

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
MUNICIPALITY OF PHNOM PENH
KINGDOM OF CAMBODIA

NO.

THE STUDY ON SOLID WASTE MANAGEMENT IN THE MUNICIPALITY OF PHNOM PENH IN THE KINGDOM OF CAMBODIA

Final Report Summary



March 2005

KOKUSAI KOGYO CO., LTD.

GE
JR
05-007

In this report, the project cost is estimated by using the December 2004 price and an exchange rate of US1.00 = 4,000 Riel = JP¥104.878.

PREFACE

In response to a request from the Government of Cambodia, the Government of Japan decided to conduct a development study on Solid Waste Management in the Municipality of Phnom Penh and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected a study team headed by Mr. Junji Anai of KOKUSAI KOGYO CO., LTD. and dispatched the team to Cambodia four times between February 2003 and January 2005.

In addition, JICA set up an advisory committee headed Dr. Hidetoshi Kitawaki, a professor of Toyo University, which examined the study from specialist and technical points of view.

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

I hope that this report will contribute to the implementation of this plan and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Cambodia for their close cooperation extended to the study.

March 2005

Etsuo KITAHARA
Vice President
Japan International Cooperation Agency

March 2005

Mr. Etsuo KITAHARA
Vice President
Japan International Cooperation Agency

Letter of Transmittal

Dear Mr. KITAHARA,

We are pleased to submit the report of the Study on Solid Waste Management in the Municipality of Phnom Penh in the Kingdom of Cambodia.

The report consists of three components: a study on the present practices of waste management; the solid waste management master plan until the year 2015; and the feasibility of the priority projects.

The current issues have been identified by analyzing the existing data and evaluating the results of eleven kinds of surveys conducted in the study on the present practices. We set the fundamental goal of the master plan as “to establish a sustainable SWM system in the Municipality of Phnom Penh by the target year 2015” and proposed that the unserved area and insufficiently serviced area should be eliminated from the city in collaboration with the public sector and private sector. We also prepared a final disposal plan for the waste collected without having an adverse effect on the environment. Moreover, we conducted a feasibility study on the new disposal site development project, the waste collection service expansion project and the present disposal site closure project as priority projects. The validity of implementation of these projects was verified from technical, social, environmental, financial and economical points of view.

In addition to the above study, we conducted pilot projects such as improvement of the SMC disposal site, expansion of the waste collection service and a public education campaign to strengthen the capability of the counterpart for waste management. The counterpart is implementing the suggestions of the study and maintaining and developing the results of the technology transfer by themselves, which seems to be bearing fruit.

We would like to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs, and the Ministry of Environment of Japan. We would also like to extend our deep appreciation to the Government of Cambodia, the Embassy of Japan and the JICA Cambodia office for their vital cooperation during the implementation of the study in Cambodia.

Last but not least, we hope that the output of the study presented here will contribute to the sustainable development of not only the Phnom Penh area but the whole country.

Respectfully,

Junji ANAI
Team Leader

The Study on Solid Waste Management in the Municipality of Phnom Penh in the Kingdom of Cambodia

Outline of the Master Plan

1. Objectives of the Study

- To formulate a master plan (hereinafter referred to as “M/P”) for solid waste management in Phnom Penh with a target year of 2015.
- To conduct a feasibility study (hereinafter referred to as “F/S”) for the selected priority projects.
- To transfer technology to the counterpart (hereinafter referred to as the C/P”) in the course of the study.

2. Study Area

The study area includes the entire municipality of Phnom Penh (population: approx. 1.2 million, area: 373.73 km²).

3. Waste covered in the study

The wastes covered in the study are municipal solid waste, septage (sludge collected from septic tanks), and industrial and medical waste. However, the team did not fully consider these three categories of waste in the M/P but clarified current conditions, identified issues that need to be resolved and proposed possible solutions.

4. The Master Plan

The fundamental goal of the M/P for SWM in MPP is “*To establish a sustainable SWM system in MPP by the target year 2015*”.

The target year of the M/P is 2015. In order to achieve the goal of the M/P step by step, the planning period is divided into the following three phases:

- 1st Phase :** **2005 to 2007 (urgent improvement)**
The new disposal site is developed as SMCDS is improved. A waste collection system under public and private partnership is established.
- 2nd Phase :** **2008 to 2012 (short term improvement)**
The new disposal site and waste collection system established in Phase 1 are operated properly.
- 3rd Phase :** **2013 to 2015 (middle term improvement)**

The target of the Master Plan is achieved and the preparation works for the next plan targeting a higher grade of management will be started.

To achieve the target of the Master Plan step by step, phased targets are set as shown in the table below.

Table 1: Numerical Targets of the Master Plan for SWM in Phnom Penh

Technical Component	Present (2004)	Phase 1 (2007)	Phase 2 (2012)	Phase 3 (2015)
Coverage of waste collection service to population (Coverage of waste collection service to waste generation amount)				
4 Urban Khans	95.6% (90.7%)	97.8% (92.5%)	100% (94.1%)	100% (93.8%)
3 Rural Khans	53.4% (48.2%)	73.4% (68.1%)	88.8% (83.0%)	95.7% (89.7%)
Generation reduction				
Growth rate of household waste (proportion of household waste to the total waste generation)	1.00 (63.0%)	1.14 (62.6%)	1.32 (61.5%)	1.42 (60.9%)
Growth rate of commercial waste (proportion of commercial waste to the total waste generation)	1.00 (37.0%)	1.16 (37.4%)	1.41 (38.5%)	1.55 (39.1%)
Proportion of recycled waste to the total waste generation				
4 Urban Khans	11.1 %	14.6 %	15.5 %	16.0 %
3 Rural Khans	6.8 %	8.3 %	10.4 %	11.7 %
Proportion of composted waste (intermediately treated waste) to the total waste generation (amount treated, tons/day)	0.1% (1.3)	2.4% (26.3)	2.0% (29.3)	1.9% (32.3)
Proportion of improper waste disposal				
4 Urban Khans	2.2 %	1.1 %	0.0 %	0.0 %
3 Rural Khans	13.8 %	7.2 %	1.8 %	0.0 %
Street Sweeping				
4 Urban Khans	46km	46km	46km	46km
3 Rural Khans	10km	14km	19km	24km
Final disposal method of municipal waste	Control tipping/ Open Dumping	SLF level 1 (Control tipping)	Sanitary landfill (SLF) Level 4	
Final disposal method of hazardous waste	A system for reduction of waste generation, recycling, proper treatment and disposal will be established in phases.			

5. Priority Project

To realise the urgent improvement proposed in the M/P, the following priority projects are selected.

Table 2: Priority Projects and Initial Investment

Project Name	Contents	Investment (2005 - 2006)	Investment (2007)
1. Dang Kor Disposal Site Development Project	Construction of new disposal site (1 st phase: 31.4ha)	8,890	0
	Construction of compost plant	1,194	0
	Construction of maintenance workshop	1,574	
	Sub total	11,658	0
2. Waste Collection Expansion Project (waste collection service provided to the unserved area by PPWM)		1,804	195
3. SMC Disposal Site Closure Project		75	745
Total		13,537	940

6. Recommendations for improvement of the M/P

6.1 Unserviced and insufficiently serviced areas

- MPP and the private company (CINTRI) should identify the unserved and insufficiently serviced areas remaining in the city and amend the agreement to allow PPWM to provide the collection service to those areas.
- MPP/DOE should establish a system to monitor and control the service provided by PPWM and the private company.

6.2 Establishment of a proper final disposal

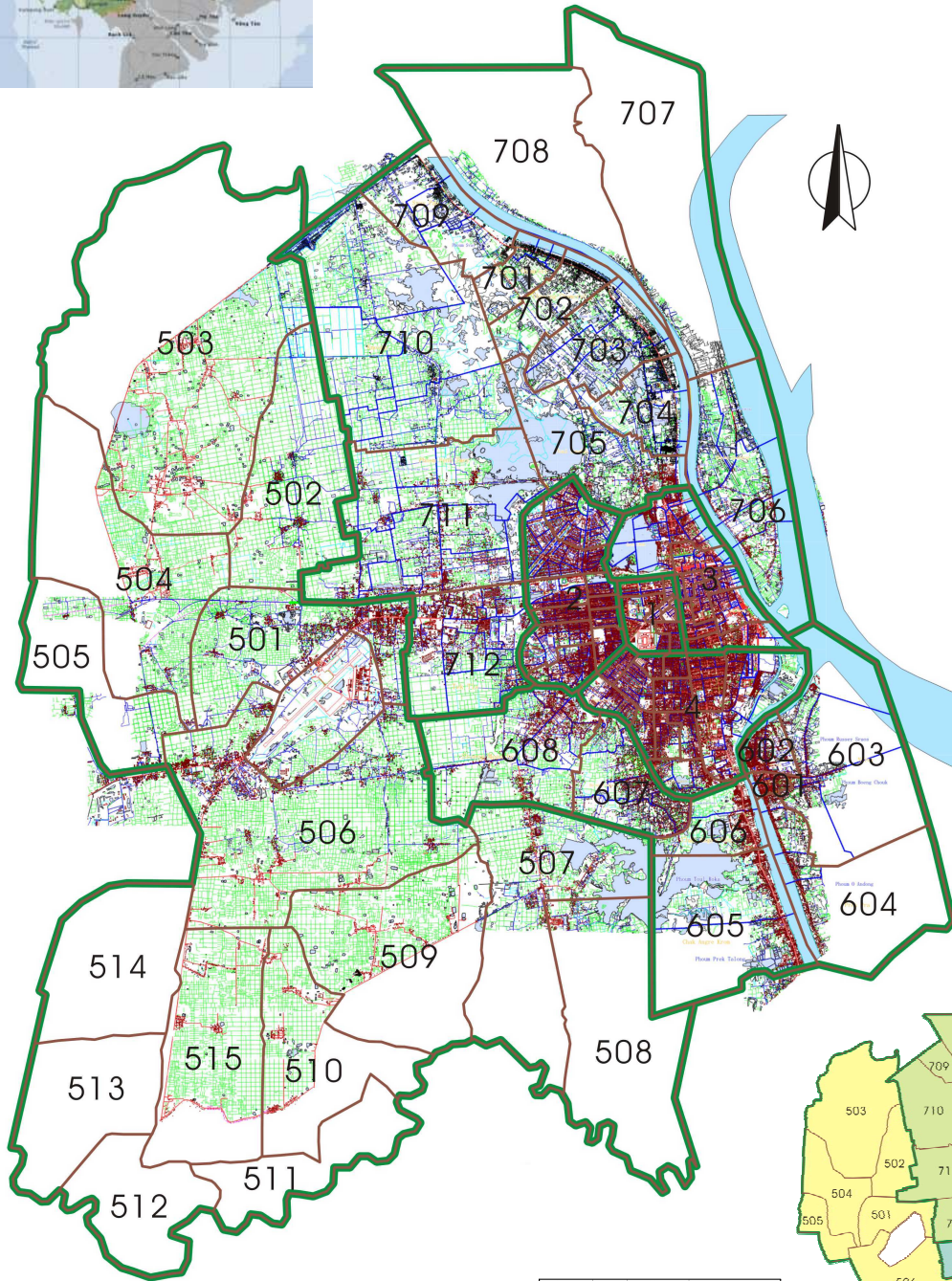
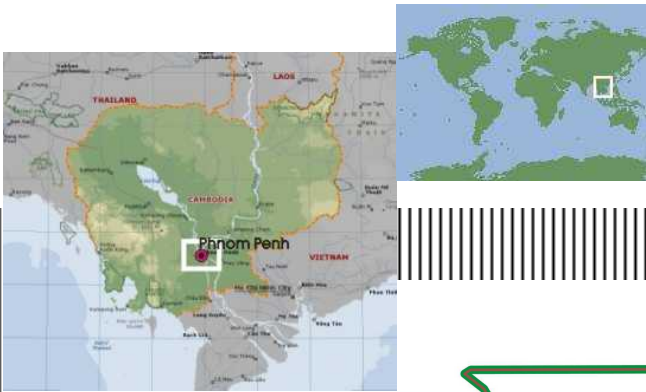
- PPWM should continue the pilot project for improvement of the SMC disposal site and develop its capability of landfill management.
- PPWM should raise the level of sanitary landfill operation in the SMC disposal site step by step.
- PPWM should explain the increased benefit resulting from improvement of the landfill operation to the users and ask them to understand the necessity of raising the disposal fee and agree to pay it.
- PPWM should negotiate with the user for raising the disposal fee step by step to cover the cost of landfill operation.
- PPWM should explain the activities conducted for improvement of the SMC disposal site and persuade not only the residents living in the surrounding area but all citizens to share the cost for proper landfill operation.

6.3 Implementation of the priority projects

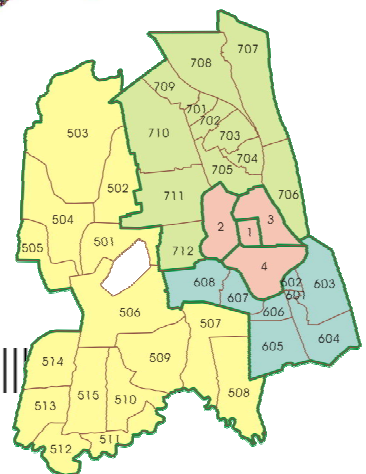
- Considering the internal difficulty in raising funds, the team recommends that MPP make every effort to secure the funds with foreign assistance to implement the Dang Kor Disposal Site Development Project and Waste Collection Service Expansion Project.
- To make the project financially sustainable by only the income from the waste fee, MPP should secure a stable fee income system based on the establishment of a reasonable and transparent fee rate system that can be well accepted by all MSW users.
- MPP should repeatedly explain the Dang Kor disposal site development project to the citizens living in the project site and the surrounding area until the implementation stage of the project to ensure their adequate understanding and to build public consensus.
- PPWM should have a meeting with the waste pickers earning their daily bread in the SMC disposal site to discuss the future plan and treatment.
- In order to supervise the operation of the new disposal site in Dang Kor, DOE should set up a monitoring committee with the cooperation of the MOE, Khan and Sangkat offices, local residents, NGOs, etc.

6.4 Acquisition of the land for the facilities needed to implement the M/P

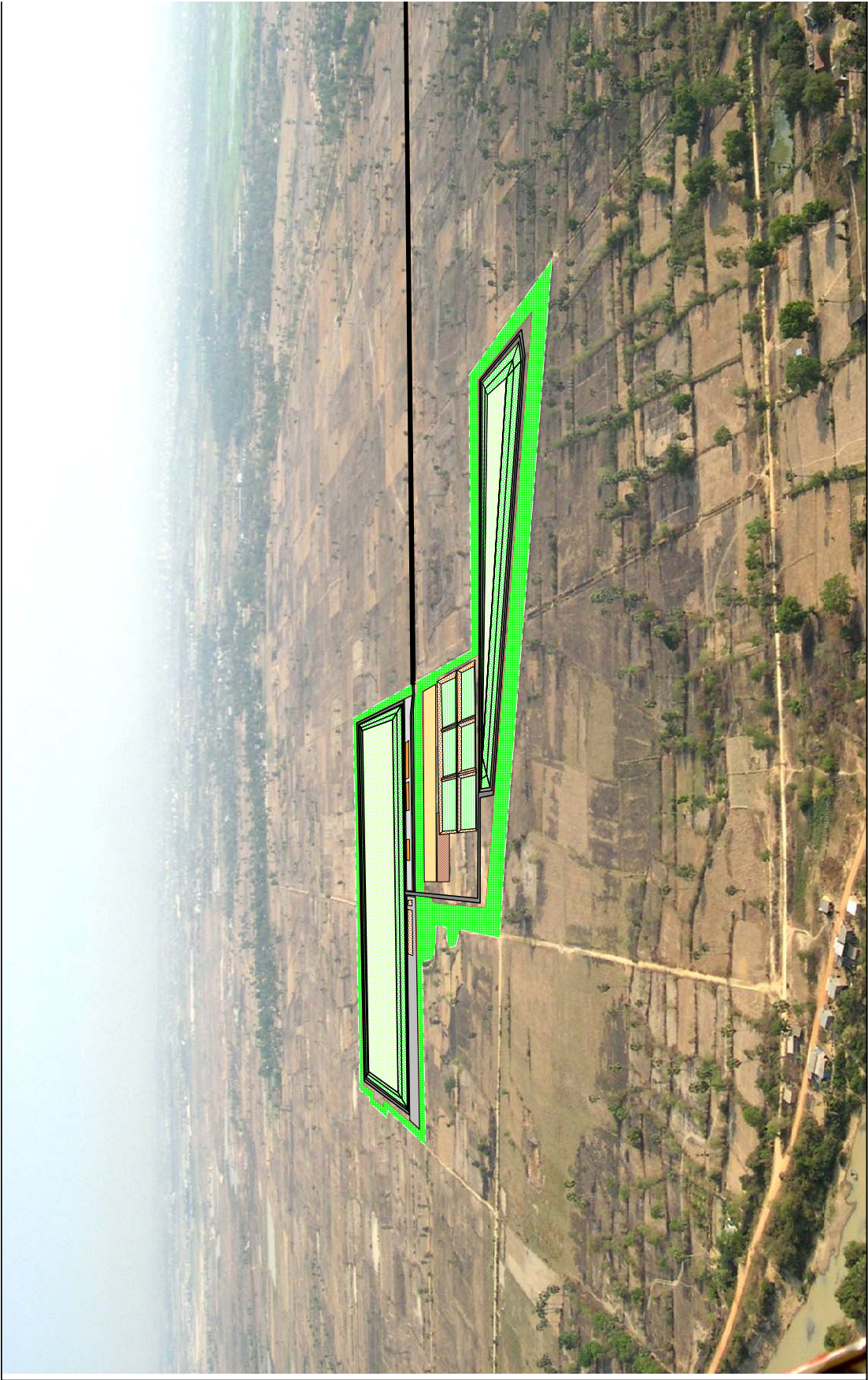
- MPP should acquire the land for waste treatment and disposal facilities according to the strategies set in Section 3 of this report. However, site acquisition becomes increasingly difficult as more and more residents have the NIMBY syndrome. The MPP should secure the sites in advance.



Area	Color	No.	Khan
Urban area	Light Green	1	Chamkar Mon
		2	Daun Penh
		3	Prampir Makara
		4	Toul Kork
Rural area	Light Yellow	501 - 515	Dang Kor
		601 - 608	Mean Chey
		701 - 712	Russel Keo



The Study on Solid Waste Management in the Municipality of Phnom Penh in the Kingdom of Cambodia
Study Area



Bird's-eye View: Proposed Dang Kor New Disposal Site