Reap

-Smart City Development by Total Solution-
 To solve the each Urban Problems in Total



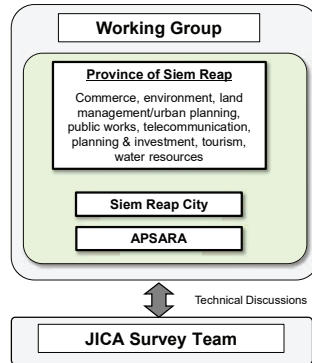
(1) CO-WORK in the WORKING GROUP

Request of formulation and co-work in the Working Group

- Working Group discusses with the JICA Survey Team for detail technical discussions.

Subjects to be discussed

- Urban problems of Siem Reap and solutions
- Priority sectors, image of Smart City, Road Map, Action Plan, priority projects and Pilot Project
- Implementation structure
- Supervision of the Pilot Project
- Other related issues.



(2) SUPERVISION OF PILOT PROJECT IMPLEMENTATION

1) Pilot Project

- (i) **Selection:** June-July, 2020 in the Business Contest
- (ii) **Implementation period:** August 2020 – January 2021
- (iii) **Supervision:** Siem Reap Government is the Supervisor of the Pilot Project
- (iv) **Support:** JICA Survey Team supports the Siem Reap Government by on site advice and remote operation (TV meeting, local staff).

2) Contribution to the future Smart City development

- (i) Learns the lessons from the Pilot Project
- (ii) The lessons connect the future Smart City projects

(3) OTHERS

- 1) Arrangement supports of meetings and interviews with relevant governmental organizations and local communities & companies
- 2) Arrangement and security supports of field survey
- 3) Sharing security and safety information during this study

The Basic Survey for Smart City in Siem Reap
Data Collection Survey on Urban Improvement in Siem Reap City
The Second Steering Committee

Meeting Information	
Subject	Current conditions, issues, and roadmap towards Smart City
Venue	Meeting Room in Siem Reap Provincial Government / online (zoom)
Date	October 16 th , 2020 9:30 - 11:30 (Cambodian time)
Material	<ul style="list-style-type: none"> • Interim Report Executive Summary (PPT, Khmer) • Interim Report Executive Summary (PPT, English) • Interim Report (PPT, English) • Annex survey Inception Report (PPT, English)
Attendees	<p>Cambodia</p> <p>Siem Reap Provincial Government: H.E. Ly Samrith (Deputy Governor) Mr. Tip Piseth (Director of Planning and Investment Division, Provincial Administration Office) Mr. Kosal Makara Piseth (Director of International Relations and Cooperation Division) Mr. Sok Thol (Director of Siem Reap Provincial Administration) Mr. Poeut Bunnarom (Officer of Finance Division) Mr. Lom Sokhak (Director of Statistic and Civil Registration Office) Mr. Soeum Vanndit (Deputy Director of International Relations and Cooperation Division) Ms. Pov Rady (Representative Officer) Mr. Soy Kimsan (Officer of Planning and Investment Division)</p> <p>Siem Reap Municipality: Ms. Lim Phalyka (Deputy Governor) Mr. Mai Uma (Deputy Director of Environment Office) Ms. Yun Synang (Officer of Economics Office)</p> <p>Department of Environment of Siem Reap Province: Mr. Norm Kimorn (Representative Officer)</p>
	<p>Japan</p> <p>JICA Headquarters: Ms. Asuka TSUBOIKE (Director) Ms. Ayumi KIKO (Deputy Director) Mr. Yamato KAWAMATA (Deputy Director) Mr. Tetsuji GOTO (Advisor)</p> <p>JICA Cambodia Office: Ms. Kaori OKUBO (Representative) Mr. Hiroaki KUBOTA (Project Formulation Advisor) Ms. Pheng Pharinet (Program Officer)</p> <p>Embassy of Japan in Cambodia: Mr. Toshikazu TOKIOKA (First Secretary)</p> <p>Ministry of Land, Infrastructure, Transport and Tourism: Mr. Yuta NAGANO (Deputy Director) Mr. Genki SUGIURA (Chief Official)</p> <p>JICA Survey Team: Mr. Kuniomi HIRANO (Team Leader) Ms. Tomoko ABE (Organization/Institute expert) Mr. Kazuo YUMITA (Waste Expert) Mr. Yoshikazu UBUKATA (Mobility Expert) Mr. Keita HIRAYANAGI (Mobility Expert) Ms. Noriko HIGO (Tourism Expert) Mr. Kai KURIMOTO (Security Expert) Mr. Atsushi YANO (Data Management Expert) Mr. Yojiro NISHIKAWA (Data Management Expert) Mr. Chhengngunn Aing (Researcher and Consultant) Ms. Vina Chhoeng (Researcher and Surveyor) Ms. Phallyda Paul (Researcher and Surveyor) Mr. Tey Tak (Office Manager)</p>

Minutes

1. The Opening Remarks was delivered by Ms. Asuka Tsuboike, director of JICA Headquarters.
2. Self-introduction was delivered by each participant.
3. Detailed explanation of the Survey was done by Mr. Hirano, the team leader of JICA Survey Team.
4. Discussions were done as follows;

H.E. Mr. Ly Samrith (Deputy Governor of Siem Reap Province)

- The Siem Reap provincial government will provide the latest plan of the “38 road construction project” to the JICA Survey Team, after its finalization that is expected in November. The area of this construction project overlaps the target area of this Smart City project. We expect that this road construction project will be integrated with the Smart City roadmap. The “38 road construction project” will start in November 2020 and is expected to finish in the end of 2021.
- The Siem Reap provincial government will also coordinate to provide information on the new airport construction project and information on land fill in Siem Reap to JICA Survey Team.

Mr. Tip Piseth (Director of Planning and Investment Division, Provincial Administration Office)

- As for the “Enhanced Smart City Committee”, we would also like to invite APSARA Authority and Angkor Enterprise as members, since the target area of this study includes the heritage area.

H.E. Mr. Ly Samrith (Deputy Governor of Siem Reap Province)

- Related to the “Enhanced Smart City Committee”, in the future, Siem Reap province is willing to decentralize part of its political power to Siem Reap municipality.

Mr. Kosal Makara Piseth (Director of International Relations and Cooperation Division)

- The pilot project proposed in the Pub-street may affect the “38 road construction project”, so we hope that the JICA Survey Team reviews the plans of the “38 road construction project” provided by the Siem Reap provincial government.
- I am concerned about the management center and body of the pilot project. Any installation project will require a management center and body regardless of its installation size. Who will be in charge of this pilot project?

Mr. Kuniomi Hirano (Team Leader of the JICA Survey Team)

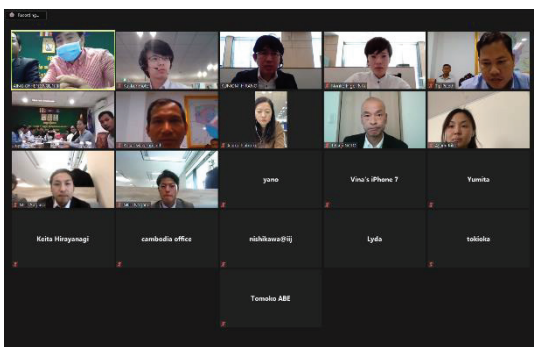
- We cannot provide a certain answer for now, but we will consider and study about this matter.

Mr. Hiroaki Kubota (Project Formulation Advisor of JICA Cambodia Office)

- We understand that there needs to be subtle modifications, but does Siem Reap Provincial Government generally agree with the concept, vision, and approach presented by the JICA Survey Team?

H.E. Mr. Ly Samrith (Deputy Governor of Siem Reap Province)

- We have generally approved the concept, vision, and approach presented by the JICA Survey Team. However, as for the implementation structure, we need to discuss with the national government for their approval.



END



01 INTRODUCTION

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OBJECTIVES

Objectives

Proposing and launching actions for total solutions of smart technologies against urban problems of Siem Reap

Main Steps

- (1) Reviewing (understanding of current situation)
- (2) Envisioning (proposal of visions based on issues)
- (3) Planning (proposal of a road map and priority projects)
- (4) Action Launching (Selection and implementation of a pilot project)
- (5) Networking

Survey Period
March 2020 – June 2021 (17 months)

01 INTRODUCTION

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TARGET AREAS

- 1) City Area
- 2) Heritage Area
- 3) Tonle Sap Lake Area

MAIN TARGET SECTORS

Tourism

Mobility

Waste

Safety

Data Management

Source: JICA Study Team based on the "Land Use Master Plan of Siem Reap, 2035 vision", MLMUPC, 2018

01 INTRODUCTION

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DELIVERABLES

Mid-March 2020	June 2020	September 2020	December 2020	End May 2020
Inception Report	Inception Report <Rev.01>	Interim Report	Draft Final Report	Final Report

KEY MEETINGS

- 1) Steering Committee: Reporting, confirming, and getting approval

1st March 2020	2nd October 2020	3rd January 2020	4th TBD
Outline of the project	Current conditions, issues, and roadmap	the roadmap and the pilot project	Progress of the pilot project
- 2) Working Level Meeting: Discussion on the detailed matters

1st Phase September 2020	2nd Phase December 2020	3rd Phase TBD	4th Phase TBD
Discussion on current situation and issues	Detailed issues discussion before or after the Steering Committee		

Source: JICA Study Team

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KEY MEETINGS – Working Level Meetings –

Sector	C/P Department, Name	Latest Date of Meetings
Tourism	Department of Tourism Mr. Soung Sitha (Chief of Bureau) Mr. Mao Ousa (Vice Chief of Bureau)	September 22nd
Mobility	Department of Public Works and Transport Mr. Tan Kim Ang (Department Staff) Mr. Mok Vira (Department Staff)	September 25th
Waste	Department of Environment Mr. Norm Kimorn (Vice Chief of Environmental Protection Office) Mr. Peach Pon (Officer) Mr. Tom Nisay (Officer)	August 28th
Security	Siem Reap Provincial Police Headquarters Mr. Meas Vannak (Public order) Mr. Chem Sovann (Traffic officer)	September 14th
Data	Department of Post and Telecommunication Mr. Som Sim (Director of DPT) Mr. Sen Phos (Technical officer)	August 14th
Capacity	Planning and Investment Division, Provincial Administration Office Mr. Tip Piseth (Director)	October 6th

Source: JICA Study Team

01 INTRODUCTION

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PROGRESS

Main Contents	Work Items
Reviewing Main Scope of this report	1) Review of Current Situations and Issues (Tourism, Mobility, Waste, Security, Data and Telecom) 2) Review of Plans and Organizations 3) Review of Regulations, procedures and Supports 4) Review of the Smart City Activities in Cambodian and ASEAN Cities
Envisioning	5) Proposal of Smart City Vision & Strategies
Planning	6) Proposal of the Road Map 7) Proposal of Priority Projects 8) Proposal of Project Implementation
Action Launching	9) Selection of the Pilot Project 10) Implementation of Pilot Project
Networking	11) Interview Survey 12) Open Innovation and Business Contest 13) Holding Seminars

Source: JICA Study Team

02 CURRENT SITUATION AND ISSUES

7

SUMMARY OF SECTORAL ISSUES

Tourism

- ✓ Sharp decline of international tourists amid COVID-19
- ✓ Site visit based tourism model
- ✓ Seasonal gap
- ✓ Mass tourism centered arrivals
- ✓ Heritage centered tourism route
- ✓ Tourist resources remaining minor
- ✓ Information and promotion not effectively reached to tourists

Waste

- ✓ Illegal dumping
- ✓ Insufficient compliance to rules
- ✓ Collecting service by informal sector
- ✓ Environment impact (smell and drainage)
- ✓ Organizational inefficiency
- ✓ Financial Aspects

Mobility

- ✓ Traffic congestion
- ✓ Traffic accidents
- ✓ Illegal parking
- ✓ Air pollution
- ✓ Increasing Road Maintenance Cost

Security

- ✓ Unsafe environment for international tourists
- ✓ Inefficient prevention and detection of traffic accidents
- ✓ Inefficient warning of natural disasters to tourists

Data Management

- ✓ Lack of multisectoral data platform and management organization
- ✓ Lack of open data and related regulations

02 CURRENT SITUATION AND ISSUES

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SUMMARY OF GENERAL ISSUES

Basic Understanding and sharing of Smart City

- ✓ Lack of understanding and sharing of basic recognition, future image, effects and implementation procedures and methods
- ✓ Lack of practice (OJT and Off-JT)

Administrative Procedures and Structure

- ✓ Less procedure/structure allowing cross-departmental decision-making, information sharing and idea exchange
- ✓ Lack of rapid/flexible decision-making process using on-time urban environmental monitoring with smart devices

Business Support base/platform

- ✓ Lack of ecosystem to provide a place for start-up companies and other businesses to flourish
- ✓ Insufficient business support

Project consolidation and verification

- ✓ No arrangement of relationship between conventional government services and smart city policies/projects
- ✓ Insufficient examination of projects costs, cost effectiveness and financing methods

Monitoring Indicators

- ✓ No indicators to monitor tourist satisfaction, efficiency improvement and cost reduction of administrative services

Data platform

- ✓ Insufficient understanding of significance of data platform (cross-departmental data sharing, open data)
- ✓ Lack of hardware (data center, wireless LAN, 4G network)

Strengthening Tourism Industry

- ✓ Heavy dependence on tourism
- ✓ Less introduction of smart technologies
- ✓ Less continuous trial and error and initiatives for new projects and activities

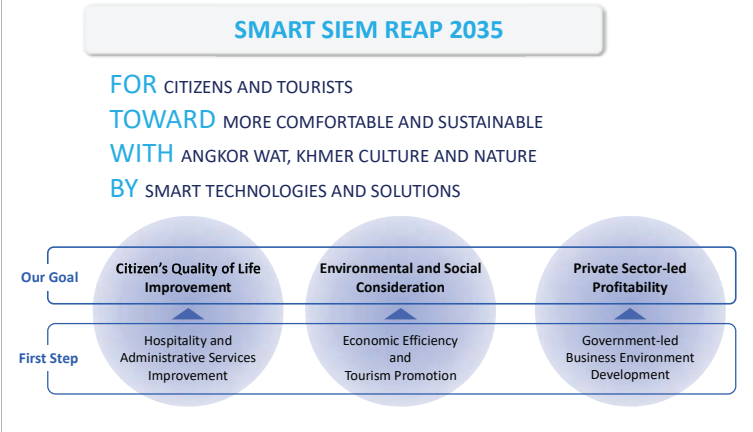
Pilot Project

- ✓ Less opportunity of putting policies into practice and improvement through short-term actions

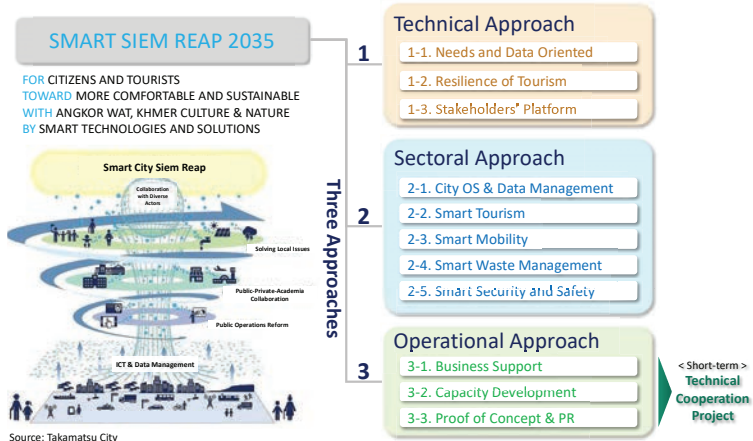
WHY SMART CITY?

Smart City is a sustainable city where **management (planning, development and operation)** is carried out to address the various issues facing the city by **utilizing new technologies such as ICT (City OS)** to **achieve total optimization**

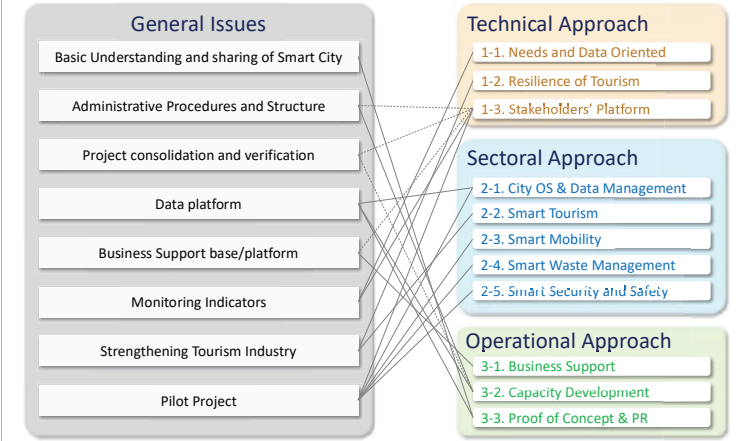
CONCEPT & VISION



CONCEPT & VISION



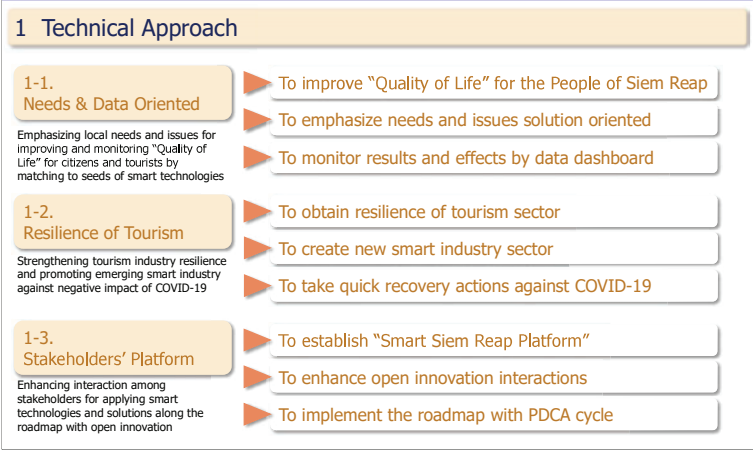
CONCEPT & VISION



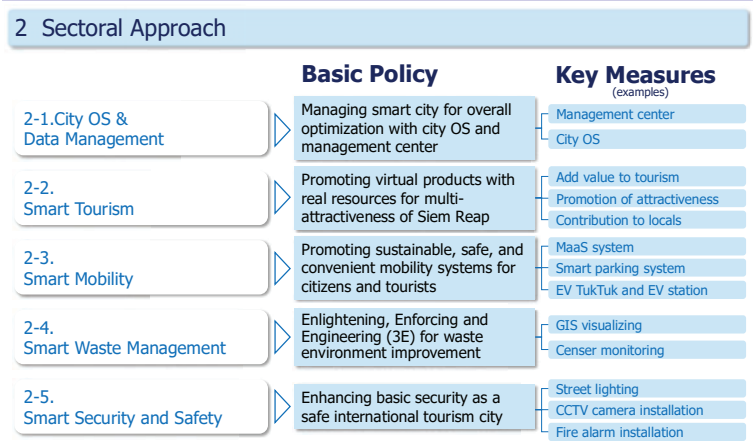
CONCEPT & VISION "Example of Phuket"



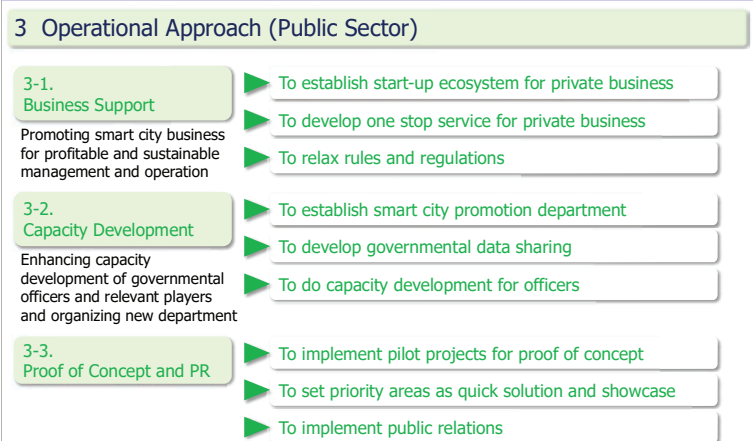
CONCEPT & VISION



CONCEPT & VISION

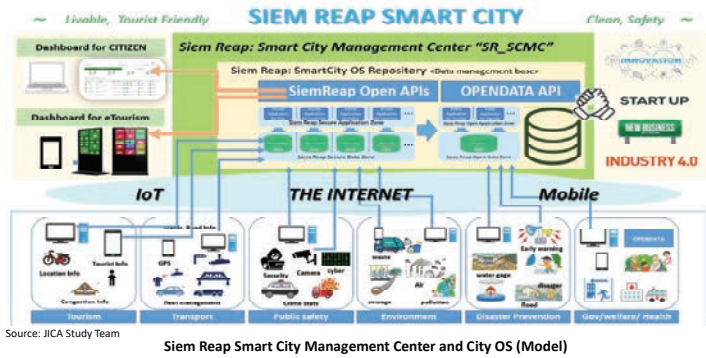


CONCEPT & VISION



BASIC POLICY "CITY OS"

Siem Reap City OS and Data management center to integrate internal data, link with external systems (traffic, environmental relations, energy, police, ..) and provide open data for data-based city management



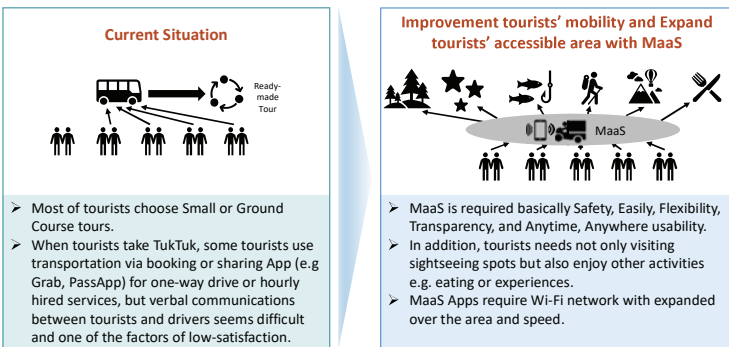
BASIC POLICY "eTourism"

Integrated tourism platform to offer real and virtual services accessible from smartphone/PC and collect data for future tourism development



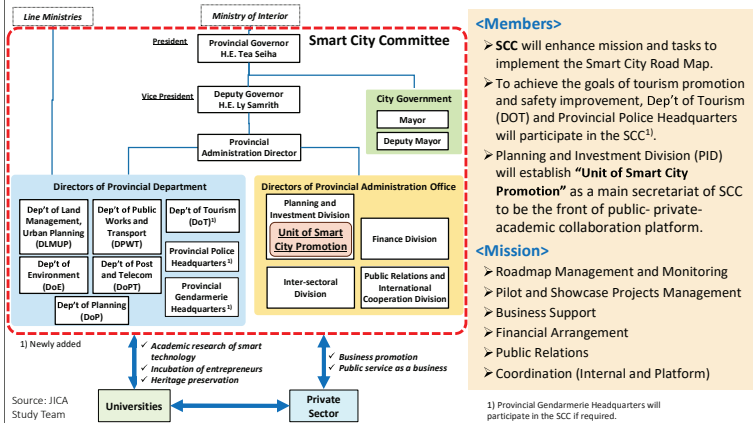
BASIC POLICY "MaaS"

Expansion of easily & freely accessible area via public transportation system including TukTuk or Taxi using Smart Technologies



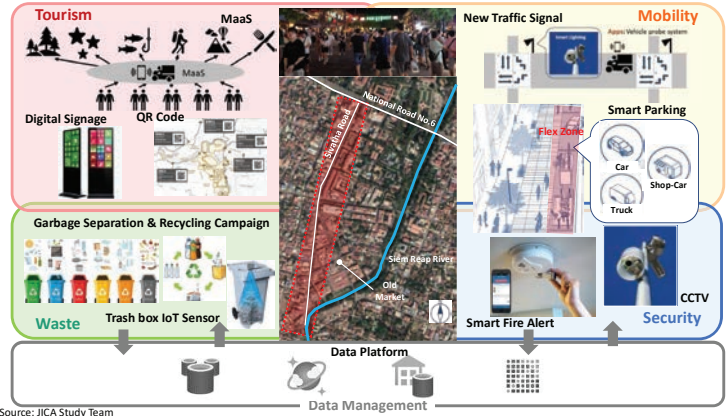
BASIC POLICY "Enhanced Smart City Committee"

Proposal on Establishment of "Unit of Smart City promotion" under Smart City Committee (SCC)



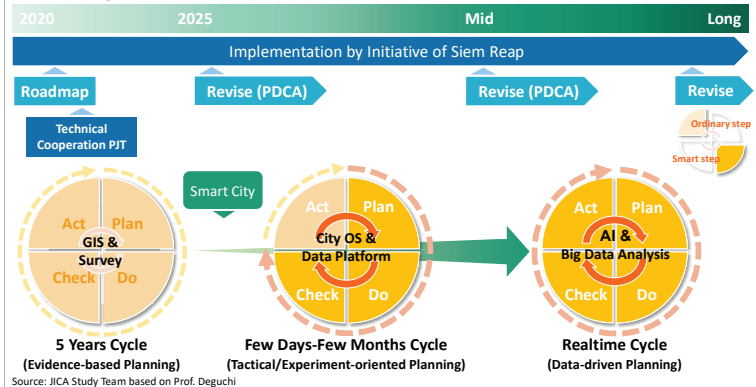
BASIC POLICY "PRIORITY AREA WITH SECTORS -PUB STREET (Sivatha Road)-"

Populated and Issues accumulated Area → Showcase of smart technologies and solutions

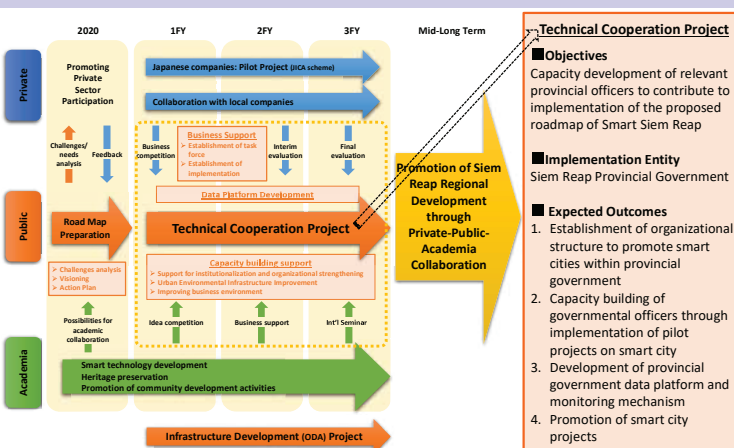


BASIC POLICY "PDCA Cycle and Phasing Development"

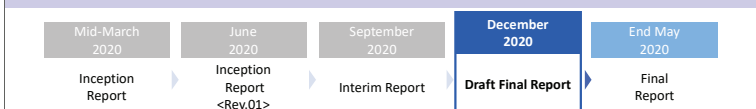
Realization of Roadmap by implementing PDCA cycle shortened by smart technologies and solutions



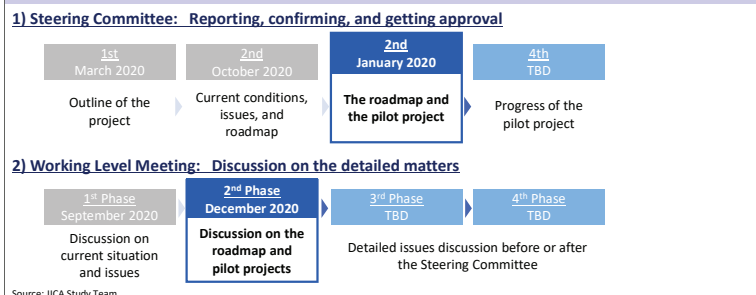
PROPOSAL OF A TECHNICAL COOPERATION PROJECT



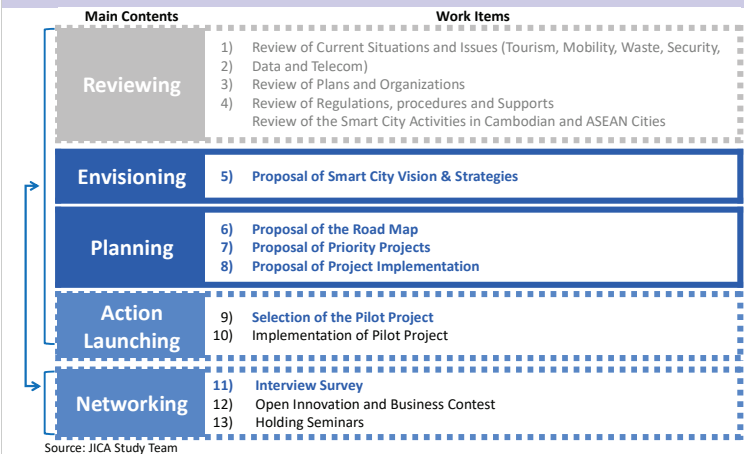
DELIVERABLES



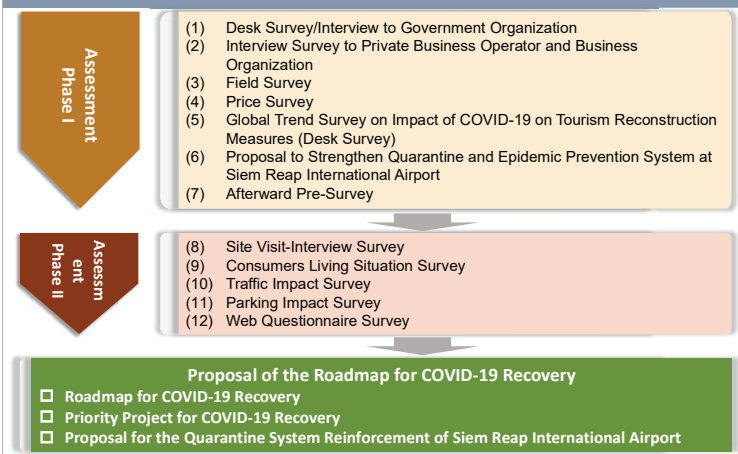
KEY MEETINGS



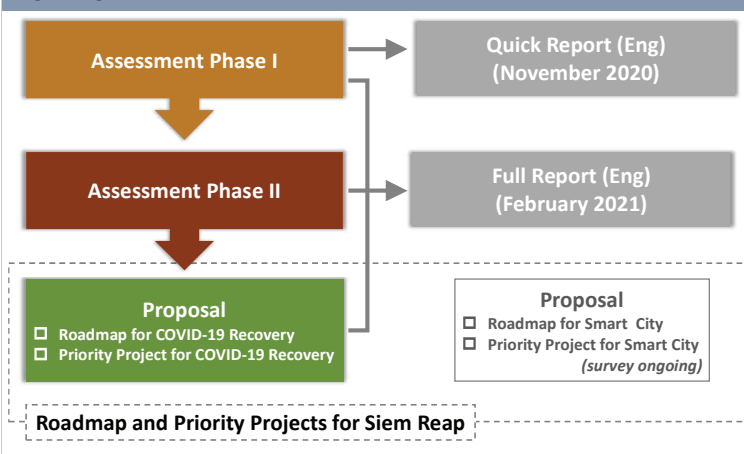
PROGRESS



SURVEY ITEMS



WORKFLOW



Discussion Points which is expected to be approved in this Meeting

1. Current Conditions and Issues
2. Concept, Vision and Basic Policies
3. Technical Cooperation Project

The Basic Survey for Smart City in Siem Reap
Data Collection Survey on Urban Improvement in Siem Reap City
Minutes of Meeting

Meeting Information	
Subject	The 3rd Steering Committee for Smart Siem Reap
Venue	Siem Reap Provincial Hall – Salle 1
Date/Time	16/02/2021 09:00 ~ 11:30
Material from JICA team	Interim Report 2 Executive Summary (English) Interim Report 2 Exclusive Summary (Khmer) Interim Report 2 Full PPT (English) Guidelines for Applicants Business and Idea Competition (English)
Attendees	<p>Cambodia side: H.E. Tea Seiha (Siem Reap Governor, SR Provincial Administration) Mr. Ly Samrith (Siem Reap Deputy Governor, SR Provincial Administration) Mr. Sok Thol (Administration Director, SR Provincial Administration) Mr. Soam Sopharat (Deputy director (Division), Apsara National Authority) Mr. Heng Ny (Acting Chief of Security Plan, SR Provincial Police Headquarter) Mr. Hom Soksan (Deputy Commander, SR Provincial Gendarmerie Headquarter) Mr. Khoy Savorak (Officer, Angkor Enterprise) Mr. Noun Chandarong (Officer, Angkor Enterprise) Mr. Tip Piseth (Director of Planning and Investment Division, SR Provincial Administration) Mr. Kosal Makara Piseth (Director of International Relations and Cooperation Division, SR Provincial Administration) Mr. Eung Sophean (Director of Inter-sectoral Division, SR Provincial Administration) Ms. Lim Phalika (City Deputy Governor, SR Municipal Administration) Mr. Seng Visal (Head of Planning Office, SR Provincial Administration) Mr. Heav Sithat (Head of Social Economic Office, SR Provincial Administration) Mr. Hoem Vannit (Deputy Director of International Relations and Cooperation Division, SR Provincial Administration) Mr. Thab Kakada (Head of General Information Office, SR Provincial Administration) Mr. Ploeut Bunnarum (Officer of Financial Office, SR Provincial Administration) Mr. Soy Kimsan (Officer of Planning and Investment Division, SR Provincial Administration) Mr. Meng Heang (Director of Land Management Office, D. Land Management, Urban Planning, and Construction) Mr. Tan Kim Ang (Deputy Director of Technical Office, D. Public Work and Transports) Mr. Noal Nanra (Deputy Director, D. Post and Telecommunication) Mr. Soeung Sitha (Director of Clean City Office, D. Tourism) Mr. Nam Kimaun (Officer, D. Environment) Mr. Long Vansak (Officer, D. Planning) Mr. Semn Pos (Officer, D. Post and Telecommunication)</p> <p>Japanese side: Ms. Ayumi Kiko (JICA Headquarter) Mr. Tetsuji Goto (JICA Headquarter) Mr. Hiroaki Kubota (JICA Cambodia Office)</p>

	<p>Ms. Pheang Pharinet (JICA Cambodia Office) Mr. Toshikazu Tokioka (Embassy of Japan in Cambodia) Mr. Kuniomi Hirano (JICA Study Team) Ms. Tomoko Abe (JICA Study Team) Mr. Yoshikazu Ubukata (JICA Study Team) Mr. Keita Hirayanagi (JICA Study Team) Ms. Noriko Higo (JICA Study Team) Mr. Kai Kurimoto (JICA Study Team) Mr. Atsushi Yano (JICA Study Team) Mr. Yojiro Nishikawa (JICA Study Team) Mr. Mengkoun Veng (JICA Study Team) Mr. Tey Tak (JICA Study Team)</p>
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Minutes

- 1. Agenda:**
- (1) Opening Remark from H.E. Tea Seiha from the Siem Reap Provincial Administration (SRPA)
 - (2) Opening Remark from JICA
 - (3) Explanation of Interim Report 2 by Dr. Hirano
 - (4) Discussions and Q&A
 - (5) Closing Remarks (H.E. Tea Seiha and JICA)
- 2. Discussion:**
- H.E. Tea Seiha would like to thank the JICA and JICA Study Team and he showed strong support for the project. He added, for most parts of the presentation, he would agree with what Dr. Hirano had presented. He also showed an interest opinion on the part of “Concept and Vision” on how the JICA Study Team had brought together technologies and cultures. Furthermore, he pointed out that capacity building is important as an example in the Ministry of Defence – there is a lot of new equipment and technologies, but there is a lack of human resources on how to effectively use them. He acknowledged that today’s participants were the expert officers from the line department for this discussion.
 - H.E. Tea Seiha and other participants such as Mr. Soam Sopharat (from Apsara National Authority), Eung Sophean (Director Inter-sectoral Division from the SRPA) and Mr. Meng Heang (from the Department of Land Management, Urban Planning, and Construction) suggested and asked to change the design of logo by using the Khmer language and presenting Siem Reap province with the Khmer architecture and culture. He also suggested changing the wording from “Smart Siem Reap” to “Siem Reap Smart”.
 - Mr. Soam Sopharat (from the Apsara National Authority) recommended the JICA Study Team to work together with Khmer architecture and culture experts to design the logo.
 - Mr. Meng Heang (from the Department of Land Management, Urban Planning, and Construction) commented on the working schedule. As the 38-Road Project will be finished at the end of the year, he urged that if any priority projects can be implemented together along with the 38-Road Project, it should be implemented before 2021. He also mentioned that as this project is a cooperation project, there should be discussed on the possibility of using both languages in the designed logo. In addition, he had a question related to one window service – how to collect data more efficiently.
 - Dr. Hirano answered that there are two ways of collecting data – one is from sensors and two is from the smartphone where those two things are the Internet of Thing system’s platform.
 - Mr. Noal Nonra (from the Department of Post and Telecommunication) commented as “to realize the smart city, the internet plays the main role in this development. So, improving internet connectivity is necessary.” He also added that the Ministry of Post and Telecommunication is also working on an E-government platform and it is expected to use in the near future.
 - Mr. Tan Kim Ang (from the Department of Public Work and Transport) gave 5 comments on the presentation:
 - (1) M1 – Official Parking System Introduction: the pre-feasibility had been studied by JICA before. So, he suggested using those data and documents for this project along with the 38-Road project.
 - (2) M2 – Road Condition Monitoring: there is an existing app for reporting the road condition developed by the Ministry of Public Work and Transport. So, he proposed if the JICA Study Team consider improving this existing app.
 - (3) M3 – with the 38-Road project, streetlights will be installed in every street.

(4) M6 – EV Promotion: there is currently a study for the possibility of introducing an E-bus with 3 lines. This project is discussed by the Department of Public Work and Transport, SRPA, Apsara National Authority, and the Global Green Growth Institute (GGGI).

(5) For wastewater treatment, if there is any possibility of implanting this project together along with the 38 Road project.

- Finally, H.E. Tea Seiha added that Siem Reap City needs smart technologies and solutions to tackle the problems that occurred in the city, especially in the security sector and tourism sector. In addition, for the establishment of the “Unit of Smart City promotion” matter, he mentioned that the decision cannot be made by SRPA as it is under the supervision of the Ministry of Interior. For the 24 proposed projects, the technical teams of SRPA will study in detail and see which is the priority project and how it can be integrated with the 38 Road project.
- H.E. Tea Seiha reckoned that once the 38-Road project finished and if the countries around the world will soon start easing the COVID-19 restrictions, the international tourists would come back to Siem Reap Province. So, the E-Tourism Platform is a priority project. In addition, the Official Parking System Introduction is also important as it can be implemented together with the 38-Road Project. He would like to establish a committee to study these 24 projects and do a report to the committee as well as feedback to the JICA Study Team.
- Dr. Hirano would like to know the opinion on the part of “Concept and Vision” from the governor.
 - H.E. Tea Seiha answered that he does not request any changes. He also supported point 2.3 – Participation in the Technical Approach as we need the engagement between the local citizens and technology solutions as it is a key success in smart city development. However, as Siem Reap city is also a heritage city with the Angkor Archeological Park as a UNESCO site, installing new technologies are needed to study critically, especially on its impacts on the cultural site; for example, we cannot install CCTVs technologies in Angkor Wat Temple, but this technology can be used in the city center where it can improve the traffic congestion and the security sector. Another thing is the XR technology. This kind of technology needed to be discussed more with SRPA and Apsara National Authority as well as Angkor Enterprise.
- Mr. Tetsuji Goto, from the JICA Headquarter, had a few questions (1) What is the process of discussion with the Ministry of Interior on the establishing “Unit of Smart City promotion”? (2) He also wanted to know which department is responsible for and will implement what priority projects and how.
 - H.E. Tea Seiha said these 24 projects will be studied by the experts from line departments; then SRPA will collect the reports and submit them to the Ministry of Interior.
- Ms. Ayumi Kiko, from the JICA Headquarter, commented that she understood that SRPA submitted an official request to JICA on the Technical Cooperation Project in 2019, and it is currently under the final stage of approval by the Japanese government. She also added that the implementation structure for this project is very important before starting this project and JICA would like to know the process and necessary document to establish this committee and implementation structure to the Ministry of Interior. Regarding the Technical Cooperation Project’s content, JICA also would like to have a separate discussion with SRPA in order to make the TOR and as well as the structure.
- Mr. Kosal Makara Piseth (from SRPA) asked what kind of procedures that SRPA needs to take and what kind of supports that JICA can provide in this process.
 - Ms. Kiko answered the request should be submitted to the Japanese government directly from the Ministry of Interior, and it should not be directly from the SRPA. JICA can help to prepare the proposal if needed.

END

SMART SIEM REAP

The Basic Survey for Smart City in Siem Reap

Data Collection Survey on Urban Improvement in Siem Reap City

Interim Report -2 Executive Summary (draft)

Presentation Material for the 3rd Steering Committee

16th February 2021
3rd Steering Committee
JICA Study Team



TABLE OF CONTENTS

Interim Report - 2 Executive Summary (draft)
Presentation Material for the 3rd Steering Committee

1. INTRODUCTION
2. CURRENT SITUATION AND ISSUES
3. ROADMAP FOR SMART SIEM REAP
4. WAY FORWARD



01 INTRODUCTION

01 INTRODUCTION

(1) OBJECTIVES

Objectives

Proposing and launching actions for total solutions of smart technologies against urban problems of Siem Reap

Main Steps

- (1) Reviewing (understanding of current situation)
- (2) Envisioning (proposal of visions based on issues)
- (3) Planning (proposal of a road map and priority projects)
- (4) Action Launching (Selection and implementation of a pilot project)
- (5) Networking

Survey Period

March 2020 – December 2021 (22 months)

(2) TARGET AREAS AND MAIN TARGET SECTORS

- 1) City Area
- 2) Heritage Area
- 3) Tonle Sap Lake Area



Source: JICA Study Team based on the "Land Use Master Plan of Siem Reap, 2035 vision", MLMUPC, 2018



01 INTRODUCTION

02 CURRENT SITUATION AND ISSUES

(3) OVERVIEW OF THE WORK

Main Contents	Work Items
Reviewing	<ol style="list-style-type: none"> 1) Review of Current Situations and Issues (Tourism, Mobility, Waste, Security, Data and Telecom) 2) Review of Plans and Organizations 3) Review of Regulations, procedures and Supports 4) Review of the Smart City Activities in Cambodian and ASEAN Cities
Envisioning	<ol style="list-style-type: none"> 5) Proposal of Smart City Vision & Strategies
Planning <small>Main Scope of this report</small>	<ol style="list-style-type: none"> 6) Proposal of the Road Map 7) Proposal of Priority Projects 8) Proposal of Project Implementation
Action Launching	<ol style="list-style-type: none"> 9) Selection of the Pilot Project 10) Implementation of Pilot Project
Networking	<ol style="list-style-type: none"> 11) Interview Survey 12) Open Innovation and Business Contest 13) Holding Seminars

Source: JICA Study Team

(1) CURRENT SITUATIONS AND MAIN PROBLEMS AS BACKGROUD OF ISSUES



- Declining trend of the number of tourists and repeaters.
- Additional large negative impact on tourism industry by COVID-19 situation.
- Continuous waste and environmental burdens mainly by the tourism industry
- Less contribution to citizens' income caused by tourism-oriented economy



02 CURRENT SITUATION AND ISSUES

02 CURRENT SITUATION AND ISSUES

(2) IMPACT OF COVID-19

Overview

- ✓ Number of foreign visitors (Jan-Aug 2020): **74.66% decrease** compared to same period in 2019
- ✓ Revenue (Jan- Jun 2020): **95% decrease** compared to same period in 2019
- ✓ Delay/suspension of restoration related activities: delay of work, suspension of training program due to absence of international experts

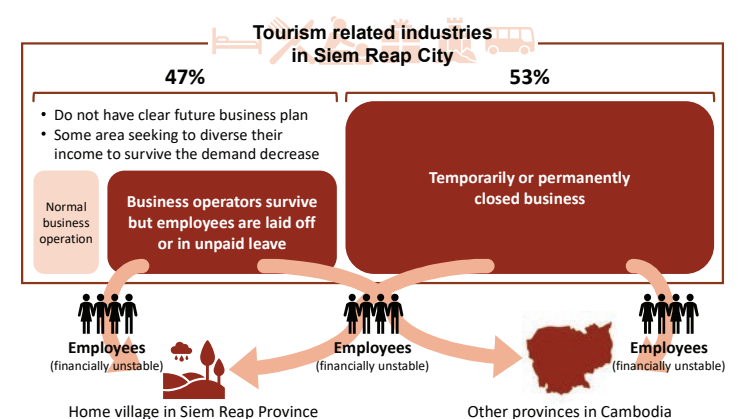


Action for post COVID-19

- Campaign to replant seedlings inside and outside Angkor Archaeological Park
- Improve the hospitality of the temples and the greening landscape to attract tourists
- Construct roads and bicycles infrastructure for a new and popular tourism

Source: Angkor Enterprise & JICA Survey Team

(3) IMPACT OF COVID-19



KEY ISSUES TO BE SOLVED IN SIEM REAP

Tourism (ISSUE 1) Needs for new virtual tourism service supporting on-site service (ISSUE 2) Needs for more diversity of tourism destinations and packaging (ISSUE 3) Needs for easier access to tourism information (e.g. smart phone)	Waste Management (ISSUE 9) Needs for cleanliness from waste and disposal at public spaces (ISSUE 10) Needs for clearer river water and drainage water
Mobility (ISSUE 4) Needs for convenience and connection of transportation services (ISSUE 5) Needs for comfort against traffic congestion and illegal parking (ISSUE 6) Needs for clean air and environmental-friendly mobility	Data Management (ISSUE 11) Needs for data-oriented analysis and build-strategy system (ISSUE 12) Needs for multi-sectoral data sharing and utilizing (ISSUE 13) Needs for open data system and regulations
Security (ISSUE 7) Needs for more safety against risks of traffic accidents and crimes (ISSUE 8) Needs for more safety against disasters (fire, flood, etc.)	Common Issues (ISSUE 14) Needs for comfortable and open space for citizens and visitors (ISSUE 15) Needs for reduction of public maintenance and service cost

TOTAL 15 KEY ISSUES TO BE SOLVED

(1) CONCEPT & VISION

SMART SIEM REAP

FOR CITIZENS AND VISITORS
TOWARD MORE SUSTAINABLE AND ATTRACTIVE
WITH ANGKOR HERITAGE, KHMER CULTURE AND NATURE
BY SMART TECHNOLOGIES AND SOLUTIONS

“SMART SIEM REAP” aims to create a sustainable city with high comfortableness for citizens and an attractive city with high satisfaction for visitors with the pride of an international heritage and tourism city.

It shall be achieved by a continuous management mechanism which enables to find solutions for urban issues with smart technologies, data-oriented analysis and visualization, and overall optimization approach.

(1) CONCEPT & VISION

FOR CITIZENS AND VISITORS Need the smart technologies and solutions to contribute on improvement of Quality of Life for citizens and visitors Key Indicator: Rate of QoL	WITH ANGKOR HERITAGE, KHMER CULTURE & NATURE Need the beautiful, attractive and unique tourism destination , characterized by Khmer history, culture and nature Key Indicator: Number of Visitors and Repeaters
TOWARD MORE SUSTAINABLE AND ATTRACTIVE Need environmental and social consideration as a basic strategy in line with SDGs for sustainability Key Indicator: Matching with SDGs	BY SMART TECHNOLOGIES AND SOLUTIONS Need the new smart business led by private sector to provide profitability and efficiency for sustainability Key Indicator: Number of New Business

(1) CONCEPT & VISION

SMART SIEM REAP

FOR CITIZENS AND VISITORS
TOWARD MORE SUSTAINABLE AND ATTRACTIVE
WITH ANGKOR HERITAGE, KHMER CULTURE & NATURE
BY SMART TECHNOLOGIES AND SOLUTIONS

Three Approaches:

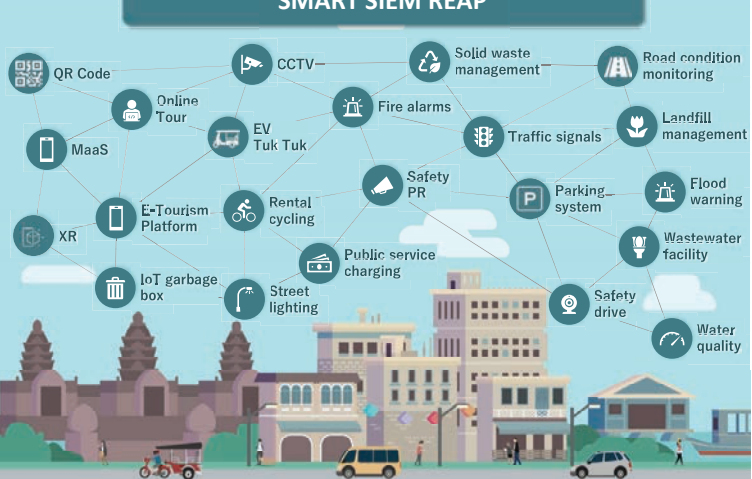
- Technical Approach (sectoral)
 - 1-1. Smart Tourism
 - 1-2. Smart Mobility
 - 1-3. Smart Security and Safety
 - 1-4. Smart Waste Management
 - 1-5. City OS & Data Management
- Technical Approach
 - 2-1. Data Oriented
 - 2-2. Business Driven
 - 2-3. Participation
- Operational Approach
 - 3-1. Business Environment Development
 - 3-2. Capacity Development

< Short-term > Technical Cooperation Project

Source: Takamatsu City

(2) NECESSARY VIEWPOINTS TO BE TACKLED FOR SMART CITY

Data Management Insufficient understanding hardware (data center, wireless LAN, 4G network) of data management (cross-departmental data sharing, open data)	2-1. Data Oriented	3-2. Capacity Development
Data Visualization & Monitoring No indicators and system to monitor tourist satisfaction, efficiency improvement and cost reduction of administrative services	2-1. Data Oriented	3-1. Business Environment Development
Business Support Lack of ecosystem to provide a place for start-up companies and other businesses to flourish	2-2. Business Driven	3-1. Business Environment Development
Basic Understanding & Capacity Development Lack of understanding and sharing of basic recognition, future image, effects and implementation procedures and methods	2-3. Participation	3-2. Capacity Development
Governmental Institution & Project Coordination Less procedure/structure allowing cross-departmental decision-making, information sharing and idea exchange	2-3. Participation	3-2. Capacity Development



(3) DEVELOPMENT PROGRAMS

Smart Tourism T-01 Online tour promotion T-02 XR development T-03 E-tourism platform development T-04 QR code development T-05 Rental cycling service T-06 MaaS introduction	Smart Mobility M-01 Official Parking System Introduction M-02 Road condition monitoring M-03 Street lighting improvement M-04 Traffic signal system improvement M-05 Safety drive improvement M-06 EV promotion	Smart Waste Management W-01 Solid Waste Management System W-02 Garbage Collection IoT Installation W-03 Landfill management W-04 Water quality improvement system W-05 Water facility system improvement W-06 Public Utilities Charging Unification	Smart Security S-01 CCTV System Introduction S-02 Fire alarm system enhancement S-03 Fire alarm system installation S-04 Public relations improvement D-01 Smart City Data Collection & Analysis D-02 Data Dissemination to Relevant Stakeholders
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The projects above shall not be limited to being implemented or financed by JICA.

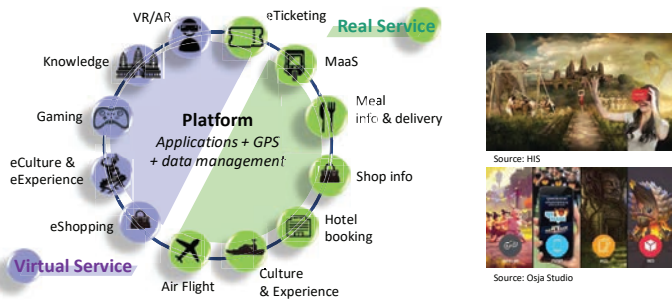
(3) BASIC POLICIES

Smart Tourism	Creating and Promoting Virtual Products with Real Resources for Multi-Attractiveness of Siem Reap
Smart Mobility	Promoting Sustainable, Safe, and Convenient Mobility Systems for Citizens & Tourists
Smart Security	Enhancing basic security as a safe international tourism city
Smart Waste Management	Enlightening, Enforcing and Engineering (3E) for waste environment improvement
Smart Data Management	Managing smart city for overall optimization with city OS and management center

(3) BASIC POLICY FOR SMART TOURISM

Smart Tourism **Creating and Promoting Virtual Products with Real Resources for Multi-Attractiveness of Siem Reap**

Establishment of an integrated tourism platform to offer real and virtual services accessible from smartphone/PC and collect data for future tourism development

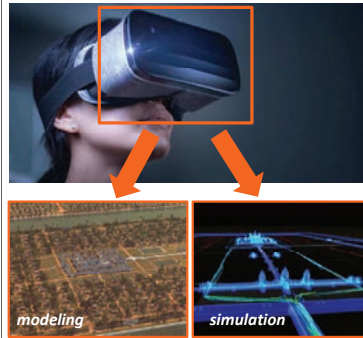


Source: JICA Study Team

(3) DEVELOPMENT PROGRAMS FOR SMART TOURISM

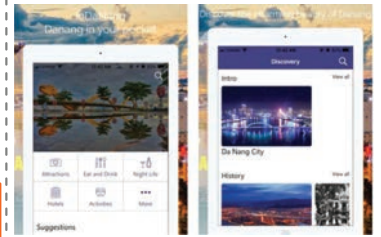
XR Development (T-02)

Project goal: To enrich knowledge and imagination with virtual services and enrich the enjoyment of local sightseeing with real services, through the fusion of smart technology and tradition.



E-Tourism Platform (T-03)

Project goal: To develop an integrated tourism platform accessible from smartphone/PC, that offers real and virtual services. The collected data (big-data) are utilized for tourism promotion, service improvement and furthermore for city planning/development.



PROJECTS FOR (ISSUE 1) (ISSUE 2) (ISSUE 3)

(3) DEVELOPMENT PROGRAMS FOR SMART TOURISM

QR Code Development (T-04)

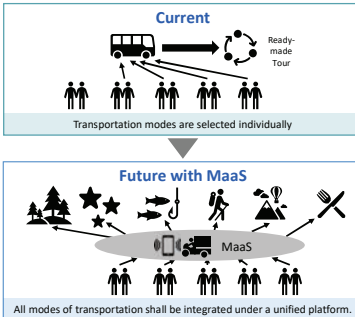
Project goal: To spread services using QR codes in tourist spots and contribute to increase tourists' satisfaction by providing useful information as well as easing procedures.



PROJECTS FOR (ISSUE 2) (ISSUE 4)

MaaS Introduction (T-06)

Project goal: To develop an application that can propose the best sightseeing route based on the tourist's interests and tourists can select the desired sightseeing spot, restaurant/souvenir store, and means of transportation (including rental-bicycle).



All modes of transportation shall be integrated under a unified platform.

(3) BASIC POLICY FOR SMART MOBILITY

Smart Mobility **Promoting Sustainable, Safe, and Convenient Mobility Systems for Citizens & Tourists**

Sustainable	Air Pollution ✓ Promote to Replace EV TukTuk and Introduce EV Charging Spots
Safe	Road Maintenance and Management ✓ Introduce Apps for Detection and Classification of Road Conditions
	Street lighting ✓ Installation of LED street lighting
Convenient	Traffic Accidents ✓ Collect and Provide Black Spots and Evaluate TukTuk Driver's Skill
	Traffic Congestion ✓ New Traffic Signal Phase based on Traffic Volume
	Illegal Parking ✓ Introduce Official Parking System

(3) DEVELOPMENT PROGRAMS FOR SMART MOBILITY

Smart Parking System Introduction (M-01)

Project goal: To install official parking system to around Pub Street and other streets which have a lot of illegal parking vehicles in Siem Reap City.



AI Road Condition Monitoring (M-02)

Project goal: To ensure the required road quality at the minimum required cost

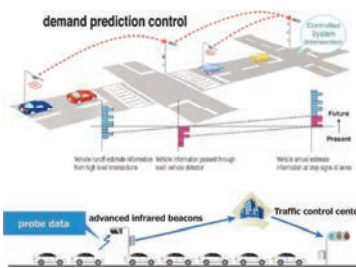


PROJECTS FOR (ISSUE 5) (ISSUE 6)

(3) DEVELOPMENT PROGRAMS FOR SMART MOBILITY

Smart Traffic Signal System Improvement (M-04)

Project goal: Optimized traffic flow according to traffic demands



EV Promotion (M-06)

Project goal: To replace conventional vehicles to electric vehicles (EV) in Siem Reap



PROJECTS FOR (ISSUE 5) (ISSUE 6)

(3) BASIC POLICY FOR SMART SECURITY

Smart Security **Enhancing basic security as a safe international tourism city**

4 elements

2 principles

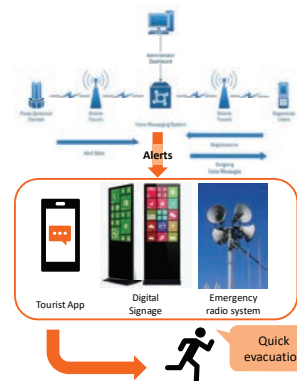


Quick detection by continuous monitoring
Prevention and damage mitigation by efficient actions

(3) DEVELOPMENT PROGRAMS FOR SMART SECURITY

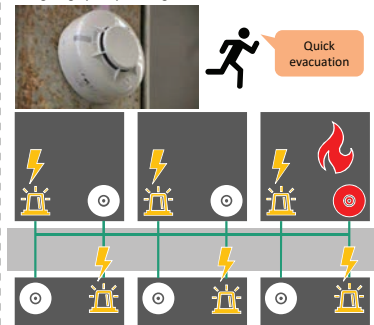
Flood Warning System Enhancement (S-02)

Project goal: To inform disaster early warnings widely to citizens and international tourists



Fire Alarm System Installation (S-03)

Project goal: To enable immediate evacuation and initial firefighting by early warning of fire



PROJECTS FOR (ISSUE 8)

(3) BASIC POLICY FOR SMART WASTE MANAGEMENT

Smart Waste Management
Enlightening, Enforcing and Engineering (3E) for waste environment improvement

Enlightenment

- Ensure observance of rules
- Promotion of 3R (Reuse, Reduce, Recycle)

Enforcement

- Developing sustainable collection system
- Classification of users
- Classification of waste
- Classification of traders and License
- Enforcement of illegal dumping /disposal

Engineering

- Improvement of technical system
- Improvement of method of processing
- Developing recycling system

By Government

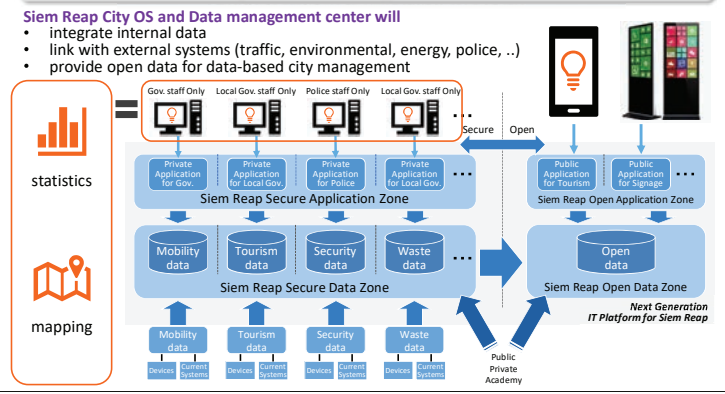
- Innovation of processing
- Administrative guidance to trader/informal sector
- Enlightenment to citizen awareness

By Operator

- Improvement of collection volumes
- Technically improvement of method of processing

(3) BASIC POLICY FOR SMART DATA MANAGEMENT

Smart Data Management
Managing smart city for overall optimization with city OS and management center

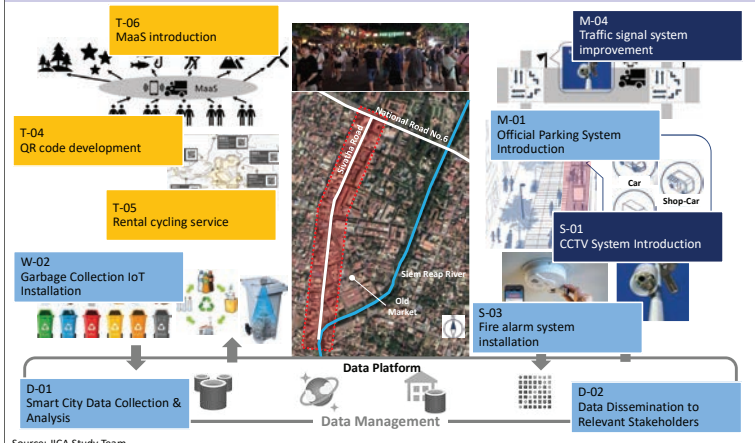


(4) PROJECT IMPLEMENTATION

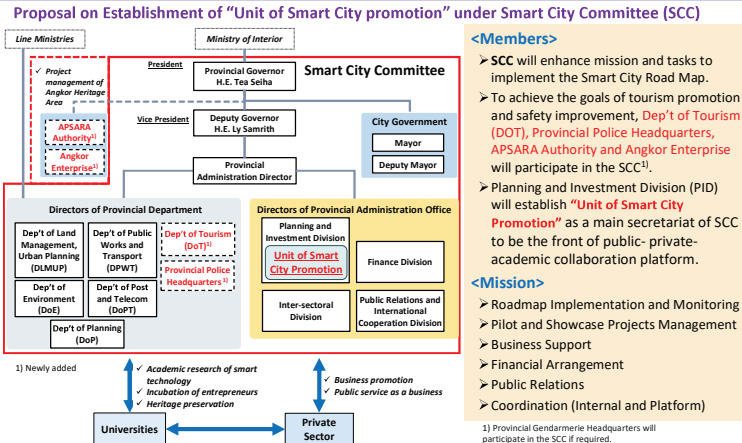
Smart Tourism	Smart Mobility	Smart Waste Management	Smart Security
T-01 Online tour promotion	M-01 Official Parking System Introduction	W-01 Solid Waste Management System	S-01 CCTV System Introduction
T-02 XR development	M-02 Road condition monitoring	W-02 Garbage Collection IoT installation	S-02 Flood warning system enhancement
T-03 E-tourism platform development	M-03 Street lighting improvement 38 Road	W-03 Landfill management	S-03 Fire alarm system installation
T-04 QR code development	M-04 Traffic signal system improvement 38 Road	W-04 Water quality improvement system	S-04 Public relations improvement
T-05 Rental cycling service	M-05 Safety drive improvement	W-05 Water facility system improvement	Smart Data Management
T-06 MaaS introduction	M-06 EV promotion	W-06 Public Utilities Charging Unification	D-01 Smart City Data Collection & Analysis
			D-02 Data Dissemination to Relevant Stakeholders

The projects above are generally assumed to be promoted by the Siem Reap Provincial Government and they shall not be limited to being implemented or financed by JICA.

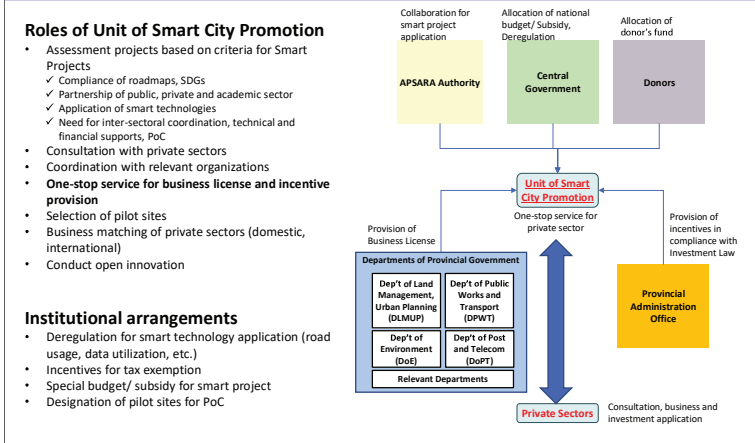
(4) PROJECT IMPLEMENTATION "City Center Showcase (example)"



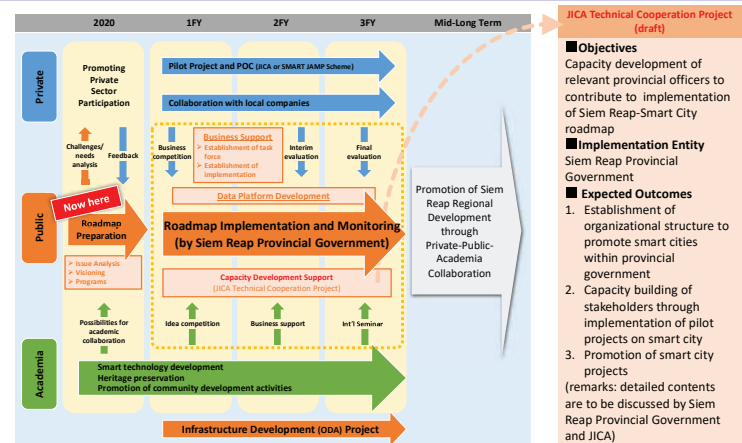
(4) PROJECT IMPLEMENTATION: ENHANCED SMART CITY COMMITTEE



(4) PROJECT IMPLEMENTATION: SMART CITY PROMOTION UNIT (PROPOSAL)



(4) PROJECT IMPLEMENTATION: TECHNICAL COOPERATION PROJECT



(1) SEMINAR

To Share and Discuss the Urban Problems, Concept and Solutions of Siem Reap Smart City

Seminars

	Place ^{*1}	Date ^{*2}	Participants
1 st Seminar	Phnom Penh	10 th February, 2021	Business Operators, Academia, Government Officers, External Experts, or other related persons (Approx. 100 persons)
2 nd Seminar	Siem Reap	May-June, 2021	
	Tokyo	May-June, 2021	

Program

[1st Seminar]

60 participants in total (zoom and facebook)

[2nd Seminar]

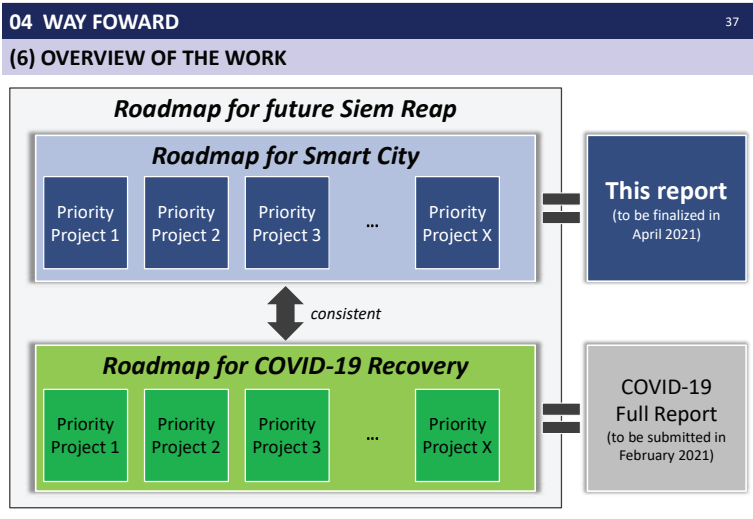
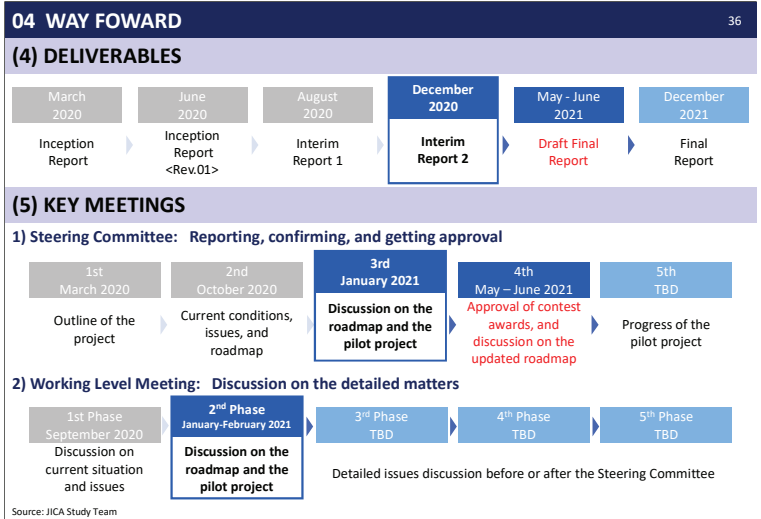
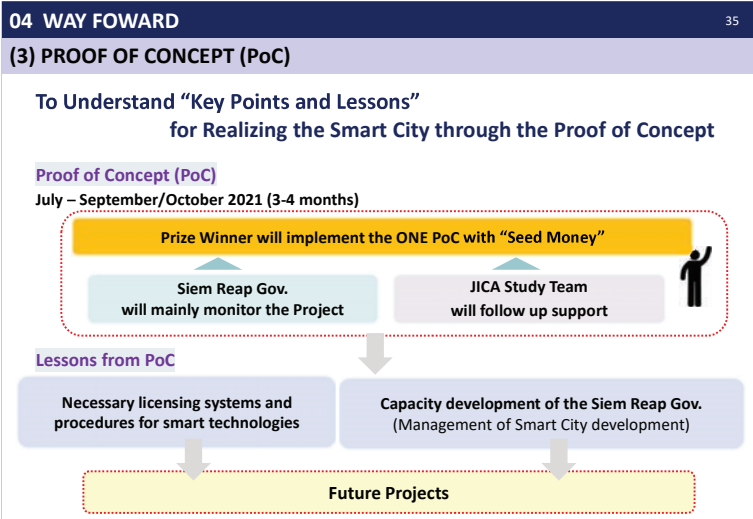
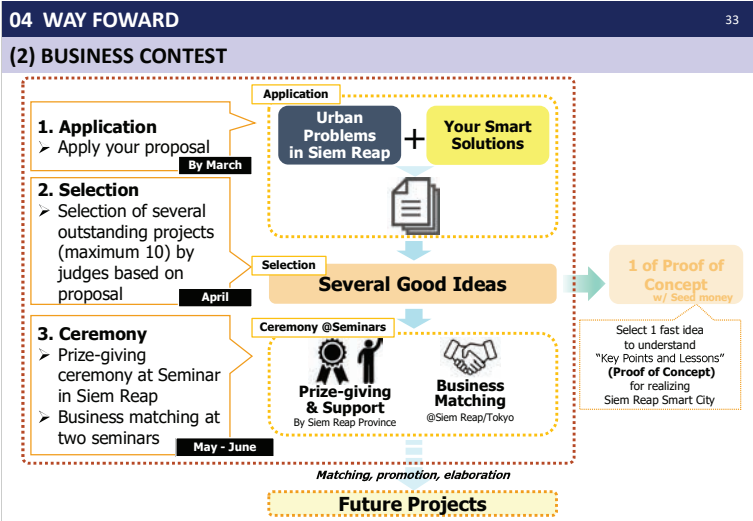
- Introduction**
 - Urban Problems
 - Priority Sectors
 - Smart City Concept
 - Road Map
- Awards Ceremony**
 - Awarding of the Business Contest Winners
 - Introduction of awarded Ideas/Projects
- Group Discussion**

Discussion on Smart City approach and solutions per sector groups

Urban Problems
Smart City Concept

Awarded Projects

Future Projects



- Discussion Points which are expected to be approved in this Meeting** 39
- 1. Concept, vision and basic policies**
Are those generally agreed?
Do you have any images or keywords which should be added?
 - 2. Development program**
Do you have any ideas of actions to be added in the program?
To make the program details, how do you think 24 projects in points below?
- importance or difficulty (by sectors or by projects)
- possibility of public (government) initiatives
- relationship with 38 road projects
 - 3. Institutional structure and a technical cooperation project**
Are those generally agreed?
Are there any issues especially for new institutional structure?
Do you need to involve central government to promote Smart City?
How do you coordinate with central government?
 - 4. Business contest and seminar, and way forward**
Are those generally agreed to receive governmental support?
- business contest approval and award ceremony
- support for private business, especially conducting PoC (trial activity)
Do you agree on schedule toward the next committee and report.
Which is preferable logo design?

The Basic Survey for Smart City in Siem Reap
Data Collection Survey on Urban Improvement in Siem Reap City
Minutes of Meeting

Meeting Information	
Subject	The 4th Steering Committee for Smart Siem Reap
Venue	Siem Reap Provincial Hall – Salle 1
Date/Time	30/08/2021 08:30 ~ 09:30
Material from the JICA team	Interim Report 3 Executive Summary (English) Interim Report 3 Exclusive Summary (Khmer)
Attendees	<p>Cambodia side: H.E. Tea Seiha (Siem Reap Governor, SR Provincial Administration) Mr. Ly Samrith (Siem Reap Deputy Governor) Mr. Sok Thol (SR Provincial Administration) Mr. Tep Piseth (SR Provincial Administration) Mr. Kosal Makara Piseth (SR Provincial Administration) Mr. Seng Visal (SR Provincial Administration) Mr. Heav Sithat (SR Provincial Administration) Mr. Hoem Vannit (SR Provincial Administration) Mr. Thab Kakada (SR Provincial Administration) Mr. Ploeut Bunnarum (SR Provincial Administration) Mr. Eung Sophean (SR Provincial Administration) Mr. Soy Kimsan (SR Provincial Administration) Ms. Lim Phalika (SR Municipal Administration) Mr. Hom Soksans (SR Provincial Gendarmerie Headquarter) Mr. Soam Sopharat (Apsara National Authority) Mr. Heng Ny (SR Provincial Police Headquarter) Mr. Sok Seyha (SR Provincial Police Headquarter) Mr. Hy Say (D. Land Management, Urban Planning, and Construction) Mr. Tan Kim Ang (D. Public Work and Transports) Mr. Soeung Sitha (Director of Clean City Office, D. Tourism) Mr. Sun Kong (D. Environment) Mr. Long Vansak (D. Planning) Mr. Mourn Sopheap (D. Culture and Fine Art) Mr. Sum Sim (D. Post and Telecommunication) Mr. Sen Phos (D. Post and Telecommunication) Mr. Khoy Savorak (Angkor Enterprise) Mr. Noun Chandarong (Angkor Enterprise) Mr. Soy Seyha (Chief of a commune) Mr. Tea Kimsot Mr. Horm Soksans Ms. Som Chanchhorvy</p> <p>Japanese side: Ms. Asuka Tsuboike (JICA Headquarter) Ms. Ayumi Kiko (JICA Headquarter) Mr. Tetsuji Goto (JICA Headquarter) Ms. Pheang Pharinet (JICA Cambodia Office) Mr. Kuniomi Hirano (JICA Study Team) Ms. Tomoko Abe (JICA Study Team) Mr. Kai Kurimoto (JICA Study Team) Ms. Toko Hirota (JICA Study Team) Mr. Mengkoung Veng (JICA Study Team) Mr. Tey Tak (JICA Study Team)</p>
Minutes	
<p>1. Agenda:</p> <ol style="list-style-type: none"> (1) Opening Remark from H.E. Tea Seiha from the Siem Reap Provincial Administration (SRPA) (2) Opening Remark from JICA (3) Presentation of Business Contest by Kai Kurimoto (4) Discussions and Q&A 	

- (5) Presentation of COVID-19 Recovery Roadmap by Tomoko Abe
- (6) Discussions and Q&A
- (7) Closing Remarks (JICA)

2. Discussion:

- H.E. Tea Seiha would like to thank the JICA and JICA Study Team for the two presentations on the Business Contest and the COVID-19 Recovery Roadmap.
- For Business Contest, H.E. Tea Seiha expressed support for the two selected projects - *Smart Parking System in Siem Reap City* and *Smart Scooter Sharing Service*. He hopes that these two development projects will align with the on-going 38-Road Construction project in the city, and it also will improve the tourist's satisfaction soon.
- For the COVID-19 Recovery Roadmap, H.E. Tea Seiha thanks the JICA Study Team for conducting this research. However, more discussions need to be held since the policies/regulations of COVID-19 instantly change.
- Mr. Tip Piseth, from the Division of Planning and Investment, showed interest in the proposed Project C-01 - *Installment of Infection Prevention and Sanitary Facilities*. At the same time, Mr. Sok Thol, Director of Siem Reap Administration, suggested that the working group should discuss more on the proposed Project C-02 (*Safety Standard Certification and Guideline*) and Project C-09 (*Airport Quarantine System Improvement*).

END

SIEM REAP SMART

The Basic Survey for Smart City in Siem Reap

Data Collection Survey on Urban Improvement in Siem Reap City

4th Steering Committee

30th August 2021
JICA Survey Team



AGENDA

SIEM REAP SMART

The Basic Survey for Smart City in Siem Reap

Data Collection Survey on Urban Improvement in Siem Reap City

Meeting Name	4th Steering Committee
Date and Time	30th August 2021 08:30- (Cambodia Time)
Venue	Zoom
Agenda	<p>Opening Remarks [H.E. Mr. Tea Seiha & JICA]</p> <ol style="list-style-type: none"> Survey Status and Coming Schedule - Explanation [JICA Survey Team] Business Contest Evaluation and POC - Explanation [JICA Survey Team] - Comments COVID-19 Recovery Roadmap - Explanation [JICA Survey Team] - Comments

MATERIALS (APPENDIXES)

Appendixes related to today's meeting (for reference)

1. List of applications for the business contest
2. COVID-19 Impact Survey Full Report (PPT)



1

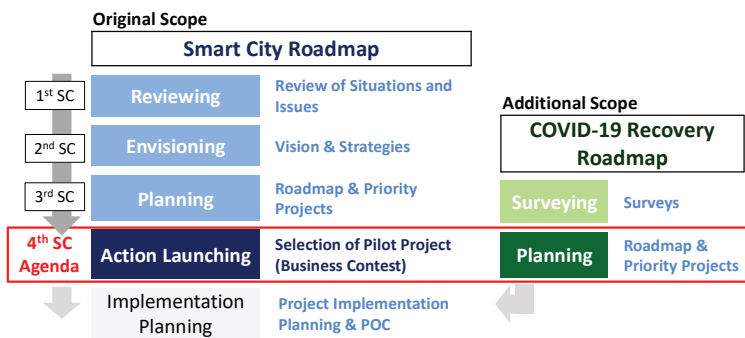
Survey Status and Coming Schedule



SURVEY STATUS

5

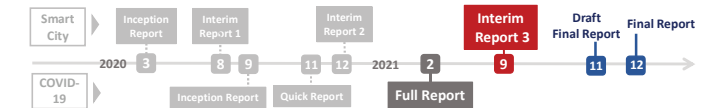
OVERVIEW OF THE WORK



Source: JICA Study Team

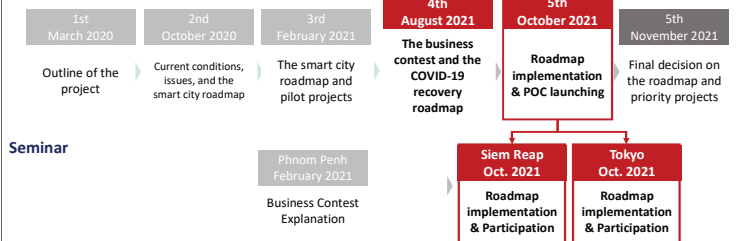
COMING SCHEDULE

DELIVERABLES



KEY ACTIVITIES

Steering Committee: Reporting, confirming, and getting approval



2

Business Contest Evaluation & POC



DISCUSSION POINTS ON THE BUSINESS CONTEST EVALUATION / POC

- ✓ Evaluation of the business contest is already generally agreed in the working group (12th May 2021)
- ✓ **Request of decision and approval**
 - Decision and approval of the Project Award
 - Decision and approval of the POC Award
- ✓ Request of support by Siem Reap Provincial Administration and relative governmental organizations
 - Further detailed discussion on the implementation of the project award projects
 - Support and commitment to the implementation of the POC

1. OUTLINE

9

In the business contest, we are going to award several good projects, and select 1 or 2 project(s) for POC. 13 projects were applied to this business contest.

List of 13 Projects (Applications)

1. Angkor Wat Virtual Tourism
2. eTourism and Local eCommunity
3. Smart Parking System in Siem Reap City
4. Warning broadcast against illegal parking by IP speaker
5. Digital streetlights
6. Smart Scooter Sharing Service
7. Mobile Solar Camera
8. Outdoor public address system for disaster prevention
9. Bakture Powder
10. Smart Energy Braker - "Expand your Energy Possibilities"
11. Nature environment & Harmony with Design & Technology Project
12. Smooth Space
13. IP Walkie-talkie

Table: Type of Awards in this Business Contest

	How many?	What kind of project?
Project Award	some*	Projects that Siem Reap Provincial Administration wants to backup and move forward for implementation
POC Award	1 or 2	A project that Siem Reap Provincial Administration will backup for POC** (August – October)

* JICA recommends to choose less than 5 projects for Project Award.

** POC = "Proof of Concept" = To implement a small-scale project as an experiment, so that issues for full-scale project implementation can be clarified

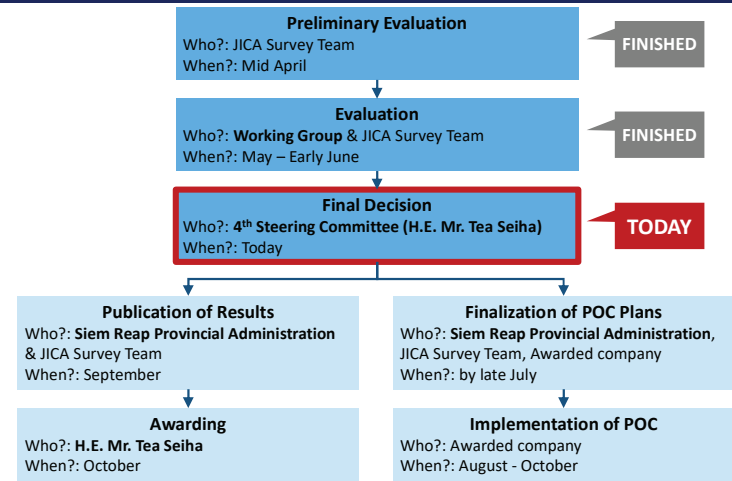
1. OUTLINE

10

13 projects applied for this business contest

2. EVALUATION METHOD

11



3. EVALUATION CRITERIA

12

6 key criteria for selecting Project Awards

Criteria	Description	Max. Points
1. Vision and Mission	• Does the applicant understand the urban issues in Siem Reap?	5
2. Target and Market	• Does the applied business benefit citizens and tourists? • Does the applied business have marketability?	5
3. Technology and/or Solution	• Does the applied business solve the urban issues in Siem Reap? • Is the technology in the application new in Cambodia?	5
4. Business model	• Is the applied business viable?	5
5. Team	• Does the team have the ability to accomplish the applied business? • Does the team have possibilities of collaboration with academic entities?	5
6. Motivation and Request for this contest	• Does the applicant have the motivation to fulfill the applied business? • Is the applied business what Siem Reap Provincial Administration want to support?	5

Total: 30 points

4. EVALUATION RESULTS BY WORKING GROUP MEETING

13

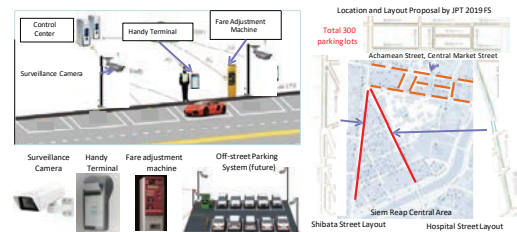
JICA Survey Team and the Working Group recommend 2 projects for awarding

Rank	Project Name	Name of Team	Evaluation
1	3. Smart Parking System in Siem Reap City	Japan Parking Technology Team	High
2	6. Smart Scooter Sharing Service	Asian Gateway Corporation	High
3	2. eTourism and Local eCommunity	Kroma Media & Apex Travel Service	Mid
4	1. Angkor Wat Virtual Tourism	Lastmileworks-Cambodia	Mid
5	9. Bakture Powder	SpaciaNet	Mid
6	10. Smart Energy Braker	Arzani	Mid
7	7. Mobile Solar Camera	NESIC	Mid
8	5. Digital street lights	NESIC	Mid
8	8. Outdoor public address system for disaster prevention	TOA Corporation	Mid
10	4. Warning broadcast against illegal parking by IP speaker	TOA Corporation	Low
10	11. Nature environment & Harmony with Design & Technology Project	Sumidesign's staff and project team	Low
12	12. Smooth Space	NESIC	Low
12	13. IP Walkie-talkie	NESIC	Low

4. EVALUATION RESULTS (PROJECT AWARD)

14

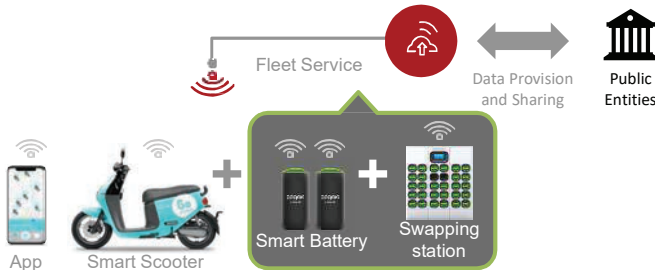
No.	3	
Project Name	Smart Parking System in Siem Reap City	
Name of Team	Japan Parking Technology Team (JPT)	
Outline of Project	Parking system	
Sector	Mobility	
Related Project in the Roadmap	M-01 Official Parking System Introduction	



4. EVALUATION RESULTS (PROJECT AWARD)

15

No.	6	
Project Name	Smart Scooter Sharing Service	
Name of Team	Asian Gateway Corporation	
Outline of Project	Smart scooter sharing service	
Sector	Mobility	
Related Project in the Roadmap	T-05 Rental cycling service M-06 EV promotion	



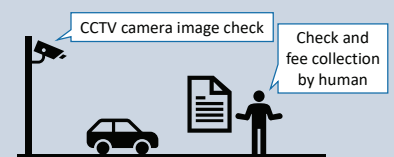
5. POC (PROOF OF CONCEPT) PREPARATION

16

No.	3	
Project Name	Smart Parking System in Siem Reap City	
Name of Team	Japan Parking Technology Team (JPT)	

POC Content of the Smart Parking Project

POC Period (tentative)	October 2021 (around 10 days)
POC Objective	To test the parking operation scheme
POC Content	Conduct a pilot car parking operation using CCTV image data and human-based management. POC target area will be streets without construction of the 38-road project.
Request to the government	<ul style="list-style-type: none"> • Explanation to citizens and local businesses • Cooperation of police officers • Support for importing equipment (customs)



5. POC (PROOF OF CONCEPT) PREPARATION

17

No.	6
Project Name	Smart Scooter Sharing Service
Name of Team	Asian Gateway Corporation



POC Content of the Smart Scooter Project

POC Period (tentative)	October 2021 -
POC Objective	To test the usability of the Smart Scooter and data transmission environment in Siem Reap.
POC Content	Provide Smart Scooters and batteries to business companies in Siem Reap so that the employees can use the scooter for their work and test the Smart Scooter's usability.

Request to the government

- Acknowledgement of the project and discussion for future cooperation

provide

DISCUSSION POINTS ON THE COVID-19 RECOVERY ROADMAP

19

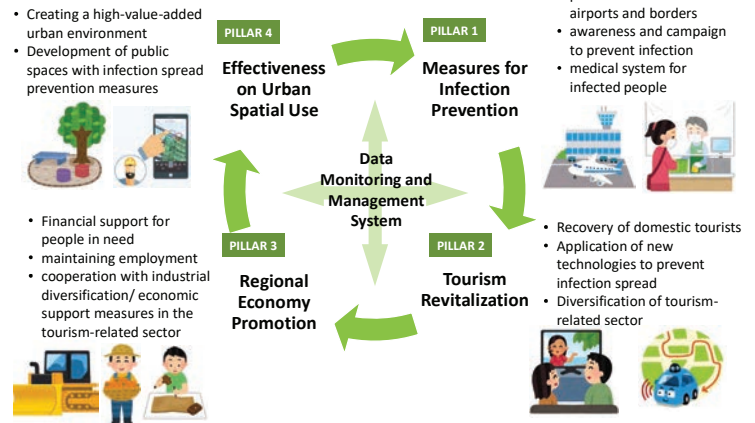
- ✓ Surveys were conducted for 5 months to identify the damage caused by COVID-19 in Siem Reap, and the report has been submitted (March 2021).
- ✓ Discussion on the COVID-19 Recovery Roadmap has already been taken place in several working groups (12th May 2021, 4th June 2021).
- ✓ Discussion on the quarantine system in Siem Reap has already been taken place (24th August 2021) and discussion is on-going.
- ✓ The COVID-19 recovery roadmap is planned to be integrated to the smart city roadmap.



RECOVERY ROADMAP

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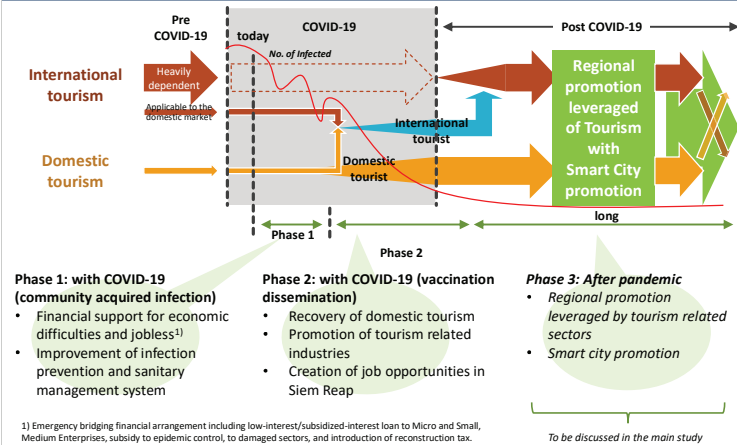
(1) BASIC POLICY



RECOVERY ROADMAP

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(1) BASIC POLICY



RECOVERY ROADMAP

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(1) BASIC POLICY

Proposed Projects by Pillar and Phase

Pillars of Main Issues	Phase1: with COVID-19 (community acquired infection)	Phase2: with COVID-19 (vaccination dissemination)	Phase 3: after pandemic
Pillar 1: Measures for Infection Prevention	<ul style="list-style-type: none"> C-01: Installment of Infection Prevention and Sanitary Facilities C-02: Safety standard certification and guideline C-03: Online Education for Infection Prevention 	<ul style="list-style-type: none"> C-08: Introduction of COVID-19 Countermeasures Information C-09: Provision Airport Quarantine System Improvement 	<p>→ Smart City Roadmap (to be proposed in the smart city part)</p>
Pillar 2: Tourism Revitalization	<ul style="list-style-type: none"> C-04: Fundraising for tourism C-05: Human resource development of the tourism sector 	<ul style="list-style-type: none"> C-10: Tourism farm 	
Pillar 3: Regional Economy Promotion	<ul style="list-style-type: none"> C-06: Expansion of Job Opportunities 	<ul style="list-style-type: none"> C-11: Siem Reap model E-Commerce development 	
Pillar 4: Effectiveness on Urban Spatial Use	<ul style="list-style-type: none"> C-07: Installment of equipment to avoid 3Cs¹⁾ 	<ul style="list-style-type: none"> C-12: Effective Urban Spatial Use with public participation 	

Potential Quick Start Projects

¹⁾ Closed spaces with poor ventilation, Crowded places with many people nearby, Close-contact settings such as close-range conversations

RECOVERY ROADMAP

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(1) BASIC POLICY

Potential Quick Start Projects in Phase 1

Project No.	Investment Amount	Necessary Time for Preparation	Implementation Body	Quick Start
C-01: Installment of Infection Prevention and Sanitary Facilities	Large	Short	DoH Siem Reap Province	
C-02: Safety standard certification and guideline	Small	Short	DoH Tourism Industry	✓
C-03: Online Education for Infection Prevention	Small	Medium	DoH Software Developer	✓
C-04: Fundraising for tourism	Small	Short	DoT Tourism Industry	✓
C-05: Human resource development of the tourism sector	Small	Long	DoT Tourism Industry	
C-06: Expansion of Job Opportunities	Small	Medium	Siem Reap Province App Developer Businesses in tourism, agriculture, industry sectors	✓
C-07: Installment of equipment to avoid 3Cs	Large	Short	Siem Reap Province New business investors	

RECOVERY ROADMAP

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(1) BASIC POLICY

Comparison of Tourism Recovery Roadmap (MOT) and the COVID-19 Recovery Roadmap (JICA Study)

	Tourism Recovery Roadmap (MOT)	COVID-19 Recovery Roadmap (JICA Study)
Phasing	<p>Phase 1: With COVID-19 (Now)</p> <p>Phase 2: Recovery</p> <p>Phase 3: After COVID-19</p>	<p>Phase 1: With COVID-19 (Now)</p> <p>Phase 2: Recovery</p> <p>Phase 3: After COVID-19</p>
Target	Nationwide	Siem Reap
Sector / Projects	Mainly tourism	<p>4 Pillars</p> <ul style="list-style-type: none"> Infection prevention measures Tourism revitalization Regional Economy promotion Urban space utilization

We expect that Siem Reap Province moves forward in line with this roadmap (referring to MOT Roadmap at the same time)

RECOVERY ROADMAP (2) PROPOSED PROJECTS 25

Project C-01 Installation of Infection Prevention and Sanitary Facilities **Phase 1 / Pillar 1**

Objective
To ensure hygienic environment for safety of citizens and tourists in both urban and rural areas

Action Plan

Action:


1. Installation of freezer for vaccine storage in hospitals
2. Installation of germicidal lamp in airport, tourism sites, public facilities
3. Installation of septic tanks in heritage areas, rural areas

Implementation body: DoH
Siem Reap Provincial Government


Financing: DoH, Donor, Private

Examples of Infection Prevention and Sanitary Facilities


Portable Freezer



Germicidal lamp



Septic Tank



RECOVERY ROADMAP (2) PROPOSED PROJECTS 26

Project C-02 Safety standard certification and guideline **Phase 1 / Pillar 1**

Objective
To establish a comprehensive certificate system of infection prevention.

Quick Start


Action Plan

Action:

1. Preparation of syllabus against infection buster
2. Developing implementation structure
3. Training of trainers
4. Improvement the existing QR code system between tourist and tourism industry
5. Establishment open to the public related certification label presence
6. Develop "contact application" to reduce public anxiety

Implementation body: Public sector: DoH
Private sector: Tourism Industry

Financing: Passing on cost to tourist



RECOVERY ROADMAP (2) PROPOSED PROJECTS 27

Project C-03 Online Education for Infection Prevention **Phase 1 / Pillar 1**

Objective
To prepare the sustainable educational system concern about infection by applying online educational tools

Quick Start

Action Plan

Action:


1. Preparation of syllabus against infection buster by trainer of health care staffs
2. Developing application for online system by private company
3. Input syllabus and developing manual for each level into App.
4. Communication between trainers and experts
5. Implementation of App. and evaluation pre survey
6. Improvement of App and evaluation post survey

Data management: Number of staffs, Evaluation of pre-post survey

Implementation body: Public sector: DoH
Private sector: Software company

Financing:

1. Online products development: Private sector
2. Passing on cost to tourist



RECOVERY ROADMAP (2) PROPOSED PROJECTS 28

Project C-04 Fundraising for Tourism **Phase 1 / Pillar 2**

Objective
To establish local tourism network supported by online tour, reward-based crowdfunding, tourism farm, etc.

Quick Start


Action Plan

Action:

1. Launch reward-based crowdfunding in the tourism industry by selling hotel vouchers, tour tickets, souvenirs etc.
2. Conduct online tour to introduce tour contents and souvenirs
3. Conduct offline tour by applying vouchers
4. Promote tourism recovery campaign by provincial government

Implementation body: - MoT
- Private tourism companies

Financing: - MoT
- Donors



RECOVERY ROADMAP (2) PROPOSED PROJECTS 29

Project C-05 Human resource development of the tourism **Phase 1 / Pillar 2**

Objective
To strengthen capacity of human resource of tourism sector to meet international standards.

Action Plan

Action:

1. Develop a syllabus and manuals of training of tourism
2. Capacity assessment of trainees (tour guides, hotel staffs, craft industry workers, etc.)
3. Conduct training and On-the-Job-Training
4. Capacity assessment of trainees including assessment of customers

Implementation body: - DoT
- Private tourism companies

Financing: - MoT
- DoT
- Donors



RECOVERY ROADMAP (2) PROPOSED PROJECTS 30

Project C-06 Expansion of Job Opportunities **Phase 1 / Pillar 3**

Objective
To establish employment support system to maintain job opportunities in Siem Reap.

Quick Start

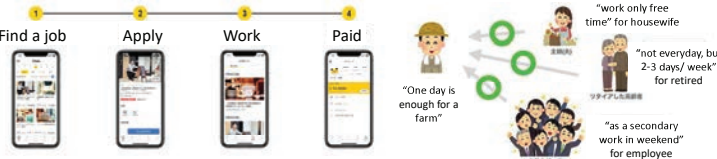
Action Plan

Action:

1. Develop an online matching application with e-payment system
2. Request for resister of job opportunity list from public and private sectors
3. Request for resister of applicants
4. Provide job opportunities through the application

Implementation body: Public sector: Siem Reap Provincial Government
Private sector: IT company (application development and operation), Tourism, agriculture, industry sectors (service providers)

Financing: Passing on cost to charge of application utilization



RECOVERY ROADMAP (2) PROPOSED PROJECTS 31

Project C-07 Installation of equipment to avoid 3Cs **Phase 1 / Pillar 4**

Objective
To control flow of tourists and citizens to avoid overcrowd gathering.

Action Plan

Action:

1. Installation of monitor cameras in public space
2. Installation of monitor cameras to monitor roadside parking
3. Installation of activity log application to avoid overcrowding

Implementation body: Public sector: Siem Reap Government
Private sector: New business investors

Financing:

1. Government/Donors for facilities and development system
2. Investment from private sector

Expected business industry: Smart monitoring system of public space (c.f. camera to monitor pedestrian flow and security, smart parking)



RECOVERY ROADMAP (2) PROPOSED PROJECTS 32

Project C-08 Introduction of COVID-19 Countermeasure Information Provision **Phase 2 Pillar 1**

Objective
To offer information on actual situations of COVID-19 countermeasures by hotels and restaurants to tourists

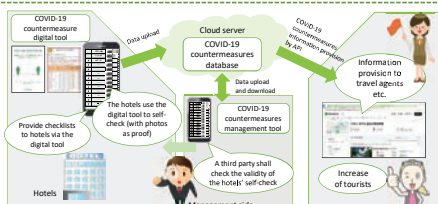
Action Plan

Action:

1. Development of a digital tool to promote COVID-19 countermeasures conducted by hotels in Siem Reap

Implementation body: DoH, DoT, Siem Reap Provincial Government, Private operator

Financing: Donor, private operator



Objective

To establish a quarantine system for COVID-19 at Siem Reap International Airport

Summary of Actions

- 1) While aiming to ensure the safety of travelers and citizens by strengthening airport quarantine, it is essential to recover international traffic demand in order to revitalize the economy while preventing infection.
- 2) In order to achieve this, it is necessary to curb the entry of infected people while strengthening border measures at international airports. Furthermore, it is necessary to mitigate the measure stepwise such as reducing the quarantine period and exemption the PCR testing after arrival etc.
- 3) Implementation of stepwise mitigation measures toward New-Normal era is desired, that is, to minimize the restricted period of arrival passengers and to maximize their time for free activity after arrival.
- 4) In order to strengthen the quarantine of existing international airports, it is necessary to secure the space required for inspections and strengthen the ventilation equipment in accordance with the guidelines of WHO and ICAO, while securing sufficient amounts of consumables such as disinfectants and PPEs. In addition, it is indispensable to establish a medical system to prepare for coming emergencies in advance.
- 5) In addition, in Phnom Penh and Siem Reap, new international airports are scheduled to open in 2023, so when developing the new airport facilities, not only for this COVID-19 countermeasure, but also as a preparation for a future pandemic, it is desirable to implement the same measures in advance.
- 6) Together with above mentioned measures, the introduction of an immune passport (Travel Pass) will enable shortening and exemption of quarantine period, and it is expected to support smooth recovery of economic activity.



Objective

To increase opportunities for local production areas and visitors to communicate, to experience farming, craft makings, etc. and to expand markets and qualities.

Action Plan

- Action:**
1. Select farms/ agricultural groups who are interested to join the campaign
 2. Conduct online farming tour, agricultural education tour
 3. Dispatch volunteers and experts for HRD and rural development
 4. Prepare Community Based Tourism promotion plan
 5. HRD for product development, marketing, etc.
- Data management:**
- Number of agricultural products
 - Smart agriculture App to monitor productivity
 - Revenue of farms
- Implementation body:**
- MAFF
 - Provincial government
 - Private agricultural groups/ farmers
 - Tourism industries (hotel, restaurant, etc.)
- Financing:**
- MoT
 - Donors



Objective

To recover and enhance local economy through promotion of e-commerce to be leveraged by the tourism recovering activities and align with e-tourism platform in the Siem Reap Smart City project.

Action Plan

- Action:**
1. Immediate: Organize Siem Reap based rewards-based crowdfunding for tourism sector and local commerce (the focal initiatives for coordination is essential: a managing advisor, working group/taskforce, etc.)
 2. Develop pilot e-commerce (incl. live commerce) platform as an exit and extension of crowdfunding and demand generation (possible policy incentives such as lowering tax rate for e-commerce) on market and data collection (big data) for the suitable e-commerce platform. (For the development of platform, (1) coordination is vital with other policy activities, such as KAS/DASCP, AIMS, and Go4eCAM, and (2) the collaborative works be considered with research capable local entities in ICT, shipping/delivering, and e-payment settlement and/or consortium of them that should be selected through open process such as the open pitch events provided as a part of activities.)
 3. Formulate and implement Siem Reap model of local commerce development (such as through e-commerce characterized in culture heritage and historical tourism hub)
- Implementation body:** Local gov. (National gov., MOC, MOT, MISTI), Industrial assoc. (or, consortium of tourism sector with, food processing, agro-industry, etc.)
- Financing:**
1. DoT (as a part of tourism promotion)
 2. MOC/MISTI (as a part of EC promotion and/or MSME promotion)
 3. Fund raised by crowdfunding

Objective

To improve public open space with appropriate infection prevention and sanitary measures.

Action Plan

- Action:**
1. Review and evaluation of urban plan along Siem Reap river
 2. Promote environmental education with garbage collection activities to raise awareness
 3. Improve riverbed space (pavement, furniture, dust bins, etc.)
 4. Install cameras and streetlights for safety and monitoring of pedestrian flow
 5. Conduct events in public space and call for investors
- Implementation body:** Public sector: Siem Reap Government, DPWT
Private sector: New business investors
- Financing:**
1. Government/Donors for facilities and development system
 2. Investment from private sector
 3. Passing on cost to tourist
- Expected business industry:**
1. Attracting venue for various events, such as e-sport, seminar/exhibition/ education room
 2. Small business development for citizens (c.f. clean up and garbage collection of public space with awards/ fees)
 3. Smart monitoring system of public space (c.f. camera to monitor pedestrian flow and security, smart parking)



The Basic Survey for Smart City in Siem Reap
Data Collection Survey on Urban Improvement in Siem Reap City
Minutes of Meeting

Meeting Information	
Subject	The 5th Steering Committee for Smart Siem Reap
Venue	Siem Reap Provincial Hall – Salle 1
Date/Time	10/11/2021 14:00 ~ 16:00
Material from the JICA team	Document of the 5th Steering Committee Poster for Siem Reap Seminar POC plans from both private companies
Attendees	<p>Cambodia side: H.E. Ly Samrith (Siem Reap Deputy Governor) Mr. Tep Piseth (SR Provincial Administration) Ms. Lim Phalika (SR Municipal Administration) Mr. Hom Soksan (SR Provincial Gendarmerie Headquarter) Mr. Soam Sopharat (Apsara National Authority) Mr. Hong Sophatphearom (SR Provincial Police Headquarter) Mr. Meas Vannak (SR Provincial Police Headquarter) Mr. Sok Seyha (SR Provincial Police Headquarter) Mr. Tan Kim Ang (D. Public Work and Transports) Mr. Chay Chet (D. Tourism) Mr. Norm Kim Orn (D. Environment) Mr. Long Vansak (D. Planning) Mr. Prom Khmera (D. Culture and Fine Art) Mr. Mourn Sopheap (D. Culture and Fine Art) Mr. Sum Sim (D. Post and Telecommunication) Mr. Sen Phos (D. Post and Telecommunication) Mr. Horm Soksan Mr. Meng Heang Ms. Som Chanchhorvy</p>
	<p>Japanese side: Ms. Asuka Tsuboike (JICA Headquarter) Ms. Ayumi Kiko (JICA Headquarter) Mr. Tetsuji Goto (JICA Headquarter) Ms. Pheang Pharinet (JICA Cambodia Office) Mr. Kuniomi Hirano (JICA Study Team) Ms. Tomoko Abe (JICA Study Team) Mr. Kai Kurimoto (JICA Study Team) Ms. Toko Hirota (JICA Study Team) Mr. Mengkoung Veng (JICA Study Team) Mr. Tey Tak (JICA Study Team)</p>
Minutes	
<p>1. Agenda:</p> <ol style="list-style-type: none"> (1) Opening Remark by H.E. Ly Samrith from the Siem Reap Provincial Administration (SRPA) (2) Opening Remark by JICA (3) Presentation of Business Contest by Kai Kurimoto (4) Discussions and Q&A (5) Discussions and Q&A (6) Closing Remarks by H.E. Ly Samrith (7) Closing Remarks by JICA <p>2. Discussion:</p> <ul style="list-style-type: none"> • H.E. Ly Samrith has a few comments regarding the discussion points of this meeting: <ul style="list-style-type: none"> ➢ For the proposed 6th Steering Committee date between 23rd and 28th of December, the Deputy Governor decided to hold it on the 23rd of December ➢ For the request to include the Department of Tourism, Apsara National Authority, Angkor Enterprise, and Provincial Police Headquarter into Siem Reap’s smart city committee, the SRPA will send requests to those departments and organizations. 	

- For the establishment of the Smart City Unit under the SRPA, SRPA together with the Ministry of Interior are currently discussing this matter. Once it's agreed from both parties, they will send official requests to the Ministry of Civil Service. In a nutshell, this modification of SRPA's organization structure will take time; but SRPA is considering establishing this Smart City Promotion Unit as a unit or as a division.
- For the request for the official letter regarding the implementation of the POC projects, we will provide it as requested.
- Mr. Sam Soparath, from the Apsara National Authority, commented that even though Apsara National Authority is currently not in the Siem Reap smart city committee, they have been working closely with the SRPA regarding the Siem Reap smart city's development. In addition, they are willing to join this Siem Reap Smart City's committee.
- Mr. Tip Piseth, from the Division of Planning and Investment, showed interest in Slide 14 of this presentation, regarding the smart city funding. He understood that we need to cooperate with private sectors in order to realize the smart city. However, there are some projects that need the public sector's initiative and to develop. So, his question was whether there are some schemes or funds from JICA in the future to conduct those kinds of projects in the future. In response, Mr. Hirano could not directly answer this question; he explained the current scheme to collect money from the end-users of the smart city services, specifically foreign tourists.
- For the closing remark, Ms. Asuka Tsuboike from JICA requested that the participants from all relevant stakeholders attend the next steering committee, as it is going to be the foundation of the next phase of a technical cooperation project between JICA and SPRA. She also hopes that we will work together face-to-face in the near future.

END

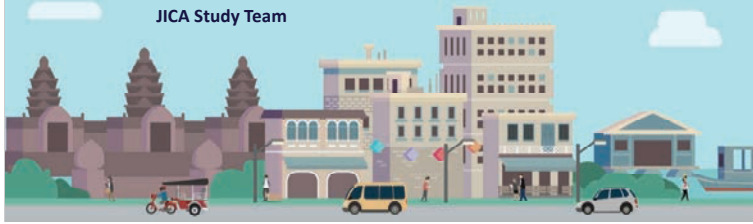
SIEM REAP SMART

The Basic Survey for Smart City in Siem Reap

Data Collection Survey on Urban Improvement in Siem Reap City

Presentation Material for the 5th Steering Committee

10th November 2021
JICA Study Team



AGENDA

SIEM REAP SMART

The Basic Survey for Smart City in Siem Reap

Data Collection Survey on Urban Improvement in Siem Reap City

Meeting Name	5th Steering Committee
Date and Time	10th November 2021 14:00- (Cambodia Time)
Venue	Siem Reap Provincial Hall Meeting Room + Zoom
Agenda	<ol style="list-style-type: none"> Opening Remarks [H.E. Mr. Tea Seiha & JICA] Presentation (Smart City Roadmap and PoC Plan) [JICA Survey Team] Discussion [All Participants] Closing Remarks [H.E. Mr. Tea Seiha & JICA]

INTRODUCTION

OBJECTIVES & CONTENTS OF THE SURVEY

Objectives

Proposing and launching actions for total solutions of smart technologies against urban problems of Siem Reap

Main Steps

- (1) Reviewing (understanding of current situation)
- (2) Envisioning (proposal of visions based on issues)
- (3) Planning (proposal of a road map and priority projects)
- (4) Action Launching (Selection and implementation of a pilot project)
- (5) Networking

Survey Period

March 2020 – January 2022 (23 months)

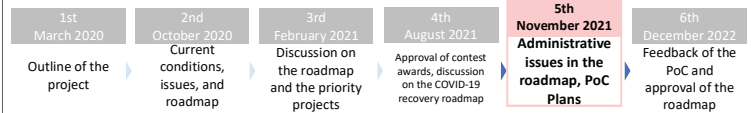
INTRODUCTION

(1) DELIVERABLES

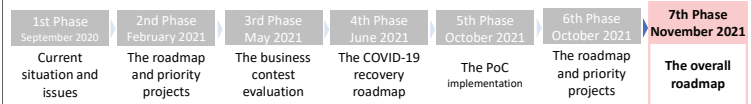


(2) KEY MEETINGS

1) Steering Committee: Reporting, confirming, and getting approval



2) Working Level Meeting: Discussion on the detailed matters



Source: JICA Study Team

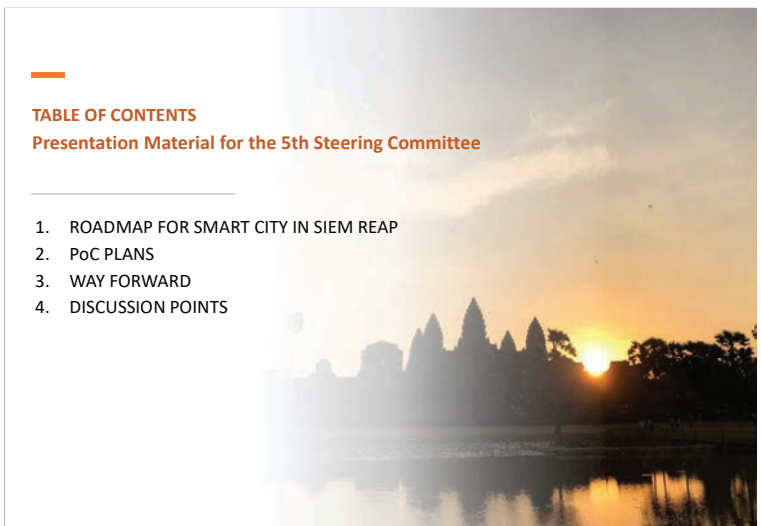
DISCUSSION POINTS

- General comments on the presentation**
 - We are especially keen on our recommendations on the vision (P7) and the administrative approach (P9 – P17)
 - Elements that we want to emphasize are in the pink box.
- Comments on our proposals related to administrative organizations (P12)**
 - Related to the Smart City Committee
 - Related to the new Smart City Promotion Unit
- Final approval and issue of an official authorization document of the PoC implementation (P 25-26)**
- Date and time of the final steering committee**
 - We expect it to be held on late December (between 23rd to 28th)

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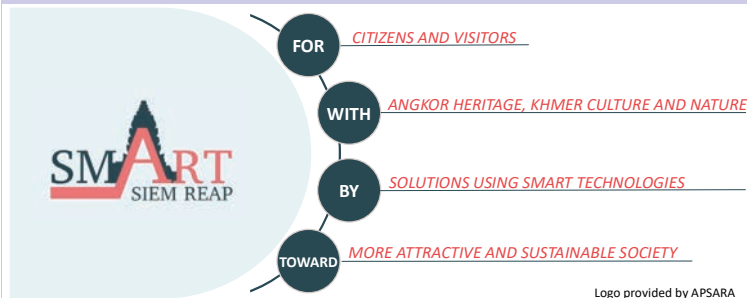
Presentation Material for the 5th Steering Committee

- ROADMAP FOR SMART CITY IN SIEM REAP
- PoC PLANS
- WAY FORWARD
- DISCUSSION POINTS



01 ROADMAP FOR SMART CITY IN SIEM REAP

(1) VISION & CONCEPT



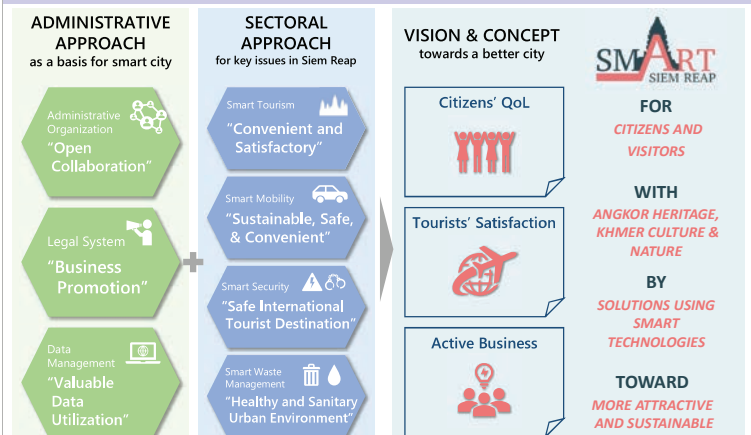
Logo provided by APSARA

"SIEM REAP SMART" aims to create a sustainable city with high comfortableness for citizens and an attractive city with high satisfaction for visitors with the pride of an international heritage and tourism city.

"SIEM REAP SMART" shall be achieved by a continuous management mechanism which enables to find solutions for urban issues with smart technologies, data-oriented analysis and visualization, and overall optimization approach

01 ROADMAP FOR SMART CITY IN SIEM REAP

(1) VISION & CONCEPT



ADMINISTRATIVE APPROACH

as a basis for smart city

- Administrative Organization "Open Collaboration"
- Legal System "Business Promotion"
- Data Management "Valuable Data Utilization"

SECTORAL APPROACH

for key issues in Siem Reap

- Smart Tourism "Convenient and Satisfactory"
- Smart Mobility "Sustainable, Safe, & Convenient"
- Smart Security "Safe International Tourist Destination"
- Smart Waste Management "Healthy and Sanitary Urban Environment"

VISION & CONCEPT

towards a better city

- Citizens' QoL
- Tourists' Satisfaction
- Active Business

SMART SIEM REAP

FOR CITIZENS AND VISITORS

WITH ANGKOR HERITAGE, KHMER CULTURE & NATURE

BY SOLUTIONS USING SMART TECHNOLOGIES

TOWARD MORE ATTRACTIVE AND SUSTAINABLE

01 ROADMAP FOR SMART CITY IN SIEM REAP 9

(2) ADMINISTRATIVE APPROACH

Sectors Basic Policy Direction of Measures

Administrative Organizations Open Collaboration Cross-divisional Administrative Structuring
 ~ Actions towards a cross sectoral smart city ~

Collaboration of Diverse Actors
 ~ Continuous Innovation with various stakeholders ~



A-01 The enhancement and operation of the Smart City Committee



A-02 The new establishment of the Smart City Promotion Unit

01 ROADMAP FOR SMART CITY IN SIEM REAP 10

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(A) ADMINISTRATIVE ORGANIZATIONS: ENHANCEMENT OF THE SMART CITY COMMITTEE

Provincial Governor H.E. Tea Seiha (Chairman) (*) = proposal of new members

Deputy Governor H.E. Ly Samrith (Deputy Chairman)

Directors of Provincial Administration		Directors of Provincial Departments		Municipal Government	APSARA Authority (*)	Angkor Enterprise (*)	Provincial Police Headquarters (*)
Provincial Administration Director	Planning and Investment Division	DLMUP	DPWT	Mayor			
Inter-sectoral Division	Finance Division	DoE	DPT	Deputy Mayor			
	Public Relations and International Cooperation Division	DoP	DoTT(*)				

Roles and Responsibilities of the Smart City Committee

- Implementation of the Smart City Roadmap
- Collaborate with external partners (including private institutions)
- Report and request decisions from relevant ministries, national institutions, and provincial councils
- Monitor and evaluate projects and progress of the Smart City Roadmap
- Coordinate financial schemes for smart city related projects

01 ROADMAP FOR SMART CITY IN SIEM REAP 11

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(A) ADMINISTRATIVE ORGANIZATIONS: SMART CITY PROMOTION UNIT

Provincial Administration	Provincial Departments	Municipal Government	APSARA Authority	Angkor Enterprise	Provincial Police Headquarters	Other organizations
Other divisions	DLMUP, DPWT, DoE, DPT, DoP, DoT					General government, international organizations, private business operators, etc.

Smart City Promotion Unit

Roles and Responsibilities of the Smart City Promotion Unit

- Become the **secretariat of the Smart City Committee** and conduct work according to the role and responsibility of the Smart City Committee
- Become a **supportive office** for smart city related private businesses
 - Business consultation with private sectors
 - Coordination with relative organizations of the business
 - Business matching among private businesses
 - Coordination of possible incentives for private business
 - Discussions on data provision with private businesses

Facilitation/Support

Private Business

01 ROADMAP FOR SMART CITY IN SIEM REAP 12

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(A) ADMINISTRATIVE ORGANIZATIONS: SHORT-TERM ACTIONS

Related to the Smart City Committee

- Add DoT, APSARA, Angkor Enterprise, and the police to the Smart City Committee.
- Enhance its roles, especially the following;
 - Collaborate with external partners (especially private businesses)
 - Monitor and evaluate projects and progress of the Smart City Roadmap
 - Coordinate financial schemes for smart city related projects
- Nominate the Smart City Promotion Unit as its secretariat.

Related to the Smart City Promotion Unit

- Become the **secretariat of the Smart City Committee** and conduct work according to the role and responsibility of the Smart City Committee
- Become a **supportive office for smart city related private businesses**
 - Coordination with relative public organizations of the business
 - Business matching among private businesses
 - Coordination of possible incentives for private business
 - Discussions on data provision with private businesses

01 ROADMAP FOR SMART CITY IN SIEM REAP 13

(2) ADMINISTRATIVE APPROACH

Sectors Basic Policy Direction of Measures

Legal Systems Business Support Promotion of Smart Business Business Environment Improvement
 ~ The government supporting private smart city businesses ~

Improving Incubation Functions
 ~ Invite and foster new businesses ~



L-01 Improvement of business operation environment for private companies



L-02 Incubation of private businesses for public services

01 ROADMAP FOR SMART CITY IN SIEM REAP 14

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(B) BUSINESS SUPPORT: GENERAL FINANCIAL SCHEME

End Users (tourists) Service Smart City Service Provider

Fund?

Entry ticketing? Car parking fees? Extra charge from accommodation fees? Service fees? (Subject to further discussion)

- In general monetization and sustainable business development is an issue in smart city development, but the basic principle is that the end user pays for the services that they receive.
- Discussion and efforts to create a sustainable scheme to obtain fees from the end users of the smart city services is necessary.
 - The creation of a smart city fund may be one solution, but need further discussion.

01 ROADMAP FOR SMART CITY IN SIEM REAP 15

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(B) BUSINESS SUPPORT: COLLABORATION/SUPPORT WITH PRIVATE BUSINESS

- While the budget from the government is limited, **promoting and supporting private businesses that contribute to smart city** is essential.
- There will be many lessons to be learnt related to private business promotion during the implementation of the 2 PoC projects. **These lessons learnt shall be used to improve the business support administration by the Smart City Promotion Unit.**

Siem Reap Provincial Administration and relative departments Support Smart City Service Provider (private business)

Realization of Smart City

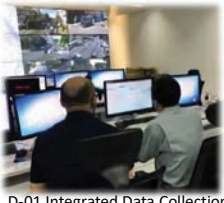
01 ROADMAP FOR SMART CITY IN SIEM REAP 16

(2) ADMINISTRATIVE APPROACH


Sectors Basic Policy Direction of Measures

Data Management Utilization of Valuable Data Development of the City OS
 ~ Optimizing urban services in a unified operation system ~

Promotion of Open Data
 ~ Encouraging free data utilization by disclosing information ~



D-01 Integrated Data Collection and Storage



D-02 Data Dissemination to Relevant Stakeholders

01 ROADMAP FOR SMART CITY IN SIEM REAP 17

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(C) DATA MANAGEMENT: THE WHOLE STRUCTURE

- An integrated data platform that collects various smart city related data will be needed.
- The data on the platform will be provided to citizens and tourists, as well as governmental officers.

01 ROADMAP FOR SMART CITY IN SIEM REAP 18

(3) SECTORAL APPROACH

Smart Tourism

Towards more convenient and satisfactory tourism

Smartification of Tourism Services
~ Deliver a more convenient and on demand tourism service ~

Satisfying Tourists' Demands
~ Develop diverse tourism resources to provide high satisfaction ~

T-06 Enhancement of Local Tourism Experience using AR

T-04 MaaS Introduction

01 ROADMAP FOR SMART CITY IN SIEM REAP 19

(3) SECTORAL APPROACH

Smart Mobility

Towards more sustainable, safe and convenient mobility systems

Safe and Smooth Traffic
~ Create road space that is safe and convenient for people ~

Efficient Management and Environment Consideration
~ Preventive maintenance of roads and the environment~

M-02 Road Condition Monitoring

M-01 Official Parking System Introduction

M-04 Traffic Signal System Improvement

01 ROADMAP FOR SMART CITY IN SIEM REAP 20

(3) SECTORAL APPROACH

Smart Security and Safety

Towards basic security as a safe international tourist destination

Mitigation and Adaptation to Crime and Accidents
~ Reduce crime and accident risks to ensure security ~

Adaptation to Disasters
~ Quick preventive actions to natural and manmade disasters ~

S-01 CCTV System Introduction

S-03 Fire Alarm System Installation

S-04 Public Relations Improvement

01 ROADMAP FOR SMART CITY IN SIEM REAP 21

(3) SECTORAL APPROACH

Smart Waste Management

Towards a healthy and sanitary urban environment

Enlightenment of the Environmental Mind
~ Encourage individual citizens' environmentally friendly actions ~

Enforcement of Public Waste Management
~ The public initiative towards sustainable environmental management ~

Engineering of Basic Infrastructure
~ Provide efficient infrastructure for waste management ~

W-02 Garbage Collection IoT Installation

W-04 Water Quality Improvement System

01 ROADMAP FOR SMART CITY 22

(4) PRIORITY PROJECTS

Roadmap (targeting 2035)

Priority Projects (short-term actions within 5 years)

7 priority projects from the administrative approach

22 priority projects from the sectoral approach

2022 2027 2035

- The roadmap and priority projects are to be implemented with the strong initiative of Siem Reap Provincial Administration.
- PoCs and pre-feasibility studies are conducted with support of JICA, MLIT, and JETRO, for the implementation of priority projects.
- Further support is planned in the JICA Technical Cooperation Project (from 2022)

01 ROADMAP FOR SMART CITY 23

(4) PRIORITY PROJECTS - ADMINISTRATIVE APPROACH

Administrative Organizations

Legal System and Business Support

Data Management

Survey ongoing (SI: Smart IAMP)

D-01 Integrated Data Collection and Storage

D-02 Data Dissemination to Relevant Stakeholders

A-01 The enhancement and operation of the Smart City Committee

A-02 The new establish of the Smart City Promotion Unit

A-03 The formulation and operation of the Private-Public-Academic-Citizen Platform

L-01 Improvement of business operation environment for private companies

L-02 Incubation of private businesses for public services

The projects above shall not be limited to being implemented or financed by JICA.

01 ROADMAP FOR SMART CITY 24

(4) PRIORITY PROJECTS - SECTORAL APPROACH Partial implementation ongoing

Smart Tourism

Smart Mobility

Smart Security

Smart Waste Management

PoC ongoing (T-03, M-01, M-06: JICA PoC)

Survey Ongoing (SI: Smart IAMP)

T-04 Maas Introduction

M-06 EV Promotion

S-03 Fire Alarm System Installation

W-01 Solid Waste Management System

T-03 Shared Mobility Development

M-01 Official Parking System Introduction

S-02 Flood Warning System Enhancement

W-02 Garbage Collection IoT Installation

T-06 Enhancement of Local Tourism Experience using AR

M-04 Traffic Signal System Improvement

S-01 CCTV System Introduction

W-03 Landfill Management

T-01 Tourism Promotion Platform Development

M-02 Road Condition Monitoring

S-04 Public Relations Improvement

W-04 Water Quality Improvement System

T-02 Centralized Reservation and Payment System

M-03 Street Lightning Improvement

W-05 Water Facility System Improvement

T-05 Contactless Payment Development with QR Codes

M-05 Safety Drive Improvement

W-06 Public Utilities Charging Unification

The projects above shall not be limited to being implemented or financed by JICA.

(1) SMART PARKING PROJECT (JPT)

POC Period (tentative)	1 st – 10 th December 2021 (7 days within this period)
POC Objective	To test the parking operation scheme
POC Content	Conduct a pilot car parking operation using CCTV image data and human-based management. PoC target area will be streets without construction of the 38-road project.

Request to the government

- Explanation to citizens and local businesses
- Cooperation of police officers

- Discussions were held in the working group (October 13th), and the PoC contents and roles of business operators and related governmental organizations have been agreed in the working group.
- **We would like H.E. Tea Seiha for final approval and issue of an official authorization document of the PoC implementation (letter etc.).**

(2) SMART SCOOTER SHARING SERVICE PROJECT (ASIAN GATEWAY)

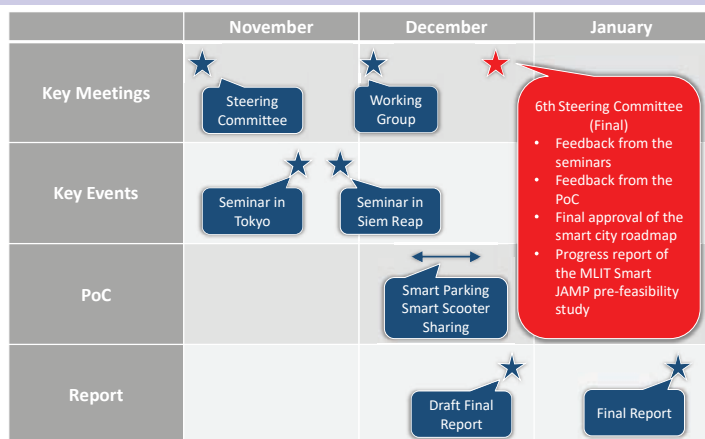
POC Period (tentative)	December 2021
POC Objective	To test the usability of the Smart Scooter and data transmission environment in Siem Reap.
POC Content	Provide Smart Scooters and batteries to business companies in Siem Reap so that the employees can use the scooter for their work and test the Smart Scooter's usability.

Request to the government

- Acknowledgement of the project and discussion for future cooperation

- Discussions were held in the working group (October 13th), and the PoC contents and roles of business operators and related governmental organizations have been agreed in the working group.
- **We would like H.E. Tea Seiha for final approval and issue of an official authorization document of the PoC implementation (letter etc.).**

(3) KEY EVENTS UNTIL THE END OF THE SURVEY



(4) SEMINAR IN SIEM REAP (ONLINE)

■ Outline

Host	Siem Reap Provincial Administration, JICA, MLIT
Date and time	29th November 2021 10:00 ~ 16:00
Objective	<ul style="list-style-type: none"> • To introduce the roadmap and the projects to be awarded in the business contest. • To introduce examples of Smart City technologies.
Expected Participants	<ul style="list-style-type: none"> • Officers of Siem Reap Provincial Administration and provincial departments • Local private sector

■ Timetable

10:00	<input type="checkbox"/> Opening Remarks	14:00	<input type="checkbox"/> Introduction of Activity of MLIT
10:10	<input type="checkbox"/> Introduction of Roadmap for smart city	14:10	<input type="checkbox"/> Speech from Business Organization [CCC, JBAC]
	<input type="checkbox"/> Introduction of Business Contest	14:30	<input type="checkbox"/> Introduction of Examples of Smart City Technologies
	<input type="checkbox"/> Introduction of the MLIT Smart JAMP pre-feasibility study	15:30	<input type="checkbox"/> Q&A
11:35	<input type="checkbox"/> Introduction of CICC ACCELERATOR PROGRAM	15:40	<input type="checkbox"/> Closing Remarks
11:50	<input type="checkbox"/> Q&A		

(4) SEMINAR IN TOKYO (ONLINE)

■ Outline

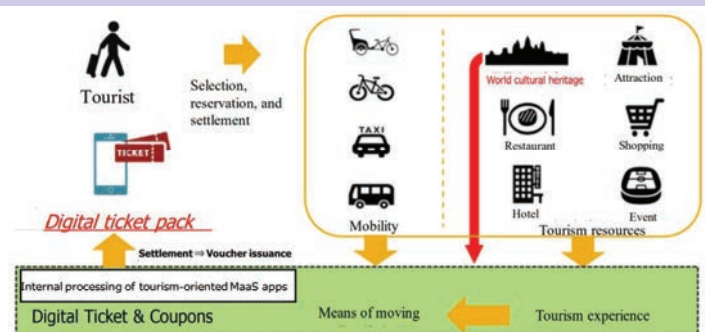
Host	Siem Reap Provincial Administration, JICA
Date and time	24th November 2021 9:00 ~ 10:45
Objective	<ul style="list-style-type: none"> • To introduce issues and the concept of smart city in Siem Reap to Japanese private companies.
Expected Participants	<ul style="list-style-type: none"> • Japanese companies

■ Timetable (tentative)

9:00	<input type="checkbox"/> Opening Remarks	<ul style="list-style-type: none"> • Activities for Smart City in Siem Reap • Introduction of Roadmap for Smart City in Siem Reap
9:10	<input type="checkbox"/> Introduction of Activity of JICA	
9:30	<input type="checkbox"/> Introduction of Business Contest and Awarded Project	<ul style="list-style-type: none"> • Smart Parking System [JPT] • Smart Scooter Sharing Service [Asian Gateway]
10:10	<input type="checkbox"/> Introduction of Activity of MLIT	
10:35	<input type="checkbox"/> Closing Remarks	

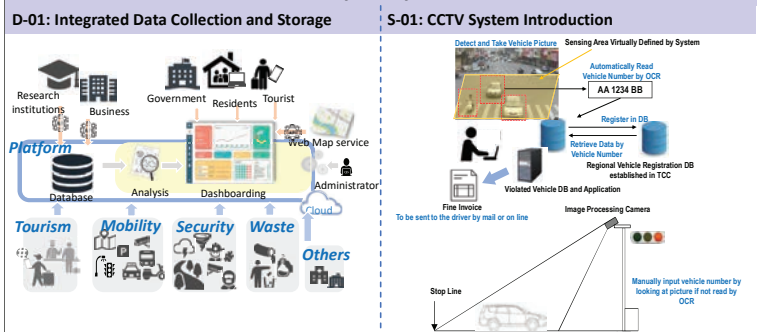
- **General comments on the presentation**
 - We are especially keen on our recommendations on the vision (P7) and the administrative approach (P9 – P17)
 - Elements that we want to emphasize are in the pink box.
- **Comments on our proposals related to administrative organizations (P12)**
 - Related to the Smart City Committee
 - Related to the new Smart City Promotion Unit
- **Final approval and issue of an official authorization document of the PoC implementation (P 25-26)**
- **Date and time of the final steering committee**
 - We expect it to be held on late December (between 23rd to 28th)

(1) JETRO PoC (T-04: MaaS Introduction)



Focusing on tourists' movements, a smartphone app prototype will be developed, that can provide packaged tourism and mobility services, providing more freedom and stress-free travel experience for tourists.

(2) MLIT Smart JAMP Pre-Feasibility Study



In the pre-feasibility study, we are studying on the first steps to realize the data platform for an inclusive data oriented smart city.

In the pre-feasibility study, we are studying on the possible solutions of urban issues that can be solved by CCTV, especially focusing on traffic and security.

Pre- Feasibility Study for Smart City Development in Siem Reap City
Smart Data Collection and Analysis & CCTV System Introduction
Minutes of Meeting

Meeting Information	
Subject	6 th Steering committee (JICA) and 2 nd Joint Coordination Committee (MLIT)
Venue	Siem Reap Provincial Hall and Zoom (online meeting)
Date/Time	27 December 2021. 9:30 AM – 12:00 PM (Cambodia time)
Material from JICA team	<ul style="list-style-type: none"> ● 20211223_2ndJCC_rev (MLIT) ● 20211223_2ndJCC_rev Khmer version (MLIT) ● ENG_presentation material (6th)1220rev (JICA) ● KHM_presentation material (6th) (JICA)
Attendees	<p>Interviewee</p> <p>Cambodia Side:</p> <p>H.E. Mr. Tea Sieha (Governor of Siem Reap Province) Mr. Sok Thol (Director of Siem Reap Provincial Administration) Mr. Kosal Makara Pisith (Director of International relation Division) Mr. Tip Pisith (Director of Planning and Investment Division) Mr. Sun Chamnan (Director of Administration Division) Ms. Lim Phallika (Vice Director of Siem Reap City Hall) Mr. Sok Seyha (Director of Department of Post and Telecommunication) Mr. Ky Vyrin (Director of Department of Public Work and Transportation) Mr. Som Sopharath (APSARA Authority) Mr. Liv Sokhon (Director of Department of Information) Mr. Eng Chhengeang (Department of Police) Mr. Meas Vannak (Department of Police) Mr. Norm Kimorn</p>
	<p>Interviewer</p> <p>JICA Survey Team:</p> <p>Ms. Ashuka Tsuboike (JICA Headquarters (Senior Director)) Ms. Ayumi Kiko (JICA Headquarters) Ms. Ryohei Ikeda (JICA Headquarters) Ms. Ai Miyahara (JICA Cambodia office (Deputy Chief Representative)) Mr. Hiroaki Kubota (JICA Cambodia office) Ms. Pheng Pharinet (JICA Cambodia office) Mr. Kei Masuda (MLIT (Counselor)) Mr. Yudai Nagano (MLIT) Mr. Daiki Tamura (MLIT) Mr. Toshikazu Tokioka (Embassy of Japan (First Secretary)) Mr. Kuniomi Hirano (JICA & MLIT Survey team (Team Leader)) Mr. Kai Kurimoto (JICA & MLIT Survey team) Mr. Toyoyuki Naito (JICA Survey team) Mr. Atsushi Yano (JICA Survey team) Mr. Kento Ozaki (MLIT Survey team) Ms. Asuka Murakami (MLIT Survey team) Mr. Michio Iseki (MLIT Survey team) Ms. Riko Sakata (MLIT Survey team) Mr. Hiroya Totani (MLIT Survey team) Mr. Yuki Sugiyama (MLIT Survey team) Mr. Ryohei Hayashi (MLIT Survey team) Ms. Toko Hirota (JICA & MLIT Survey team) Mr. Tey Tak (JICA Study Team) Mr. Soksovichea Thach (MLIT Study Team)</p>
Minutes	
<p>1. Agenda</p> <ul style="list-style-type: none"> ● Opening Remarks [H.E. Mr. Tea Seiha & JICA] ● Presentation of the Smart City Roadmap [JICA Survey Team] 	

- Discussion and Approval of the Smart City Roadmap [All Participants]
- Presentation of Ongoing actions [JICA Survey Team]
- Presentation of the Update of the Pre-Feasibility Study [MLIT Study Team]
- Question & Answers [All Participants]
- Coming Technical Cooperation Project by JICA [JICA]
- Closing Remarks [H.E. Mr. Tea Seiha, JICA, MLIT]

2. Discussion

❖ JICA Part:

- Mr. Piseth would like JICA to adjust the report if there are any shortcomings.
 - Mr. Hirano answered that this study will be completed by the end of January, but we would like to continue further discussions with Siem Reap Province during the first phase of JICA's Technical Corporation Project to finalize the roadmap.
- Mr. Piseth would like to know the role of Siem Reap Provincial Administration for legal systems because Siem Reap Provincial Administration cannot create laws.
 - Mr. Hirano said JICA Study Team understood the system, but JICA Study Team would focus on matters that were feasible for the state government, such as procedures for operation.
- Mr. Hirano explained about the "2035 Long-Term Plan", that the target year was set in accordance with the Tourism Master Plan, but also set priority projects to be implemented in a short term. He also informed that he would like input from the Siem Reap Provincial Administration as this time frame can be adjusted.

❖ MLIT Part:

- Mr. Sok Seyha asked if the CCTV system for MLIT and the 200 CCTVs for the Route 38 construction were the same.
 - Mr. Iseki explained that those projects were separate and that he had no information about the specifications of those 200 CCTVs.
 - Mr. Hirano clarified that the CCTVs surveyed by the MLIT were only a proposal, and the MLIT was not in charge of installing them.

3. Decisions

- H.E Mr. Tea Seiha approved on Roadmap for Smart City in Siem Reap.

END

SIEM REAP SMART

The Basic Survey for Smart City in Siem Reap

Data Collection Survey on Urban Improvement in Siem Reap City

Presentation Material for the 6th Steering Committee

27th December 2021
JICA Survey Team



TODAY'S AGENDA

SIEM REAP SMART (JICA)

The Basic Survey for Smart City in Siem Reap

Data Collection Survey on Urban Improvement in Siem Reap City

Smart JAMP 2021 (MLIT)

Pre-Feasibility Study for Smart City Development in Siem Reap City

Meeting Name	6th Steering Committee (JICA) & 2nd Joint Coordination Committee (MLIT)
Date and Time	27th December 2021 09:30- (Cambodia Time)
Venue	Siem Reap Provincial Hall Meeting Room + Zoom
Agenda	<ol style="list-style-type: none"> 1. Opening Remarks [H.E. Mr. Tea Seiha & JICA] 2. Presentation of the Smart City Roadmap [JICA Survey Team] 3. Discussion and Approval of the Smart City Roadmap [All Participants] 4. Presentation of Ongoing actions [JICA Survey Team] 5. Presentation of the Update of the Pre-Feasibility Study [MLIT Study Team] 6. Question & Answers [All Participants] 7. Coming Technical Cooperation Project by JICA [JICA] 8. Closing Remarks [H.E. Mr. Tea Seiha, JICA, MLIT]

OVERVIEW OF JAPANESE ACTIVITIES

INTRODUCTION

OBJECTIVES & CONTENTS OF THE SURVEY

Objectives

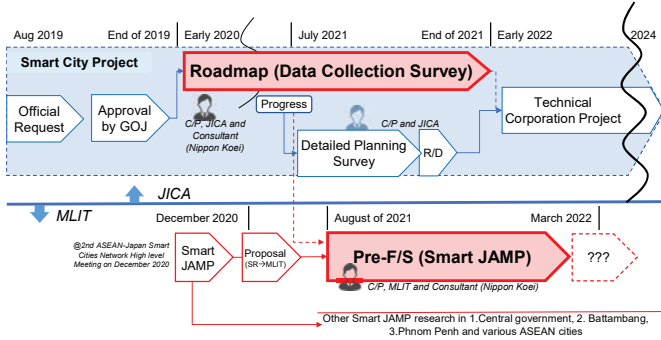
Proposing and launching actions for total solutions of smart technologies against urban problems of Siem Reap

Main Steps

- (1) Reviewing (understanding of current situation)
- (2) Envisioning (proposal of visions based on issues)
- (3) Planning (proposal of a road map and priority projects)
- (4) Action Launching (Selection and implementation of a pilot project)
- (5) Networking

Survey Period

March 2020 – January 2022 (23 months)



INTRODUCTION

INTRODUCTION

(1) DELIVERABLES

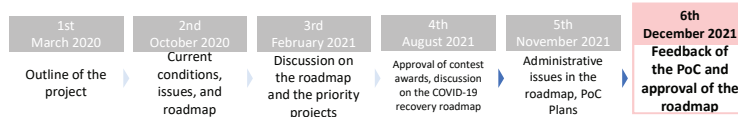
MAIN DISCUSSION POINTS



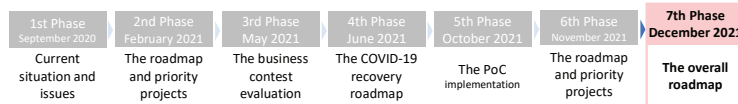
- **Approval of the Smart City Roadmap**
- We would like H.E. the governor to give a final approval of the smart city roadmap.

(2) KEY MEETINGS

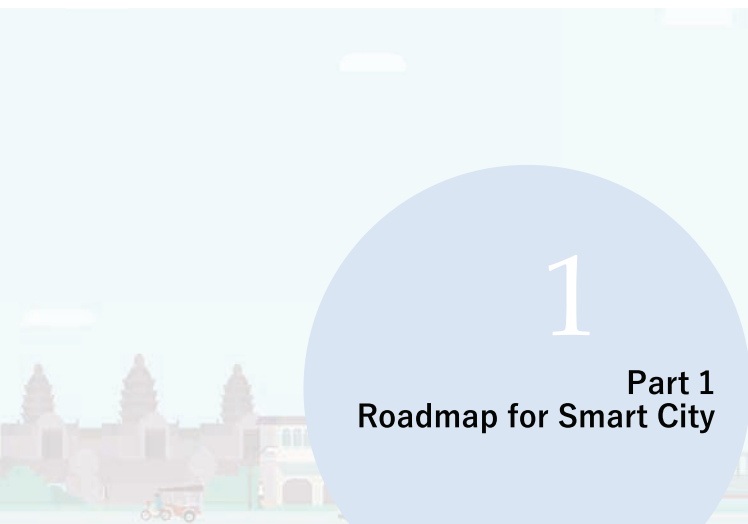
1) Steering Committee: Reporting, confirming, and getting approval



2) Working Level Meeting: Discussion on the detailed matters

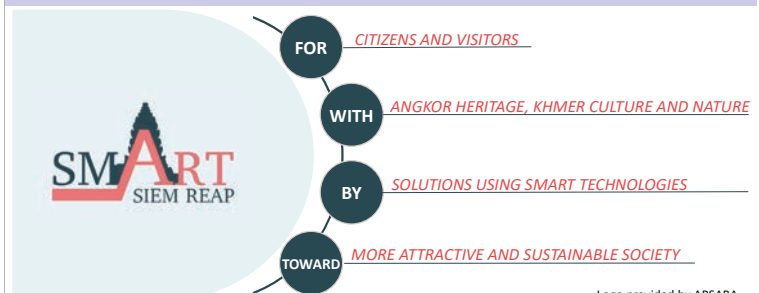


Source: JICA Study Team



01 ROADMAP FOR SMART CITY IN SIEM REAP

(1) VISION & CONCEPT



Logo provided by APSARA

"SIEM REAP SMART"
aims to create a sustainable city with high comfortableness for citizens and an attractive city with high satisfaction for visitors with the pride of an international heritage and tourism city.

"SIEM REAP SMART"
shall be achieved by a continuous management mechanism which enables to find solutions for urban issues with smart technologies, data-oriented analysis and visualization, and overall optimization approach

01 ROADMAP FOR SMART CITY IN SIEM REAP 9

(1) VISION & CONCEPT

ADMINISTRATIVE APPROACH
as a basis for smart city

- Administrative Organization "Open Collaboration"
- Legal System "Business Promotion"
- Data Management "Valuable Data Utilization"

SECTORAL APPROACH
for key issues in Siem Reap

- Smart Tourism "Convenient and Satisfactory"
- Smart Mobility "Sustainable, Safe, & Convenient"
- Smart Security "Safe International Tourist Destination"
- Smart Waste Management "Healthy and Sanitary Urban Environment"

VISION & CONCEPT
towards a better city

- Citizens' QoL
- Tourists' Satisfaction
- Active Business

FOR CITIZENS AND VISITORS

WITH ANGKOR HERITAGE, KHMER CULTURE & NATURE

BY SOLUTIONS USING SMART TECHNOLOGIES

TOWARD MORE ATTRACTIVE AND SUSTAINABLE

01 ROADMAP FOR SMART CITY IN SIEM REAP 10

(2) ADMINISTRATIVE APPROACH

Sectors

Basic Policy

Direction of Measures

Open Collaboration

Administrative Organizations

- Promotion Unit
- Smart City Committee
- industry-government-academia platform

Direction of Measures

- Cross-divisional Administrative Structuring ~ Actions towards a cross sectoral smart city ~
- Collaborating with Diverse Actors ~ Continuous Innovation with various stakeholders ~

A-01 The enhancement and operation of the Smart City Committee

A-02 The new establishment of the Smart City Promotion Division

01 ROADMAP FOR SMART CITY IN SIEM REAP 11

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(A) ADMINISTRATIVE ORGANIZATIONS: ENHANCEMENT OF THE SMART CITY COMMITTEE

Provincial Governor H.E. Tea Seiha (Chairman) (*) = proposal of new members

Deputy Governor H.E. Ly Samrith (Deputy Chairman)

Directors of Provincial Administration

- Provincial Administration Director
- Planning and Investment Division
- Finance Division
- Inter-sectoral Division
- Public Relations and International Cooperation Division

Directors of Provincial Departments

- DLMUP
- DPWT
- DoE
- DPT
- DoP
- DoT(*)

Municipal Government

- Mayor
- Deputy Mayor

APSARA Authority (*)

Angkor Enterprise (*)

Provincial Police Headquarters (*)

Roles and Responsibilities of the Smart City Committee

- Implementation of the Smart City Roadmap
- Collaborate with external partners (including private institutions)
- Report and request decisions from relevant ministries, national institutions, and provincial councils
- Monitor and evaluate projects and progress of the Smart City Roadmap
- Coordinate financial schemes for smart city related projects

01 ROADMAP FOR SMART CITY IN SIEM REAP 12

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(A) ADMINISTRATIVE ORGANIZATIONS: SMART CITY PROMOTION DIVISION

Provincial Administration

- Other divisions
- Smart City Promotion Division

Provincial Departments

- DLMUP
- DPWT
- DoE
- DPT
- DoP
- DoT

Municipal Government

- APSARA Authority
- Angkor Enterprise
- Provincial Police Headquarters

Other organizations (central government, international organizations, private business operators, etc.)

coordination

Roles and Responsibilities of the Smart City Promotion Division

- Become the **secretariat of the Smart City Committee** and conduct work according to the role and responsibility of the Smart City Committee
- Become a **supportive office** for smart city related private businesses
 - Business consultation with private sectors
 - Coordination with relative organizations of the business
 - Business matching among private businesses
 - Coordination of possible incentives for private business
 - Discussions on data provision with private businesses

01 ROADMAP FOR SMART CITY IN SIEM REAP 13

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(A) ADMINISTRATIVE ORGANIZATIONS: SHORT-TERM ACTIONS

Related to the Smart City Committee

- Add DoT, APSARA, Angkor Enterprise, and the police to the Smart City Committee.
- Enhance its roles, especially the following;
 - Collaborate with external partners (especially private businesses)
 - Monitor and evaluate projects and progress of the Smart City Roadmap
 - Coordinate financial schemes for smart city related projects
- Nominate the Smart City Promotion Division as its secretariat.

Related to the Smart City Promotion Division

- Become the **secretariat of the Smart City Committee** and conduct work according to the role and responsibility of the Smart City Committee
- Become a **supportive office** for smart city related private businesses
 - Coordination with relative public organizations of the business
 - Business matching among private businesses
 - Coordination of possible incentives for private business
 - Discussions on data provision with private businesses

01 ROADMAP FOR SMART CITY IN SIEM REAP 14

(2) ADMINISTRATIVE APPROACH

Sectors

Basic Policy

Direction of Measures

Promotion of Smart Business

Improving the Business Environment
~ The government supporting private smart city businesses ~

Improving Incubation Functions
~ Invite and foster new businesses ~

L-01 Improvement of business operation environment for private companies

L-02 Incubation of private businesses for public services

01 ROADMAP FOR SMART CITY IN SIEM REAP 15

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(B) BUSINESS SUPPORT: GENERAL FINANCIAL SCHEME

End Users

tourists

←

Service

Fund?

→

Smart City Service Provider

Entry ticketing? Car parking fees?
Extra charge from accommodation fees?
Service fees? (Subject to further discussion)

- In general monetization and sustainable business development is an issue in smart city development, but the basic principle is that the end user pays for the services that they receive.
- Discussion and efforts to create a sustainable scheme to obtain fees from the end users of the smart city services is necessary.
 - The creation of a smart city fund may be one solution, but need further discussion.

01 ROADMAP FOR SMART CITY IN SIEM REAP 16

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(B) BUSINESS SUPPORT: COLLABORATION/SUPPORT WITH PRIVATE BUSINESS

- While the budget from the government is limited, **promoting and supporting private businesses that contribute to smart city** is essential.
- There will be many lessons to be learnt related to private business promotion during the implementation of the 2 PoC projects. **These lessons learnt shall be used to improve the business support administration by the Smart City Promotion Unit.**

Public Sector

- Investment approval
- Business consultation
- Coordination with relative organizations
- Coordination of possible incentives
- Discussions on data provision

PARTNERSHIP

Private Sector

- Business development
- Technical development
- Service provision
- PoC implementation

Realization of Smart City that benefits the city and citizens

(2) ADMINISTRATIVE APPROACH


Sectors **Basic Policy** Direction of Measures

Data Management


Utilization of Valuable Data

Developing the City OS
~ Optimizing urban services in a unified operation system ~

Promoting Open Data
~ Encouraging free data utilization by disclosing information ~



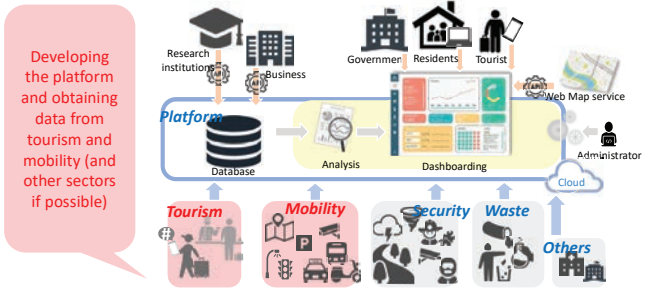
D-01 Integrated Data Collection and Storage



D-02 Data Dissemination to Relevant Stakeholders

(2) ADMINISTRATIVE APPROACH - KEY TOPICS

(C) DATA MANAGEMENT: THE WHOLE STRUCTURE



Developing the platform and obtaining data from tourism and mobility (and other sectors if possible)

- An integrated data platform that collects various smart city related data will be needed.
- The data on the platform will be provided to citizens and tourists, as well as governmental officers.

(3) SECTORAL APPROACH

Sectors **Basic Policy** Direction of Measures

Smart Tourism

Towards more convenient and satisfactory tourism

Updating Tourism Services
~ Deliver a more convenient and on demand tourism service ~

Satisfying Tourists' Demands
~ Develop diverse tourism resources to provide high satisfaction ~



T-06 Enhancement of Local Tourism Experience using AR



T-04 MaaS Introduction

(3) SECTORAL APPROACH

Sectors **Basic Policy** Direction of Measures

Smart Mobility

Towards more sustainable, safe and convenient mobility systems

Creating Safe and Smooth Traffic
~ Create road space that is safe and convenient for people ~

Efficient Management and Environment Consideration
~ Preventive maintenance of roads and the environment ~



M-02 Road Condition Monitoring



M-01 Official Parking System Introduction



M-04 Traffic Signal System Improvement

(3) SECTORAL APPROACH

Sectors **Basic Policy** Direction of Measures

Smart Security and Safety

Towards basic security as a safe international tourist destination

Mitigating and Adaptation to Crime and Accidents
~ Reduce crime and accident risks to ensure security ~

Adapting to Disasters
~ Quick preventive actions to natural and manmade disasters ~



S-01 CCTV System Introduction



S-03 Fire Alarm System Installation



S-04 Public Relations Improvement

(3) SECTORAL APPROACH

Sectors **Basic Policy** Direction of Measures

Smart Waste Management

Towards a healthy and sanitary urban environment

Enlightening of the Environmental Mind
~ Encourage individual citizens' environmentally friendly actions ~

Enforcing Public Waste Management
~ The public initiative towards sustainable environmental management ~

Engineering of Basic Infrastructure
~ Provide efficient infrastructure for waste management ~



W-02 Garbage Collection IoT Installation



W-04 Water Quality Improvement System

(4) PRIORITY PROJECTS

Roadmap (targeting 2035)

Priority Projects (short-term actions within 5 years)

7 priority projects from the administrative approach

22 priority projects from the sectoral approach

2022 2027 2035

- The roadmap and priority projects are to be implemented with the strong initiative of Siem Reap Provincial Administration.
- PoCs and pre-feasibility studies are conducted with support of JICA, MLIT, and JETRO, for the implementation of priority projects.
- Further support is planned in the JICA Technical Cooperation Project (from 2022)

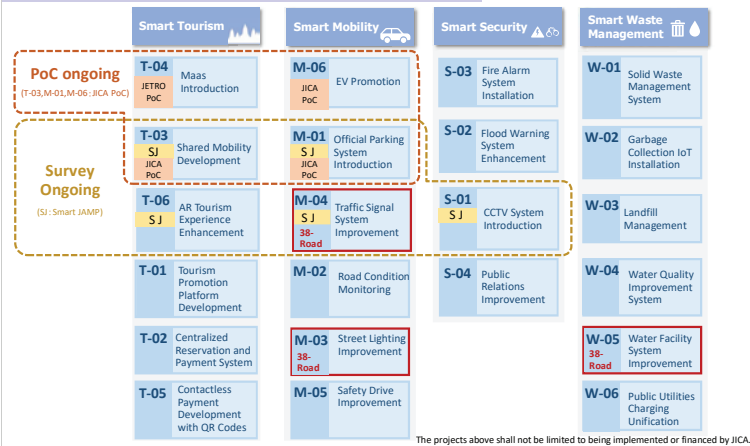
(4) PRIORITY PROJECTS - ADMINISTRATIVE APPROACH

Administrative Organizations	Legal System and Business Support	Data Management
<p>Survey ongoing (SI-Smart IAMP)</p> <p>A-01 The enhancement and operation of the Smart City Committee</p> <p>A-02 The new establish of the Smart City Promotion Unit</p> <p>A-03 The formulation and operation of the Private-Public-Academic-Citizen Platform</p>	<p>L-01 Improvement of business operation environment for private companies</p> <p>L-02 Incubation of private businesses for public services</p>	<p>D-01 Integrated Data Collection and Storage</p> <p>D-02 Data Dissemination to Relevant Stakeholders</p>

The projects above shall not be limited to being implemented or financed by JICA.

(4) PRIORITY PROJECTS - SECTORAL APPROACH

Partial implementation ongoing



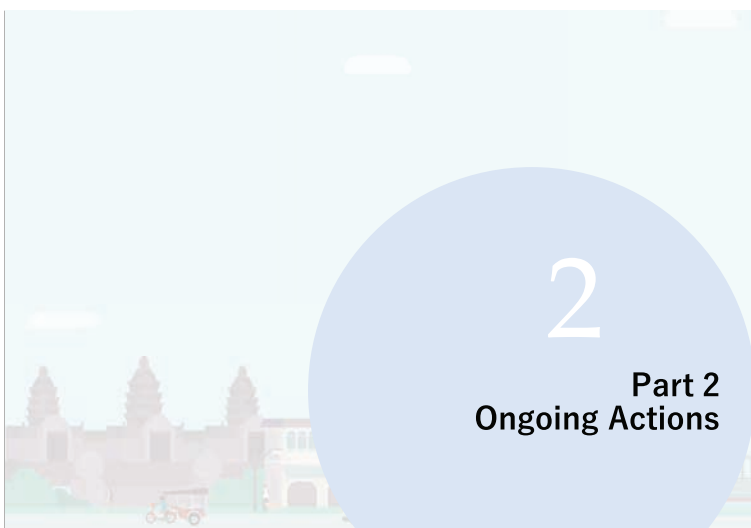
(5) FINAL REPORT

The Smart City Roadmap shall be owned and implemented by Siem Reap Provincial Administration and related organizations.

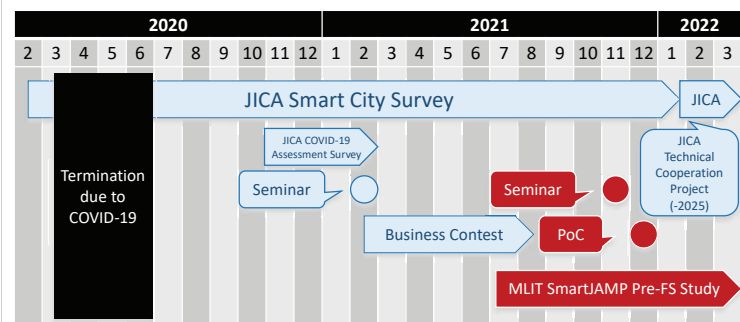
Deliver period	By the end of January 2022
Language	English (full version) Khmer (summary version)
Table of Contents (tentative)	Chapter 1 Introduction Chapter 2 Current Condition and Issues Chapter 3 The Smart City Roadmap Chapter 4 Survey Activities and the Business Contest
Volume (tentative)	English: approx. 200 pages Khmer: approx. 100 pages

DISCUSSION POINTS

- **Approval of the Smart City Roadmap**
 - We would like H.E. the governor to give a final approval of the smart city roadmap.



(1) OVERALL SCHEDULE OF ACTIONS



In the steering committee, we will report on the following activities;

- Seminar (2 times in November)
- PoC (Smart Parking Project)
- MLIT SmartJAMP Pre-FS Survey

(2) SEMINAR TO JAPAN

Outline	Host: Siem Reap Provincial Administration, JICA															
Date and time	24th November 2021 9:00 ~ 10:45															
Objective	• To introduce the smart city roadmap of Siem Reap to Japanese private companies.															
Participants	• Japanese companies (52 in total)															
Timetable	<table border="0"> <tr> <td>9:00</td> <td><input type="checkbox"/> Opening Remarks</td> <td></td> </tr> <tr> <td>9:10</td> <td><input type="checkbox"/> Introduction of Activity of JICA</td> <td>• Introduction of the smart city roadmap</td> </tr> <tr> <td>9:30</td> <td><input type="checkbox"/> Introduction of Business Contest and Awarded Project</td> <td>• Smart Parking System [JPT] • Smart Scooter Sharing Service [Asian Gateway]</td> </tr> <tr> <td>10:10</td> <td><input type="checkbox"/> Introduction of Activity of MLIT</td> <td></td> </tr> <tr> <td>10:35</td> <td><input type="checkbox"/> Closing Remarks</td> <td></td> </tr> </table>	9:00	<input type="checkbox"/> Opening Remarks		9:10	<input type="checkbox"/> Introduction of Activity of JICA	• Introduction of the smart city roadmap	9:30	<input type="checkbox"/> Introduction of Business Contest and Awarded Project	• Smart Parking System [JPT] • Smart Scooter Sharing Service [Asian Gateway]	10:10	<input type="checkbox"/> Introduction of Activity of MLIT		10:35	<input type="checkbox"/> Closing Remarks	
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10:10	<input type="checkbox"/> Introduction of Activity of MLIT															
10:35	<input type="checkbox"/> Closing Remarks															
		Comments from participants														
		<ul style="list-style-type: none"> • Generally interested expect progress in the smart city roadmap • Interested in possibilities of integrating other sectors in the roadmap (energy, healthcare, etc.) 														

(2) SEMINAR TO CAMBODIA

Outline	Host: Siem Reap Provincial Administration, JICA, MLIT																								
Date and time	29th November 2021 10:00 ~ 16:00																								
Objective	<ul style="list-style-type: none"> • To introduce the roadmap and the projects to be awarded in the business contest. • To introduce examples of Smart City technologies. 																								
Participants	• Public officers of Siem Reap and local private sector (110 in total)																								
Timetable	<table border="0"> <tr> <td>10:00</td> <td><input type="checkbox"/> Opening Remarks</td> <td>14:00</td> <td><input type="checkbox"/> Introduction of Activity of MLIT</td> </tr> <tr> <td>10:10</td> <td><input type="checkbox"/> Introduction of Roadmap for smart city</td> <td>14:10</td> <td><input type="checkbox"/> Speech from Business Organization [CCC, JBAC]</td> </tr> <tr> <td></td> <td><input type="checkbox"/> Introduction of Business Contest</td> <td>14:30</td> <td><input type="checkbox"/> Introduction of Examples of Smart City Technologies</td> </tr> <tr> <td></td> <td><input type="checkbox"/> Introduction of PoC Business [JPT, Asian Gateway]</td> <td>15:30</td> <td><input type="checkbox"/> Q&A</td> </tr> <tr> <td>11:35</td> <td><input type="checkbox"/> Introduction of CJCC ACCELERATOR PROGRAM</td> <td>15:40</td> <td><input type="checkbox"/> Closing Remarks</td> </tr> <tr> <td>11:50</td> <td><input type="checkbox"/> Q&A</td> <td></td> <td></td> </tr> </table>	10:00	<input type="checkbox"/> Opening Remarks	14:00	<input type="checkbox"/> Introduction of Activity of MLIT	10:10	<input type="checkbox"/> Introduction of Roadmap for smart city	14:10	<input type="checkbox"/> Speech from Business Organization [CCC, JBAC]		<input type="checkbox"/> Introduction of Business Contest	14:30	<input type="checkbox"/> Introduction of Examples of Smart City Technologies		<input type="checkbox"/> Introduction of PoC Business [JPT, Asian Gateway]	15:30	<input type="checkbox"/> Q&A	11:35	<input type="checkbox"/> Introduction of CJCC ACCELERATOR PROGRAM	15:40	<input type="checkbox"/> Closing Remarks	11:50	<input type="checkbox"/> Q&A		
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11:50	<input type="checkbox"/> Q&A																								
		Comments from participants																							
		<ul style="list-style-type: none"> • Generally interested expect progress in the smart city roadmap • What are the priority actions in the smart city roadmap? • What are the main challenges for the work development in terms of the smart city roadmap? 																							

(2) SEMINAR TO CAMBODIA

Opening Remarks from H.E. Ly Samrith

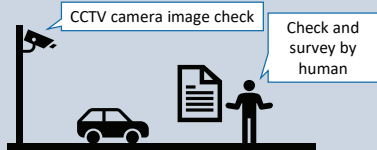
Presentation from JICA Survey Team

Presentation from Business Contest Winners

Presentation from Japanese companies with smart city technologies

(3) JICA PoC (M-01: SMART PARKING PROJECT)

PoC Period	28th November – 4th December
PoC Objective	To test the parking operation scheme using CCTV
PoC Content	Conduct a pilot car parking operation using CCTV image data and human-based management.
PoC Site location (front of the hospital)	



(3) JICA PoC (M-01: SMART PARKING PROJECT)



PoC already finished (November - December). Currently under analysis.

(3) JICA PoC (M-01: SMART PARKING PROJECT)

Questionnaire to Drivers

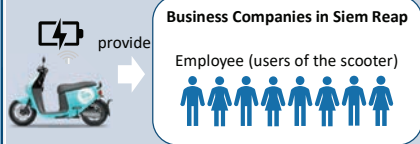
- Do you agree with the image surveillance system (CCTV) for parking?
 - 100% YES
- Do you agree with the placement of parking staffs?
 - 100% YES
- Do you agree with paid street parking?
 - 92% YES
- How much do you think is reasonable as parking fees?
 - 2000 Riel 50%
 - 1000 Riel 36%
 - 500 Riel 5%
 - N/A 6%
 - by day 3%

92% is an unexpectedly high number, indicating that drivers of Siem Reap are not reluctant to paid street parking

Some negative comments on paid street parking from nearby shoppers. Installation of parking space for long-time parking of nearby shoppers is recommended.

(3) JICA PoC (T-03 & M-06: SMART SCOOTER PROJECT)

POC Period (tentative)	2022~
POC Objective	To test the usability of the Smart Scooter and data transmission environment in Siem Reap.
POC Content	Provide Smart Scooters and batteries to business companies in Siem Reap so that the employees can use the scooter for their work and test the Smart Scooter's usability.
Request to the government	<ul style="list-style-type: none"> Acknowledgement of the project and discussion for future cooperation



Currently pending due to manufacturing problems of the scooter. (JICA Survey Team is currently waiting for the company's answers for the schedule)

(3) JETRO PoC (T-04: TOURISM MaaS)

A PoC to develop an application for tourists to realize seamless user experience in tourism and mobility in Siem Reap. Conducted by Toyota Tsusho Corporation and Nippon Koei

Mobility (TukTuk / Car / Van) + Activity ticket

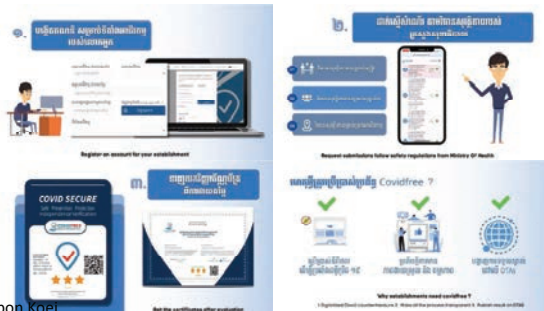


Source: Toyota Tsusho Corporation

PoC already finished (September – October). Currently under analysis. Report from the conducting company expected by March 2022

(3) JETRO PoC (For reference: COVID-19 DIGITAL ASSESSMENT TOOL)

A PoC to digitalize the certificate for hotels to follow the anti COVID-19 measures set by MoT. Conducted by Nippon Koei and SpaciaNet.



Source: Nippon Koei

PoC already finished (September – November). Currently under analysis. Report from the conducting company expected by March 2022

Appendix 4

**PROVISION OF THE LESSONS LEARNT
FROM THE PROOF OF CONCEPT FOR
SMART PARKING SYSTEM
INTRODUCTION
FINAL REPORT**

December 2021

Japan Parking Technology Corporation

**PROVISION OF THE LESSONS LEARNT FROM THE PROOF OF CONCEPT FOR
SMART PARKING SYSTEM INTRODUCTION
< FINAL REPORT >**

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1. Summary of Activities and Achievements

1.1 Objective of PoC

JPT was awarded in the “BUSINESS and IDEA COMPETITION for SMART CITY in SIEM REAP”, to conduct a proof of concept of its business idea. The proof of concept shall be conducted according to mutual understanding and agreement of Siem Reap Provincial Administration, and relevant governmental organizations. The objective of the PoC is to provide the lessons learnt through the attempts towards the implementation of the proof of concept that shall be useful knowledge for Siem Reap Provincial Administration and relevant governmental organizations to promote and implement the roadmap for smart city.

The PoC will conduct a pilot project on the parking operation and maintenance methods (surveillance cameras, operations maintenance methods, cleaning activities by parking staffs) that are part of the smart parking system. Through the implementation of Poc, the Siem Reap Provincial Administration will deepen its awareness of the merits of the operation and maintenance method of the smart parking system. The parking users and local shoppers also understand the merit of on-street public parking. JPT aim to obtain an overall business permit from the Siem Reap Provincial Administration at an early stage. Specifically, the PoC checks the following items.

- Confirmation of surveillance camera performance
- Acquisition of teacher data required for car plate number recognition AI system
- Confirmation of the business performance of the parking manager
- Understanding the acceptability of parking lot users for paid parking lots
- Understanding the acceptability of government agencies, traffic police, and local residents for the development of street parking lots

1.2 Outline of the Business

This business aims to reduce illegal parking and mitigate traffic congestion by installing on-street smart parking system using smart technologies such as surveillance cameras and communication technology in the center of Siem Reap City. This business also contributes to produce safe, secure attractive area and sustainable job opportunities. The smart parking system will be built up to one-smart system by utilizing the excising smart devices and know-how. The main smart technologies applied are surveillance cameras, handy terminals, fare adjustment machine and communication network.

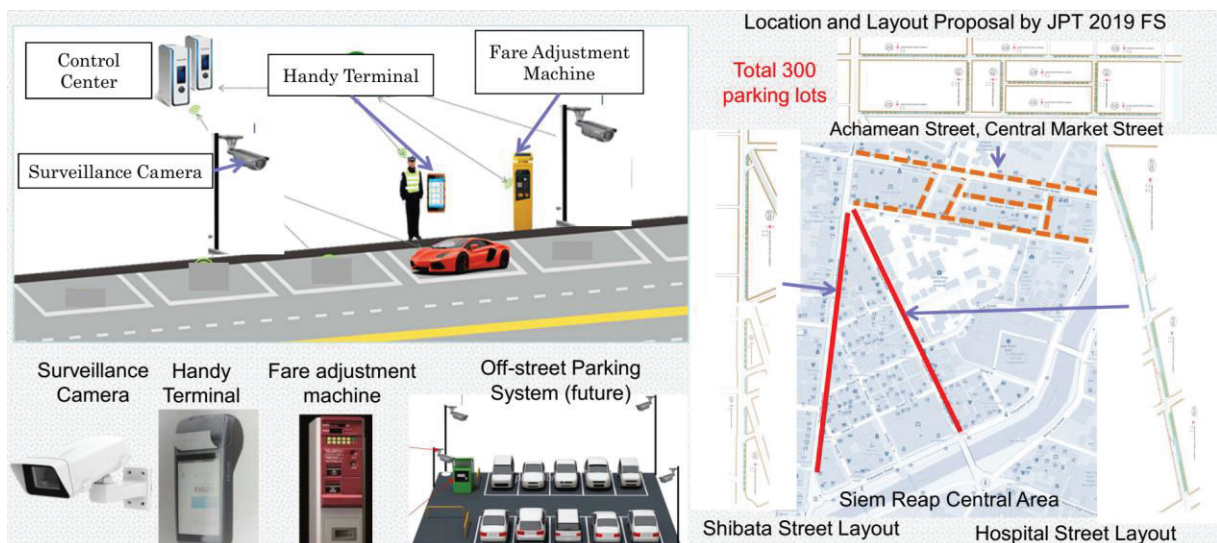


Figure 1-1 Smart Parking System in Siem Reap City

1.3 Activities of PoC

1.3.1 Location of Pilot Project

The pilot project location is the Hospital street, north section segment, East side section. The location was decided after site visit with Siem Reap Provincial Administration, DPWT and EDC officers.

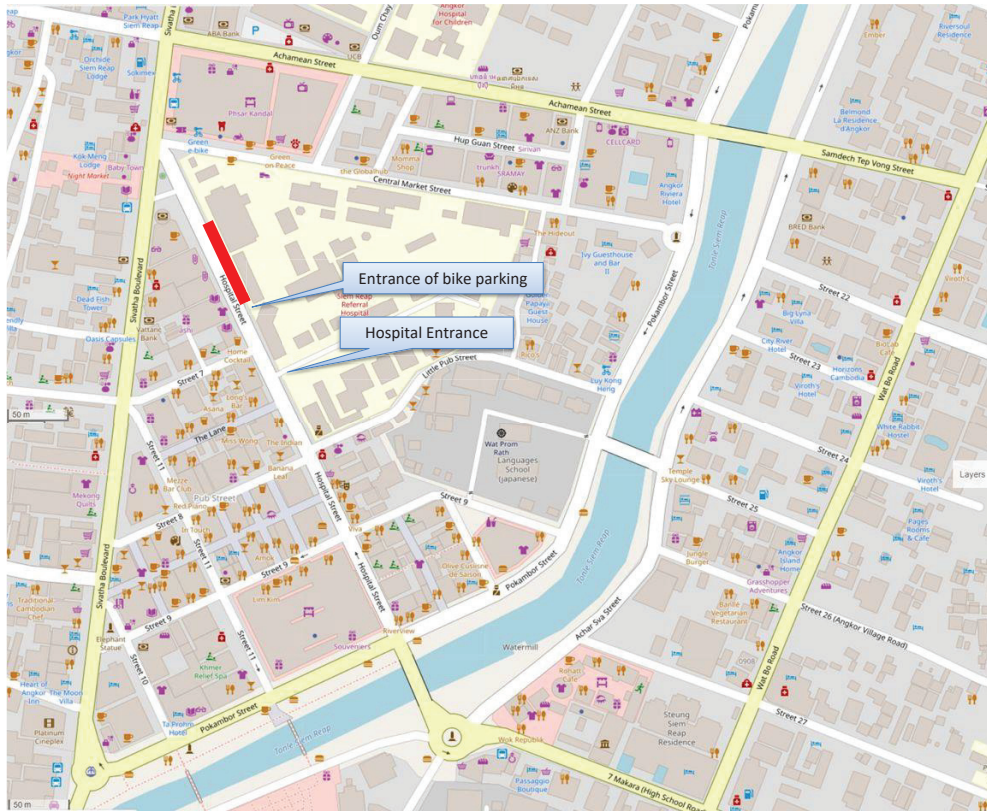


Figure1-2 Pilot Project Location

1.3.2 Input Equipment for the PoC

The equipment shown in Table 1-1 was procured for the implementation of the pilot project.

Table 1-1 Procured Equipment

Item	Amount	Specifications
Surveillance Camera	2 sets	IP Camera Specs (DS-2CD2T55FWD-I5) - Color: 0.027lux @(F2.0,AGC ON), 0 lux with IR - Up to 5MP High Resolution (2560 × 1920) - 81° (2.8 mm), 63.5° (4 mm), 50° (6 mm), 33° (8 mm) - Main stream: H.265+ / H.265 / H.264+ / H.264 - 20 fps (2560 × 1920), 30 fps(2560 × 1920, 2048 × 1536,1920 x 1080,1280 × 720) - Up to165ft (50 m) - 12 VDC ± 25%, 6W;PoE(802.3af, 42.5 to57V, class 3)
Video Recorder	1 set	Recorder Specs - Up to 8 channel IP cameras can be connected - Supports decoding H.265+/H.265/H.264+/H.264 video formats - Up to 4K high-definition live view, storage and playback - Up to 8-ch @ 1080p decoding capacity - Up to 80 Mbps high incoming bandwidth ensures IP cameras can be connected - 1 HDMI and 1 VGA interfaces: both interfaces support independent video output - 2 HDDs for continuous video recording

Item	Amount	Specifications
Laptop Computer	1 set	- Plug & Play with 8 Power-over-Ethernet (PoE) interfaces MSI Modern 14 Package - 10th Gen Intel Core i3-10110U - RAM : 8GB (DDR4) - Storage : 256GB SSD PCIe - 14.0" FHD (1920x1080) Thin bezel IPS - Backlight Key (Single-Color, White) - Window 10 License - 52 Battery (Whr) (Upto 10 Hrs) - 1.3 Kg Carbon Gray
Materials of networking, installation	the amount needed	PoE Ethernet cable 100m
Road Marking paint	the amount needed	TOA road line paint White color

1.3.3 Installation of Equipment and Marking work of Parking Lots

The Parking equipment (surveillance cameras and video recorder) and parking lot marking works were installed on 26th November 2021 with support of Siem Reap Provincial Administration and Traffic Police. The 17th parking lots were installed and one surveillance camera can monitor 6th parking lots. The video recorder was located at the WingShop with his power supply.



Figure 1-3 Installation Work of Equipment and Parking lot marking

The banner for public relations was installed and training of parking staffs was conducted on 27th November 2021. Parking staffs wore uniforms so that residents and drivers could easily understand. In addition to monitoring parked vehicles, parking staffs also carried out cleaning activities at parking spots.



Figure 1-4 Banner for Public relations and parking staffs training

1.3.4 Conducting Pilot Project

The pilot project was conducted 7 days from 28th November to 4th December, and from 8:00am to 6:00 pm.

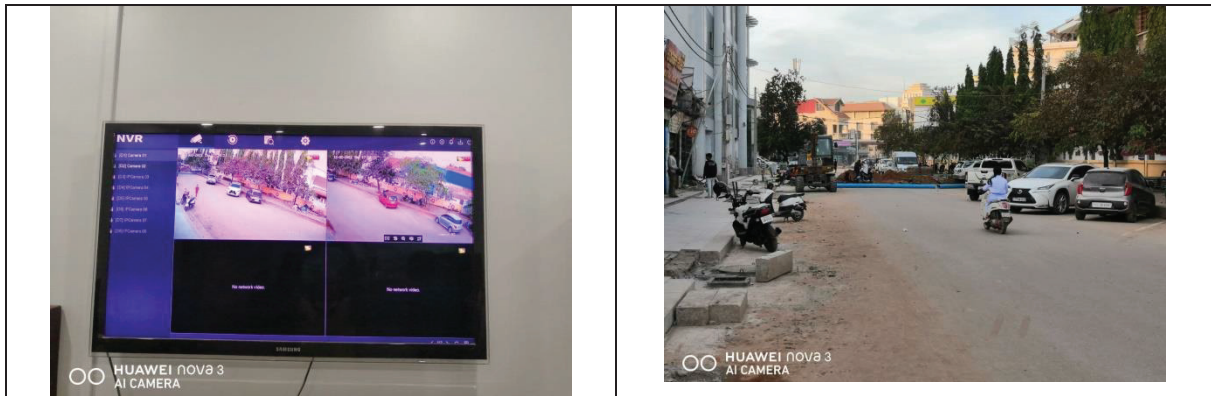


Figure 1-5 Conduction of Pilot Project

1.3.5 Parking Management sheet and Interview survey for parking users and roadside shops

The parking situation, start time, end time and vehicle plate number were registered on the parking management sheet. The interview survey for parking users and roadside shops shown in Table 1-2 was conducted.

Table 1-2 Interview survey sheet for parking users and roadside shops

Questionnaire on paid on-street parking installation
<p>A About the image surveillance system It is a system that monitors images inside and outside the parking lot 24 hours a day. You can manage the trouble situation in the parking lot and the surrounding area 24 hours a day. It can keep good security and be used for local crime prevention measures.</p> <ul style="list-style-type: none"> • Do you agree or disagree with this image surveillance system?
<p>B About the placement of parking staffs The parking staffs will guide the parked vehicles, cleaning the area, and collection the parking fee. You can prevent illegal parking and beautify the surrounding area by cleaning the parking lot.</p> <ul style="list-style-type: none"> • Do you agree or disagree with this placement of parking staffs?
<p>C About Installation of paid on-street parking The street parking will be charged, and planned to pay 2000 Riel per hour. However, for roadside facility users such as shops and restaurants, the first one hour will be free of charge.</p> <ul style="list-style-type: none"> • Do you agree or disagree with this paid street parking? • Is 2000 Riel per hour a reasonable amount? • If No, How much do you think reasonable parking fee?

1.4 Schedule of PoC Activities

The schedule of PoC Activities was shown in Table 1-4

Table 1-4 Schedule of PoC Activities

Work Item	October				November				December			
Preparation Stage in Japan												
Travel arrangements												
Equipment procurement												
Advance preparation and coordination by Siem Reap Provincial Administration and JPT												
Site Activity Stage												
Pilot project preparation												
Installation of equipment, parking staff training (between 26 ^h to 27 th Nov)												
7 days Pilot project conduction (between 28 th Nov to 4 th Dec)												
Evaluation Stage												
Pilot project evaluation												
Prepare and Submission of the Final Report												

2. Records of Discussions and Meetings

2.1 List of Discussions and Meetings

Date	Participants
13 th Oct 2021	Working Group Member
21 st Oct 2021	Siem Reap Provincial Administration, DPWT Siem Reap, EDC
22 nd Nov 2021	Siem Reap Provincial Administration
23 rd Nov 2021	DPWT Siem Reap
6 th Dec 2021	Siem Reap Provincial Administration

2.2 Details of Each Meetings

2.2.1 Working Group (October 13th)

Meeting Information		
Subject	Working Group on the PoC Projects	
Venue	Zoom Meeting	
Date/Time	13/10/2021	09:00 ~ 12:00
Material from JPT	PoC plan	
Attendees	Cambodia Side	Mr. Kosal Makara Piseth (SRPA) Mr. Chea Kimhong (SRPA) Mr. Hum Chay (SRPA) Ms. Mak Sovibol (SRPA) Mr. Ieng Ratha (SRPA) Mr. Heiv Sithat (SRPA) Mr. Peut Bunnarom (SRPA) Mr. Chou Tina (SRPA) Mr. Eang Ratha (SRPA) Mr. Sean Kimthan (Siem Reap Municipality) Mr. Tan Kim An (DPWT) Mr. Sok Seyha (DPT) Mr. Sen Phos (DPT) Mr. Sambo (EDC) Mr. Eng Chhengleang (Provincial Police Headquarter)
	Japanese Side	JICA: Mr. Ryohei IKEDA JICA Survey Team: Mr. Kuniomi HIRANO (Team Leader) Mr. Kazuo YUMITA (Waste Expert) Mr. Kai KURIMOTO (Security Expert) JPT: Mr. Kazuteru KITA (Parking System Expert) Mr. Masazumi ONO (Chief Advisor)
Minutes		
1. Agenda (1) Discussion on the two Proof of Concept (PoC) projects that have been selected in the Business Contest.		
2. Smart Parking System <ul style="list-style-type: none"> JPT plans to conduct the PoC on the Smart Parking System in the center of Siem Reap city. Ten parking lots will be tested for this trail for 7-10 days (8 AM to 8 PM). The trial is free for the users; however, the company will survey users' interests and their intentions on the payment. EDC had some questions regarding the duration of the installed camera on the electricity/streetlight poles and the power supply needed. During the trial, he was also concerned about the maintenance works from two sides, either the company or EDC. Concerning other requests, he will inform his colleagues. Answering his question, JPT considered the installation on the rooftop. Mr. Tan Kim An, from DPWT, was concerned about the proposed implementation place (near the 		

<p>hospital) as it is under the construction of the 38-Road project. So, to implement on this place, more discussions should be held. For the request for two officers, he would like to discuss more with Mr. Ono.</p> <ul style="list-style-type: none"> • Mr. Eng Chhengleng, from the Provincial Police Headquarters, was concerned about the same issue regarding the ongoing 38-Road Construction Project. A question from him was the price if it will be calculated per hour or day. JPT answered the rate would be the same in Phnom Penh, 2000 Riels per hour. However, it is free for users during the trial. • Mr. Sok Seyha, from the DPT, commented on the installation equipment on the streetlight poles. DPT is planning to install 5G connectivity on those poles. However, the number of poles is under discussion, depending on the number of users. • Mr. Makara Piseth would like to clarify the payment during the trial. Besides the survey on the user's interests, he also requested the company to conduct a study on the impact on society and the environment. JPT responded that they would train the parking staff on this survey matter. It is also to mention that the parking staff will do the cleaning around the parking area. Regarding the installed equipment after the trial, JPT would take it back. However, it can discuss more if SRPA needs to use later. The data storing (videos, images) would be flexible on the site condition, either fiber or WiFi networks. For the implemented area, it needs more discussion. Responding to this issue, JPT will be flexible depending on the decision of SRPA.
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2.2.2 Siem Reap Provincial Administration (21st Oct 2021)

Meeting Information		
Subject	PoC Plan	
Venue	Siem Reap Provincial Administration, DPWT, Pilot Project site	
Date/Time	21 st Oct 2021, 10:30~11:30, 14:30~15:00, 16:00~17:00	
Material from JPT	PoC Plan (Draft)	
Attendees	Cambodia Side	Mr. Kosal Makara Piseth (SRPA) Mr. Ky Vyrin (Director of DPWT) EDC
	Japanese Side	JICA Survey Team: Mr. Kazuo YUMITA (Waste Expert) Mr. Kai KURIMOTO (Security Expert) JPT: Mr. Masazumi ONO (Chief Advisor)
Minutes		
<ul style="list-style-type: none"> • The JPT explained the draft PoC implementation plan and obtained an understanding of the purpose of implementation, equipment to be procured, activity content, and actual timing. • JPT requested the Siem Reap Provincial Administration to cooperate in the following matters. <ul style="list-style-type: none"> ✓ Pre-determination of pilot business locations ✓ Request for cooperation from DPWT, traffic police, and EDC ✓ Explanations and cooperation requests to related organizations, local shoppers and residents ✓ Public relations activities and explanations for local residents and visitors ✓ Cooperation in equipment installation work, aerial work platforms (including operators), provision of 2 workers ✓ Power supply during the pilot project ✓ Witnessing during the pilot project and explaining to non-cooperative drivers (always one person) ✓ Parking violation control and guidance during pilot business (1 person at all times) • JICA Project Team, JPT, Siem Reap Provincial Administration, and DPWT visited the pilot project implementation site and decided to implement it on the east side of the road on the north side of the hospital street. 		

2.2.3 Siem Reap Provincial Administration (22nd Nov 2021)

Meeting Information	
Subject	PoC Implementation
Venue	Siem Reap Provincial Administration
Date/Time	22 nd Nov 2021, 10:00~11:00
Material from JPT	PoC Plan

Attendees	Cambodia Side	Mr. Sok Thol Mr. Makara Piseth
	Japanese Side	JICA Survey Team: Mr. Kai KURIMOTO (Security Expert) Ms. Toko Hirota JPT: Mr. Kazuteru KITA (Parking System Expert) Mr. Masazumi ONO (Chief Advisor)
Minutes		
<ul style="list-style-type: none"> JPT explained the PoC implementation plan It was decided that the pilot project will be carried out for 7 days from November 28th to December 4th in the north section of the hospital street, from 8am to 6pm, and it was agreed to obtain official approval of PoC implementation from the Siem Reap Provincial Administration governor. The Siem Reap Provincial Administration has agreed to conduct advance public relations activities for citizens and drivers. The recorder will be installed at a shop (Wing Shop) along the pilot's site, and the power of camera and recorder is borrowing from this shop. During the seven-day period of conducting the pilot project, the Siem Reap Provincial Administration agreed to dispatch Siem Reap Provincial Administration officials and traffic police officer to the site. 		

2.2.4 Siem Reap Provincial Administration (23rd Nov 2021)

Meeting Information		
Subject	On-street Parking Business	
Venue	Siem Reap Provincial Administration	
Date/Time	23 rd Nov 2021, 10:00~11:00	
Material from JPT	PoC Implementation Plan	
Attendees	Cambodia Side	Mr. Tip Piseth (Director of Planning and Investment Division, Siem Reap Provincial Administration)
	Japanese Side	JICA Survey Team: Mr. Kai KURIMOTO (Security Expert) Ms. Toko Hirota JPT: Mr. Kazuteru KITA (Parking System Expert) Mr. Masazumi ONO (Chief Advisor)
Minutes		
<ul style="list-style-type: none"> In order to carry out a parking business in Cambodia, it is necessary to register the business and company on the Ministry of Commerce and the Ministry of Finance in accordance with the law of Cambodia. This business is planned to be carried out in collaboration with JPT and the business partner of SONATRA Carling. Sonatra Carling has already obtained business license from the Ministry of Commerce and the Ministry of Finance for the parking business in Cambodia. When a private company implements an investment project in Cambodia, it is necessary to apply for an investment project based on the newly revised investment law in order to benefit from tax exemption measures. Since this project is a parking business project that uses road space, it is necessary to discuss with the Siem Reap Provincial Administration that manages the road and conclude a business contract in advance. There is no department that serves as a contact point for business licenses and business contracts for on-street parking business, and direct negotiations with the Governor of SR are required. 		

2.2.5 DPWT (23rd Nov 2021)

Meeting Information	
Subject	Installation of Surveillance camera and Parking lot marking
Venue	DPWT
Date/Time	23 rd Nov 2021, 10:00~11:00

Material from JPT	PoC Implementation Plan	
Attendees	Cambodia Side	Mr. Tan Kim An (DPWT)
	Japanese Side	JICA Survey Team: Mr. Kai KURIMOTO (Security Expert) Ms. Toko Hirota JPT: Mr. Kazuteru KITA (Parking System Expert) Mr. Masazumi ONO (Chief Advisor)
Minutes		
<ul style="list-style-type: none"> It was planned to dispatch DPWT staff for surveillance camera installation work and parking lot marking work, but DPWT staff cannot be dispatched due to the busy schedule of other projects. Since the installation location and work method have already been confirmed, it was agreed that the JPT and Siem Reap Provincial Administrations would implement it. It was agreed that parking lot marking should be carried out according to international design standards and that the marking material should be carried out with commercially available paint. 		


2.2.6 Siem Reap Provincial Administration (6th Dec 2021)

Meeting Information		
Subject	Result of pilot project of PoC	
Venue	SR政府	
Date/Time	6ht Dec 2021, 10:00~11:00	
Material from JPT		
Attendees	Cambodia Side	Mr. Makara Piseth
	Japanese Side	JICA Survey Team: Mr. Kai KURIMOTO (Security Expert) JPT: Mr. Kazuteru KITA (Parking System Expert) Mr. Masazumi ONO (Chief Advisor)
Minutes		
<ul style="list-style-type: none"> It was reported that the pilot project was carried out from November 28th to December 4th as scheduled. The report of PoC results will be prepared by the end of December 2021 and submit to JST. The surveillance cameras and recorders used in PoC were originally planned to transfer to the Siem Reap Provincial Administration, but it was agreed to transfer the equipment after the parking survey at the market on NR6 as request from Siem Reap Provincial Administration 		

3. Provided Documents

3.1 Notification from Siem Reap Provincial Administration

ព្រះរាជាណាចក្រកម្ពុជា
ជាតិ សាសនា ព្រះមហាក្សត្រ



រដ្ឋបាលខេត្តសៀមរាប
លេខ: ១៧៧ ចត. ប. ស. ណ
/ ២១

ថ្ងៃពុធ ១២ ខែ វិច្ឆិកា ឆ្នាំ ២០២១ ព.ស. ២៥៦៥
ខេត្តសៀមរាប ថ្ងៃទី ០១ ខែ ធ្នូ ឆ្នាំ ២០២១

សេចក្តីជូនដំណឹង
ផ្លូវថ្នាក់


ការអនុវត្តគម្រោងសាកល្បង (POC) នៃគម្រោងដឹក្រុមភ្នាក់ងារ ខេត្តសៀមរាប

រដ្ឋបាលខេត្តសៀមរាប សូមជូនដំណឹងដល់បងប្អូនប្រជាពលរដ្ឋក្នុងខេត្ត និងសាធារណជនទាំងអស់ ឱ្យបានជ្រាបថា បច្ចុប្បន្ននេះរដ្ឋបាលខេត្ត បានពិនិត្យឃើញថាការចែកចាយ និងយានជំនិះគ្រប់ប្រភេទនៅតាម បណ្តោយផ្លូវសាធារណៈ ក្នុងក្រុងសៀមរាប (ជាពិសេសតាមបណ្តាជងផ្លូវ៣៨ខ្សែដែលកំពុងស្ថាបនា) មានភាព អនាធិបតេយ្យ ដែលបានបណ្តាលឱ្យមានការកកស្ទះចរាចរ និងបាត់បង់នូវសណ្តាប់ធ្នាប់សាធារណៈ។ រដ្ឋបាល ខេត្តសៀមរាប ដោយមានកិច្ចសហប្រតិបត្តិការ និងគាំទ្រដោយទីភ្នាក់ងារសហប្រតិបត្តិការអន្តរជាតិជប៉ុន JICA ទៅលើគម្រោងដឹក្រុមភ្នាក់ងារ ក្នុងគោលបំណងប្រែក្លាយក្រុងសៀមរាប ឱ្យក្លាយទៅជាទីក្រុងឆ្លាតវៃ ស្របពេលវេលាដែលក្រុងសៀមរាប ខេត្តសៀមរាប ត្រូវបានដាក់បញ្ចូលជាសមាជិកនៃបណ្តាញដឹក្រុមភ្នាក់ងារអន្តរជាតិ ក្នុងឆ្នាំ២០១៨ កន្លងទៅ។ រដ្ឋបាលខេត្តសៀមរាប និងសហការជាមួយនឹងទីភ្នាក់ងារសហប្រតិបត្តិការអន្តរជាតិ- ជប៉ុន JICA ក្នុងការដាក់ឱ្យសាកល្បងនូវគម្រោងចំណតសាធារណៈឆ្លាតវៃ (SMART PARKING PROJECT) ហើយដែលគម្រោងនេះនឹងត្រូវអនុវត្តនៅទីតាំងមុខមន្ទីរពេទ្យបង្អែកខេត្តសៀមរាប (ផ្លូវ១២១) ដែលមានរយៈពេល អនុវត្តចាប់ពីថ្ងៃទី២៨ ខែវិច្ឆិកា ដល់ថ្ងៃទី០៤ ខែធ្នូ ឆ្នាំ២០២១ ដោយក្រុមហ៊ុន JAPAN PARKING TECHNOLOGY CO., LTD ហើយក្នុងរយៈពេលនៃការអនុវត្តសាកល្បងនេះ គឺមិនតម្រូវឱ្យម្ចាស់រថយន្ត និងយានជំនិះនានាដែល ចូលចតនៅក្នុងចំណតសាធារណៈនេះ ធ្វើការបង់ប្រាក់ទេ។ ជាមួយនោះ បន្ទាប់ពីបញ្ចប់គម្រោងសាកល្បងនេះ នាពេលខាងមុខ នៅពេលដែលគម្រោងផ្លូវ៣៨ខ្សែបានសម្រេចដាក់ឱ្យប្រើប្រាស់ជាផ្លូវការរួច រដ្ឋបាលខេត្តនឹងពិនិត្យ លទ្ធភាពធ្វើការបង្កើតនូវចំណតសាធារណៈឆ្លាតវៃ នៅតាមបណ្តោយផ្លូវនានាក្នុងក្រុងសៀមរាប។ ដូច្នេះ ដើម្បីឱ្យ ដំណើរការនៃគម្រោងសាកល្បងខាងលើទទួលបានជោគជ័យ រដ្ឋបាលខេត្ត សូមស្នើឱ្យ អង្គការពាក់ព័ន្ធនានា បងប្អូនប្រជាពលរដ្ឋ និងសាធារណជនទាំងអស់ ចូលរួមអនុវត្តគម្រោងនេះ ឱ្យទទួលបានជោគជ័យ និងសូមធ្វើការ ផ្តល់មតិយោបល់តាមរយៈគេហទំព័រ ឬ Facebook ផ្លូវការរបស់រដ្ឋបាលខេត្តសៀមរាប។

អាស្រ័យហេតុនេះ សូមបងប្អូនប្រជាពលរដ្ឋក្នុងខេត្តសៀមរាប និងសាធារណជនទាំងអស់ មេត្តាជ្រាប ជាព័ត៌មាន។ រ.ស.វ

ឧបនាយករដ្ឋមន្ត្រី

- រដ្ឋបាលក្រុងសៀមរាប
- ស្នងការដ្ឋាននគរបាលខេត្ត
- កងរាជអាវុធហត្ថខេត្ត
- មន្ទីរសាធារណការ និងដឹកជញ្ជូនខេត្ត
- ដើម្បីជ្រាប និងសហការ
- ឯកសារ កាលប្បវត្តិ



រដ្ឋបាលខេត្ត

ខេង សីហា

សាលាខេត្តសៀមរាប ផ្លូវ២០ខ្សែក្រ ភូមិបឹងដូនបា សង្កាត់ស្បូវក្រាម ក្រុងសៀមរាប ខេត្តសៀមរាប Siem Reap Provincial Hall, 60m Street, Boeung Domp Village, Sangkat Storkram, Siem Reap Municipality, Siem Reap Province, E-mail: grphall@vsn.com Tel: (855) 63 765-276, (855) 63 765 319, Fax: (855) 63 765 343

4. Results of Surveys

4.1 Analysis of Parking User

Table 4-1 shows the number of the parking lots used on a daily basis. The total for 7 days was 243, and the average for 1 day was 34.7. The average parking time was 2 hours 16 minutes in total. There are 17 parking spaces, and the average turnover rate is 2.04.

Table 4-1 Status of Parking lot usage

Date	Day of week	No. parking vehicle	Average Parking Time (hh:mm)
2021/11/28	Sun	24	2:36
2021/11/29	Mon	40	2:36
2021/11/30	Tue	46	2:11
2021/12/1	Wed	42	2:23
2021/12/2	Thu	35	2:02
2021/12/3	Fri	31	1:57
2021/12/4	Sat	25	1:41
Total		243	
Average		34.7	2:16

The parking time distribution is shown in Table 4-2 and Figure 4-1. Less than 30 minutes is 31%, 30 minutes to 1 hour is 15%, and relatively short parking is 46%. On the other hand, there were 12% of parking for 5 hours or more, and these vehicles were the shop owners and employees vehicles of roadside shops.

Table 4-2 Parking Time Distribution

Parking Time	Frequency	Share
0:00-0:30	76	31%
0:30-1:00	36	15%
1:00-2:00	41	17%
2:00-3:00	25	10%
3:00-5:00	36	15%
5:00-10:00	29	12%
Total	243	100%

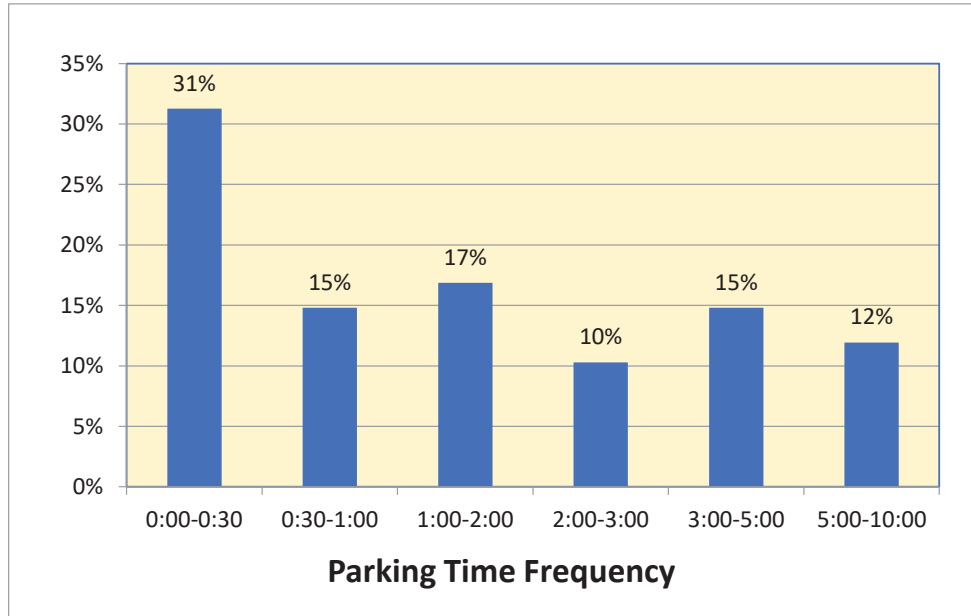
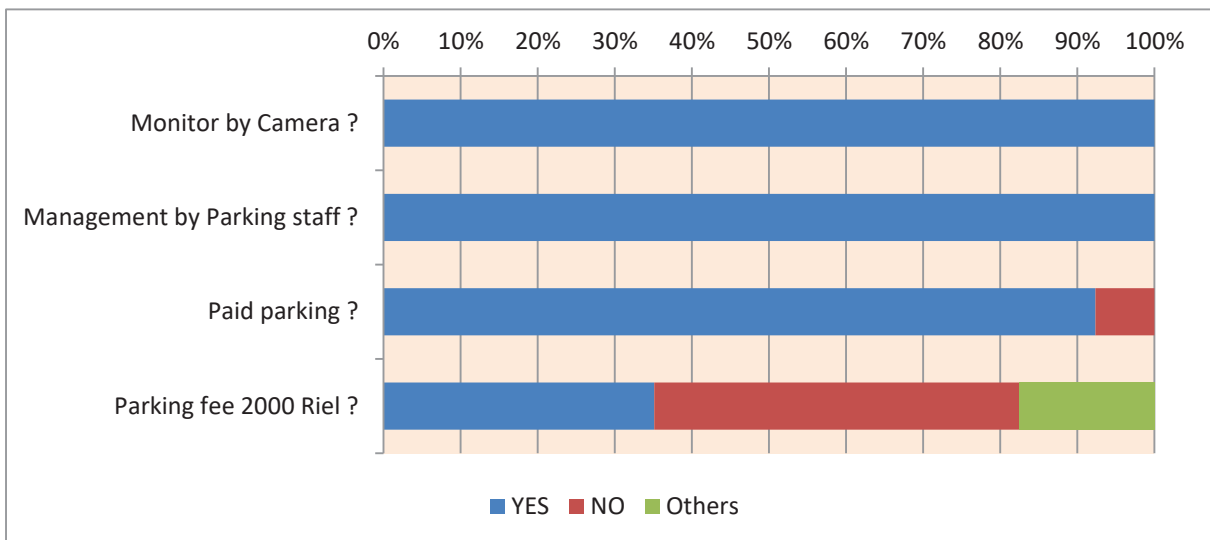


Figure 4-1 Parking Time Distribution

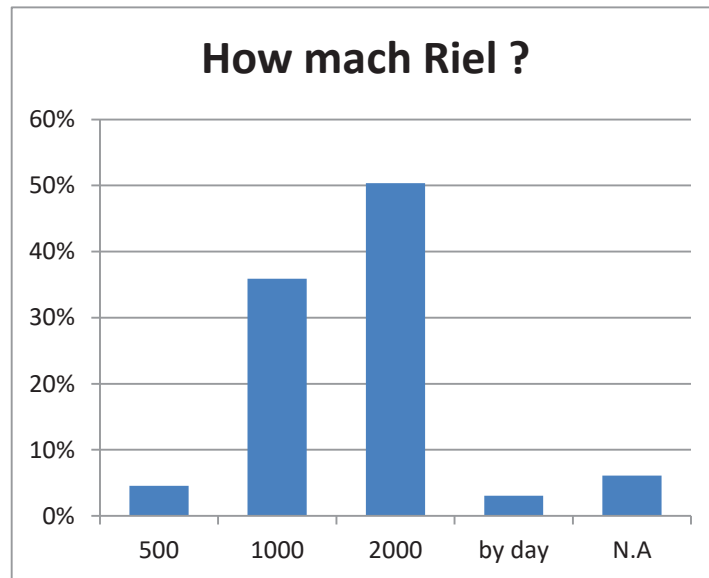
4.2 Analysis of Interview Survey

4.2.1 Interview survey to Parking Users

Parking lot users were positive about the introduction of surveillance cameras, management by parking managers, and the introduction of paid parking lots. The parking fee is 2000 Riel / hour 35%, 1000 Riel / hour 47%, and the others are not hourly but one-time base parking.

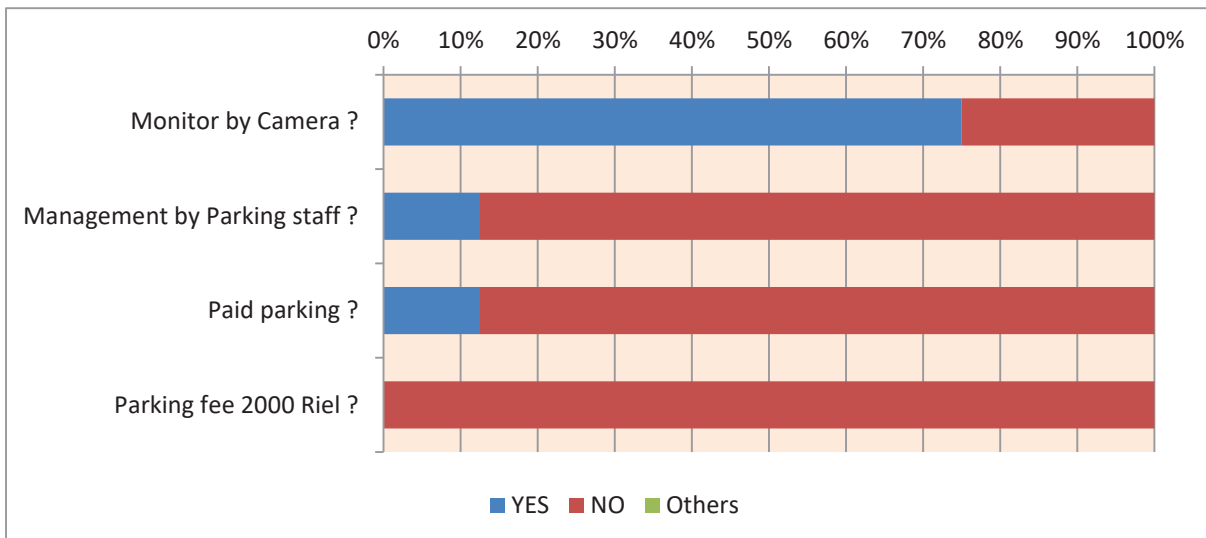


In question about acceptable parking fees to parking users, 50% were 2000 Riel / hour and 36% were 1000 Riel / hour. (The question method is different from the above, and the ratio of 2000 Riel / hour is different)



4.2.2 Interview Survey to Local Shops

In a questionnaire survey of 8 shops along the road, 6 stores affirmed the introduction of surveillance cameras, but 7 stores denied the introduction of paid parking lots and management by parking staffs. All stores denied the 2000 Riel / hour pricing.



4.3 Consideration on Parking Fee

Parking users are positive about the introduction of paid on-street parking, and agreed that the parking fee is about 1000-2000 Riel / hour. The parking fee in the existing market on Siem Reap is about 2000 Riel / time, and the tip for parking guides is 1000-2000 Riel, so there is no hesitation in paying for parking. In JPT's experience in other countries, drivers often opposed the introduction of paid parking system. By comparison, Siem Reap city drivers were found to be positive for paying for parking.

On the other hand, shops along the road are against paid on-street parking. This is because they tend to park on the road in front of the store for a long time and use it as a commuting parking lot or a garage. As a countermeasure, the following measures have been introduced in many cities.

- Setting special parking fee, such as daily rate, long time parking fee discount for shop and worker vehicles
- Develop a large-scale and low-priced parking lot for shops and workers

5. Provision of the Lessons Learnt

5.1 Difficulties Faced

5.1.1 Setting of pilot project location and coordination with road construction schedule

At the pilot project site, road maintenance was underway for 38 road projects, and it was requested to finish the road construction work before the start of the pilot project. However, since the road construction was managed by MPWT directly, it could not be adjusted by the Siem Reap Provincial Administration or DPWT. For this reason, the road construction was continued to carry out even during the pilot project, and parking demand was not sufficient.

5.1.2 Securing power supply for equipment

The power supply for surveillance cameras and recorders was initially planned to secure EDC power. However, it turned out that it takes time for private companies to use EDC power from the application for use to obtain permission, and it costs a considerable amount of money to procure the power meter and connect the power required for use. For this reason, the solution was to procure electricity from roadside shops. Power supply is indispensable for smart technology, and it is expected that the time and cost burden required for the procedure will be a major obstacle.

5.1.3 Impact of COVID 19

During the pilot project period, there were few tourists due to the influence of COVID 19, and most of the commercial facilities for tourists were closed. For this reason, this PoC could not obtain information on the original parking usage. Normally, the PoC should be implemented after international and domestic tourists recover.

5.1.4 Siem Reap Provincial Administration, traffic police on-site witness

The PoC implementation plan required the presence of Siem Reap Provincial Administration officials and traffic police during the pilot project, but the actual on-site witness was only one day for preparation and one day for start day. This PoC was planned to grasp the acceptability of government agencies and traffic police for the development of on-street parking lots, but this purpose could not be achieved.

5.1.5 Information on business licenses and business contracts for on-street parking business

In order to carry out the on-street parking business, it is necessary to obtain a business permit from the Siem Reap Provincial Administration and conclude a business contract. However, it turned out that there is no department within the Siem Reap Provincial Administration that serves as a contact window, and direct negotiations with the SR Provincial Governor are required. The procedure was unclear and no information was available on the procedure. No progress has been made on the JPT's goal of obtaining a business permit and contract for the Smart Parking business.

5.2 Recommendations

5.2.1 Development of smart infrastructure-related laws and regulations by the Cambodian government

In Cambodia, the only related law regarding parking is the Road and Traffic Law, which stipulates sections where parking is prohibited on the road. However, the content is the designation of parking and stopping places from the viewpoint of vehicle traffic, and there are no provisions regarding policies, planning, and construction regarding on-street parking lots and off-street parking lots.

In Japan and other countries, laws and regulations such as the Parking Law have been established under the basic laws and regulations such as the Road and Traffic Law to facilitate urban traffic. It is expected that the Parking Law will be enacted as soon as possible in Cambodia as well.

5.2.2 Development of the related laws and regulations around smart infrastructure (garage / parking attached building)

In this pilot project, it was confirmed that "road use as a garage" where vehicles of neighboring shop owners and employees park for a long time. The use of roads as garages is a private occupancy of public spaces and is not desirable from the perspective of fairness in the use of public spaces. For this reason, it is necessary to develop not only the parking law but also laws related to the "garage" that regulates the storage location of cars and the the parking attached building".

5.2.3 Administrative services related to smart infrastructure (traffic police parking control and guidance on illegal parking)

Parking is prohibited on the sidewalks of roads in Cambodia under the Road and Traffic Law, but the sidewalks are customarily used exclusively by roadside shops and house owners, and traffic police are cracking down and giving guidance. However, sidewalk parking is tolerated.

In Siem Reap city, the 38 road projects are underway, sidewalks have been mount-up, and roads that cannot be parked on sidewalks are being developed. There will be also markings on the road to allow parking on the road, but the method of operation is unclear. When constructing sidewalks, the sidewalks are devaluated due to the entry and exit of vehicles to and from the entrances of shops and houses, and if there is no guidance or crackdown on parking, the sidewalks and roads may be used as parking lots.

5.2.4 Planning of Siem Reap Provincial Administration's smart infrastructure upper level plan (parking policy / parking lot development plan)

The roads in the center of Siem Reap have so far controlled on-street parking in three categories: parking allowed, parking prohibited, and odd / even days. In front of a large market, a market association secures and operates a parking lot for visitors. Although individual parking facilities are secured in the city center and markets, there is a lack of parking policies, parking maintenance, and the formulation of parking control policies and plans for the entire city is required.

5.2.5 Establishment and clarification of the department in charge of the Siem Reap Provincial Administration's smart infrastructure (parking policy / parking development plan)

The department in charge of urban infrastructure development such as parking lots in the Siem Reap Provincial Administration is unclear and undeveloped, and it is desirable to establish a department in charge of parking policy within the Siem Reap Provincial Administration. In order to carry out the street parking business, it is necessary to obtain a business permit from the Siem Reap Provincial Administration and conclude a business contract, but there is no department within the SR state government that serves as a contact point for these, and direct negotiations with the SR Provincial Governor are necessary. The procedure is unclear, and it is necessary to clarify the procedure for smart infrastructure-related businesses.

5.2.6 Development of basic infrastructure (road / communication infrastructure) based on smart infrastructure by Siem Reap Provincial Administration and DPWT

In order to develop an on-street parking system, it is necessary to prepare the basic infrastructure for roads, sidewalks, and communications, which are the foundations of the parking lot. However, the basic infrastructure development is not sufficient, and it is necessary to develop the basic infrastructure on the premise of smart infrastructure development (sufficient road width, sidewalks / bollards that cannot be parked, hand holes / conduit for communication lines).