Appendix 5 Minutes of Discussions on the Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System in the Kingdom of Cambodia (Results of Second Field Survey, February, 2003)

MINITES OF MEETING

1. **Date:** February 18, 2003
2. **Place** Conference Room of MOWRAM
3. **Subject:** Result of Second Field Survey for the Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System in the Lower Prek Thnot Basin

4. Discussion

At the end of the second survey, senior officials of MOWRAM and the Study Team as well as concerned agencies held a meeting based on the survey results conducted by the Study Team. The meeting was chaired by H.E. Mr. Veng Sakhon, Under Secretary of State , Ministry of Water Resource and Meteorology. The list of participants in the meeting is attached as ANNEX-1. Based on the explanation of survey results and findings, various discussions were made between the parties. The major points of discussions and agreed upon both parties are as follows:

1) Findings of the Second Field Survey by the Study Team

a) MOWRAM basically agreed with the findings reported by the JICA Study Team.
b) Both sides confirmed that leakage problem was observed in both Tuk Thla and Kompong Tuol regulators, of which effect on stability of the regulators shall be examined at home office work of the Study Team in Japan.

2) Rehabilitation Project Plan for the Secondary/Tertiary Canals

a) Both sides confirmed importance of the implementation of the Rehabilitation Project for the Secondary / Tertiary Canals of the Project area in order to make its efficiency full as whole Kandal Stung Irrigation System.

b) The Study Team confirmed that MOWRAM has submitted the latest plan of the Rehabilitation Project of the Secondary / Tertiary Canals with a budgetary request letter to Ministry of Economy and Finance (hereinafter referred to MEF).

c) The Study Team confirmed that MOWRAM has already explained to MEF about the plan of the Rehabilitation Project of the Secondary / Tertiary Canals, and MEF has understood the project should be conducted in collaboration with the rehabilitation of the main irrigation system and Japanese technical cooperation project, and recognized

the importance of the project.

d) Both sides confirmed Royal Government of Cambodia (hereinafter referred to RGC) has put a priority on irrigation sector especially improvement of the existing irrigation systems mentioned in "The Implementation of Economic and Financial Reforms : Report for 1999-2003) and the discussion made between MEF and MOWRAM. The Study Team confirmed that MOWRAM would have discussions with MEF to put the priority on the project including the allocation of the Japanese counterpart fund soon

e) MOWRAM agreed to prioritize the Rehabilitation Project of the Secondary / Tertiary Canals as one of the top prioritized projects and make continuous efforts to secure the implementation of the project by conducting close discussion with MEF.

3) Land Acquisition related to Rehabilitation of Main Irrigation System

Both sides confirmed that MOWRAM would provide a letter designated to Japanese Minster of Foreign Affairs, referring to assure that MOWRAM and Inter-Ministerial Resettlement Committee would take the whole responsibility to carry out land acquisition work under the agreement with the concerned beneficiaries prior to March12, 2003 at the explanation of the Study Team Results to the RGC and Discussion.

4) The Project O&M Framework

a) Both sides confirmed that MOWRAM explained that the proposed O&M Plan (ANNEX-2) by the Study Team had some difficulty to harmonize with the policy of Statue No 306 in terms of the ISF use, and the Project O&M framework shall be further examined later.

b) Both sides confirmed that MOWRAM takes responsibility of the whole O&M work for the main irrigation facilities and of establishing the Project O&M Office and of organizing and strengthening the FWUC for the Project by assigning the required staff to the Project O&M Office.

5) The Integrated Development Project in the Western Side of Phnom Pen Municipality

The Cambodian side confirmed that the newly approved project have already been finalized and completed to rehabilitate the 20 km of the main canal including 1km new construction, out of the projected 70 km length, and would be no influence to the Kandal Stung Irrigation

Project.

6) Arrangement of Necessary Formality to Investigate & Remove UXO by MOWRAM

Both sides confirmed that MOWRAM committed to proceed with official formality of investigating and removing the UXO in the Kandal Stung Irrigation Project area by her own budget after the E/N, especially 5.4 km length of the main canals with 15 m width in both sides and other site as required.

7) Purpose of the Project

Both sides confirmed that the purpose of rehabilitating the Kandal Stung Irrigation System in the Lower Prek Thnot Basin was aimed at crystallizing a new farming system by introducing rice double cropping system in order to reduce rural poverty.

8) Custom Clearance/Banking Cost

According to the Inception Meeting Minutes, i.e, Annex 5, both sides confirmed that MOWRAM bore the cost generated from custom clearance and banking arrangement associated with implementation of the construction work.

Veng Sakhon

H.E. Mr. Veng Sakhon
Under Secretary of State,
Ministry of Water Resources and Meteorology
Royal Government of Cambodia

for 栗田純学

Mr. K. Okada
Chief Consultant for the Study Team
Japan International Cooperation Agency
(Nippon Koei Co., Ltd)

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ANNEX. I

List of Attendance

Date: February 18, 2003

Time: From 9:00 am

Place: Office of Under Secretary of State, MOWRAM

Subject: **Explanation of Field Survey Results**

No	Name	Designation	Signature
1	Veng Sakhon	Under Secretary of State	Veng Sakhon
2	THENG NARA	Director Depat of W. Resources	Theng Narae
3	TE AUV. KIM	Director dept Irrigated Agriculture	
4	Ngaun Pich	Deputy Dept of engineering	
5	PRUM KANTHEL	IRRIGATION AND DRAINAGE Dep.	T.S.C
6	MEAS. SAVOEUN		T.S.C
7	TEAV. VUTHA		T.S.C
8	YOU SOTHA		T.S.C
9	HAY BUNTHOEUN		T.S.C
10	Kenji Yasuda	TSC expert.	安田憲司
11	Takanobu Kobayashi	JICA Advisor	小林俊信
12	Jiro Takeuchi	JICA Cambodia office	武内二郎
13	Yasunori Ueda	Japanese Embassy	
14	Hidetoshi Sawada	JICA Study Team	
15	Zetsugaku KURITA	JICA Study Team	
16	Yutaka Niikawa	JICA Study Team	新川豊
17			
18			
19			
20			

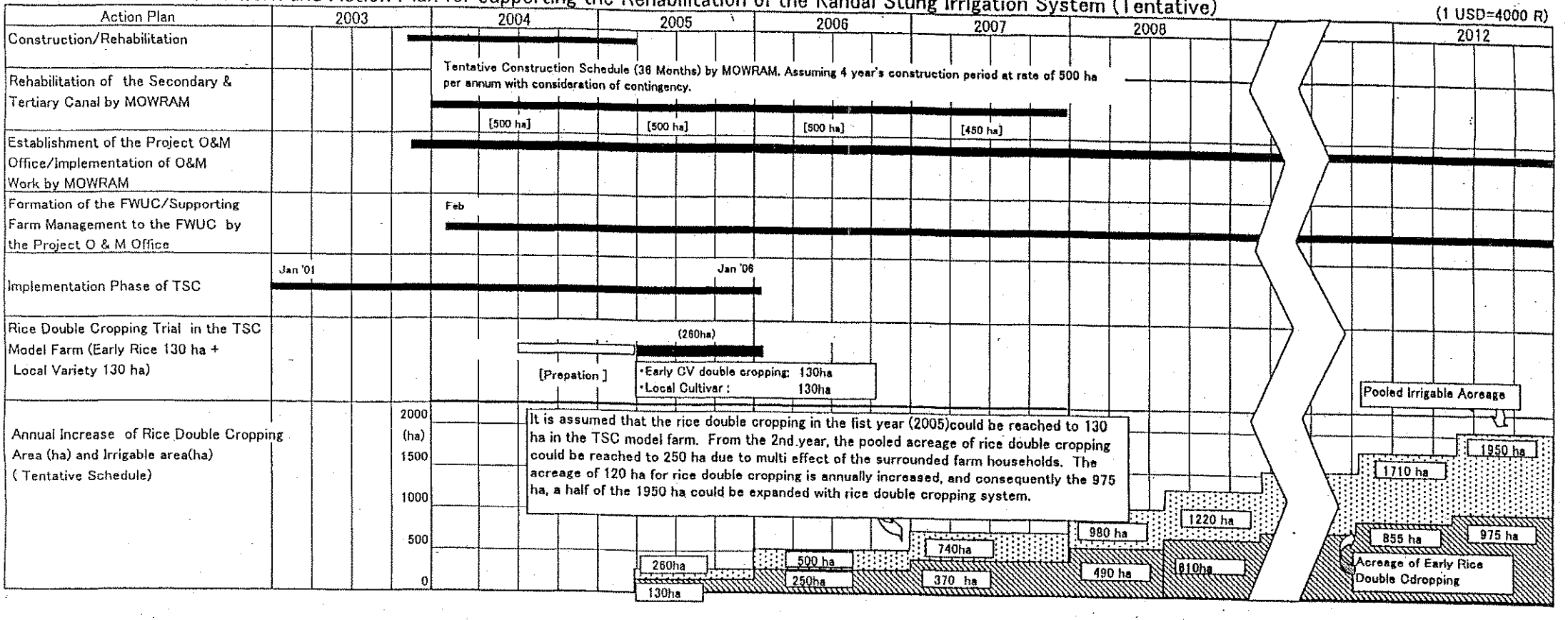
Basic Design Study
On
Rehabilitation
Of
The Kandal Stung Irrigation System
In
The Lower Prek Thnot Basin
In
The Royal Government of Cambodia

Operation and Maintenance Plan
(Draft)

Table of Contents

Exhibit – 1 The Frame work and Action Plan for supporting the Rehabilitation of the Kandal Stung Irrigation System (Tentative)

(1 USD=4000 R)



Assigned Staff to the Project O & M Office

Staff	Person
Chief Irrigation Engineer	1
・Technician	1
・Assistant	1
Senior Agriculture Extension Officer	1
・Technician	1
・Assistant	1
Senior Irrigation Community Organizer	1
・Vice ICO	1
・Assistant	1
Chief Accountant	1
・Assistant	1
Total	11

ISF can be applied to the O & M cost for the Project.
Annual ISF per hectare is;
Annual O & M cost 24527 USD /1950 ha = 12.6 USD/ha
Since rice double cropping is scheduled, so
12.6 USD /2 times = 6.3 USD/ha/season

This rate of ISF is well bearable by the beneficiaries.

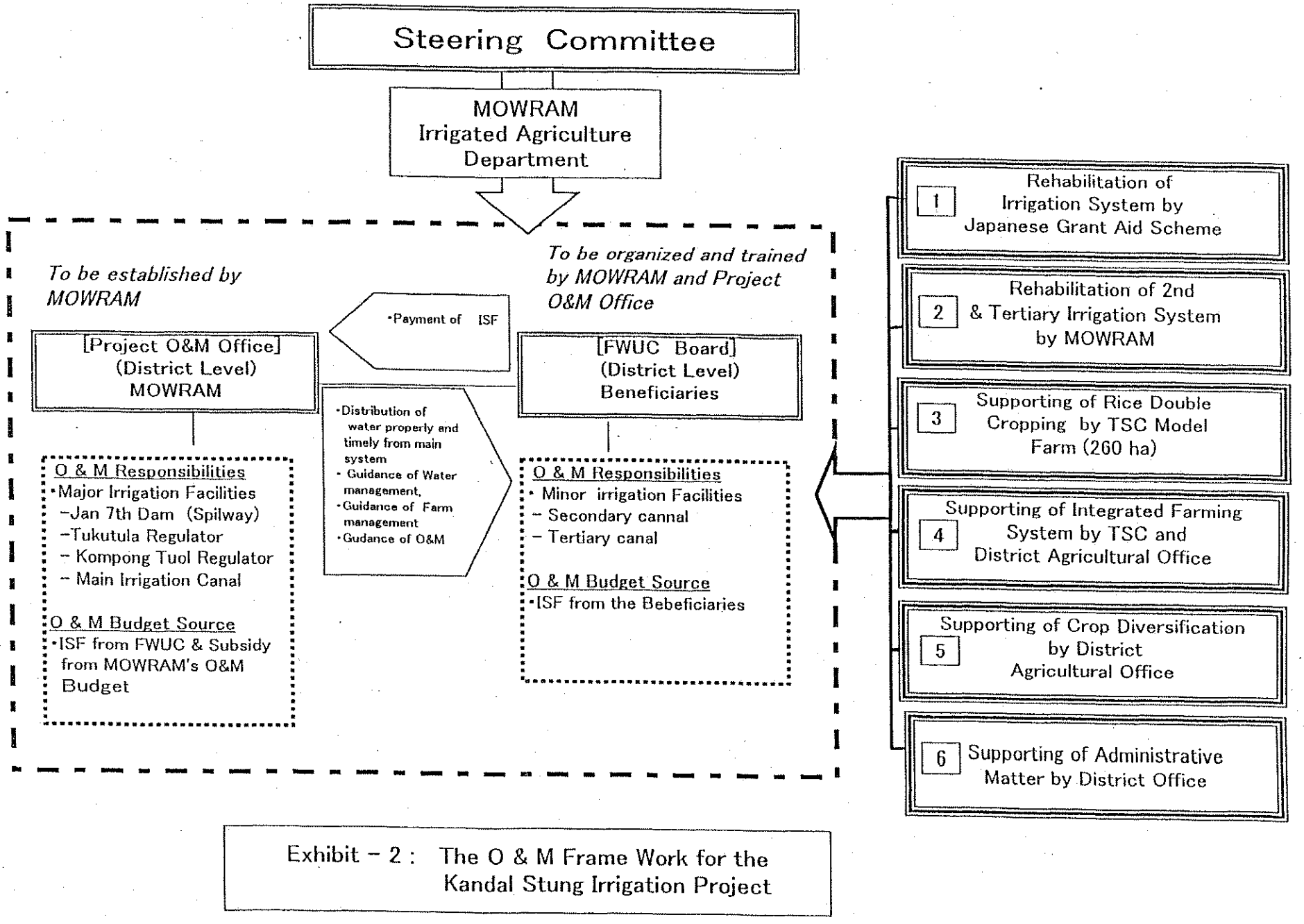
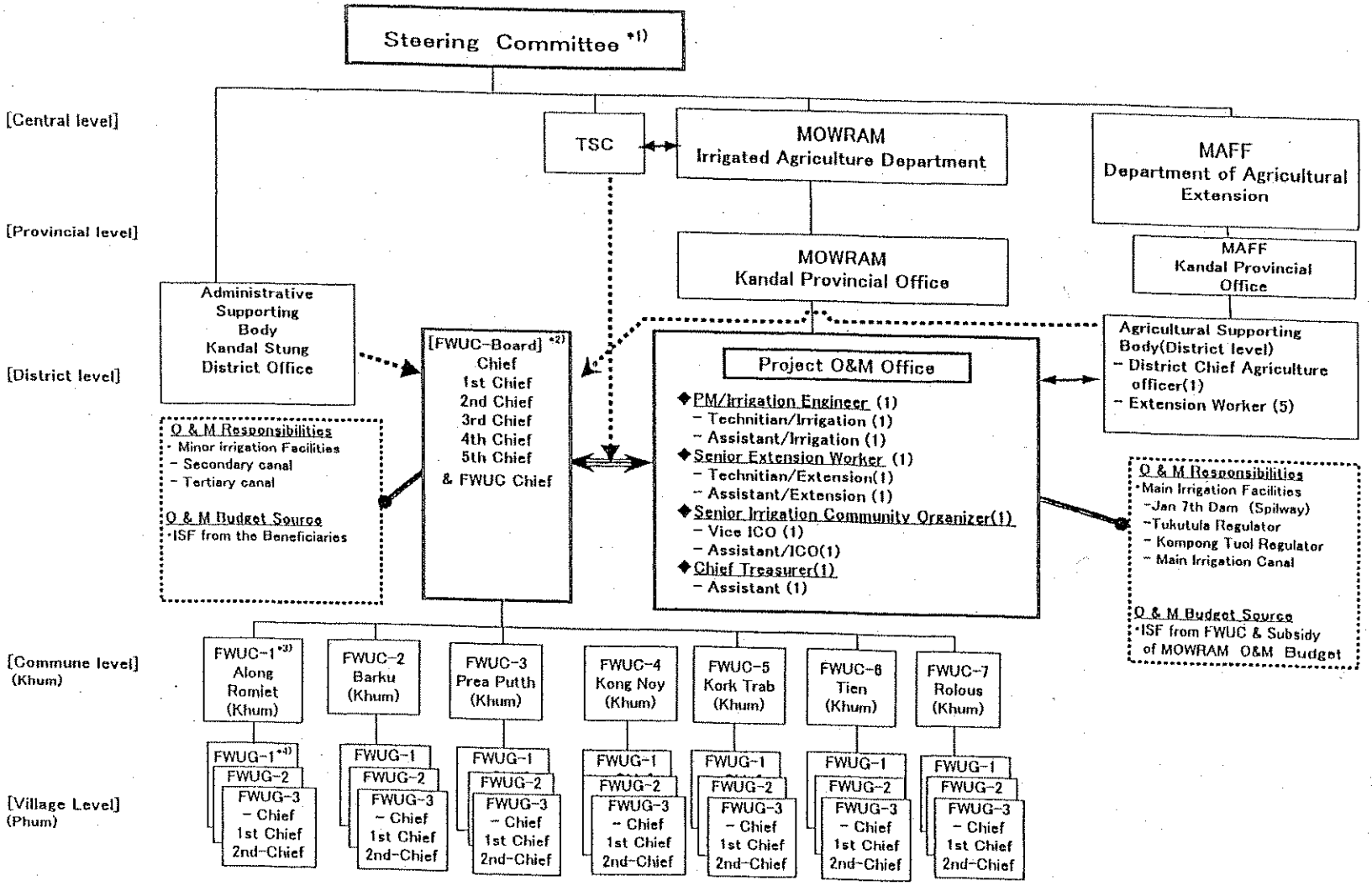


Exhibit - 2 : The O & M Frame Work for the Kandal Stung Irrigation Project



Remark: A FWUG is proposed to be organized based on every 50 ha irrigation block in each commune..

*1) Remark
Chairperson of the S/C, Under Secretary of State of MOWRAM
Director General of Technical Affairs of MOWRAM
Director of Planning and International Cooperation Dept, MOWRAM
Director of Irrigated Agriculture Dept, MOWRAM
Director of Water Resource Management and Conservation Dept.,
Deputy Director of Engineering Dept
Director of Kandal Provincial Bureau of MOWRAM
CDC Reprepresentative
MAFF Representative
Res Rep of the JICA Cambodia Office
JICA Expert of MOWRAM
Chief Advisor of TSC
Representative of Kandal Stung District Office
Representative of FWUC-Board
Project Manager of the Project O&M Office

*2) Remark

Chief	Supervise overall matter
1st Chief	Planning of Operation & Maintenance
2nd Chief	Water Distribution
3rd Chief	Farm management
4th Chief	Treasurer
5th Chief	Secretary
FWUC Head	

*3) Remark

Chief	Supervise overall matter
1st Chief	Planning of Operation & Maintenance
2nd Chief	Water Distribution
3rd Chief	Farm management
4th Chief	Treasurer
5th Chief	Secretary

*4) Remark

Chief	Farmer's Group Leader
1st Chief	Water Distribution and Maintenance
2nd Chief	Treasurer

Exhibit – 3 : Organization for O & M Activeities for the Kandal Stung Irrigation Project

Exhibit – 4 Implementing Organs and its Role for the Kandal Stung Irrigation Project

	Implementing Organs	Function	Member
1	Steering Committee	The steering committee is scheduled to set up followed by E/N and shoulders the following role. ● Coordination work of inter-ministerial matter related to construction work of the Project ● Monitoring the construction work and progress of the Project implementation, and administering/guiding the Project when it is necessary.	・Chairman : Under Secretary of State of MOWRAM ・Concerned Directors/Deputy Director of MOWRAM and Director of Kandal Provincial MOWRAM Office ・CDC Representative ・MAFF Representative ・Res., Rep., of JICA Cambodia Office ・JICA Expert/MOWRAM ・JICA TSC Chief Advisor ・Project Manager of Construction of Secondary/Tertiary Canals ・Project Manager of the O&M Office In accordance with necessity, Representatives of Kandal Stung District Office and the FWUC are convened.
2	MOWRAM	● Overall managerial work of the grant aid project and construction of the secondary/tertiary canal ● Land acquisition and compensation for construction work ● Arrangement about closing the water canal during the dry season for construction work ● Guide the Project O&M Office to organize the FWUCs ● Design/construction of the secondary/tertiary canals	・Irrigated Agriculture Dept., ・Engineering Dept., ・Project Manager of O & M Office ・Project Manager of Construction of Secondary/Tertiary Canals
3	Technical Service Center for Irrigation System (TSC)	● Give guidance/recommendation to the staff assigned to the Project O&M Office ● Supporting formation of the FWUC ● Establishing a demonstration farm about a rice double cropping trial in the JICA TSC Model Farm	・JICA Experts Team ・Counterparts
4	Farmers Water User Community(FWUC)	● Collection of ISF from the FWUC members ● Implementation of regular O&M work for the 2nd/tertiary canals ● Carry out the necessary support of technical advice/farm management to the FWUC members ● Mediation of disagreement among the FWUGs	・FWUC Committee member ・Beneficiary
5	Project Operation & Maintenance Office	● Comprehensive O&M work for the main facility (water intake work, main canal) ● Give guidance of water management to the FWUC ● Give guidance of farm management to the FWUC ● Give guidance of O&M to the FWUC	・Project Manager/Chief Irrigation Engineer ・Senior Agriculture Extension Officer ・Senior Irrigation Community Organizer ・Chief Treasurer And technicians / assistants amounted to 11 members

Exhibit – 5 TOR of the Staff assigned to the Project O&M Office (1/2)

	Position/Qualification	Terms of Reference
1	◆Project Manager/Chief Irrigation Engineer (CIE) ・ Engineer ・ 15 years experience ・ English communication skill	■In charge of overall responsibility for the Project O &M and take the duty of water management and O & M work for the main irrigation facility ● Formulate an annual O & M Plan ● Formulate water distribution plan based on the cropping area and water demand ● Carry out farmer's training to ensure irrigation practice efficiently in collaboration with the SAEW and SICO ● Monitor and evaluate the FWUC activity based on the formulated Monitoring & Evaluation System (M&E) in collaboration with SAEO and SICO, and direct necessary supervision to the FWUC ● Update and revise a manual of water management for the Project ● Establish a partnership with the concerned agricultural supporting organizations such as District Agriculture Office, AQIP, CARDI, etc.
	◆Technician	●Give guidance of O&M and water management to the beneficiaries in the field under instructed by the CIE
	◆Assistant ・Qualified staff	●Assist SIE and Technician
2	◆Senior Agricultural Extension Officer (SAEO) ・Engineer ・15 Years Experience ・English Communication Skill	■ Carry out agriculture extension work focusing on the Kandal Stung Irrigation Project as a command area, and formulate an annual extension plan with guidance for the beneficiaries in the proposed cropping plan. ● Grasp the agronomic environment (natural and socio-economic environment) of the command area ● Formulate a best-fit extension plan for the Kandal Stung command area ● Guide and train the beneficiaries about farming practice of IR cultivars ● Guide a second crop to the rice ● Formulate a crop guideline for the major crops ● Plan and conduct study tour for the beneficiaries in collaboration with the CIE and SICO ● Establish a partnership with the concerned agricultural supporting organs such as District Agriculture Office, AQIP, CARDI, etc.
	◆Technician	●Give guidance to the beneficiaries in the field under instruction made by the SAEO
	◆Assistant ・Qualified	●Assist SAEO and Technician
3	◆Senior Irrigation Community Organizer (SICO) ・Engineer ・15 Year experience ・English communication Skill	■Organize the beneficiaries in the command area into the FWUC ●Grasp the village social-structure, farming system and water management in the command area ●Organize the FWUC based on the area-basis 7 communes involved in the command area in collaboration with CIE and SAEO ●Formulate a cadastral map and registered land for the FWUCs and the FWUC members ●Formulate a rational ISF (cash, rice and labor) to the FWUCs with collecting ISF system
	◆Vice ICO ・Technician	●Organize the FWUC under instruction made by SICO
	◆Assistant ・Qualified	●Assist SICO and Vice ICO

4	◆Chief Treasurer(CT) ・Engineer ・10 Years experience	■Take a responsibility for collecting ISF from the FWUC and financial management of the Project O&M Office. ●Collect the ISF from each community-based FWUC ●Formulate a system to store and sell in kind ISF under assumption of ISF payment such as cash, paddy and labor. ●Prepare the financial statement of the Project O& M Office to MOWRAM and the FWUC ●Proceed a formality to apply subsidy for the Project O&M Office to MOWRAM ●Guidance for the treasures of the FWUCs
	◆Assistant accountant ・Qualified	●Assist CT

Exhibit – 6 Annual Cost of the Project O&M Office of MOWRAM

Item of Expense		Unit	Quantity		Unit Price		Total		Remark
			Total	M/M	(Riel)	(USD)	(Riel)	(USD)	
O&M Staff	・Project Manager/Irrigation Engineer	Person	1	12	800,000	200.00	9,600,000	2,400.0	Recruited from MOWRAM including base salary
	・Technician	Person	1	12	400,000	100.00	4,800,000	1,200.0	
	・Assistant	Person	1	12	200,000	50.00	2,400,000	600.0	
	・Senior Agriculture Extension Officer	Person	1	12	800,000	200.00	9,600,000	2,400.0	Seconded from MAFF (including base salary)
	・Technician	Person	1	12	400,000	100.00	4,800,000	1,200.0	
	・Assistant	Person	1	12	200,000	50.00	2,400,000	600.0	
	・Senior Irrigation Communitry Organizer	Person	1	12	800,000	200.00	9,600,000	2,400.0	Recruited from MOWRAM including base salary
	・Vice ICO	Person	1	12	400,000	100.00	4,800,000	1,200.0	
	・ Assistant	Person	1	12	200,000	50.00	2,400,000	600.0	
	・Chief Treasurer	Person	1	12	800,000	200.00	9,600,000	2,400.0	Recruited from MOWRAM including base salary
	・Assistant	Person	1	12	200,000	50.00	2,400,000	600.0	
Sub Total			11	132	5,200,000	1,300	62,400,000	15,600.0	(1)
O&M Expence for the Project O&M Office	Office Supply	lot/M	12		60,000	15.00	720,000	180.0	
	Consumable goods	lot/M	12		40,000	10.00	480,000	120.0	
	Communication	hour/Day	810		80	0.02	64,800	16.2	3 hrs/day * 270 days/year for telephone
	O&M for Generator								
	Fuel (Disesel)	Lit/Day	2700		1,440	0.36	3,888,000	972.0	10 Lt/daily consumption
	Spareparts	5%/year					520,000	130.0	5 % of the body price/year
	O&M for Copy Machine	1%/year						26.3	1 % of the body price
	Regular meeting with FWUC	Person	84		8,000	2.00	672,000	168.0	Monthly meeting with 7 FWUC
Sub Total				0				1,612.5	(2)
Annual O&M cost	O&M cost for vehicles								
	Fuel for Pick-up	Lit/Day	1350		1,440	0.36	1,944,000	486.0	5 Lt /day * 270 days/year
	and its spareparts	4.5%/Year	1				3,600,000	900.0	4.5 % of the body price
	Fuel for motorcycle	Lit/Day	4320		2,200	0.55	9,504,000	2,376.0	2 Lt/day * 270 days/year * 10 units
	and its spareparts	4.5%/Year	8				1,728,000	432.0	4.5 % of the body price * 8 units
	Regular O&M expense (main facility, road)							3,120.0	50 % of personnel costs is counted but first 5 year is 20 % only due to new facility.
Sub total				0			16,776,000.0	7,314.0	(3)
					(1)+(2)+(3)			24526.5	USD
					O&M expense/ha/year			12.6	USD

Feb., 3, 2003

Exhibit - 7 Expense for Establishment of the Kandal Stung Irrigation Project O&M Office (To be financed by MOV

5-Feb-03

Item of Expense		Unit	Quantity		Unit Price		Total		Remark
			Number	M/M	(Riel)	(USD)	(Riel)	(USD)	
Project O&M Office and Office Items	O&M Office (140m2)	m^2			0	0.00	0	0.0	Hiring a vacant office in the Kandal Stung District Office compound
	Personal Computer	set	1		0	0.00	0	0.0	Transferring PC to the Project O&M office followed by phased-out of TSC
	Printer	set	1		0	0.00	0	0.0	ditto
	Copy machine	set	1		0	0.00	0	0.0	ditto
	Desk & Chair for staff	set	11		1,128,000	282.00	12,408,000	3,102.0	
	Table for meeting	set	1		764,000	191.00	764,000	191.0	For 8 persons
	and chair	set	8		104,000	26.00	832,000	208.0	
	Cabinet	set	2		616,000	154.00	1,232,000	308.0	
	Table Telephone	set	1		1,400,000	350.00	1,400,000	350.0	Wireless type telephone
	White board	set	1		452,000	113.00	452,000	113.0	
	Office Stationary (One lot)	lot	1		0		0	0.0	
	Water supply system	lot	1		9,988,000	2497.00	9,988,000	2,497.0	Drilling up to 50 m depth + submergible pomp
	Diesel Generator	set	1		10,400,000	2600.00	10,400,000	2,600.0	Supplying electricity to the Office
							0	0.0	
Vehicle for O&M Work	Pick up truck(4WD)	set	1		0	0.00	0	0.0	Transferring vehicle to the Project O&M office followed by phased-out of TSC for the project manager use.
	Motor cycle (50 cc)	set	8		4,800,000	1200.00	38,400,000	9,600.0	for AEO, ICO and CT
Sub total				0	29,652,000	7,413	75,876,000	18,969.0	

Remark: AEO: Agriculture Extension Officer, ICO: Irrigation Community Organizser, CT: Chief Treasurer

(1 USD = 4000 R)

Exhibit – 8 Annual Subsidy to the Project O&M Office by MOWRAM

(unit: USD)

	Item of Expense	Target Year							
		2005	2006	2007	2008	2009	2010	2011	2012
1	Annual O&M Cost (est.)	24,527	24,527	24,527	24,527	24,527	29,207	29,207	29,207
2	Cumulative Irrigable Area (ha)	260	500	740	980	1,220	1,460	1,710	1,950
3	Cumulative Irrigable Area(%)	13.3	25.6	37.9	50.3	62.6	74.9	87.7	100.0
4	ISF/ha/Year	12.6	12.6	12.6	12.6	12.6	15	15	15
5	ISF Collected (= 4 * 2)	3,276	6,300	9,324	12,348	15,372	21,900	25,650	29,250
6	Subsidy by MOWRAM (= 1– 5)	21,251	18,227	15,203	12,179	9,155	7,307	3,557	0

Remark: The first 5 year's O&M cost is estimated based on 20 % of the perssonel expense and 50 % from the 6th year.

Appendix 6 Letter of MOWRAM regarding Land Acquisition

ព្រះរាជាណាចក្រកម្ពុជា
Kingdom of Cambodia
ជាតិ សាសនា ព្រះមហាក្សត្រ
Nation Religion King

ក្រសួងធនធានទឹក និងឧតុនិយម
Ministry of Water Resources
and Meteorology
****
N° ២៨៣ MOWRAM

Phnom Penh, February 21, 2003

Letter of Assurance on Land Acquisition at Kandal Stung Irrigation Rehabilitation Project

The Ministry of Water Resources and Meteorology (MOWRAM) has the honor to inform that all issues related to the resettlement or land acquisition in the Project Area of Kandal Stung, in cooperation with Inter-ministerial Resettlement Committee (IRC), will be arranged after signing of the Exchange of Notes by the two parties, the Royal Government of Cambodia and the Government of Japan.

MOWRAM and IRC will take all efforts to assure that this activity will be completed within three months after signing of the Exchange of Notes according to the Land Law and the Government Guideline on Land Acquisition.

LIM KEAN HOR
Minister of Water Resources and Meteorology

លេខ ៤៧ មហាវិថី ព្រះនរោត្តម រាជធានីភ្នំពេញ ទូរស័ព្ទ/ទូរសារលេខ : (៨៥៥) ២៣.៤២៦ ៣៤៥ / (៨៥៥) ២៣.៧២៥ ៩៨៩
47 Preah Norodom B V D. Phnom Penh. Fax/phone: (855)23 426 345 / (855)23.725 989 E-mail : planning@ottnet.com.kh

Appendix 7 Minutes of Discussions on the Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System in the Kingdom of Cambodia (Explanation on Draft Report, March, 2003)

MINUTES OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY
ON THE PROJECT FOR
REHABILITATION OF
KANDAL STUNG IRRIGATION SYSTEM
IN
THE KINGDOM OF CAMBODIA
(EXPLANATION ON DRAFT REPORT)

In November 2002, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Team on the Project for Rehabilitation of Kandal Stung Irrigation System (hereinafter referred to as "the Project"), and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the Study.

In order to explain and to consult the Cambodian side on the components of the draft report, JICA sent to the Cambodia the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Motoharu Wakabayashi, Forth Project Management Division, Grant Aid Management Department, JICA, from 12 March to 17 March 2003.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Phnom Penh, 14 March, 2003

Mr. Motoharu WAKABAYASHI
Team leader
Draft Report Explanation Team
Japan International Cooperation Agency

H.E. Veng Sakhon
Under Secretary of State
Ministry of Water Resources and
Meteorology

ATTACHMENT

1. Components of the Draft Report

The government of Cambodia (hereinafter referred to as "Cambodian side") was explained about the draft report by the Team. The Cambodian side will send their comments on the draft report to JICA-Cambodia office by 4 April, 2003. The government of Japan will re-examine the feasibility of the Project based on the comments of the Cambodian side.

2. Reconfirmation of the previous Minutes of Discussions

Both sides reconfirmed validity of all the contents in the previous Minutes of Discussions signed on 15 November during the Basic Design Study.

3. Japan's Grant Aid Scheme

The Cambodian side understood the Japan's Grant Aid Scheme explained by the team and will take the necessary measures, described in the Annex-4 and 5 of the Minutes of Discussions signed on 15 November 2002.

4. Other Relevant Issues

4-1. Both sides confirmed the feasibility of construction plan of secondary and tertiary canals of the Project area shown in Annex.1. The Cambodian side reconfirmed to construct these canals by their own responsibility according to the planned schedule with utilizing know-how and experience obtained through the activities of "The Technical Service Center for Irrigation System Project (hereinafter referred to as "TSC")".

4-2. The Team confirmed that Ministry of Economy and Finance allocated the counterpart fund for the Project from its 2003 budget. Both sides confirmed that the Cambodian side allocated the budget for the construction of these canals as the top priority project.

4-3. On condition that the Grant Aid by the Government of Japan is extended the Project, the Cambodian side shall take necessary measures as follows,

(1) to secure sufficient personnel and budget necessary for operating and maintaining the facilities of the Project,

(2) to secure the safety of the concerned personnel during the implementation of the Project,

(3) and to remove all UXOs and mines in Kandal Stung Irrigation Project area by her own budget prior to the commencement of construction work in accordance with the results of official formality of investigation of UXOs.

4-4. MOWRAM committed to take whole responsibility to carry out land acquisition work for the improvement of the canals, roads, temporary office and storage yards etc by effective coordination with Inter-Ministerial Resettlement Committee under the agreement with

concerned beneficiaries prior to implementation of the Project referred to the letter of Minister of MOWRAM shown in Annex.2.

4-5. The Cambodian side expressed that there was no influence to the Project by implementing the newly approved irrigation project by the Government of Cambodia, which named as the "Integrated Development Project in the Western Side of Phnom Penh Municipality" at the upstream side of Tuk Thla regulator. Both sides confirmed that the Cambodian side would monitor the influence of above-mentioned project periodically and take necessary measures to protect the Project from its adverse effects whenever necessary arises.

4-6. Both sides confirmed the feasibility of the proposed operation and maintenance (hereinafter referred to as "O&M") plan for implementing the Project effectively as shown in the draft report, and that MOWRAM took responsibility of whole O&M work for the main irrigation facilities and of establishing the Project O&M Office with budgetary allocation and assigning the required staff, who had know-how and experience obtained through the activities of TSC. MOWRAM took responsibility of organizing and strengthening the Farmers' Water Users Committees for the Project under the activities of the Project O&M Office with utilizing know-how and experience obtained through the activities of TSC.

4-7. Both sides confirmed that MOWRAM, with utilizing know-how and experience obtained through the activities of TSC, shall take responsibility to extend a new farming system by introducing rice double cropping system by the demonstration farming in TSC's model site under the collaboration of related agencies.

4-8. The Cambodian side strongly requested to provide two (2) vehicles (pick-up truck type) and one office space (appx 140m^2) for O&M and construction supervision of the secondary and tertiary canals.

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Ministry of Water Resources
and Meteorology

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N° ២៨៦ MOWRAM

Phnom Penh, February ២១, 2003

Letter of Assurance on Land Acquisition at Kandal Stung Irrigation Rehabilitation Project

The Ministry of Water Resources and Meteorology (MOWRAM) has the honor to inform that all issues related to the resettlement or land acquisition in the Project Area of Kandal Stung, in cooperation with Inter-ministerial Resettlement Committee (IRC), will be arranged after signing of the Exchange of Notes by the two parties, the Royal Government of Cambodia and the Government of Japan.

MOWRAM and IRC will take all efforts to assure that this activity will be completed within three months after signing of the Exchange of Notes according to the Land Law and the Government Guideline on Land Acquisition.

LIM KEAN HOR
Minister of Water Resources and Meteorology

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47 Preah Norodom B V D. Phnom Penh. Fax/phone: (855)23 426 345 / (855)23.725 989 E-mail : planning@cttnet.com.kh

Appendix 8 Minutes of Discussions on the Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System in the Kingdom of Cambodia (Commencement of Third Field Survey, June, 2003)

MINUTES OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY
ON THE PROJECT FOR
REHABILITATION OF
KANDAL STUNG IRRIGATION SYSTEM
IN
THE KINGDOM OF CAMBODIA

In response to a request form the Royal Government of Cambodia, the Government of Japan decided to conduct a Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Cambodia the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Juro CHIKARAISHI, Resident Representative of JICA Cambodia Office.

The Team held discussions with the officials concerned of the Royal Government of Cambodia and conducted a field survey at the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Phnom Penh, June 27, 2003

Mr. Juro CHIKARAISHI
Leader
Basic Design Study Team
Japan International Cooperation Agency

H.E. Lim KEAN HOR
Minister
Ministry of Water Resources and
Meteorology

ATTACHMENT

1. Reconfirmation of the previous Minutes of Discussions

Both sides reconfirmed validity of all the contents in the previous Minutes of Discussions signed on 15 November 2002 during the Basic Design Study and the previous Minutes of Discussions signed on 14 March 2003 during the Basic Design Study for Draft Report Explanation.

2. Japan's Grant Aid Scheme

The Cambodian side understood the Japan's Grant Aid Scheme explained by the Team and will take the necessary measures, described in the Annex-4 and 5 of the Minutes of Discussions signed on 15 November 2002.

3. Schedule of the Study

JICA implements the additional study until July 18, 2003 to discuss alternatives and complete the final report in accordance with the confirmed items and send it to the Royal Government of Cambodia on October 2003.

4. Other relevant issues

4-1. Cambodian side explained that though they recognized that technical reliability of the draft basic design, they requested Japanese side to replace Kampong Tuol regulator based on the reasons as shown in Annex of this Minutes.

Japanese side explained that additional study will be conducted by the Team in response to aforementioned request, taking into consideration the following items:

i) Rationality of replacing the Kampong Tuol regulator;
ii) The results of past studies;
iii) Collaboration among concerned organizations notably TSC;
iv) Viable operation and maintenance;
v) Cost and Benefit; and
vi) Financial viability.

4-2. Cambodian side will provide Japanese side with a document that shows ADB has no objection to the replacement of the Kampong Tourl regulator that has renovated in 2001 with ADB's assistance.

4-3. Both sides confirmed that the purpose of partial renovation of Tuk Thla regulator is not for the improvement of flood flow capacity but for the stable irrigation water supply in the Project.

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Ministry of Water Resources
and Meteorology

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N° 510 MOWRAM

Phnom Penh, April 4, 2003

To : **Mr. Juro Chikaraishi,**
Representative of JICA
Phnom Penh, Cambodia

Subject: **Draft Basic Design Study of Kandal Stung Irrigation Rehabilitation Project**

Dear Mr. Juro Chikaraishi,

With reference to the meeting held on March 14, 2003 in MOWRAM's meeting room, discussed on the Draft Basic Design Study of Kandal Stung Irrigation Rehabilitation Project prepared by Nippon Koei Co., Ltd. the Ministry of Water Resources and Meteorology would like to inform that in order to minimize the number of structures along the National Road No. 3, the Kampong Tourl Regulator should be replaced by the new proposed spillway.

The new proposed spillway should be much considered and taken into account the compensation for the discharge of water to downstream due to the demolition of Kampong Tourl Regulator.

I strongly hope that you would accept and consider on this matter.

LIM KEAN HOR
Minister of Water Resources and Meteorology

CC: - Takanobu KOBAYASHI, JICA Advisor to MOWRAM
- Akira MIYAZAKI, Chief Advisor of TSC

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Ministry of Water Resources
and Meteorology

N° 551 MOWRAM

Phnom Penh, April 22, 2003

To : **Mr. Juro Chikaraishi,**
Representative of JICA
Phnom Penh, Cambodia

Subject: **Draft Basic Design Study of Kandal Stung Irrigation Rehabilitation Project**

Dear Mr. Juro Chikaraishi,

With reference to the letter JC15 dated April 8, 2003, the Ministry of Water Resources and Meteorology (MOWRAM) would like to express sincere appreciation of all the efforts of Ministry of Foreign Affairs, JICA and the B/D team that have been done so far on this project. MOWRAM is satisfied indeed with most of the design and report, and process for making design. MOWRAM strongly expect that this Kandal Stung Irrigation System Rehabilitation Project (hereinafter referred to the Project) would play a most important role in order to develop modernized model irrigation system of Cambodia including main to on-farm level development.

MOWRAM also convince that TSC project and the Study on the on-farm development by JIID could contribute very much to realize the model irrigation system and believe that the draft basic design has no defect in terms of technical reliability.

However, MOWRAM has a perspective on the Kampong Tourl regulator, and thus, recommended and requested to remove the aforementioned structure based on the following reasons:

a) The foundation of Kampong Tourl Regulator, the gates and the quality of construction seem to be very poor and considerable leakage has been detected as shown in the draft report. From these viewpoint, MOWRAM is very concerned about the stability of this structure.

b) The National Road No.3 will be upgraded in the next few years, and then, an old and narrow structures like the Kampong Tourl regulator will have to be removed and reconstructed. Taking this condition into consideration, the functions of the new spillway and the Kampong Tourl regulator should be integrated into one structure that will be newly constructed in the

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Japan's Grand Aid scheme from the viewpoint of efficient mid-and long-term public investment and operation/maintenance.

c) The Kampong Tourl Regulator is one of the structures constructed in the Pol Pot regime, and it could be said to be a symbol of negative legacy left by Pol Pot. MOWRAM strongly believes that the Project, with assistance from Japan, will provide us a very precious occasion to replace the Pol Pot structure to new one and reduce negative social impact arisen from the aforementioned structure.

d) The view of the three successive structures within the only about 200 m of section along the National Road might be confusing for people, and might cause some anxiety about flood and malevolent allegation towards the structures. Thus, MOWRAM is very concerned about this matter since these structures will be seen by many people passing through on the National Road as well as those living in the area.

Finally, I strongly hope again that Ministry of Foreign Affairs, JICA and the B/D team will give high consideration to the request of my previous letter with the reasons above, and find the best solution or design for Cambodian people in cooperation with my officials concerned.

Thank you very much for your continuous assistance.

Sincerely Yours,

LIM KEAN HOR
Minister of Water Resources and Meteorology

CC: - Mr. Takanobu KOBAYASHI, JICA Advisor to MOWRAM,
- Mr. Akira MIYAZAKI, Chief Advisor of TSC

ហ្វូង ៤៧ មហាវិថី ព្រះនរោត្តម រាជធានីភ្នំពេញ ទូរស័ព្ទ/ទូរសារលេខ : (៨៥៥) ២៣.៤២៦ ៣៤៥ / (៨៥៥) ២៣.៧២៥ ៩៨៩
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Japanese Grant Aid considering smooth work sequence and possible delay in budget arrangement in the country. This matter should be discussed officially at the final stage.

03 July, 2003

H.E. Veng Sakhon
Under Secretary of State
MOWRAM

Koji Okada
Chief Consultant
Nippon Koei Co., Ltd.

Jiro TAKEICHI
Cambodia Office
JICA
(Witness)

Appendix 9 Minutes of Discussions on the Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System in the Kingdom of Cambodia (Results of Third Field Survey, July, 2003)

Minutes of Discussions

1. Subject: Additional Basic Design Study on Rehabilitation of Kandal Stung Irrigation System
2. Date and Place: 02 July 2003, Office of the Under Secretary of State, MOWRAM
3. Attendance: See attached list
4. Discussions:

(1) Alternative plans of headwork

The Consultant Team and officials of Cambodia side (MOWRAM) discussed alternative plans of headwork and its design concept, which were explained based on the attached sheets on 24 June 2003. MOWRAM side presented his internal discussion results that Alternative-1 (new regulator with steel gates of 500 m3/s capacity), which is the similar structure to the Roleng Chrey regulator, is the best selection for the site from the following reasons:

① Same type of structure (new spillway) would not be located near the existing spillway
② An attractive structure to the public is desired for the site where NR-3 runs alongside
③ Experience in operation and maintenance obtained from Roleng Chrey regulator could be utilized fully for new gated structure
④ No significant problem from the technical views could be recognized at present for all proposed alternative plans

The Study Team took note and promised to convey the above opinion of MOWRAM.

The Study Team stated that the additional study would be continued as scheduled.

(2) Consent of ADB to remove the existing gates

MOWRAM side stated that he has already sent a letter to ADB on June 27 to obtain the consent of ADB for removal of gates on the Kompong Tuol regulator, which was replaced by using ADB's fund in 2001 (refer to the attachment). MOWRAM informed that the letter of consent from ADB would be sent to JICA Cambodia office as soon as they receive it.

(3) Removal cost of the existing regulator

The Consultant informed basic consideration of Japanese side about cost sharing for a removal cost of the Kompong Tuol Regulator, namely there would be some possibility that the Japanese side would request the Cambodia side to share the removal cost according to the results of additional study. Although MOWRAM basically agreed to share the cost, he proposed implementing the work by one project under the

BASIC CONCEPT OF THE REHABILITATION PLAN

1. Goal of the Project:
   - ✓ To realize the double cropping of paddy through rehabilitation of the existing irrigation infrastructure, such as the existing headwork, irrigation canals and roads

2. Basic concept for rehabilitation of the headwork:
   - ✓ To sustain the flood flow capacity of the existing headwork
   - ✓ To be similar the financial and organizational burdens to the present O&M works by MOWRAM,
   - ✓ To minimize the change of environmental conditions of the river and reverine areas as pointed out by Ministry of Environment
   - ✓ To introduce fail-safe design concept and be economical

3. Required conditions for formulating new alternatives:
   - ✓ ADB accepts to remove the newly installed gates on the Kompong Tuol regulator by his loan in 2001: written evidence is to be provided by MOWRAM
   - ✓ Although both Kompong Tuol and Tuk Thla regulators have similar historical and social background, the additional study on the headwork will be focused on the rehabilitation of the Kompong Tuol regulator, but not on the Tuk Thla regulator. The overall rehabilitation work for the Tuk Thla regulator would be planned and implemented after finalizing basin-wide flood control plan with other fund source
   - ✓ Alternative plans will be formulated freely based on the basic concept and conditions mentioned above.
   - ✓ MOWRAM will bear the cost for removal of the existing Kompong Tuol regulator

4. Alternative plans to evacuate the flood flows

Compensatory discharge due to raising the existing spillway:	390 m^3/sec
Flood flow capacity of the existing Kompong Tuol regulator:	110 m^3/sec
Total	500 m^3/se

- ✓ Alternative 1: Gated structure with 500 m^3/sec capacity only
- ✓ Alternative 2: Spillway with 500 m^3/sec capacity (proposed plan by MOWRAM) only
- ✓ Alternative 3 &4: Conjunctive plan of the gated structure and spillway with total capacity of 500 m^3/sec

Refer to the comparison table and sketches of the alternative plans attached

Reference:

FLOOD FLOW CAPACITY OF THE STRUCTURES ON HEADWORK

Structure	Present		After raising		Balance
	Q1 (m^3/s)	(%)	Q2 (m^3/s)	(%)	Q2 - Q1
Spillway (7/Jan dam)	**910**	**(69 %)**	520	(39 %)	-390
Regulator-1(Tuk Thla)	260	(20 %)	260	(20 %)	0
Regulator-2(Kompong Tuo	*110*	*(8 %)*	*110*	*(8 %)*	*0*
Diam Rus	40	(3 %)	40	(3 %)	0
New structure	-	-	**390**	**(30 %)**	**390**
Total	1,320	(100 %)	1,320	(100 %)	0

1 After rising the existing spillway, the share the spillway will be reduced to 39 % only, though nearly 70 % at the present.

2 Share of new structure would be 30 % of the total capacity: the fail-safe design of the structure is needed.

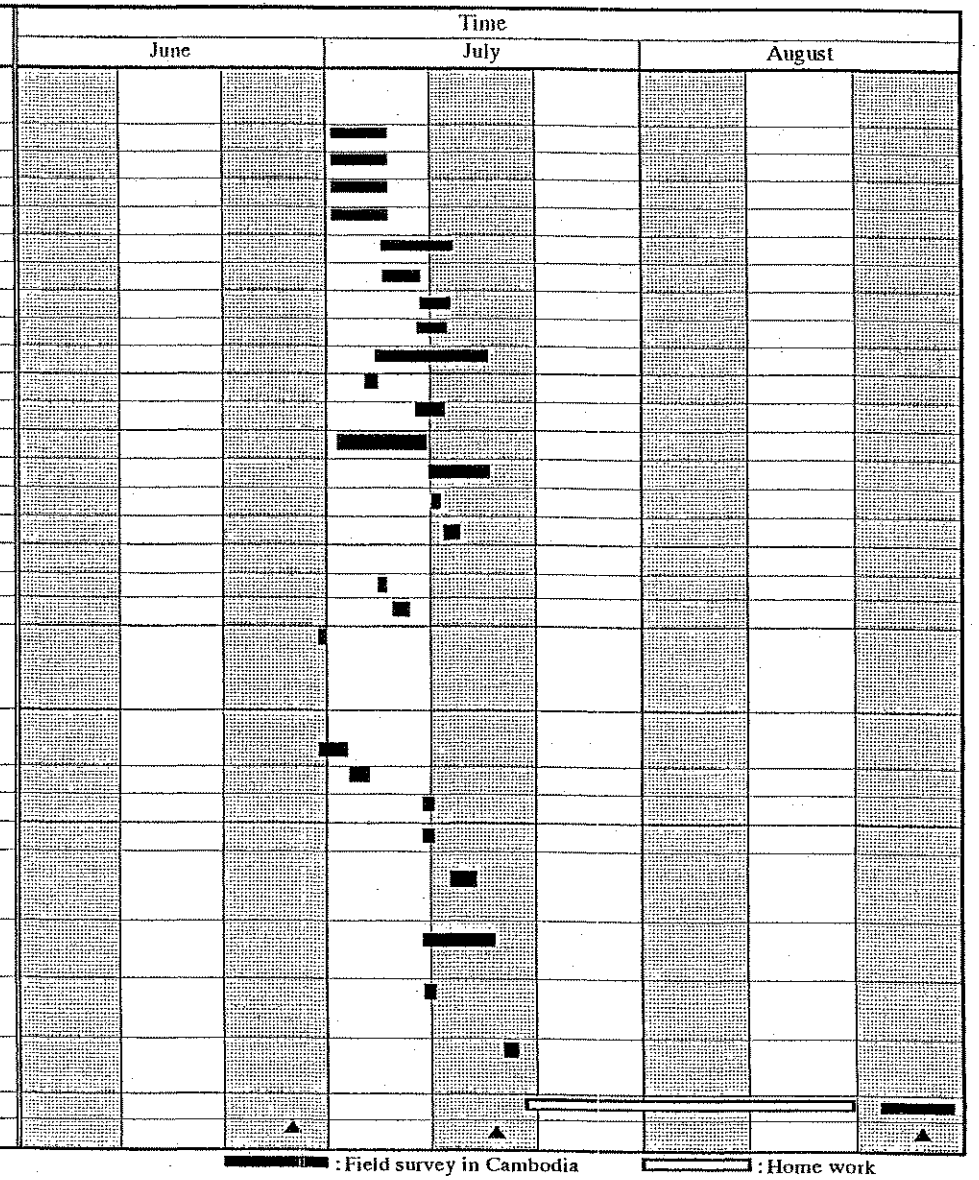
3 Capacity of the Kompong Tuol regulator should be kept at it is at least for securing th environmental condition of the river including release of water to the downstream stre

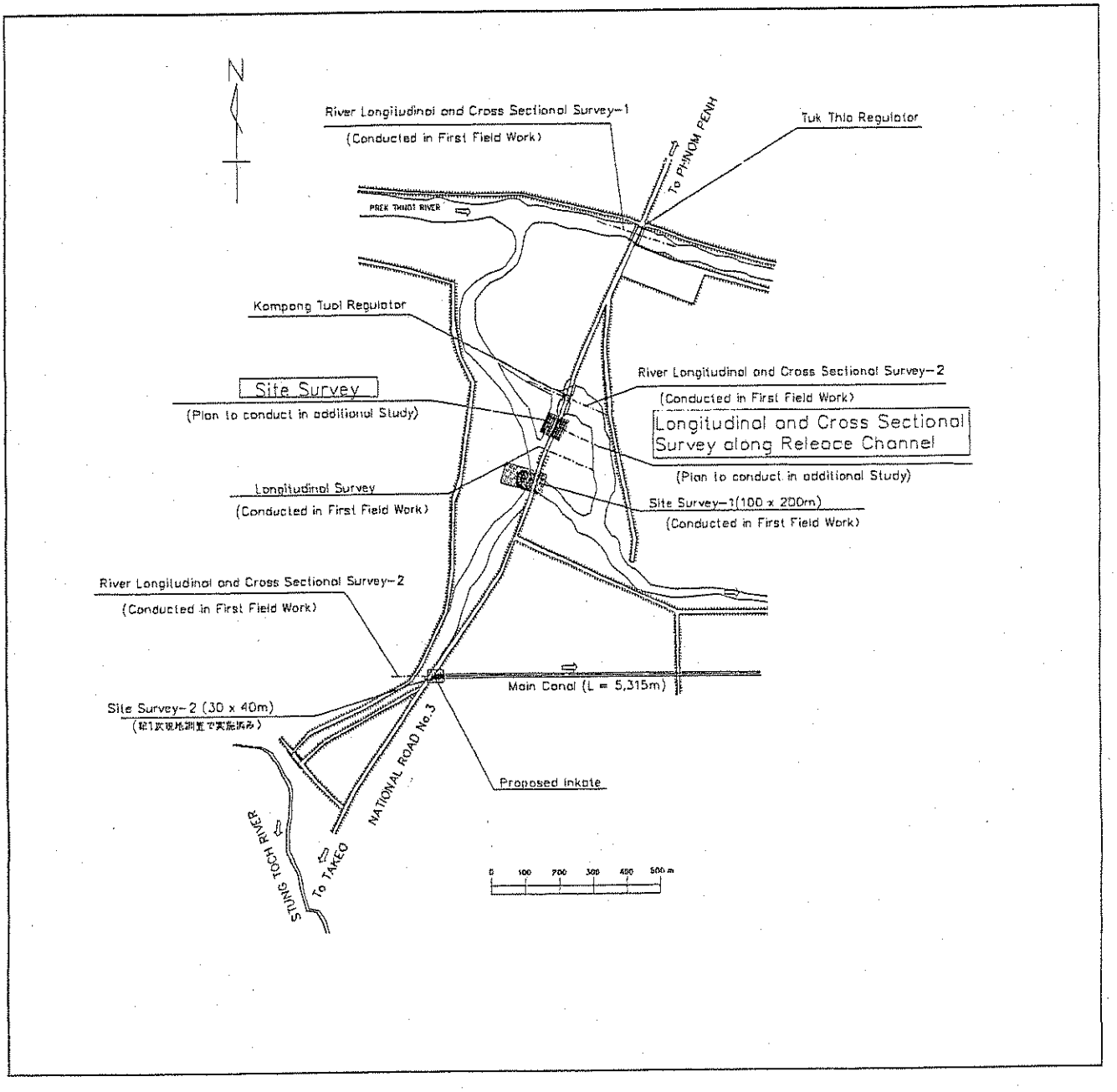
TENTATIVE WORK SCHEDULE

Item	June	July	August	September
1 Field survey in Cambodia				
2 Preparation of Draft Report in Japan	23	18		
3 Explanation of Draft Report in Cambodia			△Draft Report	
4 Finalization of the Report in Japan				Final Report △

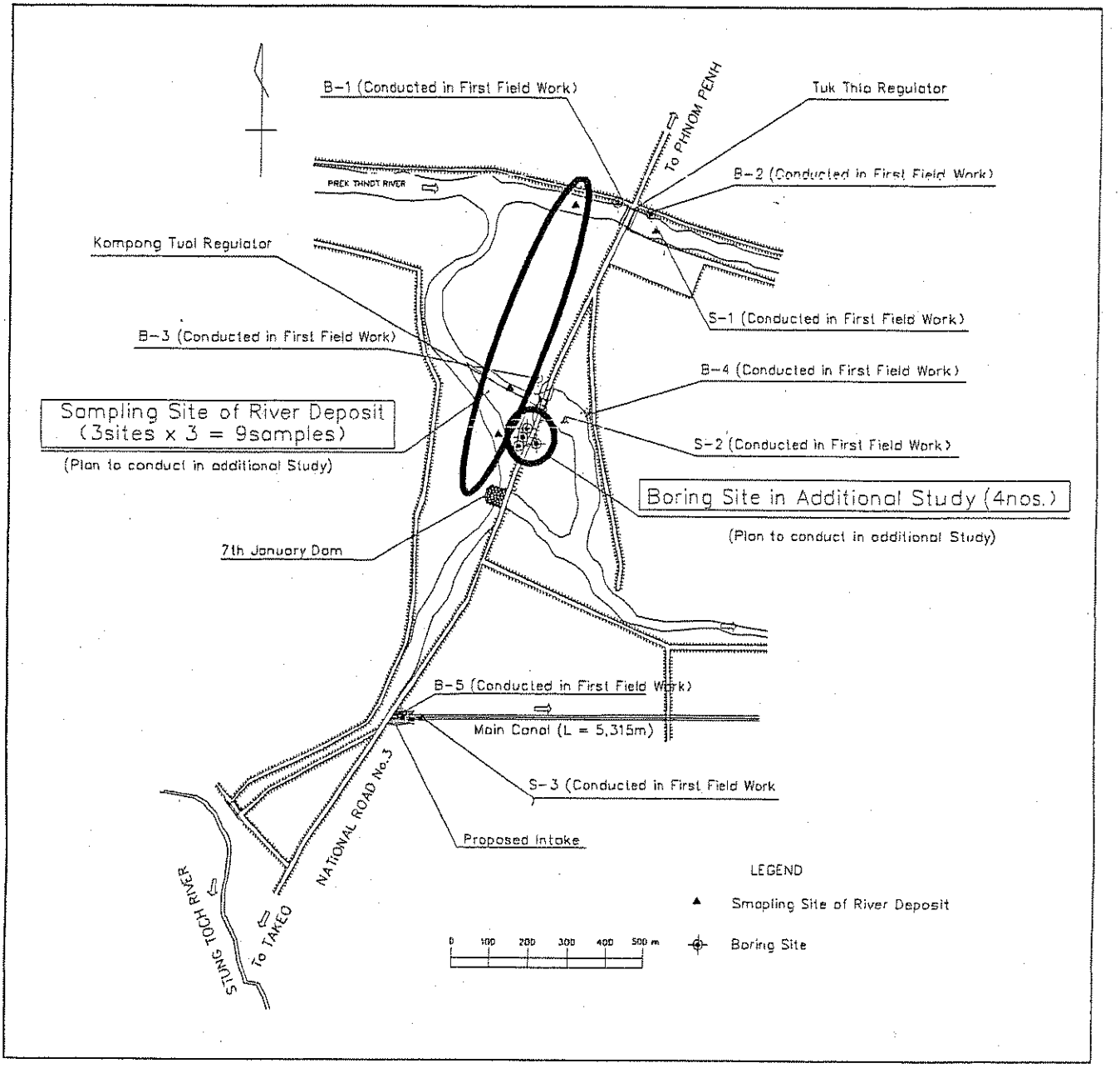
ADDITIONAL SURVEY SCHEDULE (Tentative)

Item		Description	Q'ty
<Field survey>			
A. Physical condition survey			
1)	Geo-technical investigations	Core boring (20m x 4site)	80 m
		Standard penetration test (every one m)	80 nos.
		Field permeability test (every 5 m)	16 nos.
		Sampling	24 nos.
		Grain size analysis	24 nos.
		Natural moisture contents test	24 nos.
		Specific gravity test	24 nos.
		Liquid and plastic limit test	24 nos.
		Triaxial compression test	24 nos.
2)	River bed load material survey	Sampling	9 nos.
		Grain size analysis	9 nos.
3)	Topographic survey	Grid survey	1 ha
		Topographic mapping	1 ha
		Longitudinal section survey of sluiceway	300 m
		Cross sectional survey of sluiceway	1,200 m
B. Assessment of Kompong Tuol Regulator			
4)	Assessment of deterioration degree	Visual assessment	1 nos.
		Summit hammer test	1 nos.
5)	Investigation of river flow in the downstream of the regulator	Reconnaissance survey	
C. Other investigations			
6)	Assessment of the existing gates and its O&M	Kompong Tuol Regulator	
		Roleng Chery diversion weir	
		O&M of bridges	
7)	Supplemental survey of construction cost	Collection of design standard of bridge	
		Survey on equipment and machinery for construction of bridge and long span gate	
		Survey of commodity price indexes and additional costs	
		Transportation condition survey for long span gate	
		Survey on removal of the existing Kompong Tuol regulator	
<Home work>			
<Discussions with Cambodian side>			

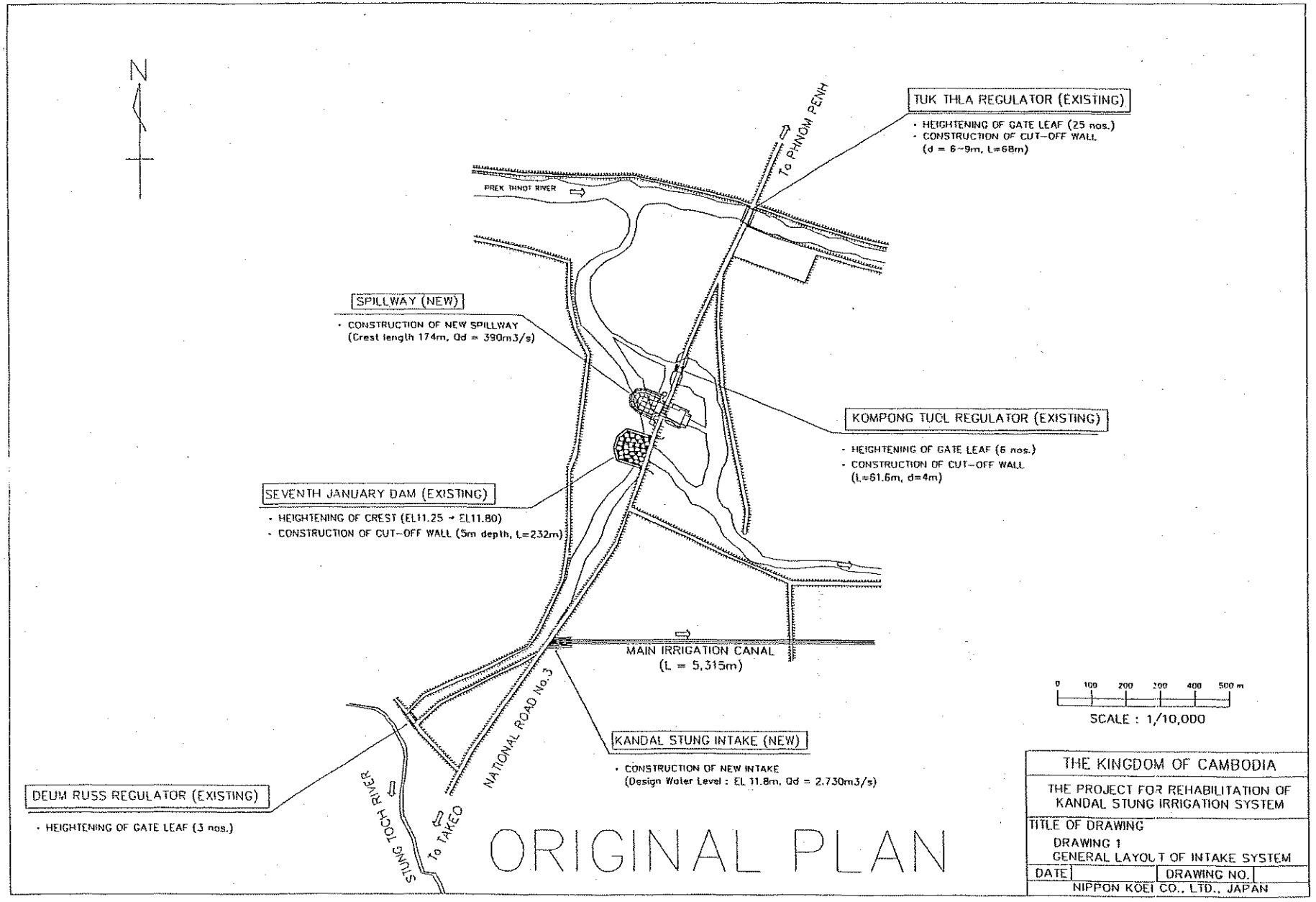


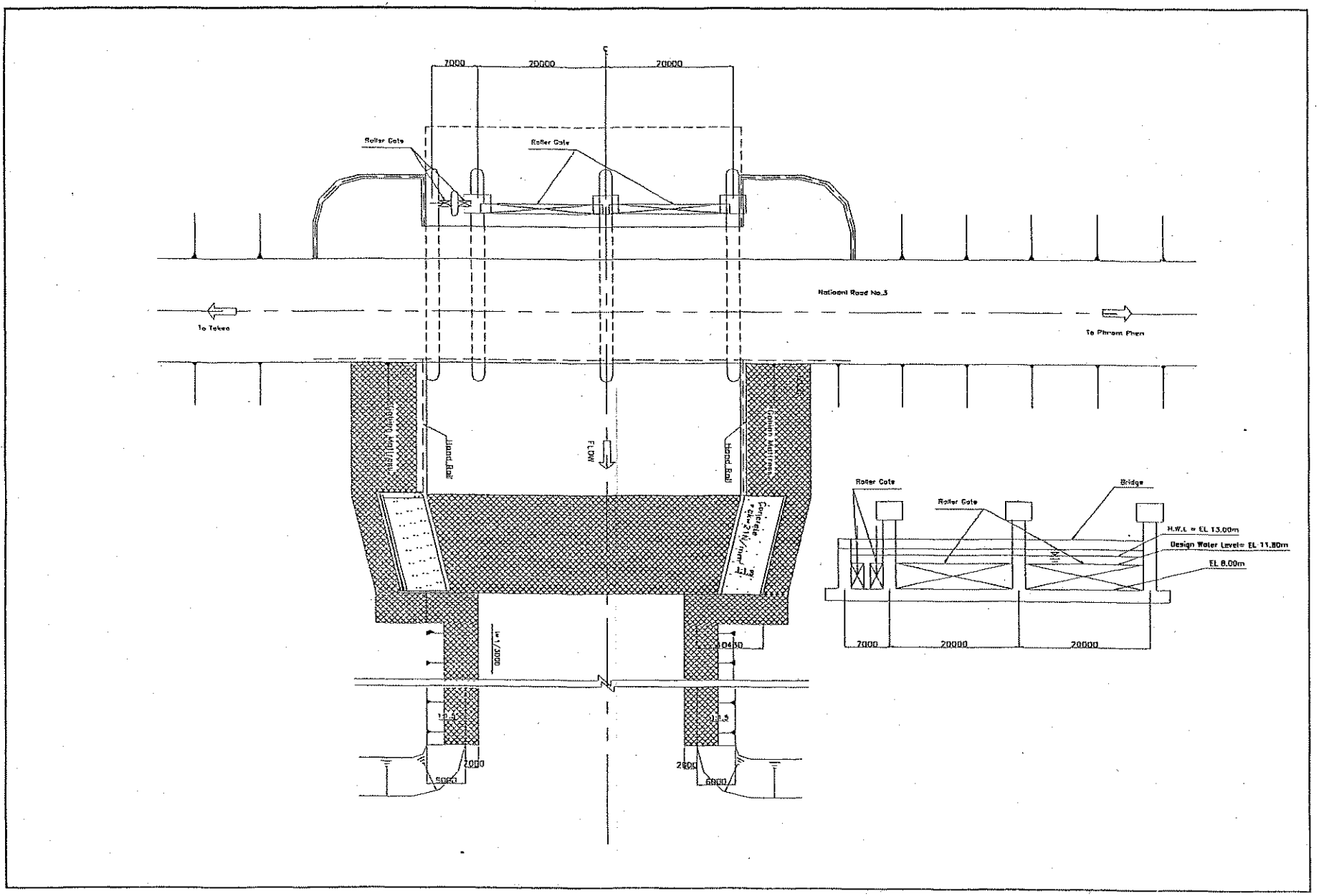


Location of Topographic Survey Site

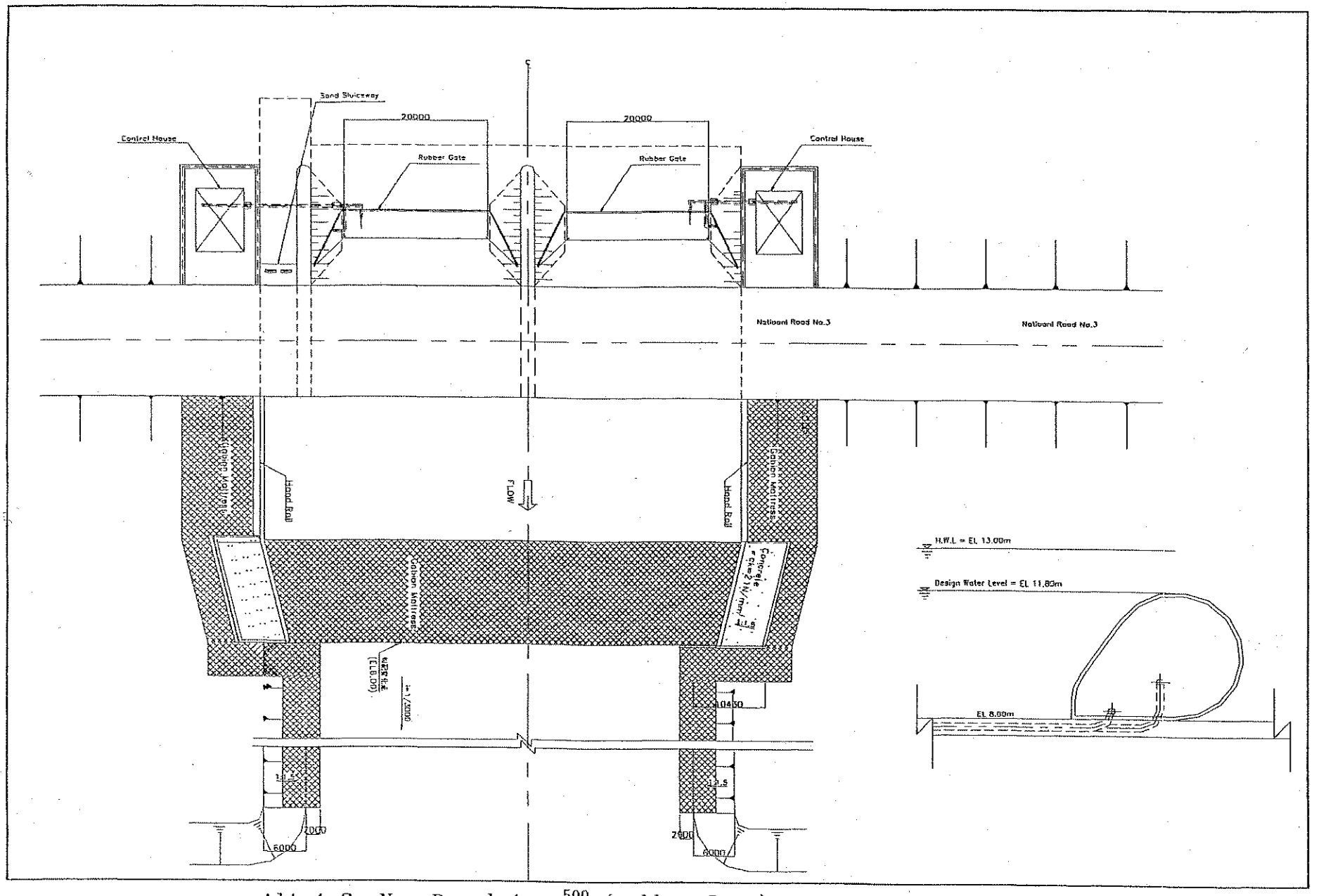


Location of Geological and Soil Mechanical Investigation Site

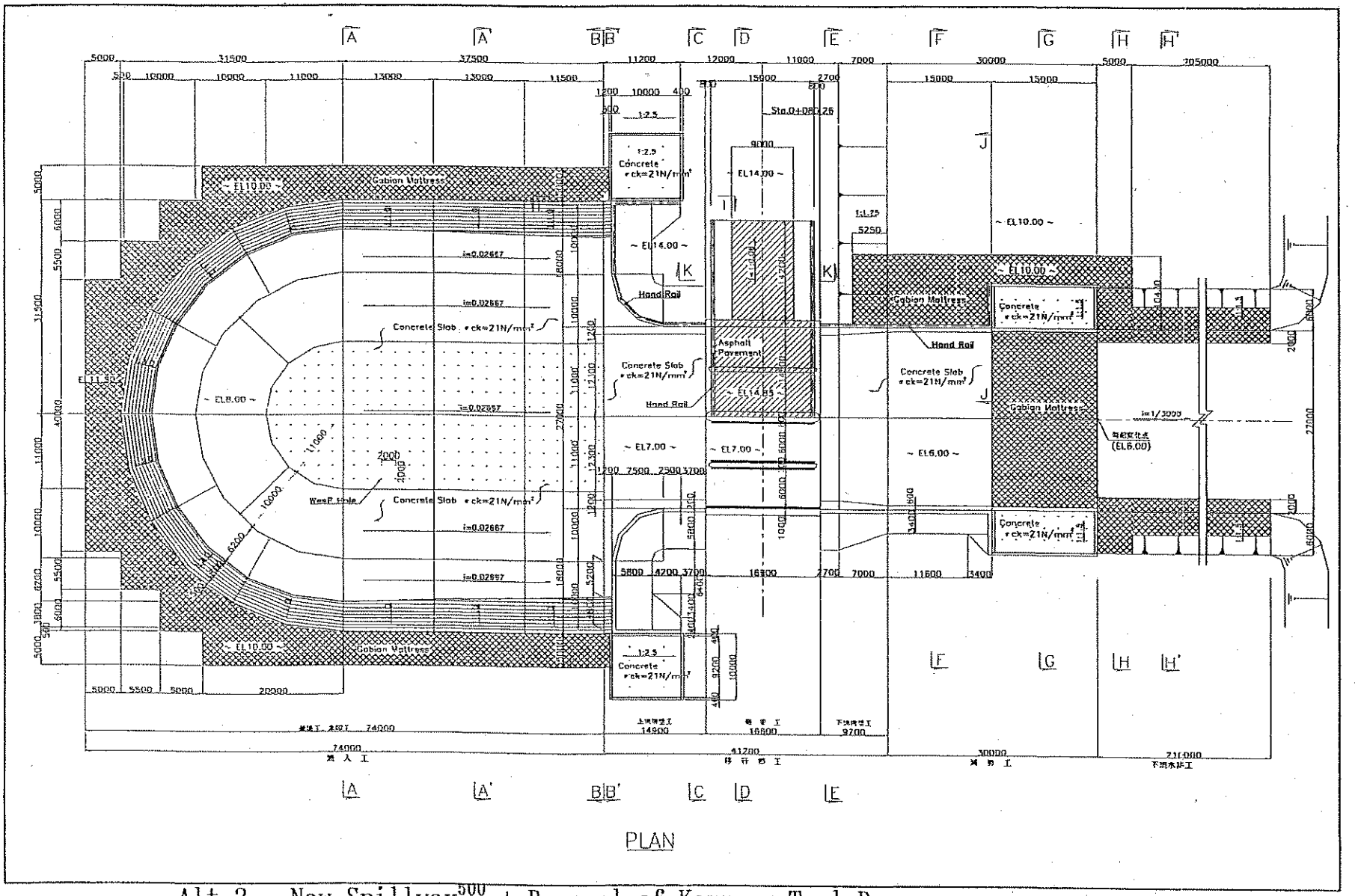

N
TUK THLA REGULATOR (EXISTING)
· HEIGHTENING OF GATE LEAF (25 nos.)
· CONSTRUCTION OF CUT-OFF WALL
(d = 6~9m, L=68m)
To PHNOM PENH
PREK THNOT RIVER
SPILLWAY (NEW)
· CONSTRUCTION OF NEW SPILLWAY
(Crest length 174m, Qd = 390m3/s)
KOMPONG TUCL REGULATOR (EXISTING)
· HEIGHTENING OF GATE LEAF (6 nos.)
· CONSTRUCTION OF CUT-OFF WALL
(L=61.6m, d=4m)
SEVENTH JANUARY DAM (EXISTING)
· HEIGHTENING OF CREST (EL11.25 → EL11.80)
· CONSTRUCTION OF CUT-OFF WALL (5m depth, L=232m)
MAIN IRRIGATION CANAL
(L = 5,315m)
NATIONAL ROAD No.3
KANDAL STUNG INTAKE (NEW)
· CONSTRUCTION OF NEW INTAKE
(Design Water Level : EL 11.8m, Qd = 2.730m3/s)
DEUM RUSS REGULATOR (EXISTING)
· HEIGHTENING OF GATE LEAF (3 nos.)
STUNG TOCH RIVER
To TAKEO
0 100 200 200 400 500 m
SCALE : 1/10,000
ORIGINAL PLAN
THE KINGDOM OF CAMBODIA
THE PROJECT FOR REHABILITATION OF KANDAL STUNG IRRIGATION SYSTEM
TITLE OF DRAWING
DRAWING 1
GENERAL LAYOUT OF INTAKE SYSTEM
DATE
DRAWING NO.
NIPPON KOEI CO., LTD., JAPAN



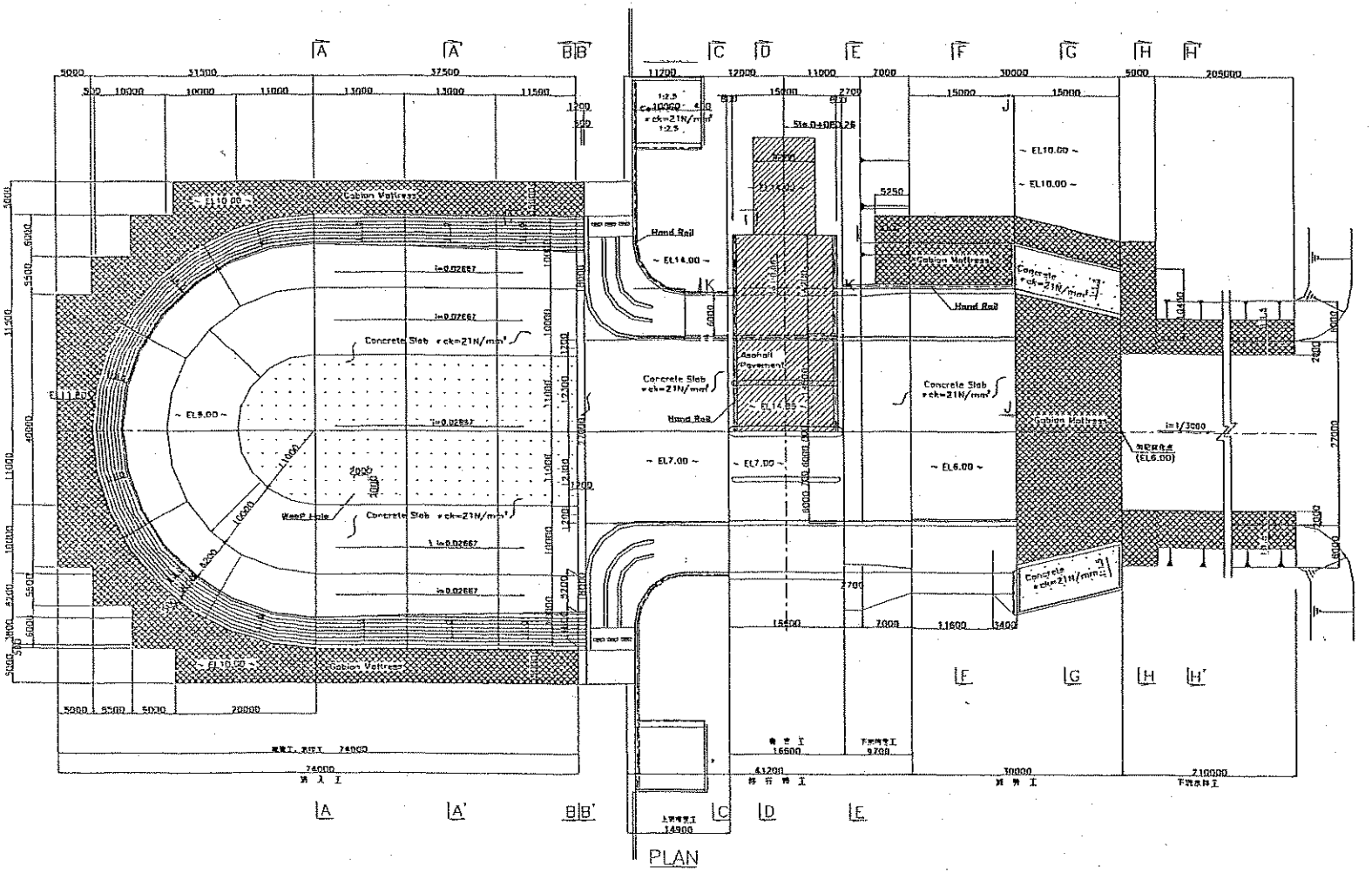
Alt-1_1 New Regulator ^{500} (Roller Gate)+ Removal of Kompong Tuol Reg.



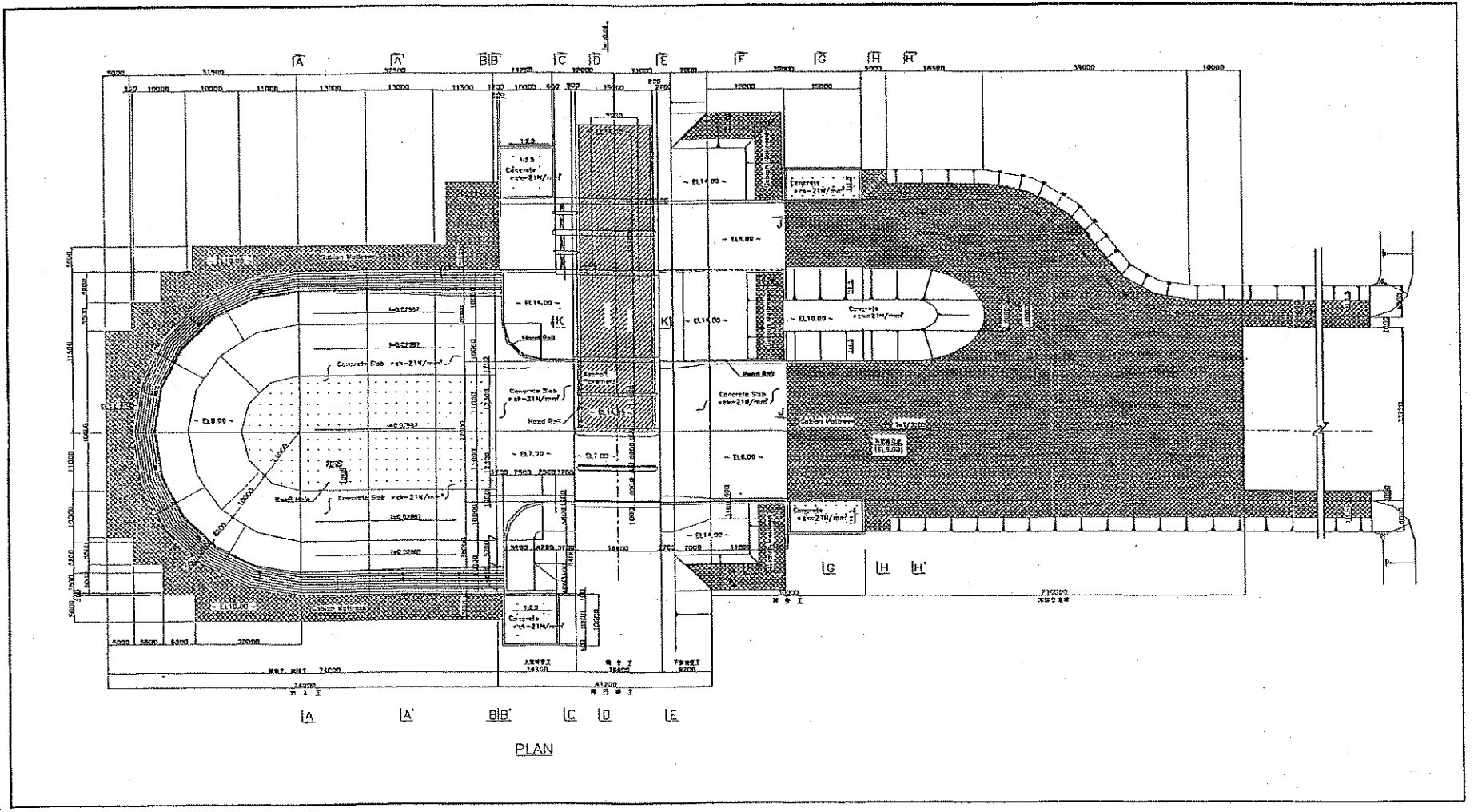
Alt-1_2 New Regulator [500] (Rubber Gate)+ Removal of Kompong Tuol Reg.



Alt-2 New Spillway[500] + Removal of Kompong Tuol Reg.

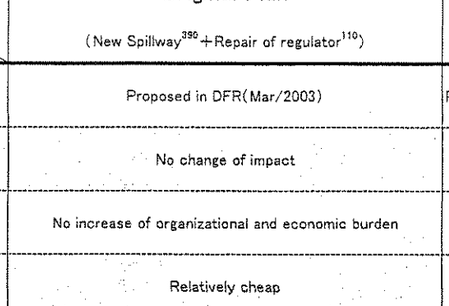
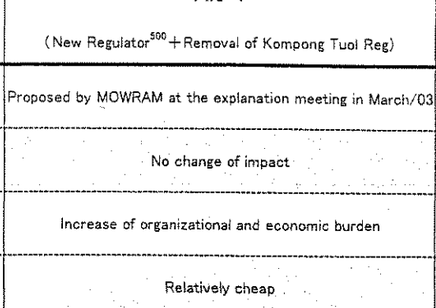
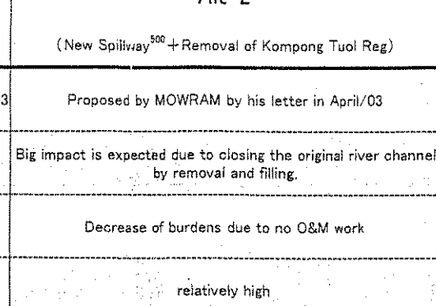
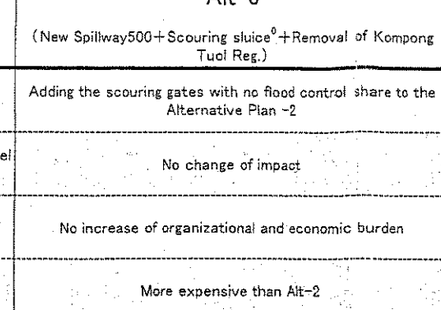
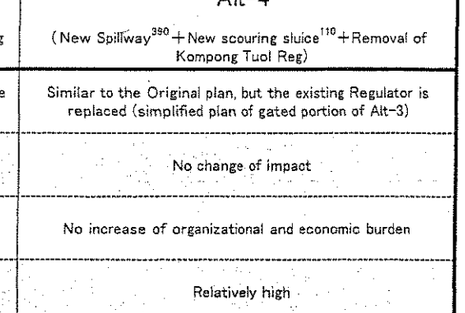


Alt-3 New Spillway^{500} + Scouring Sluive^{0} + Removal of Kompong Tuol Reg.



Alt-4 New Spillway^{390} + New Scouring Sluice^{110} + Removal of Kompong Tuol Reg.

COMPARISON OF ALTERNATIVE PLANS FOR HEADWORK

Alternative / Item	Original Plan (New Spillway^{390}+Repair of regulator^{110})	Alt-1 (New Regulator^{500}+Removal of Kompong Tuol Reg)	Alt-2 (New Spillway^{500}+Removal of Kompong Tuol Reg)	Alt-3 (New Spillway500+Scouring sluice^{0}+Removal of Kompong Tuol Reg.)	Alt-4 (New Spillway^{390}+New scouring sluice^{110}+Removal of Kompong Tuol Reg)
Reference	Proposed in DFR(Mar/2003)	Proposed by MOWRAM at the explanation meeting in March/03	Proposed by MOWRAM by his letter in April/03	Adding the scouring gates with no flood control share to the Alternative Plan -2	Similar to the Original plan, but the existing Regulator is replaced (simplified plan of gated portion of Alt-3)
Environmental impact to downstream area	No change of impact	No change of impact	Big impact is expected due to closing the original river channel by removal and filling.	No change of impact	No change of impact
Operation and maintenance	No increase of organizational and economic burden	Increase of organizational and economic burden	Decrease of burdens due to no O&M work	No increase of organizational and economic burden	No increase of organizational and economic burden
Construction cost	Relatively cheap	Relatively cheap	relatively high	More expensive than Alt-2	Relatively high
Operation at the floods	No change from the present operation	Much increase the volume of operation with high technique	No operation is required at all	No operation is needed at all	No change from the present operation
Securing the water way (treatment of sediment load)	No change of the present condition	Much increase of the sccouring capability	Impossible and danger to the environment (The project would not be approved by MOE)	No change of the present condition	No change of the present condition
Utilization of the existing structure	Highly utilized	Low: No use of the existing structure	Low: No use of the existing structure	Low: No use of the existing structure	Low: No use of the existing structure
Consent of ADB for the removal of the gates	No need (No removal of gates installed by ADB loan)	Written consent is required	Written consent is required	Written consent is required	Written consent is required
Fail-safe design	Safety: 70 % of flood discharge can flow the spillway crest which is no need of operation and maintenance	Risky: 60 % of the total flood should pass the gated structure: Should remember the breach of NR-3 due to difficulty to open the gates in 1990's	Safety: 80 % of flood discharge can flow the spillway crest which is no need of operation and maintenance	Safety: 80 % of flood discharge can flow the spillway crest which is no need of operation and maintenance	Safety: 70 % of flood discharge can flow the spillway crest which is no need of operation and maintenance
Comments of the parties concerned	MOWRAM did not accept the proposed plan from the social and historical views and present the counter proposal of Alt-2	GOJ side worries about O&M of large scale gates and risk against flood from the fail-safe design concept	Since adverse impacts to the environment due to cancellation of gated structure isexpected, the plan is not recommended by GOJ	GOJ side considers that the plan is expensive and doubtful about scouring capability due to complicated layout.	GOJ side feels the plan is natural and applicable from the view of O&M burdens and fail-safe concept
Overall evaluation (Tentative)	----------	Proper provision of O&M set-up in terms of organization and budgeting would be required. The plan may against the basic concept of MOWRAM(structures should be maintenance & operation free as far as possible). The plan is risky against the flood control of the headwork comparing with other alternatives.	Adverse impacts to the environment due to cancellation of gated structure are expected. The plan should not be accepted. The gated structure to maintain the environmental condition such as scouring the river loads and release of water to the downstream is required.	Due to the layout of the sluices on 2 places and a right-angled turn of the water flow, the scouring capacity would be lower and more complicated than others. The construction cost would be the most expensive. Hydraulic design of the gate portion is complicated and may need model test.	The plan is conjunctive structure of spillway and scouring sluice as one structure, though the layout is similar to the Original Plan. The cost would be relatively expensive than the Original Plan due to replacement of the existing regulator. No increase of O&M burden and no decrease of fail-safe degree is expected.
Sketch					

"New Spillway390+Repair of regulator110" means construction of new spillway of 390 m3/s capacity and repair of the existing regulator of 110 m3/s capacity

ព្រះរាជាណាចក្រកម្ពុជា
Kingdom of Cambodia
ជាតិ សាសនា ព្រះមហាក្សត្រ
Nation Religion King

ក្រសួងធនធានទឹក និងឧតុនិយម
Ministry of Water Resources
and Meteorology

N° ******** 899 MOWRAM

Phnom Penh, 26 , 2003

To : **Mr. C R Rajendran**
Director, Mekong Region Agriculture,
Environment and Natural Resources (MKAE)
Asian Development Bank
P O Box 789, 0980 Manila, Philippines,
+001-632-636 2444

Subject: Removal of Kampong Toul Regulator

Dear Mr. Rajendran,

In 1998, Ministry of Water Resources and Meteorology (MOWRAM) had requested to Japanese Government for Grant Aid Assistance to rehabilitate the Kandal Stung Irrigation System which consists of Tuk Thla Regulator, Kampong Toul Regulator and 7th January Spillway, Intake Gate and the Main Canal.

Following the flood of 2000, many irrigation systems have been collapsed and loss their original function and led to insufficient water storage capacity for agricultural production. In that time the Government of Japan had not accepted yet to the MOWRAM's request and MOWRAM decided to request to the Asian Development Bank assistance.

Amongst of some projects, Kampong Toul and Toek Thla head Regulator is one of the subprojects, under the ADB - Emergency Flood Rehabilitation Project/Flood Control and Irrigation Component, has been repaired and put it in a normal operation with a cost of USD 100,000.

In 2002, the Government of Japan decided and dispatched the Basic Design Team to conduct the basic design of the aforementioned project.

MOWRAM has requested for long term development to JICA to consider removing the Kampong Toul Regulator as it was old and constructed in Pol Pot regime. The seepage under the foundation of the structure has been occurred and was in a difficult condition to be recovered. JICA understood the background of MOWRAM's request and accepted it.

លេខ ៤៧ មហាវិថី ព្រះនរោត្តម រាជធានីភ្នំពេញ ទូរស័ព្ទ/ទូរសារលេខ : (៨៥៥) ២៣.៤២៦ ៣៤៥ / (៨៥៥) ២៣.៧២៥ ៩៨៩
47 Preah Norodom B V D. Phnom Penh. Fax/phone: (855)23 426 345 / (855)23.725 989 E-mail : planning@cttnet.com.kh

So, in order to allow the JICA to continue to do their detail design to the above mentioned project, MOWRAM would like to seek your comment on this matter.

It would be highly appreciated so much for your kind early response.

Please find in the attached files, the letter of JICA and ADB Consultant.

Thank you very much for your continuous assistance.

Sincerely yours,
For Minister

VENG SAKHON,
Under-Secretary of State, MOWRAM

CC:
- ADB Residence Mission in Cambodia
- JICA Office in Cambodia
- File

ផ្ទះ ៤៧ មហាវិថី ព្រះនរោត្តម រាជធានីភ្នំពេញ ទូរស័ព្ទ/ទូរសារ : (៨៥៥) ២៣.៤២៦ ៣៤៥ / (៨៥៥) ២៣.៧២៥ ៩៨៩
47 Preah Norodom B V D. Phnom Penh. Fax/phone: (855)23 426 345 / (855)23.725 989 E-mail : planning@cttnet.com.kh

Japan International Cooperation Agency JICA ទីភ្នាក់ងារសហប្រតិបត្តិការអន្តរជាតិ នៃប្រទេសជប៉ុន

Office: P.O Box 613, House No. 440A, Monivong Blvd, PHNOM PENH CAMBODIA, Tel: 211 673 / 4, 212 142, 217 129 Fax: 015-913 639, 211 675

JC15- 159

May 23, 2003

To: H.E. Lim Kean Hor,
Minister of Water Resources and Meteorology

Subject: Draft of Basic Design on the Rehabilitation of Kandal Stung Irrigation System

Your Excellency,

With reference to the letter No.551 MOWRAM dated April 22, 2003, I would like to inform you that JICA headquarter plans to conduct the additional study under the condition of removing of Kampong Tourl regulator. Before starting off the further study, I would like to make sure items below:

- ADB understands removal and displace of the Kampong Tourl regulator that has renovated in 2001 with assistance from ADB.
- The purpose of renovation of Tuk Thla regulator is not for the improvement of flood flow capacity but for the stable irrigation water supply in this grant aid cooperation project.
- Considering your request, draft basic design will be determined after comparison of alternative designs.

It would be appreciated if you could provide us a written response.

Sincerely yours,

Japan International Cooperation Agency JICA

Juro CHIKARAISHI
Resident Representative
JICA Cambodia Office

C.C.

- H.E. Veng Sakhon, Under Secretary of State, MOWRAM
- H.E. Ly Chana, Director General of Administration Affaires, MOWRAM
- H.E. Bun Hean, Director General of Technical Affairs, MOWRAM
- Mr. Pich Veasna, Director of Planning and International Cooperation Department, MOWRAM
- Mr. KOBAYASHI Takanobu, JICA Expert to MOWRAM
- Mr. MIYAZAKI Akira, Chief Advisor of TSC Project

Our ref: 61782/1/50/429
61782/2/340/429
Your ref:

Mott MacDonald

Emergency Flood Rehabilitation Project
Ministry of Water Resources and Meteorology
47 Norodom Boulevard
Phnom Penh
Cambodia
Tel/Fax: +855 23 219 577/210 362
Email: mottmac@bigpond.com.kh

Under Secretary of State
Ministry of Water Resources and Meteorology
47 Norodom Boulevard
Phnom Penh
Cambodia

Attention: H.E. Veng Sakhon

4 June 2003

Your Excellency,

Emergency Flood Rehabilitation Project: 1824-CAM (SF)
Kandal Stung Irrigation System: Basic Design and Kampong Toul Complex

Thank you for copies of correspondence between yourselves and JICA in April and May on the above subject.

The ADB-assisted EFRP focussed upon urgent repairs to works damaged by the devastating floods of September 2000 and putting them into an operable condition. Funds were not generally available to carry out planning and detailed studies for new works.

Such urgent rehabilitation works were carried out at two of the three regulating structures that make up the Kampong Toul Complex, namely the 24 gate Tuk Thla barrage and the 6 gate Kampong Toul regulator. The total cost of the works relating to the Kampong Toul regulator was about $100,000.

In preparing the rehabilitation contract, the Master Plan for the Rural Development in the Suburbs of Phnom Penh, prepared for JICA in 1995 was studied. This plan included for works both to improve the performance of the Kampong Toul complex and to upgrade the Kandal Stung Irrigation Project. The estimated cost was given as $7.4 million. (see extract of Prek Thnot Flood Dike Rehabilitation: Design Review Report, April 2001)

We are aware that the Kampong Toul regulator leaks and we agree that the number of river regulating structures should be kept to the minimum. Hence, a new structure incorporating a fixed weir and scour sluices would be the best long-term option, allowing the Kampong Toul regulator to be removed. Such a new structure should be designed to allow for the upgrading of RN 3.

Yours sincerely,
For Mott MacDonald

Martin Gillham
Acting Team Leader

cc Chhon Bitoul

LIST OF ATTENDANCE

Date: July 02, 2003
Time: from 3:00 p.m.
Place: Office of Under Secretary of State, MOWRAM

Subject: **Additional Survey for Alternative Plans**

No.	Name	Designation	Signature
1	UENG SAKHON	Under Secretary of State, MOWRAM	
2	Ngoeun Pich	D / Director of Engineering	
3	THENG TARA.	Director Depat. of Water Resources.	
4	EM BUN THOEUN	Director Depet. of Engineering	
5	TE AUV. KIM	Director of Dept of Irrigated Agriculture	
6	PICH - VEASNA	Director of PICD	
7	Akira Miyazaki	Chief Advisor of TSC, JICA	宮崎 旦
8	Takanobu Kobayashi	JICA Advisor to MOWRAM	小林貴信
9	Arata Yamaguchi	Nippon Koei	A. Yamaguchi
10	Jiro Takeichi:	JICA cambodia office	武市
11	Koji OKADA	JICA Study Team	
12	Yutaka Niikawa	JICA Study Team	新川豊
13			
14			
15			
16			
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Appendix 10 Minutes of Discussions on the Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System in the Kingdom of Cambodia (Results of Forth Field Survey, September, 2004)

MINUTES OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY
ON THE PROJECT FOR
REHABILITATION OF
KANDAL STUNG IRRIGATION SYSTEM
IN
THE KINGDOM OF CAMBODIA

In response to a request form the Royal Government of Cambodia, the Government of Japan decided to conduct a Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Cambodia the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Hiroto Mitsugi, Deputy Resident Representative, JICA Cambodia Office.

The Team held discussions with the officials concerned of the Royal Government of Cambodia and conducted a field survey at the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Phnom Penh, 10 September, 2004

Hiroto MITSUGI
Leader
Basic Design Study Team
Japan International Cooperation Agency

Veng SAKHON
Secretary of State
Ministry of Water Resources and
Meteorology

ATTACHMENT

1. Background of the Study

The Government of Japan has decided to accept the request from the Royal Government of Cambodia regarding the removal of Kompong Toul regulator in order to realize the effective water resources management in the Project area. In addition to the matters agreed in the Minutes of Discussions signed on 15 November 2002, on 14 March 2003, and 27 June 2003, the Team conducted survey taking into account the river and hydrological condition which will be influenced by the removal of the Kompong Toul regulator.

2. Japan's Grant Aid Scheme

The Team reconfirmed that the Cambodian side understood the Japan's Grant Aid Scheme explained by the Team and would take the necessary measures, described in the Annex-4 and 5 of the Minutes of Discussions signed on 15 November 2002.

3. Schedule of the Study

3-1. The Japanese side will examine the alternative plans of the new weir structure regarding design and sites to be established based on the results of the study.

3-2. JICA will prepare for the report of the above- mentioned examination and dispatch a mission in order to explain its contents around October 2004.

3-3. In case that the contents of the report are agreed by the Royal Government of Cambodia, JICA will prepare for the draft final report of the Basic Design of the adopted plan and explain the contents of the report through JICA Cambodia Office around November 2004.

3-4. After the contents of the Basic Design are accepted in principle by the Royal Government of Cambodia, JICA will complete the final report and send it to the Royal Government of Cambodia by February 2005.

4. Operation and Maintenance

4-1. Both sides agreed that availability of the financial and human resources for operation and maintenance of the facilities be taken into consideration in examination of appropriate design for the Kandal Stung Irrigation System.

4.2 Both sides confirmed that the Cambodian side would allocate sufficient budget and staff for operation and maintenance of facilities in the Kandal Stung Irrigation System after the construction work.

Appendix 11 Technical Discussion Record of Steering Committee for the Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System in the Kingdom of Cambodia (September, 2004)

Technical Discussion Record
of
Steering Committee
for
Basic Design Study on Rehabilitation
of
the Kandal Stung Irrigation System
in
the Kingdom of Cambodia

between

The Ministry of Water Resources and Meteorology,
the Royal Government of Cambodia

and

The JICA Basic Design Study Team

September 10, 2004

Japan International Cooperation Agency

Technical Discussion Record
of
Steering Committee
for
Basic Design Study on Rehabilitation
of
the Kandal Stung Irrigation System
in
the Kingdom of Cambodia

1. Headworks

① Determination of the flow capacity of the new rehabilitation facilities

The present facilities have three regulators, such as the Tuk Thla regulator, the Kompong Toul regulator, and the Deum Russ regulator, and the 7th January dam.

The design conditions of the flow capacity of the new rehabilitated facilities are as follows:

(i) To remove the Kompong Toul regulator;
(ii) To raise the crest elevation of the 7th January dam from EL.11.26 m to EL. 11.80 m and to heighten the top of sluice gates at the Tuk Thla regulator and the Deum Russ regulator to EL.11.80m in order to raise the operational water level and secure the storage capacity in the reservoir; and
(iii) To construct a new structure in order to recover decrease of flood discharge capacity of the 7th January dam due to the crest raising. The flow capacity must be equal to the present capacity.

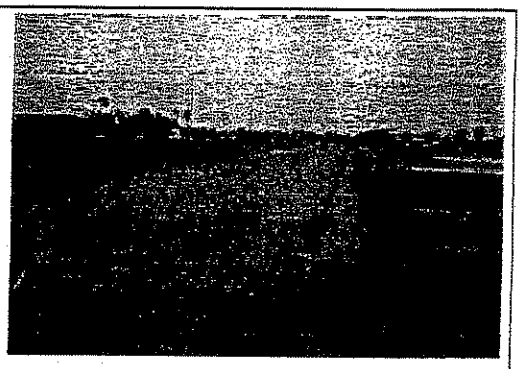
Then, the flow capacity of the rehabilitated facilities including the new structure is calculated according to the following procedure:

(i) The flow capacity of the present facilities is calculated by hydraulic calculation under the condition that the crest elevation is EL.11.26m.
(ii) In order to keep the above calculated flow capacity, the size of the new structures such as fixed weir type with a sand sluiceway and full-gates weir type are determined by hydraulic calculation under the condition that the crest elevation of the 7th January dam is EL.11.80 m.

The flow capacity of the existing structure has been estimated to be approximately 900m3/s so far. The flow capacity of the river after the National Road No.3 has also been calculated to be approximately 900m3/s.
The above calculation has been made so far, but still needs further study after getting more information from the site investigation.

② Road Design (bridge of the headworks)

As the new weir structure crosses the National Road No.3, a bridge is planned to be provided. For the road design on the bridge, the following road width components are recommended by the JICA basic design study team in the steering committee meeting taking account of the existing road condition in principle:



Road Condition
(7th January Dam)

Road width component	Width (m)
1. Handrail (upstream side)	0.4
2. Sidewalk (for ordinary passengers and O/M)	2.0
3. Road shoulder (upstream side)	0.5
4. Roadway (3.5m x 2 lanes)	7.0
5. Road shoulder (downstream side)	0.5
6. Sidewalk (downstream side)	1.0
7. Handrail(downstream side)	0.4
Total	11.8

Longitudinal Slope from bridge to road	Equal to or less than 4%

On September 9, 2004, the MOWRAM issued a letter to the Ministry of Public Works and Transport (MPWT) for the inquiry of the above design parameters as shown in Attachment-1. In advance, the MPWT informed the MOWRAM of its acceptance on the design parameter before issuing an official response letter.

③ Construction area and land ownership (public land or private land)

On September 8, 2004, the MOWRAM dispatched relevant engineers and other staff to the site in order to check the boundary between public land and private land. They went to the office of Kandal Stung District and met commune leaders at the site and confirmed the land boundary in and around the construction site.

Meeting with Commune Leaders

As a result, the boundary was mutually confirmed as described in the Attachment-2.

The investigation result was summarized as follows:

i) In the construction area, which covers four alternative locations for a weir structure, most of the area belongs to public land;

ii) Between the river course after the 7th January dam and the old river course, there is a gentle hill where mango trees are planted. The hill was used as a relaxation place for local people;

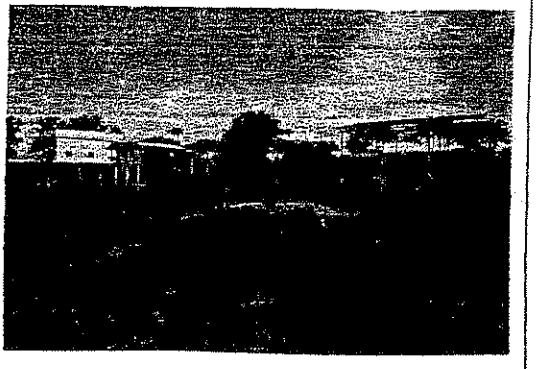
iii) Except the above hill, no land has been utilized so far;

iv) As the above hill is only a private land and its value seems to be not so high, no difficulty was found to acquire the private land in the construction area; and

v) There are several houses and small restaurants beside the National Road No.3. The lands of those houses and small restaurants, however, have been occupied without legal procedure based on the Land Law in Cambodia.

④ Relocation of houses and small restaurants

As well as the investigation of the land boundary, a survey was conducted in order to check the number and the



Houses

locations of houses and small restaurants in the construction area on September 8, 2004.

According to the above survey, the number of houses and small restaurants to be relocated for the construction was roughly estimated as shown in the following table:

Small restaurants

Unit : nos.

Location Plan	House	Restaurant
1. Gate Weir Type Alternative-1	0	0
2. Gate Weir Type Alternative-2	0	9
3. Gate Weir Type Alternative-3	0	2
4. Gate Weir Type Alternative-4	9	0
5. Fixed Weir Type Alternative-1	0	4
6. Fixed Weir Type Alternative-2	0	9
7. Fixed Weir Type Alternative-3	7	2
8. Fixed Weir Type Alternative-4	9	0

As well as the small restaurant owners, most of the people living in the above houses are doing business mainly with drivers and passengers.
During the construction period, it is expected that they can do business with construction workers. Hence, it does not seem to be difficult for the MOWRAM to resettle the above houses and/or small restaurants.

⑤ Resettlement Principles

The MOWRAM will follow the following resettlement principles;

a) Legal Frame Work

For resettlement of houses, land and other relevant assets, the MOWRAM will follow the national policy on involuntary resettlement and the 30 August 2001 Land Law and its sub-decrees, which establish rights of land ownership and of

entitlement to compensation and replacement in land losses resulting from public works.

Resettlement will follow the following procedure:

i) Steps will be taken to minimize the impact of project works on affected persons and their land and structures and to mitigate any adverse effects;

ii) A planned resettlement program will be provided, including entitlements to replacement of land and other assets and/or compensation;

iii) Affected persons and their representatives will participate fully in project design and works and in the resettlement planning and implementation;

iv) Specific provision will be made to safeguard or improve the welfare of affected vulnerable groups;

v) The economic and social future of people shall not be unfavorably affected, and they will not face a material reduction in income, living standards or unnecessary social and cultural dislocation as a result of the project;

vi) The compensation to be provided is

- Compensation at replacement cost for houses and other affected structures without deduction for depreciation or salvageable materials;
- For agriculture land, compensation in terms of land for land of equal productive capacity or compensation in cash permitting land purchase by affected persons of equal quality and productivity to that loss;
- Replacement of premise/residential land of equal size acceptable to the affected persons; and
- Replacement of commercial land of equal size and commercial potential acceptable to the affected person;

vii) The resettlement program will provide for the monitoring and evaluation of resettlement; and

viii) No distinction will be made between affected persons with land title and those without title, and their land right are based on land use and occupancy.

b) Eligibility of Affected persons

In general, people eligible for compensation will include those affected in the following categories:

i) Land to be permanently acquired for the project:

- Owners with formal legal title
- Owners/occupiers formally recognized as eligible for formal legal title under

Cambodian law, e.g. by possession of a certificates issued by the commune or district land office;

- Owner/occupier who are recognized by commune leaders being in occupation of such land prior to August 30, 2001 (the 30 August 2001 Land Law started in valid on this day.)
- Leaseholders and tenants of land

ii) Permanent removal of houses, other structures and improvements and land base assets, such as trees and crops:

- Owners of houses and other structures (whether with land title or not) and whether the house or structure was built with permit or not
- Tenants of houses and other structures

iii) Any person or business suffering temporary effects, such as distribution to land, crops, business operation during construction.

c) Entitlement

Land, houses and other structures and other fixed assets, including trees, wells and graves will be compensated on the basis of survey agreed with affected persons and at prices based on the market and on the need for replacement of livelihood at least their level prior to project actions. In addition to compensation for land or any structures each affected person's household will be entitled to a one-off disruption allowance to be paid in cash where the affected person's household is relocating away from the existing site.

d) Valuation and replacement of assets

Land and structures lost through the impact of project operation are initially measured and valued during the detailed measurement survey, basically on the principle of replacement cost at market rates. However, when land and structures are within a Government Right of Way, they are also determined by the cost of replacement of long-term livelihood. In practice, this will be arrived at by providing the replacement cost regardless of legal possession or ownership. Measurements and valuation are discussed with affected persons in the presence of local leaders, and if requested by the affected person, during the consultation phase between the detailed measurement survey and compensation. If the compensation or proposals for restoration are agreed, the affected persons'

head of household provides his/her thumb-print to a document which records the measurement and sketch from the detailed measurement survey and amount of compensation agreed.

The MOWRAM has coped with resettlement for irrigation projects such as the Stung Chinit Irrigation and Rural Infrastructure Project, and Northwest Irrigation Sector Project. Comparing with the other projects, the scale of resettlement in this project is rather small. Considering such situation, it is expected that the resettlement issue would not become a serious obstacle against the construction work.

⑥ Present actual performance of the operation and maintenance for the gates of the Rolaeng Chrey, Tuk Thla, and Kompong Toul regulators

At present, the Rolaeng Chrey regulator is under control of the Kompong Speu Provincial Department of Water Resources and Meteorology. The Tuk Thla and Kompong Toul regulators are under control of the Irrigated Agriculture Department and Engineering Department of the MOWRAM. The respective offices in charge of controlling the gate structures have conducted the operation and maintenance using their budget.

According to the study, each relevant office has their internal budget for the operation and maintenance. The detail is given below:

1) Rolaeng Chrey Regulator

a) Site allowance for 1 river water level observer and 5 gate operators

6 persons x 50,000Riels x 12 months = 3,600,000Riels =US$900.

b) Allowance for gasoline of motorcycle

6 persons x 15 liter x 12 months x 0.70 US$/litter =US$700.

c) Phone Card

6 persons x 10 US$/month x 12 months =US$720.

d) Grease

300 kg/year x 1.0 US$/kg =US$300.

e) Diesel

3 litter x 365 days x 0.50 US$/litter = US$550.

f) Oil = US$120.

g) Spare parts = US$1,500.

Total = US$4,790.

2) Tuk Thla Regulator

a) Site allowance for gate operators

6 persons x 150,000Riels x 12 months = 10,800,000Riels =US$2,700.

b) Allowance for gasoline of motorcycle

Included in a). = 0.

c) Phone Card

6 persons x 10 US$/month x 5 months =US$300.

d) Grease

100 kg/year x 1.0 US$/kg =US$100.

e) Diesel

2,000 litter x 0.5 US$/litter =US$1000.

f) Oil = US$90.

g) Spare parts = US$1,500.

Total = US$5,690

3) Kompong Toul Regulator

a) Site allowance for gate operators

3 persons x 50,000Riels x 12 months = 1,800,000Riels =US$450.

b) Allowance for gasoline of motorcycle

3 persons x 10 liter x 12 months x 0.70 US$/litter =US$250.

c) Phone Card

3 persons x 10 US$/month x 12 months =US$360.

d) Grease

50 kg/year x 1.0 US$/kg = US$50.

e) Diesel

800 litter x 0.5 US$/litter =US$400.

f) Oil = US$40.

g) Spare parts = US$800.

Total = US$2,350

The above calculation is summarized in the following table:

Pay Item	Rolaeng Chrey	Tuk Thla	Kompong Toul
a) Site allowance for gate operators	900.	2,700.	450.
b) Allowance for gasoline of motorcycle	700.	0.	250.

c) Phone Card	720.	300.	360.
d) Grease	300.	100.	50.
e) Diesel	550.	1,000.	400.
f) Oil	120.	90.	40.
g) Spare parts	1,500.	1,500.	800.
Total	4,790.	5,690.	2,350.

⑦ Future program of budget and staff for operation and maintenance of gates for the new weir

The operation and maintenance for gates shall be a key issue for considering the gate weir alternatives. In the steering committee meeting, for each alternative, the consultant showed the rough estimation of the number of staff for gate operation and the cost for operation and maintenance as shown in the following table:

Item	Gate weir type	Fixed weir type
1. Number of staff for rainy season	5	3
2. Number of staff for dry season	2	2
3. Total running cost for O/M*(30years) (US$)	174,000	63,000
4. Annual cost for O/M*(US$)	5,800	2,100

*: Present cost

The detailed of the cost for operation and maintenance are shown in Attachement-3.

Comparing with the present expenditure and internal budget made by the relevant offices for the operation and maintenance, the above cost in case of a gate weir does not seem to be a considerable burden to the MOWRAM. Also, the MOWRAM is now planning to organize a task force so as to strengthen the organization of O/M, such as the instruction system and the training system of O/M.

⑧ Design Condition

Design Parameter	EL.(m)
1. Design Flood Water Level	WL. 13.00

2. Design Top Elevation of Dike	EL. 14.00
3. Design Intake Water Level	WL.11.80
4. Design Upstream River Bed Level	EL. 7.00
5. Design Downstream River Bed Level	EL.5.00
6. Design Top Elevation of Gate	EL.11.80
7. Design Bottom Elevation of Gate	EL.7.00

2. Rehabilitation of the Regulators and the 7th January Dam

The design intake water level is changed from WL.11.26m to WL.11.80m in order to keep sufficient water level for allocating water and to store water against occasional water shortage at the beginning of rainy seasons. Therefore, the raising of gate crest and extension of creep length are planned for the respective regulators and the 7th January dam. The components of the construction work are given in the following table:

Structure	Construction method for raising of crest	Construction method for extension of creep length
1. 7th January Dam	To raise the crest from EL.11.26 to EL.11.80 by constructing a retaining wall adjacent to the outside of the existing structure	Sheet pile driving works
2. Tuk Thla Regulator	To add gate leaves in order to raise the intake water level from WL.11.26 to WL.11.80	Ditto
3. Deum Russ Regulator	Ditto	No work

3. Irrigation Canal

① Scope of the Work under Japan's Grant Aid

The basic design covers the rehabilitation of the intake, the main canal, the related structures on the main canal, the inspection roads beside the main canal and the lateral canals. In the steering committee meeting, the Cambodian side confirmed the above scope of work in the Kandal Stung Irrigation Project under

the Japan's grant aid.

② Irrigation facilities design

Design Parameter	Design Value
1. Design Water Level before Intake	WL.11.80m
2. Design Water Level after Intake	WL.11.50m
3. Design Water Depth	1.50m
4. Design Total Width of Right Dike	5.50m
5. Design Total Width of Left Dike	3.00m
6. Design Width of Inspection Road	4.50m

③ Design condition of the irrigation facilities

Design Parameter	Design Value
1. Irrigation Area	1,950ha
2. Unit Irrigation Water Requirement	1.41 liter/ha/sec.

④ Design concept for the structures (intake structure, check structure, turnout, maintenance flow gate, and bridge)

- The design intake water level WL.11.80 before the intake is adjusted to WL.11.50m so that the storage capacity ranging from WL.11.80m to WL.11.50m could be secured against the occasional shortage of river flow at the beginning of the rainy season.
- At any structure after the intake, the design water depth is set as 1.5m as well as the design water depth of the main canal.
- Two check structures are provided at certain points on the main canal in order to maintain the design water level.

⑤ Water in the main canal at the construction stage

With regards to water in the main canal at the construction stage, the followings were confirmed in the steering committee meeting:

- Water during the dry season isn't required.
- Water during the rainy season is required.

The above conditions should be taken into consideration for the construction plan.

⑥ Design of Asphalt pavement

The Cambodian side requested the JICA basic design study team to study the possibility of construction of asphalt pavement for the inspection road of the main canal. The team asked the Cambodian side to provide its design drawings and cost estimate.

The construction will be studied mainly from the construction cost and its maintenance cost. On September 8, 2004, the team received drawings and a cost estimate from the MOWRAM.

⑦ Design of the main canal

The earthwork problems caused by the dispersive soil have been reported in the Mekong River basin. According to the Master Plan Study, soil of the Kandal Stung Irrigation Project area is also classified as dispersive soil. As no design for effective filter layers against dispersive soil has been made, the counter measure design for the main irrigation canal shall be taken as below;

- Original earth or embankment material which is taken from in and around the canal should be covered by the well grained soil;
- Thickness of the well grained soil layer should be more than 1.0m; and
- Concrete block lining should be provided on the main canal slope.

The both parties confirmed the above technical issues in the steering committee meeting held on September 6, 2004 and through the further study from September 7 to 9, 2004.

Phnom Penh, September 10, 2004

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Pich VEASNA
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Hiroto MITSUGI
Leader
Basic Design Study Team
Japan International Cooperation Agency

Veng SAKHON
Secretary of State
Ministry of Water Resources and Meteorology

ព្រះរាជាណាចក្រកម្ពុជា

ជាតិ សាសនា ព្រះមហាក្សត្រ

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ក្រសួងធនធានទឹក និងឧតុនិយម

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លេខ 1244 ចទឧ

រាជធានីភ្នំពេញ, ថ្ងៃទី 29 ខែ 29 ឆ្នាំ ២០០4

ជម្រើសក្រសួងធនធានទឹក និង ឧតុនិយម

គោរពជូន

ឯកឧត្តមរដ្ឋមន្ត្រីក្រសួងសាធារណការ និងដឹកជញ្ជូន

កម្មវត្ថុ : សំណើសុំសេចក្តីបញ្ជាក់ និងផ្តល់យោបល់លើទំហំផ្ទៃរំសាយនៃឆ្លងកាត់ទ្វារទឹកថ្មី នៅតាមបណ្តោយផ្លូវជាតិលេខ 3 ត្រង់ចំណុចកំពង់ទួល ។

ដំណក្សាប់ : ទីតាំងសំណង់ទ្វារទឹក និងគំនូសបង្ហាញស្ថានលើទ្វារទឹក 01 ច្បាប់

ដូចមានចែងក្នុងកម្មវត្ថុខាងលើ ខ្ញុំសូមឯកឧត្តមជ្រាបថា ក្រសួងធនធានទឹក និងឧតុនិយម នឹងរៀបចំសាងសង់ទ្វារទឹកថ្មី តាមបណ្តោយផ្លូវជាតិលេខ 3 ត្រង់ចំណុចកំពង់ទួល នៃទំនប់បង្ហៀរ 7 មកវា ស្ថិតក្នុងឃុំអន្លង់រមៀត ស្រុកកណ្តាលស្ទឹង ខេត្តកណ្តាល ក្រោមជំនួយឥតសំណងរបស់ប្រទេសជប៉ុន នាពេលដ៏ខ្លីខាងមុខនេះ ។

គោលបំណងនៃការសាងសង់សំណង់ទ្វារទឹកនេះ គឺដើម្បីបង្កើនកំពស់ទឹកដែលមានស្រាប់កំពស់ 11.26ម អោយដល់កំរិតកំពស់ 11.80ម ព្រមទាំងសំរួលដល់ធារទឹកនៃទឹកជំនន់ដែលហូរធ្លាក់ពីខ្សែទឹកខាងលើ កុំអោយមានការខូចខាតដល់ផ្នែកដែលស្ថិតនូវខ្សែទឹកខាងក្រោម។ ក្នុងន័យនេះ ដើម្បីអោយការរៀបចំតំរោងប្លង់ប្រព្រឹត្តទៅបានល្អប្រសើរ ក្រសួងធនធានទឹក និងឧតុនិយម សូមការបញ្ជាក់ និងផ្តល់យោបល់លើចំណុចសំខាន់ៗ មានដូចខាងក្រោម:

១- ឯកឯកន្លែងលើស្ពាន

ដោយផ្អែកតាមស្ថានភាពជាក់ស្តែងនៃផ្លូវ ទំហំធាតុបន្សំនៃផ្លូវលើស្ពានត្រូវបានគ្រោងដូចខាងក្រោម:

Road component	Width (m)
1. Handrail (upstream side)	0.4
2. Sidewalk (for ordinary passengers and O/M)	2.0
3. Road shoulder (upstream side)	0.5
4. Roadway (3.5m x 2 lanes)	7.0
5. Road shoulder	0.5
6. Sidewalk (downstream side)	1.0
7. Handrail (downstream side)	0.4
Total	11.8

លេខ ៤៧ មហាវិថី ព្រះនរោត្តម រាជធានីភ្នំពេញ ទូរស័ព្ទ/ទូរសារលេខ : (៨៥៥) ២៣.៤២៦ ៣៤៥ / (៨៥៥) ២៣.៧២៥ ៤៨៩

២. ទីតាំងផ្ទះល្វែងស្ថានទូត

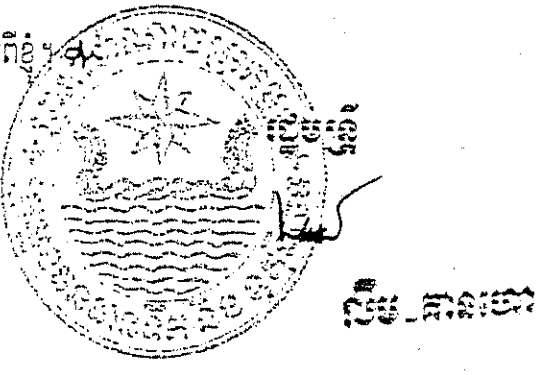
នាពេលបច្ចុប្បន្ន កំរិតកំពស់ខ្នងផ្លូវជាតិលេខ 3 មានកំពស់ 14 ម ចំណែកឯកំរិតកំពស់ផ្លូវលើទ្វារទឹក មានកំពស់ 15.30 ម ដែលតំរូវអោយមានជំរាលទាំងសងខាងនៃទ្វារទឹក ដើម្បីសំរួលដល់ការធ្វើចរាចរទូទៅនៃយានយន្ត។

ជំរាលផ្លូវទាំងសងខាងនៃទ្វារទឹក ដែលក្រសួងបានគ្រោងមានដូចខាងក្រោម:

Longitudinal Slope from bridge to road	Equal to or less than 4%

អាស្រ័យហេតុនេះ ខ្ញុំសូមឯកឧត្តមរដ្ឋមន្ត្រី មេត្តាជួយបញ្ជាក់ និងផ្តល់យោបល់បច្ចេកទេសលើទំហំផ្លូវ និងជំរាលផ្លូវ នៃទ្វារទឹកសំរាប់តំរោងខាងលើតាមការគួរ។

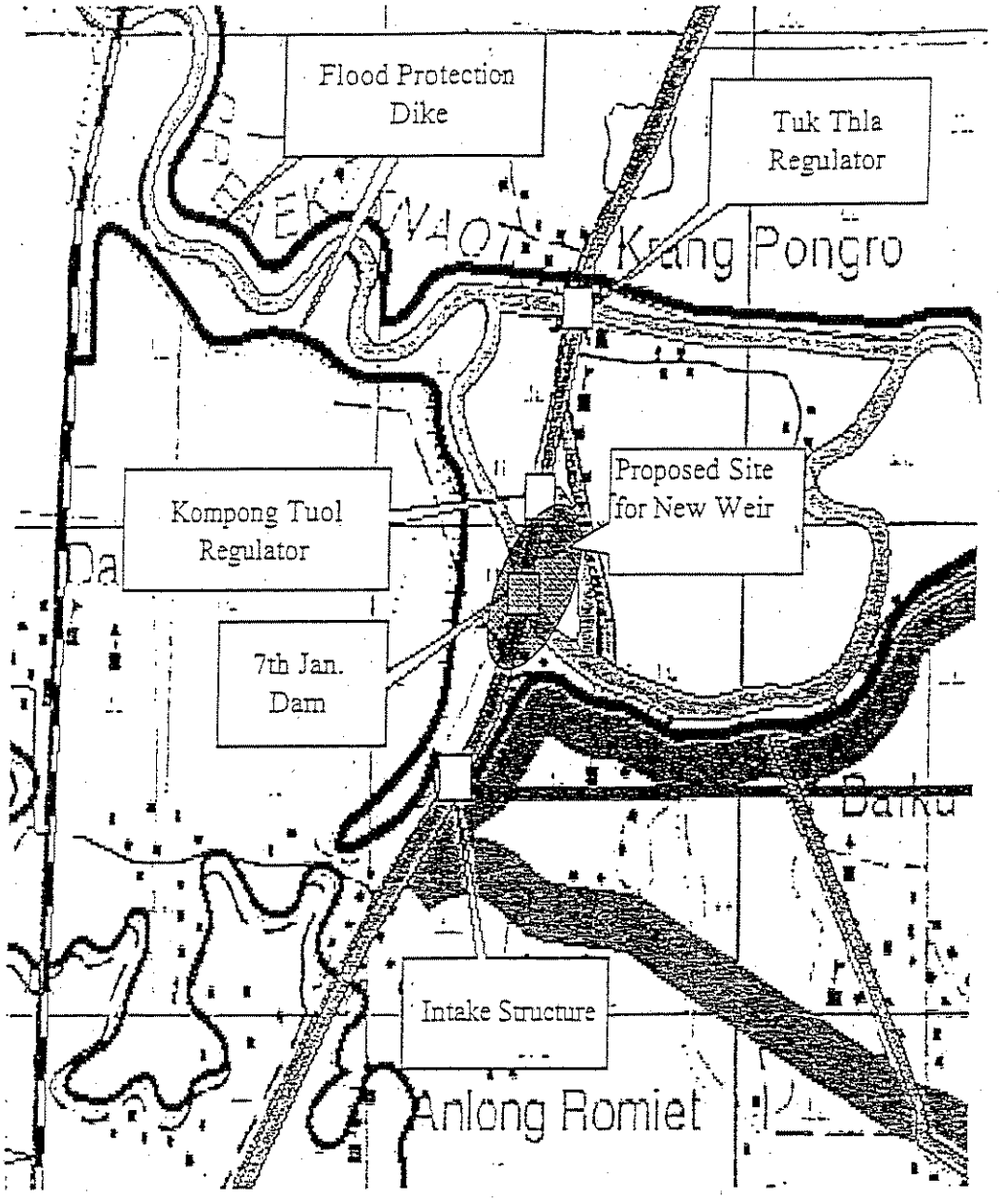
សូមឯកឧត្តមរដ្ឋមន្ត្រីទទួលនូវការរាប់អានអំពីខ្ញុំ។



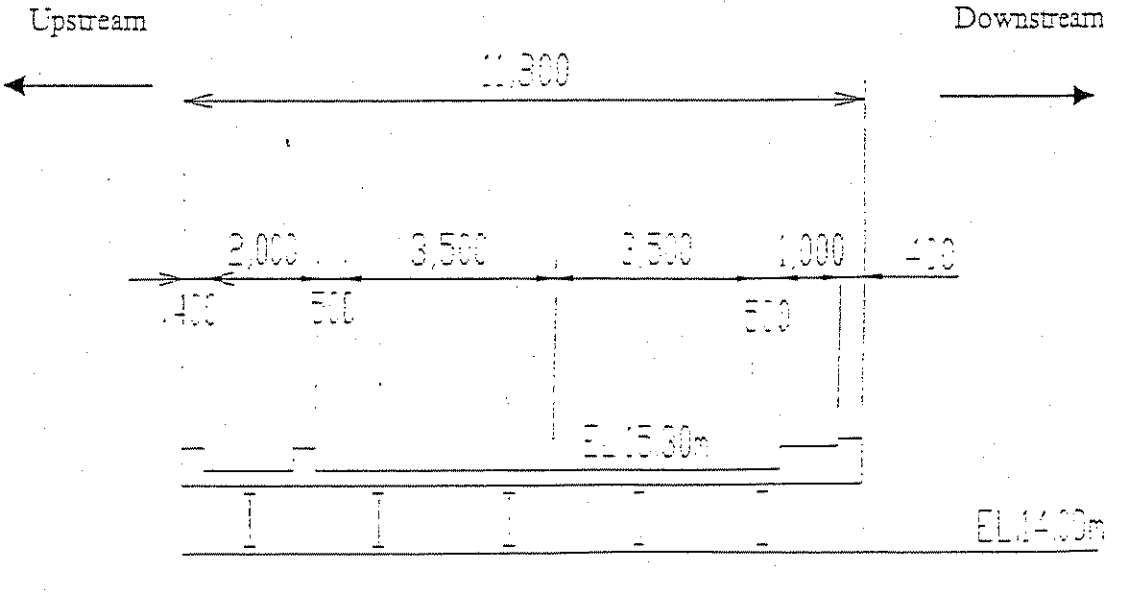
ចំណង់ចំណូល :

- ទាយកដ្ឋានវិនិយោគ និងសហប្រតិបត្តិការអន្តរជាតិ
- ការិយាល័យគ្រប់គ្រងតំរោង (PMO)
- កាលប្បវត្តិ-ឯកសារ

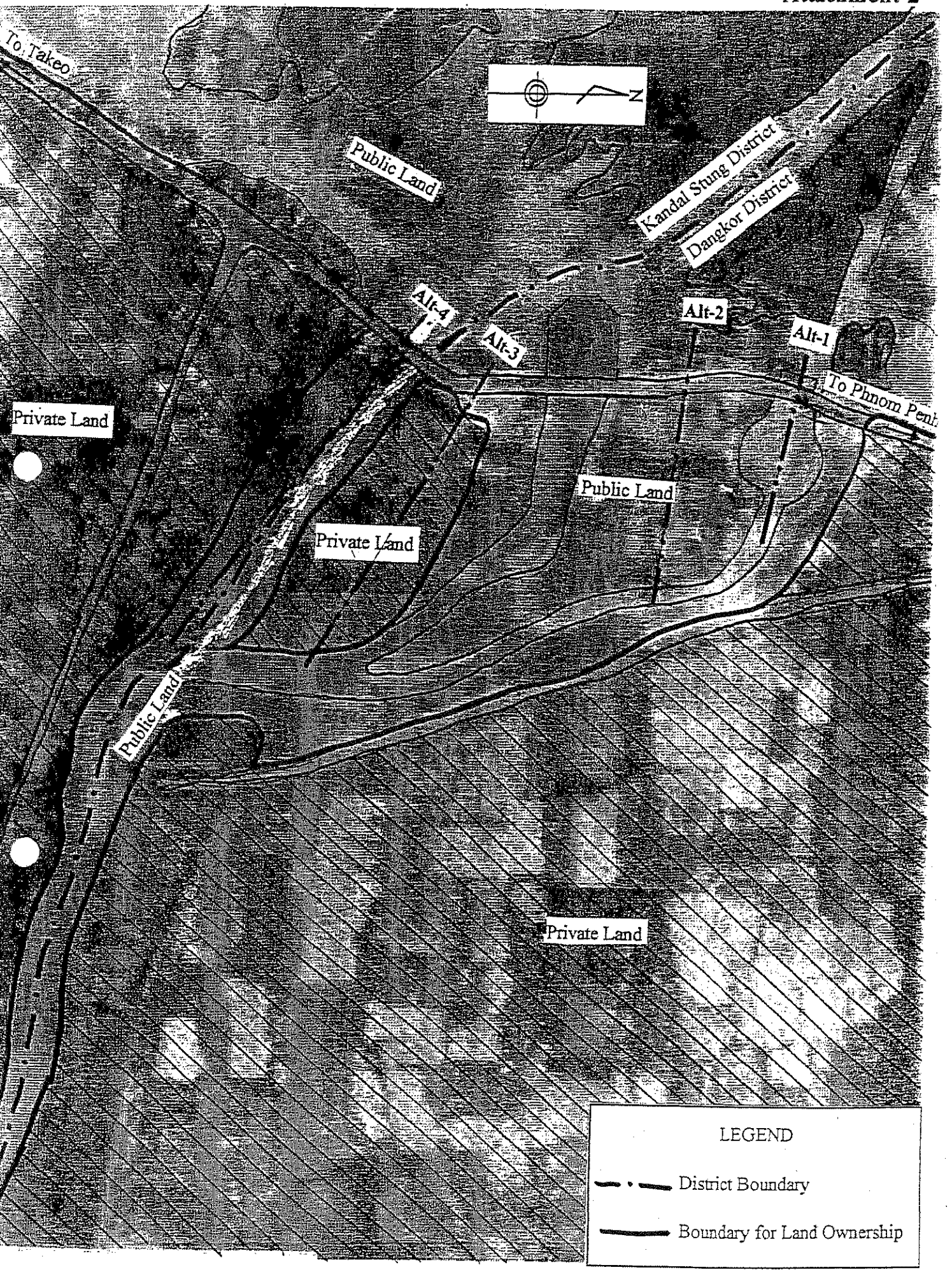
លេខ ៨៧ មហាវិថី ព្រះនរោត្តម រាជធានីភ្នំពេញ ទូរស័ព្ទ/ទូរសារលេខ : (៨៥៥) ២៣.៨២៦ ៣៥៥ / (៨៥៥) ២៣.៧២៥ ៨៨៩



Location Map for Proposed Site for New Weir



Bridge for New Weir



Boundary of Districts and Land Ownership

O&M Cost Estimation for Gate Weir Type

Painting Area m^2: 556.15 | Diesel: 13liter/hour | 180days per Yearx0.5hour | 1,170 liter/Year

Gate Weir Type (Flood Gate B12.5m · H4.9m · 3nos..Sand Flush GatesB5.0m · H4.9m · 1no.)

Year	A. Maintenance Cost					B. Operation Cost				Total Japanese Yen	Total US$
	Periodical Inspection	Periodical Maintenance	Replace of Watertight	Painting JY4,000/m2	Replace of Wire Rope	Operation Cost	diesel	Periodical Inspection	Periodical Maintenance		
1	Not Considered	40,000	Once every 20 years		Not necessary in 30 years	MOWRAM Staff	140,000	Not Considered	84,000	264,000	2,400
2		40,000					140,000		84,000	264,000	2,400
3		40,000					140,000		84,000	264,000	2,400
4		40,000					140,000		84,000	264,000	2,400
5		40,000					140,000		84,000	264,000	2,400
6		40,000					140,000		84,000	264,000	2,400
7		40,000					140,000		84,000	264,000	2,400
8		40,000					140,000		84,000	264,000	2,400
9		40,000					140,000		84,000	264,000	2,400
10		40,000					140,000		84,000	264,000	2,400
11		80,000					140,000		166,000	386,000	3,509
12		80,000		2,200,000			140,000		166,000	2,586,000	23,509
13		80,000					140,000		166,000	386,000	3,509
14		80,000					140,000		166,000	386,000	3,509
15		80,000					140,000		166,000	386,000	3,509
16		80,000					140,000		166,000	386,000	3,509
17		80,000					140,000		166,000	386,000	3,509
18		80,000					140,000		166,000	386,000	3,509
19		80,000					140,000		166,000	386,000	3,509
20		80,000	3,500,000				140,000		166,000	3,886,000	35,327
21		80,000					140,000		250,000	470,000	4,273
22		80,000					140,000		250,000	470,000	4,273
23		80,000					140,000		250,000	470,000	4,273
24		80,000		2,200,000			140,000		250,000	2,670,000	24,273
25		80,000					140,000		250,000	470,000	4,273
26		80,000					140,000		250,000	470,000	4,273
27		80,000					140,000		250,000	470,000	4,273
28		80,000					140,000		250,000	470,000	4,273
29		80,000					140,000		250,000	470,000	4,273
30		80,000					140,000		250,000	470,000	4,273
Total	0	2,000,000	3,500,000	4,400,000	0	0	4,200,000	0	5,000,000	19,100,000	173,638
										Total	174,000
										Average	5,800

O&M Cost Estimation for Fixed Weir Type

Painting Area m² : 147 | Diesel : 7 liter/hour | 180days per Year×0.25hour | 315 liter/Year

Fixed Weir Type (Flood Sluice cum Sand Flush Gates B5.0m×H4.9m×2nos.)

Japanese Yen

Year	A. Maintenance Cost					B. Operation Cost				Total Japanese Yen	Total US$
	Periodical Inspection	Periodical Maintenance and Parts replacement	Replace of Watertight Rubber	Painting JY4,000/m2	Replace of Wire Rope	Operation Cost	diesel and oil	Periodical Inspection	Periodical Maintenance		
1	Not Considered	20,000	Once every 20 years		Not necessary in 30 years	By MOWRAM	35,000	Not Considered	42,000	97,000	882
2		20,000					35,000		42,000	97,000	882
3		20,000					35,000		42,000	97,000	882
4		20,000					35,000		42,000	97,000	882
5		20,000					35,000		42,000	97,000	882
6		20,000					35,000		42,000	97,000	882
7		20,000					35,000		42,000	97,000	882
8		20,000					35,000		42,000	97,000	882
9		20,000					35,000		42,000	97,000	882
10		20,000					35,000		42,000	97,000	882
11		40,000					35,000		83,000	158,000	1,436
12		40,000		600,000			35,000		83,000	758,000	6,891
13		40,000					35,000		83,000	158,000	1,436
14		40,000					35,000		83,000	158,000	1,436
15		40,000					35,000		83,000	158,000	1,436
16		40,000					35,000		83,000	158,000	1,436
17		40,000					35,000		83,000	158,000	1,436
18		40,000					35,000		83,000	158,000	1,436
19		40,000					35,000		83,000	158,000	1,436
20		40,000	1,200,000				35,000		83,000	1,358,000	12,345
21		40,000					35,000		125,000	200,000	1,818
22		40,000					35,000		125,000	200,000	1,818
23		40,000					35,000		125,000	200,000	1,818
24		40,000		600,000			35,000		125,000	800,000	7,273
25		40,000					35,000		125,000	200,000	1,818
26		40,000					35,000		125,000	200,000	1,818
27		40,000					35,000		125,000	200,000	1,818
28		40,000					35,000		125,000	200,000	1,818
29		40,000					35,000		125,000	200,000	1,818
30		40,000					35,000		125,000	200,000	1,818
Total	0	1,000,000	1,200,000	1,200,000	0	0	1,050,000	0	2,500,000	6,950,000	63,179
										Total	63,000
										Average	2,100

Appendix 12 Minutes of Discussions on the Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System in the Kingdom of Cambodia (Alternative Plans of the New Weir Structure, October, 2004)

MINUTES OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY
ON THE PROJECT FOR
REHABILITATION OF
KANDAL STUNG IRRIGATION SYSTEM
IN
THE KINGDOM OF CAMBODIA

In response to a request from the Royal Government of Cambodia, the Government of Japan decided to conduct the Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Cambodia the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Mr. Toshikazu Kambara, Chief Consultant of the Team.

The Team held discussions with the officials concerned of the Royal Government of Cambodia.

In the course of discussions, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Phnom Penh, 7 October, 2004

Toshikazu KAMBARA
Chief Consultant
Basic Design Study Team
Japan International Cooperation Agency

Veng SAKHON
Secretary of State
Ministry of Water Resources and
Meteorology

Witness;

Juro CHIKARAISHI
Resident Representative
JICA Cambodia Office

1. Background of the Study

The Government of Japan has decided to accept the request from the Royal Government of Cambodia regarding the removal of Kompong Toul regulator in order to realize the effective water resources management in the Project area. In addition to the matters agreed in the Minutes of Discussions signed on 15 November 2002, on 14 March 2003, 27 June 2003, and 8 September 2004, the Team examined the alternative plans of the new weir structure regarding design and sites. Then, JICA prepared a report of the above- mentioned examination (The report is named "STUDY REPORT FOR WEIR TYPE AND LOCATION") and dispatch a mission in order to explain its contents in early October 2004.

2. Schedule of the Study

2-1. JICA will prepare a draft final report for the Basic Design based on the adopted plan and explain the contents of the report through JICA Cambodia Office around November 2004.

2-2. After the contents of the Basic Design are accepted in principle by the Royal Government of Cambodia, JICA will complete the final report and send it to the Royal Government of Cambodia by February 2005.

3. Other Relevant Issues

3-1. The Cambodian side accepted the plan of a full-gate type weir structure to be constructed on the old river course after the explanation of the report prepared by JICA. This alternative was selected as the most appropriate one out of the alternatives through the study by the Team.

3.2 The Cambodian side stated that the land acquisition and the removal of houses and small restaurants can be handled without difficulty because their scale is comparatively small.

3.3 The Cambodian side agreed to explain the content of the Project to the affected persons and get their agreement.

3.4 Both sides confirmed that the Team would prepare drawings showing the boundaries of land possession for the temporary land-use (during the construction) and for the permanent land-use (after the construction) in order that the Cambodian side could cope with the land acquisition and removal of houses and small restaurants successfully before starting of the construction.

3.5 The Cambodian side stated that it highly appreciated Japan-made gates through its experience in Cambodia. Then, the Cambodian side requested the Team to consider the adoption of reliable and durable large-scaled gates for the weir.

Appendix 13 Minutes of Discussions on the Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System in the Kingdom of Cambodia (Explanation on Draft Report, November, 2004)

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY ON THE PROJECT
FOR REHABILITATION OF THE KANDAL STUNG IRRIGATION SYSTEM
IN THE KINGDOM OF CAMBODIA
(EXPLANATION ON DRAFT REPORT)

In response to the request from the Royal Government of Cambodia, the Government of Japan decided to conduct the Basic Design Study on the Project for Rehabilitation of Kandal Stung Irrigation System (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA organized the Basic Design Study Team (hereinafter referred to as " the Team "), which is headed by Mr. Juro CHIKARAISHI, Resident Representative, JICA Cambodia Office. The team held discussions with the officials concerned of the Royal Government of Cambodia. In the course of discussions, both parties confirmed the main items described on the attached sheets.

The Team will proceed to further works and prepare the Basic Design Study Report.

Phnom Penh, 16th November 2004

Mr. Juro CHIKARAISHI
Leader
Draft Report Explanation Team,
Resident Representative,
Japan International Cooperation Agency
Cambodia Office

H.E. Veng Sakhon
Secretary of State

Ministry of Water Resources and
Meteorology

ATTACHMENT

1. Components of the Draft Report

The Royal Government of Cambodia agreed and accepted in principle the components of the draft report explained by the Team.

2. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and send it to the Royal Government of Cambodia by around January 2005.

3. Other Relevant Issues

(1) The draft report for Basic Design was prepared through the study based on the minutes of discussion between the Royal Government of Cambodia and the JICA Basic Design Study Team. Especially, the report reflects the minutes of discussions of the 4th and 5th field survey (signed on 10th September and 7th October, 2004 respectively), the discussion results in the steering committee meeting on 6th September 2004 and the site investigation by the both parties after the meeting.

(2) The Royal Government of Cambodia understood the obligation of recipient country as stated in Chapter 3 of the Draft Report. Especially, the disposal of mines/bombs, the land acquisition of the facilities for permanent use, the removal of houses, the land borrowing of site offices, storage houses and yards should be completed by the Royal Government of Cambodia at least before the contract for the construction works. The area for them will be indicated during the detailed design stage.

5. Cost Estimation Borne by the Recipient Country

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Required Costs to be born by the Cambodian Side

Description	Unit Price (USD)	Quantity	Amount (USD)
1. Land acquisition m2	1	20,000	20,000
(1) Main canal: 15,000 m^2			
(2) O&M roads (4 nos): 5,000 m^2			
2. Investigation and removal of UXOs	LS		156,000
3. Banking cost	LS		2,700
4. Customs clearance cost	LS		1,000
4. Construction and improvement of lateral	LS		767,000
and tertiary canals			
5. Establishment of O&M office	LS		10,500
Total			957,200

Operation and Maintenance Cost

Item	Amount (USD)
Personnel cost of O&M office	2,475
O&M cost for O&M office	1,460
O&M cost (average of 30 years)	4,145
Total	8,080