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1. Member List of the Survey Team

(1) the first survey (2000/Jul/12~Aug/27 (leader : Aug/18~Aug/22)

Name	Field in Charge	Present Position
Mr. kazuo NAKAGAWA	Leader	Sub-Director Grant Aid Management Department, and Head of Examination, JICA
Mr. Kazumasa TADA	Consultant Chief	Nippon Koei Co.,Ltd.
Mr. Tatuhiro KONO	Road Designer	Pacific Consultants International Inc.
Mr. Shuji MURAKAMI	Bridge designer	Nippon Koei Co.,Ltd.
Mr. Mitutaka IWASAKI	Investigator in site I	Nippon Koei Co.,Ltd.
Mr. Seiju IKEDA	Investigator in site II	Nippon Koei Co.,Ltd.
Mr. Takuya FUNAHARA	Construction planner, Cost Estimator	Nippon Koei Co.,Ltd.

(2) The Second Survey (2000/Oct/22~Nov/1 (leader: Oct/25~Oct/28)

Name	Field in Charge	Present Position
Mr. Yoshikazu YAMADA	Leader	Director, Third Project Management Division, Grant Aid Management Department and JICA
Mr. Kazumasa TADA	Consultant Chief	Nippon Koei Co.,Ltd.
Mr. Tatsuhiro KONO	Road Designer	Pacific Consultants International Inc.
Mr. Shuji MURAKAMI	Bridge designer	Nippon Koei Co.,Ltd.

2. Survey Schedule

First Survey

No	Date.	D a y	Contents of a member movement.	Staying	Contents of investigation.
1	17-Jul	Mon.	Tada, Iwasaki NRT-BKK-PNH	PNH	Departure, Meeting
2	18	Tue	Leader Nakagawa arrive PNH	PNH	MPWT conference.
3	19	Wed	Phnom Penh city.	PNH	MPWT · EOJ · JICA courtesy call, conference
4	20	Thu	Phnom Penh city.	PNH	Minutes Signing
5	21	Fri	PNH – Kompong Cham	PNH	Site Investigation on foot, Embassy · JICA office
6	22	Sat	Leader Nakagawa leave PNH	K/C	Tada investigation site.
7	23	Sun	Tada, Iwasaki	PNH · K/C	Data arrangement.
8	24	Mon	Tada, Iwasaki	PNH · K/C	Investigation (hydrological).
9	25	Tue	Tada, Iwasaki	PNH · K/C	Investigation (hydrological).
10	26	Wed	Kono, Murakami, Ikeda, Funahara NRT-BKK	BKK · PNH · K/C	Investigation (hydrological).
11	27	Thu	Kono, Murakami, Ikeda, Funahara BKK-PNH	PNH · K/C	JICA courtesy call, General meeting.
12	28	Fri	all Member Kampong Cham	K/C	Field investigations.
13	29	Sat	kono, Murakami K/C – PNH	PNH · K/C	Field investigations, General meeting.
14	30	Sun	Tada, Iwasaki, Funahara K/C – PNH	PNH · K/C	Data arrangement.
15	31	Mon	Tada, Kono, Murakami, Funahara PNH, other K	PNH · K/C	Field investigations, Meeting Chankosai · Chhin · Bunna
16	1-Aug	Tue	Tada, Murakami, Funahara PNH	PNH · K/C	Field investigations Design confrence · traffic,
17	2	Wed	Tada, Kono, Murakami, PNH, other K/C	PNH · K/C	Field investigations, design investigations.
18	3	Thu	Tada, Kono, Murakami, PNH, other K/C	PNH · K/C	Field investigations, design investigations.
19	4	Fri	all Member K/ C	K/C	Field investigations, design investigations.
20	5	Sat	Tada, Kono, Murakami, Funahara PNH, other K	PNH · K/C	Field investigations, design investigations.
21	6	Sun	Tada, Kono, Murakami, Funahara PNH, other K	PNH · K/C	Field investigations, design investigations.
22	7	Mon	Tada, Kono, Murakami, PNH, other K/C	PNH · K/C	Field investigations, design investigations.
23	8	Tue	Tada, Kono, Murakami, PNH, other K/C	PNH · K/C	Conference Chankosal · Sokha, field
24	9	Wed	Tada, Kono, Murakami, PNH, other K/C	PNH · K/C	Field investigations.
25	10	Thu	Tada, Kono, Murakami, PNH, other K/C	PNH · K/C	conference Chankosal (a cross section), field
26	11	Fri	Tada, Kono, Murakami, PNH, other K/C	K/C	Field investigations.
27	12	Sat	all Member K/ C	PNH · K/C	Field investigations, General meeting.
28	13	Sun	Tada, Kono, Murakami, Funahara PNH, other K	PNH · K/C	Data arrangement.
29	14	Mon	Tada, Kono, Murakami, Funahara PNH, other K	PNH · K/C	Field investigations.
30	15	Tue	Tada, Kono, Murakami, Funahara PNH, other K	PNH · K/C	Conference SMEC · Conference Chankosal
31	16	Wed	Tada, Kono, Murakami, PNH, other K/C	PNH · K/C	Meeting Kawamura · Field investigations
32	17	Thu	all Member PNH	PNH	General meeting, Receive aerial photograph
33	18	Fri	all Member PNH	PNH	Floodplain observation by the helicopter · RCC
34	19	Sat	all Member PNH	PNH	General meeting.
35	20	Sun	all Member PNH	PNH	Data arrangement.
36	21	Mon	Ikeda leave PNH	PNH	Report preparation.
37	22	Tue	Ikeda arrive NRT	PNH	Report preparation.
38	23	Wed	Tada, Kono, Murakami, Iwasaki, Funahara	PNH	Memorandum signing.
39	24	Thu	Tada, Kono, Murakami, Iwasaki, PNH, Funahara	PNH · K/C	Report preparation, Receive drawing s ..
40	25	Fri	Tada, Kono, Murakami, Iwasaki, Funahara	PNH	Returning report JICA office
41	26	Sat	Tada, Kono, Murakami, Iwasaki, Funahara	PNH · BKK	PNH 10:50 – BKK 12:00
42	27	Sun	Tada, Kono, Murakami, Iwasaki, Funahara	NRT	BKK – NRT 19:00

Second Survey

No	Date.	Day	Contents of a member movement.	Staying	Contents of investigation.
1	22-Oct.	Sun	Tada.Kono.Murakami NRT-BKK	BKK	Departure,
2	23	Mon	Tada.Kono.Murakami BKK-PNH	PNH	JICA· embassy arrangements.
3	24	Tue	Tada.Kono.Murakami PNH	PNH	MPWT conference.
4	25	Wed	Leader YAMADA BKK-PNH	PNH	MPWT conference , Meeting.
5	26	Thu	Tada.Kono.Murakami PNH	PNH	MPWT basic design outline explanation ,
6	27	Fri	Tada.Kono.Murakami PNH	PNH	Embassy ·JICA office report.
7	28	Sat	Leader YAMADA PNH-BKK	PNH	Field investigations.
8	29	Sun	Tada.Kono.Murakami PNH	PNH	Data arrangement.
9	30	Mon	Tada.Kono.Murakami PNH	PNH	Data arrangement.
10	31	Tue	Tada.Kono.Murakami PNH	PNH·BK	PNH1035—BKK1140
11	1-Nov.	Wed	Tada.Kono.Murakami PNH	NRT	BKK0820—NRT1600

3. list of Party Concerned in Recipient Country (Cambodia)

(1) The Japanese Embassy in Cambodia

Mr.Masaki SAITOU Ambassador
Mr.Tisihiko HORIUCHI First Secretary
Mr.Yosunari UEDA First Secretary

(2) JICA office in Cambodia

Mr kazuo MATSUDA Representative of JICA Cambodia Office
Mr.Sinniti MASUDA Deputy Representative

(3) Ministry of Public Works and Transport

Cabinet minister.	Khy Tainglim
Director General	Chhin Kong Hean
First Deputy Director General	Tauch Chankosal
Deputy Director General	Phy Lyda
The Head of Laboratory	Yit Bunna
Director of Laboratory	Khun Sokha
Bridge Engineer	Nou Vaddhanak

Director of Kampong Cham.	Slot Sambo
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The Head of Phnom Penh Port	Bun Eng
Deputy Director	Hei Bavy
Chief Enginner	Eang Veng Sun

(4) JICA Expert

Mr.Masaru KAWAMURA
Mr.Yasuo TAKAGAKI
Mr.Kiyosi AKIYAMA
Mr.Tetsuo HAGIWARA
Mr.Shoshiro HORIGOME
Mr.Masao MIYAZAKI

list of the persons Concerned in Cambodia (D-B/D)

(1) The Japanese Embassy in Cambodia

Mr.Masaki KAWAGUCHI Second Secretary
Mr.Yuji WATANABE Second Secretary

(2) JICA office in Cambodia

Mr kazuo MATSUDA The head.
Mr.Yukihiro KOIZUMI Staff

(3) Ministry of Public Works and Transport

Director General	Mr.Chhin Kong Hean
First Deputy Director General	Mr.Tauch Chankosal
The Head of Laboratory	Mr.Yit Bunna
Director of Cabinet	Mr.Sam Sok
Department of Road Infrastructura Director	Mr.Lim Sidenine
Planning Department Deputy Director	Mr.Vasim Sorya
Administration Department director	Mr.Min Meanvy
Accounting & finance DepartmentDeputy Director	Mrs..Khuoyhak Sothyrun
Directrate General for Deputy Director Director General	Me.Slot Sambo
Heavy Equipment Centre Deputy Director	Mr.Prum Chan Souannary
Heavy Equipment Centre Deputy Director	Mr.Sar Siyhan
Director of Finance Deputy Director	Mrs.En Sotha

(4) JICAExpert

Mr.Masaru KAWAMURA

4. Minutes of Discussions

- (1) Minitutes of Discussions (July 20, 2000)**
- (2) Minitutes of Discussions (October 26, 2000)**

Minutes of Discussions
on the Basic Design Study
on the Project for Rehabilitation of National Road No.7, Kampong Cham
in the Kingdom of Cambodia

In response to the request from the Government of the Kingdom of Cambodia (hereinafter referred to as "Cambodia"), the Government of Japan has decided to conduct a basic design study on the Project for Rehabilitation of National Road No.7, Kampong Cham (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 a basic design study team (hereinafter referred to as "the Team"), which is headed by Mr. Kazuo Nakagawa, Managing Director, Office of Technical Coordination and Examination, Grant Aid Management Department, JICA, and is scheduled to stay in the country from July 17 to August 26, 2000.

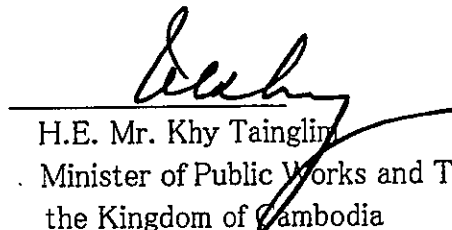
The Team held discussions with the concerned officials of the Government of the Kingdom of Cambodia.

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

Phnom-Penh, July 20, 2000.



Kazuo Nakagawa
Leader
Basic Design Study Team
Japan International
Cooperation Agency



H.E. Mr. Khy Tainglin
Minister of Public Works and Transport,
the Kingdom of Cambodia

ATTACHMENT

1. OBJECTIVE

The objective of the Project is to improve living conditions of inhabitants in the Project area by Rehabilitation of the roads and bridges on National Road No.7 in Kampong Cham Area.

2. PROJECT SITE

The site of the Project is shown in Annex-1.

3. RESPONSIBLE ORGANIZATION AND IMPLEMENTING AGENCY

(1) Responsible Organization : Ministry of Public Works and Transport
(MPWT)

(2) Implementing Agency : Heavy Equipment Center, MPWT

The organization chart is shown in Annex-2.

4. ITEMS REQUESTED BY THE GOVERNMENT OF THE KINGDOM OF CAMBODIA

After discussions with the Team, the following were finally requested by Cambodian side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

- (1) Road Rehabilitation (Tonle Bet – Thnal Totoeng) apporox.11,500m
- (2) Moat Khmung Bridge
- (3) Meaream Bridge



5. JAPAN'S GRANT AID SYSTEM

The Cambodian side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Cambodia explained by the Team and described in Annex-3 and Annex-4 of the Minutes of Discussions signed by both parties on April 10, 1999.

6. SCHEDULE OF THE STUDY

- (1) The consultants will proceed to further studies in Cambodia until August 26, 2000.
- (2) JICA will prepare the draft final report in English and dispatch a mission in order to explain its contents in October, 2000.
- (3) In case that the contents of the report is accepted in principle by the Government of Cambodia, JICA will complete the final report and send it to the Government of Cambodia by January, 2001.

7. OTHER RELEVANT ISSUES

- (1) The Government of Cambodia will take all possible measures to secure the safety of the people concerned during the study and implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.
- (2) In case land acquisition and compensation including relocation of resident are required as a result of the Basic Design Study, the Government of Cambodia confirmed to complete all necessary procedures relating land acquisition and compensation prior to implementation of the Project.
- (3) The Government of Cambodia will remove all UXOs and mines in accordance with the results of the UXO and mine search. The search and removal work by the Government of Cambodia will complete prior to the commencement of the detailed design and construction of the Project, respectively. While executing the Basic Design Study, the Government of Cambodia will also secure safety survey condition

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regarding all UXOs and mines.

(4) In case the Government of Cambodia judges the necessity of EIA (Environmental Impact Assessment), MPWT will undertake required procedure to get approval from related agency within the period of this Basic Design Study.

(5) The Government of Cambodia will conduct the traffic control on overloaded vehicles in order to maintain the facilities in proper condition while this project is being executed and after completed. MPWT promised to explain current situations of traffic control on overloaded vehicles to the Study Team.

(6) The Team will investigate following items relating facilities possessed by Road Construction Center in order to study the possibility of availability on this Project:

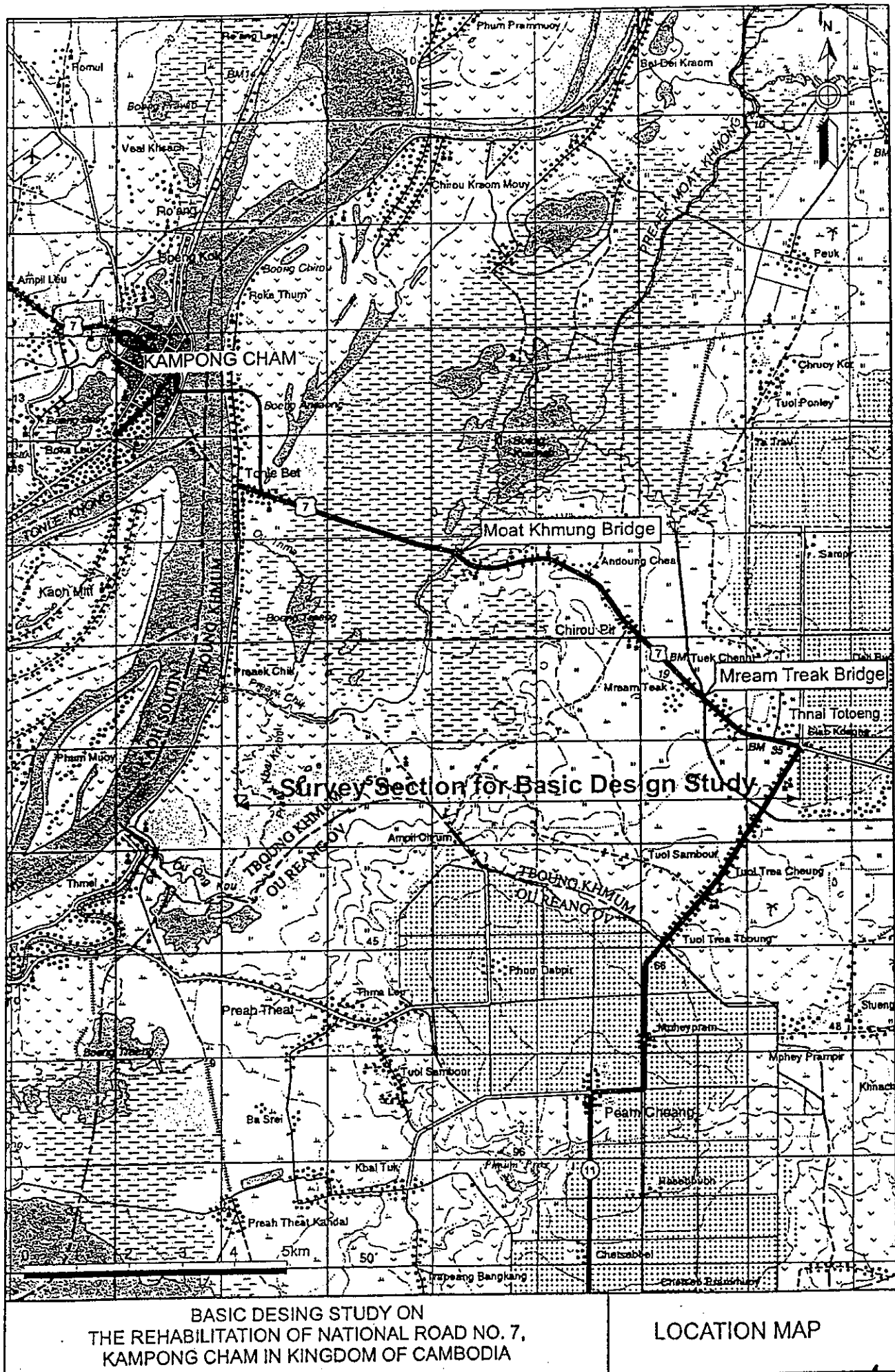
- 1) availability of machineries and equipment
- 2) list of machineries and equipment
- 3) condition of lease on these goods

The Government of Cambodia agreed, in principal, to take the necessary measures to utilize the facilities for the Project.

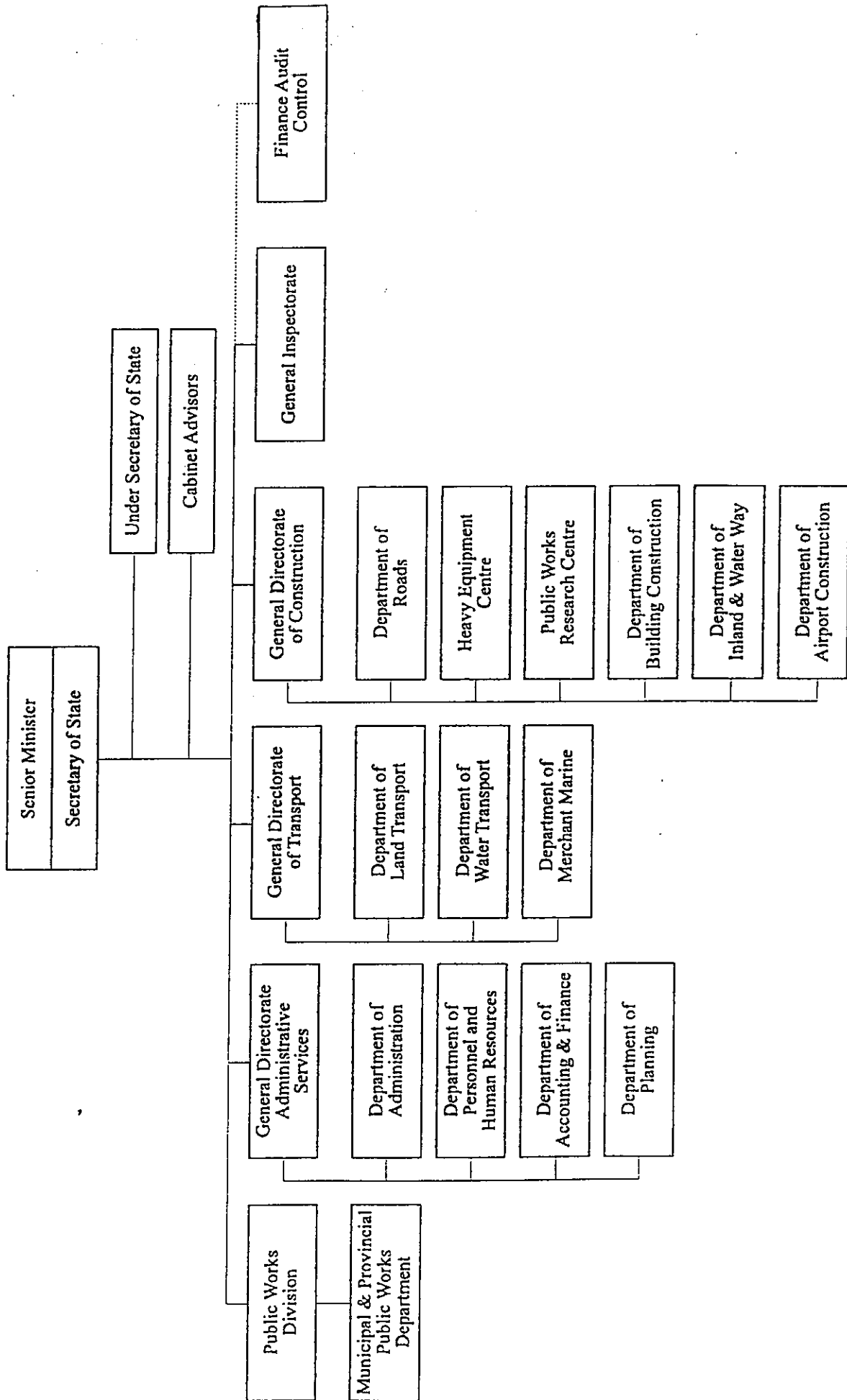
(7) As for rehabilitation of road section between ferry port and the junction point with newly constructing approach road in the Mekong bridge project, MPWT will submit documents regarded as validity of necessity towards rehabilitation of this section such as development scheme around this area inclusive of utilization of existing ferry port in the wake of completion of the Mekong bridge before the Study Team returns to Japan. Based on the results of analysis in Japan, Japanese and Cambodian sides will discuss again whether this section is incorporated in the Project and will determine rehabilitation level on this section.

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The Organization Chart of Ministry of Public Works and Transport



**Minutes of Discussions
on the Basic Design Study
on the Project for Rehabilitation of National Road No.7,
Kampong Cham
in the Kingdom of Cambodia
(Explanation on Draft Report)**

In July 2000, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched Basic Design Study Teams on the Project for Rehabilitation of National Road No.7, Kampong Cham in the Kingdom of Cambodia (hereinafter referred to as "the Project") to the Kingdom of Cambodia (hereinafter referred to as "Cambodia"), and through discussions, 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 Government of Cambodia on the components of the draft report, JICA sent to Cambodia the Draft Report Explanation Team, which is headed by Mr. Yoshikazu Yamada, Director, Third Project Management Division, Grant Aid Management Department, JICA, from October 23 to 31, 2000.

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

Phnom-Penh, October 26, 2000.



Yoshikazu Yamada
Leader
Draft Report Explanation Team
Japan International Cooperation Agency



for H.E. Mr. Khy Tainglim
Minister of Public Works and Transport
the Kingdom of Cambodia

- (3) Both sides agreed that demarcation between this project and ADB funded project was just before the junction point with Route 7 and Route 11.
- (4) The Government of Cambodia shall take all possible measures to secure the safety of the concerned people during the study and implementation of the Project on condition that the Grant Aid by the Government of Japan is extended to the Project.
- (5) The Government of Cambodia shall remove all UXOs and mines in accordance with the results of the UXO and mine search. The search and removal work by the Government of Cambodia will complete prior to the commencement of the detailed design and construction of the Project, respectively. The Government of Cambodia shall make officials dealing with UXO accompany with the detailed design study team.
- (6) The Government of Cambodia shall conduct the traffic control on overloaded vehicles in order to maintain the facilities in proper condition while this project is being executed and after its completion.

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ATTACHMENT

1. Components of the Draft Report

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

2. Japan's Grant Aid Scheme

The Cambodian side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Cambodia as explained by the Team and described in Annex-3 and Annex-4 of the Minutes of Discussions signed by both parties on April 10, 1999.

3. Schedule of the Study

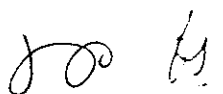
JICA will complete the Final Report in accordance with the confirmed items and send it to the Government of Cambodia by February 2001.

4. Other Relevant Issues

(1) The Government of Cambodia especially confirmed that the Cambodian side had the responsibility for the following items:

- a) Demolition of the existing Moat Khmung bridge after the completion of new bridge.
- b) Land Acquisition including compensation, if necessary, for the execution of the Project, such as the land for house, temporary offices, working areas, storage yards and others.
- c) Inspection and maintenance of the existing Moat Khmung bridge until commencement of this Project.
- d) Relocation / removal and installation of utilities consisting of power line, telephone line and TV cable.

(2) Both sides agreed that rehabilitation of road section between ferry station at the east side of Mekong River and junction point with newly constructing approach road in the Mekong bridge project was not included in this project.



5. Cost Estimation Borne by the Government of Cambodia

Following cost is estimated to be borne by the Government of Cambodia.

(1) removal of existing bridge(Moat Khmun Bridge)	50,000US\$
(2) relocation cost regarding power line and telephone line	5,000US\$
(3) investigation and clearing of mines and unexploded ordnance	150,000US\$
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Total	205,000US\$

6. Other Relevant Data

6-1 Survey of Traffic Volume

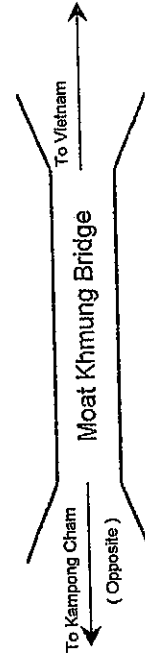
Nippon Koei Classified traffic Counting Survey

Station : Moat Khmung Bridge
Direction : To Vietnam and Opposite

Direction	Time of Survey (Hours)	Date : 01/08/2000					Date : 03/08/2000					Date : 05/08/2000				
		Vehicle Type					Vehicle Type					Vehicle Type				
		1	2	3	4	Total	1	2	3	4	Total	1	2	3	4	Total
B1 : To Vietnam	06-07	123	24	16	7	170	127	19	6	2	154	150	10	7	16	183
	07-08	166	18	12	1	197	135	24	7	1	167	149	19	8	5	181
	08-09	117	28	8	7	160	119	13	7	2	141	137	17	9	2	165
	09-10	90	20	8	1	119	116	30	17	4	167	130	29	15	3	177
	10-11	97	20	10	0	127	79	25	6	3	113	119	20	7	9	155
	11-12	92	26	12	2	132	115	36	5	1	157	109	27	19	3	158
	12-13	96	30	5	3	134	103	19	6	2	130	102	27	10	5	144
	13-14	99	27	6	2	134	115	11	3	2	131	91	16	7	0	114
	14-15	109	21	7	9	146	89	16	6	1	112	94	14	4	3	115
	15-16	101	14	5	1	121	102	19	7	10	138	90	14	6	4	114
B2 : Opposite	16-17	93	23	6	4	126	103	10	4	16	133	91	23	5	6	125
	Sub- Total	1183	251	95	37	1566	1203	222	74	44	1543	1262	216	97	56	1631
	06-07	157	44	17	6	224	170	16	22	5	213	127	19	6	2	154
	07-08	176	38	9	3	226	171	20	11	2	204	135	24	7	1	167
	08-09	121	35	12	0	168	176	51	12	2	241	119	13	7	2	141
	09-10	116	15	6	0	137	104	21	3	0	128	116	30	17	4	167
	10-11	142	26	5	1	174	128	17	11	1	157	79	25	6	3	113
	11-12	82	18	5	1	106	95	16	5	2	118	115	36	5	1	157
	12-13	84	10	3	3	100	76	12	4	2	94	103	19	6	2	130
	13-14	143	16	5	3	167	92	9	6	12	119	115	11	3	2	131
Grand Total	14-15	59	13	6	3	81	91	7	7	7	112	89	16	6	1	112
	15-16	45	9	4	4	62	69	14	5	8	96	102	19	7	10	138
	16-17	60	14	6	5	85	86	20	3	1	110	103	10	4	16	133
	Sub- Total	1185	238	78	29	1530	1258	203	89	42	1592	1203	222	74	44	1543
	Grand Total	2368	489	173	66	3096	2261	425	163	86	3135	2465	438	171	100	3174

Legend:
Vehicle Type:

- 1 : Bicycle, Motorcycle, Motorcycle with trailer
- 2 : Passenger car, Light Delivery Vehicle, Minibus
- 3 : Two Axle Truck / Bus
- 4 : Three Axle Truck / Bus



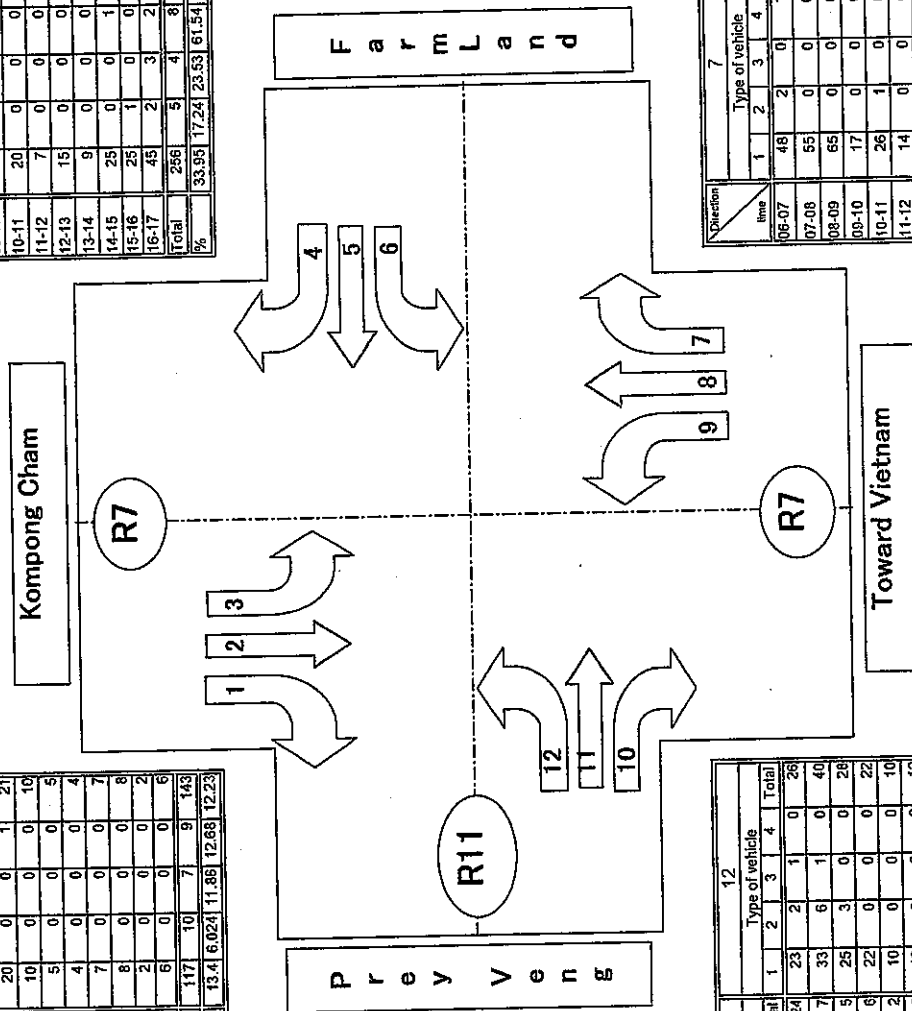
Nippon Koei Classified Traffic counting Survey

Station : Thnal Tolung (C)

Direction : 1 - 6

Date : 01/08/2000

Direction	1																2																3																																																																																																																																																																															
	Type of vehicle																Total	Type of vehicle																Total	Type of vehicle																Total																																																																																																																																																													
	1	2	3	4	Total	1	2	3	4	Total	1	2	3	4	Total	1		2	3	4	Total																																																																																																																																																																																											
line	06-07	23	3	1	1	28	60	10	7	9	86	20	5	4	4	33	07-08	31	1	1	0	33	65	6	5	6	82	15	3	2	2	22	08-09	24	0	1	0	25	70	16	10	6	102	20	2	1	2	25	09-10	28	4	1	0	33	50	22	7	10	89	20	0	0	1	21	10-11	19	1	0	0	20	50	15	2	3	70	10	0	0	0	10	11-12	23	2	0	0	25	45	13	2	2	62	5	0	0	0	5	12-13	14	1	1	0	16	42	13	1	4	60	4	0	0	0	8	13-14	12	3	0	1	16	46	12	2	5	65	7	0	0	0	7	14-15	11	1	0	1	13	45	12	5	4	66	8	0	0	0	8	15-16	17	1	2	3	23	40	8	3	4	55	2	0	0	0	2	16-17	11	1	1	1	14	30	11	0	2	43	6	0	0	0	6	Total	213	18	6	7	246	643	138	44	55	780	117	10	7	9	143	%	24.4	10.84	13.56	9.859	21.04	62.2	83.13	74.58	77.46	66.72	13.4	5.024	11.95	12.68	12.23



Direction	7					8					9				
	Type of vehicle					Type of vehicle					Type of vehicle				
	1	2	3	4	Total	1	2	3	4	Total	1	2	3	4	Total
08-07	48	2	0	1	51	105	14	3	4	126	30	2	2	1	35
07-08	55	0	0	0	55	122	29	7	0	158	38	0	0	0	38
08-09	65	0	0	0	65	126	14	12	2	154	20	1	0	1	22
09-10	17	0	0	0	17	78	16	5	4	103	26	1	0	1	28
10-11	26	1	0	0	27	41	7	2	1	51	17	1	0	1	19
11-12	14	0	0	0	14	31	4	2	0	37	15	0	1	1	17
12-13	23	0	0	2	25	47	5	3	0	55	18	0	1	0	19
13-14	16	0	0	0	16	33	6	2	3	44	26	0	3	0	29
14-15	13	0	0	1	14	40	11	2	2	55	13	0	1	0	14
15-16	22	0	0	0	22	36	6	1	2	45	24	1	0	0	25
16-17	30	2	1	1	34	15	4	1	4	24	2	0	1	1	4
Total	329	5	1	5	340	674	116	40	22	852	229	6	9	6	250
%	26.7	3.937	2	15.15	23.58	54.71	91.34	90	66.67	59.08	18.50	4.724	18	18.18	17.34

Division lines	10					11					12				
	Type of vehicle					Total	Type of vehicle					Total			
	1	2	3	4	1		2	3	4	1	2		3	4	
06-07	76	0	2	4	82	20	2	0	2	24	23	2	1	0	26
07-08	57	0	2	2	61	7	0	0	0	7	33	6	1	0	40
08-09	40	0	2	0	44	5	0	0	0	5	25	3	0	0	28
09-10	15	2	1	1	19	6	0	0	0	6	22	0	0	0	22
10-11	20	0	0	0	20	2	0	0	0	2	10	0	0	0	10
11-12	28	0	0	0	28	5	1	0	0	6	12	0	0	0	12
12-13	27	0	2	4	33	13	1	0	0	14	30	2	0	1	33
13-14	25	0	1	0	26	2	0	0	0	2	14	0	0	0	14
14-15	21	3	0	3	27	5	0	0	0	5	15	2	1	1	19
15-16	26	2	0	3	31	8	0	0	0	8	17	2	0	2	21
16-17	6	1	0	0	7	5	5	0	0	1	6	11	2	0	14
Total	343	10	8	19	380	78	4	0	3	85	212	19	3	5	239
%	54.19	30.3	72.73	70.37	53.06	12.32	12.12	0	11.11	12.07	33.49	57.56	27.27	15.52	33.93

Nippon Koei Classified Traffic counting Survey

Station : Thnal Tehung (C)

Direction : 1 - 12

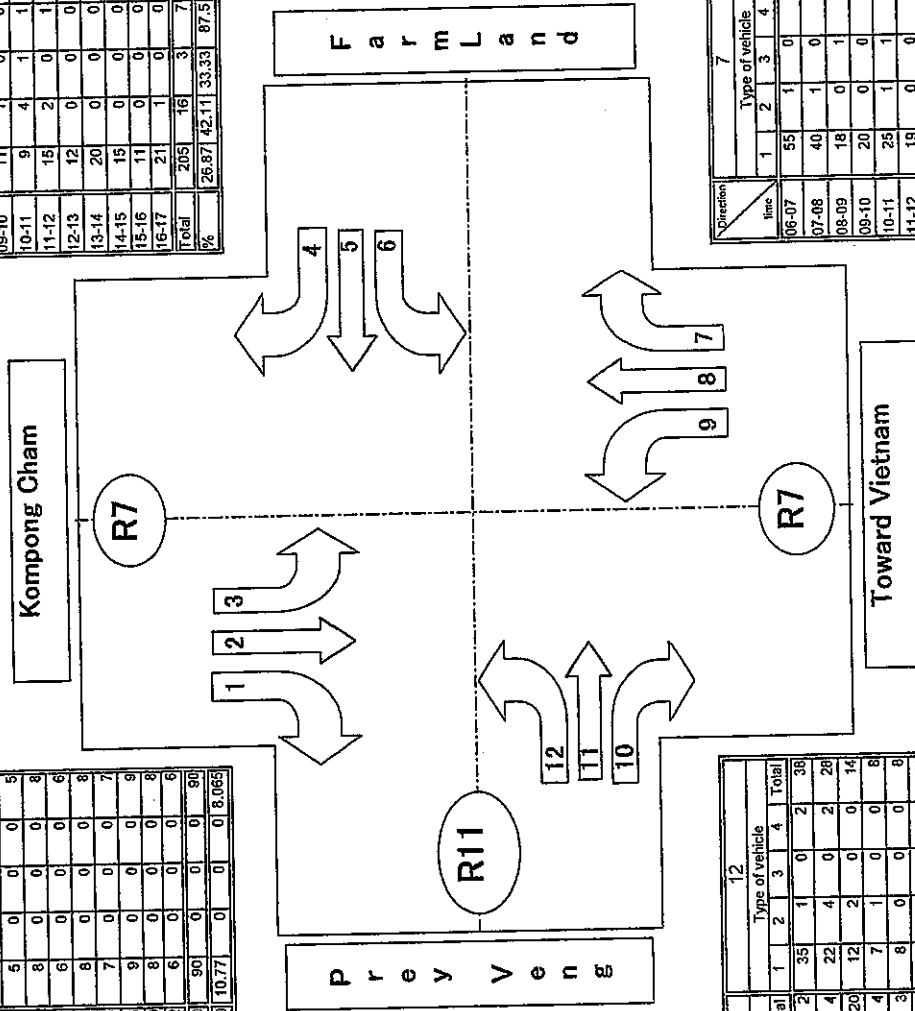
Date : 03/08/2000

Direction Time	1				2				3			
	1	2	3	4	1	2	3	4	1	2	3	4
06-07	22	2	1	2	27	60	10	2	1	73	10	0
07-08	23	1	0	0	24	75	10	3	2	90	15	0
08-09	26	0	1	1	28	70	22	5	2	99	8	0
09-10	18	3	1	0	22	59	16	8	5	78	5	0
10-11	22	2	1	1	26	55	26	8	2	91	8	0
11-12	15	4	1	1	21	40	22	6	2	70	6	0
12-13	19	2	0	0	21	45	16	3	2	66	8	0
13-14	14	0	0	2	16	30	11	3	1	45	7	0
14-15	17	0	0	0	17	35	5	4	2	46	9	0
15-16	12	2	0	0	14	40	10	6	3	59	8	0
16-17	18	2	0	0	20	40	11	6	15	72	6	0
Total	206	18	5	7	236	540	159	54	37	790	90	0
%	24.64	10.17	8.475	15.91	21.15	64.59	19.83	91.53	84.09	70.79	10.77	0

Direction Time	10				11				12			
	1	2	3	4	1	2	3	4	1	2	3	4
06-07	90	3	0	5	98	2	0	0	2	35	1	0
07-08	68	1	1	2	72	3	1	0	4	22	4	0
08-09	50	0	0	0	50	20	0	0	20	12	2	0
09-10	28	1	0	0	29	4	0	0	4	7	1	0
10-11	20	1	0	1	22	3	0	0	3	8	0	0
11-12	24	1	0	0	25	4	0	0	4	11	0	0
12-13	15	1	0	0	16	2	0	0	2	13	2	0
13-14	10	0	0	0	10	4	0	0	4	12	0	0
14-15	12	1	1	0	14	3	0	0	3	9	2	0
15-16	20	0	0	0	20	4	0	0	4	14	2	0
16-17	10	3	5	0	18	2	2	0	4	30	0	0
Total	347	12	7	8	374	51	3	0	54	173	14	0
%	60.77	41.38	100	50	60.03	8.932	10.34	0	8.668	30.3	48.28	0

Direction Time	4				5				6			
	1	2	3	4	1	2	3	4	1	2	3	4
06-07	45	4	0	2	51	35	5	1	0	41	56	4
07-08	20	2	2	2	26	20	2	1	0	23	25	1
08-09	28	2	0	1	29	26	1	0	0	27	30	1
09-10	11	1	0	0	12	15	1	0	0	16	22	1
10-11	9	4	1	1	15	30	0	0	0	30	25	1
11-12	15	2	0	1	18	20	0	0	0	37	22	0
12-13	12	0	0	0	12	36	1	0	0	37	22	0
13-14	20	0	0	0	20	20	0	0	0	20	25	0
14-15	15	0	0	0	15	21	1	0	0	22	25	0
15-16	11	0	0	0	11	22	0	0	0	22	19	0
16-17	21	1	0	0	22	18	0	0	0	18	16	3
Total	205	16	3	7	231	263	11	2	0	276	235	11
%	26.87	42.11	33.33	87.51	28.24	34.47	28.95	22.22	0	33.74	38.66	28.95

Direction Time	7				8				9			
	1	2	3	4	1	2	3	4	1	2	3	4
06-07	55	1	0	0	56	89	7	4	1	101	27	3
07-08	40	1	0	1	42	75	17	9	0	101	27	1
08-09	18	0	1	0	19	81	21	6	1	109	30	1
09-10	20	0	0	0	20	51	18	3	1	73	8	0
10-11	25	1	1	0	27	47	8	1	0	55	8	1
11-12	19	0	0	0	19	28	9	4	0	41	32	0
12-13	25	1	0	0	26	51	8	7	4	70	22	2
13-14	30	0	0	0	30	65	7	5	4	81	8	0
14-15	28	0	0	1	29	48	6	5	6	67	26	2
15-16	26	0	0	0	26	32	7	4	3	46	17	1
16-17	35	1	0	1	37	37	13	5	2	57	12	2
Total	321	5	2	3	331	604	121	53	24	802	217	13
%	28.11	3.597	3.03	9.091	23.98	52.89	87.05	80.3	72.73	58.12	19.9353	16.67



Nippon Koel Classified Traffic counting Survey

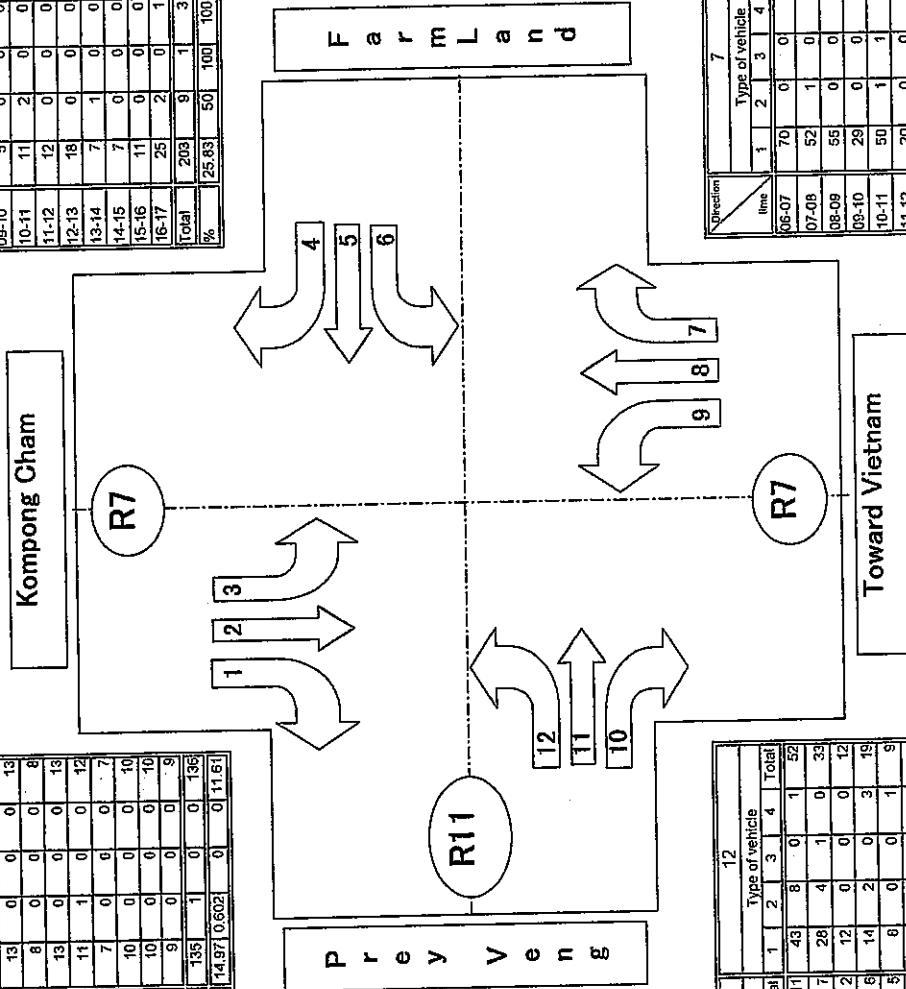
Station : Thnat Totung (C)

Direction : From 1 to 12

Date : 05/08/2000

Direction Time	1				2				3			
	Type of vehicle				Type of vehicle				Type of vehicle			
	1	2	3	4	1	2	3	4	1	2	3	4
06-07	28	3	3	2	36	70	6	2	9	87	20	0
07-08	25	2	1	2	30	75	14	2	3	94	16	0
08-09	24	2	2	1	29	72	19	6	3	100	18	0
09-10	21	2	1	1	25	60	15	6	2	83	13	0
10-11	17	2	1	0	20	50	28	9	8	92	8	0
11-12	21	4	0	3	28	43	6	2	1	52	13	0
12-13	15	2	1	2	20	35	12	4	3	54	11	0
13-14	13	3	1	0	17	37	13	5	2	57	7	0
14-15	12	1	1	0	14	33	10	3	1	47	10	0
15-16	20	0	0	0	20	35	9	2	2	48	10	0
16-17	26	4	1	0	31	35	11	2	3	51	9	0
Total	222	25	12	11	270	545	140	43	37	765	135	1
%	24.61	15.06	21.82	22.92	23.06	60.42	84.34	78.16	77.09	65.33	14.97	0.602

Direction Time	4				5				6			
	Type of vehicle				Type of vehicle				Type of vehicle			
	1	2	3	4	1	2	3	4	1	2	3	4
06-07	50	4	0	1	55	35	2	0	0	37	51	3
07-08	40	0	1	1	42	61	1	0	0	62	75	1
08-09	17	0	0	0	17	30	1	0	0	31	45	1
09-10	5	0	0	0	5	16	0	0	0	16	24	0
10-11	11	2	0	0	13	19	0	0	0	19	20	0
11-12	12	0	0	0	12	17	0	0	0	17	20	0
12-13	18	0	0	0	18	15	0	0	0	15	26	0
13-14	7	1	0	0	8	15	0	0	0	15	17	0
14-15	7	0	0	0	7	14	0	0	0	14	18	0
15-16	11	0	0	0	11	16	0	0	0	16	21	0
16-17	25	2	0	1	28	15	0	0	0	15	13	0
Total	203	9	1	3	216	253	4	0	0	257	330	5
%	25.83	50	100	100	26.73	32.19	22.22	0	0	31.81	41.98	27.78



Direction Time	10				11				12			
	Type of vehicle				Type of vehicle				Type of vehicle			
	1	2	3	4	1	2	3	4	1	2	3	4
06-07	80	0	3	9	102	10	0	1	11	43	8	0
07-08	60	3	2	0	65	6	1	0	7	28	4	1
08-09	60	0	0	0	60	2	0	0	2	12	0	0
09-10	17	0	2	19	6	0	0	0	6	14	2	0
10-11	16	3	0	0	19	5	0	0	5	8	0	1
11-12	6	1	1	1	9	3	0	0	3	19	0	0
12-13	13	1	0	0	14	6	0	0	6	21	2	0
13-14	12	0	0	1	13	2	0	0	2	17	2	0
14-15	15	1	1	6	22	14	0	0	14	8	0	0
15-16	22	3	0	1	26	4	0	0	4	21	4	0
16-17	10	0	1	2	13	8	0	0	8	10	2	0
Total	321	12	8	22	363	66	1	0	1	66	201	24
%	54.59	32.43	88.89	73.33	54.67	11.22	2.703	0	3.333	10.24	34.18	64.86

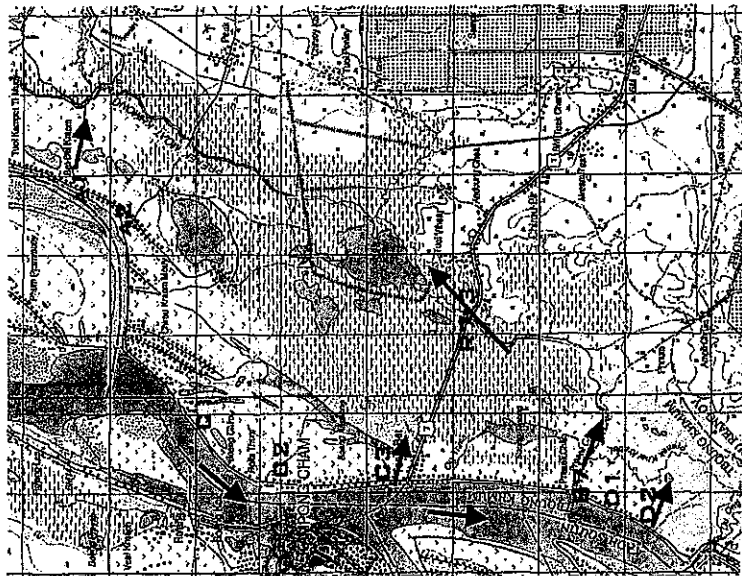
Direction Time	7				8				9			
	Type of vehicle				Type of vehicle				Type of vehicle			
	1	2	3	4	1	2	3	4	1	2	3	4
06-07	70	0	0	2	72	91	16	10	6	123	30	4
07-08	52	1	0	1	54	70	23	6	2	101	37	2
08-09	55	0	0	1	56	91	21	6	2	120	35	1
09-10	29	0	0	0	29	75	16	5	1	97	30	0
10-11	50	1	1	0	52	39	9	6	2	56	12	0
11-12	20	0	0	1	21	31	6	3	1	41	16	1
12-13	23	0	0	0	23	44	12	1	4	51	14	2
13-14	13	0	0	0	13	35	10	6	9	60	20	2
14-15	17	0	0	0	17	41	6	1	7	56	8	2
15-16	25	0	0	1	26	51	9	3	3	66	10	0
16-17	30	1	1	2	34	40	5	4	2	51	17	0
Total	384	3	2	8	397	503	133	51	39	831	229	14
%	31.45	2	3.175	14.04	26.63	49.8	88.67	80.95	68.42	55.73	18.76	9.333

6-2 Survey of Hydrological Observation

FLOODING SURVEY ON MEKONG RIVER

RECORDING DATE: 11-JULY-2000
WATER LEVEL @ MEKONG BRIDGE (12.40 M.)

MAP LOCATION



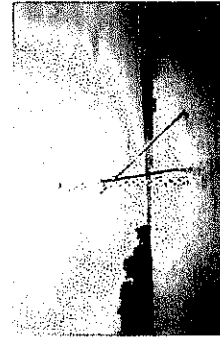
LOCATION PHOTOGRAPH



Location: A1



Location: C2



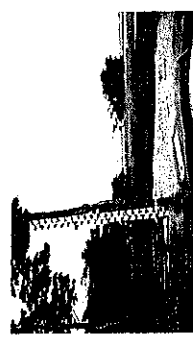
Location: D1



Location: A2



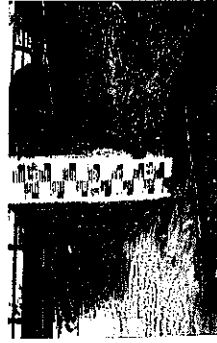
Location: C3



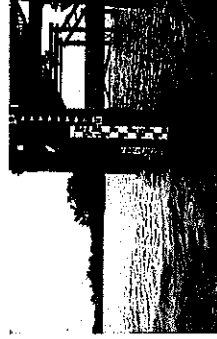
Location: D2



Location: C1



Location: B7



Location: B7-3 Moat Khmung Bridge

RECORDING DATA				
STAT.	WATER LEVEL (M)	VELOCITY (m/s)		FLOW DIRECTION OF V2
		V1	V2	
A1	12.960	1.589	0.509	+
A2	12.800	1.529		
C1	12.700	1.469		
C2	12.465	1.409		
C3	12.460	1.589		+
B7	12.360	1.409		+
D1	12.240	1.169		
D2	12.100	1.109		+
B6				
R7-1				
R7-2				
R7-3	12.280			
R7-4				
R7-5				
R7-6				

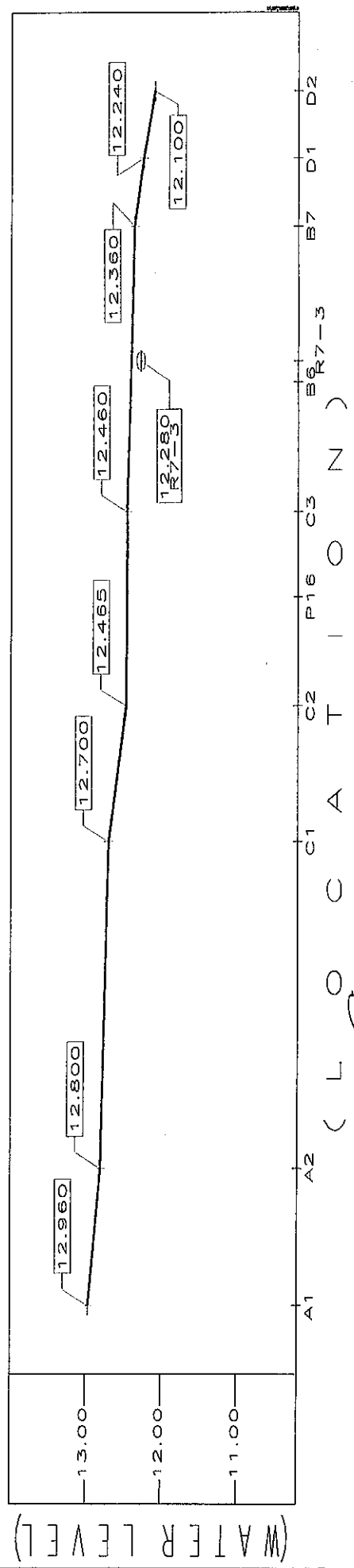
NOTE:

V1 = Velocity of the Main Stream Flow of Mekong River

V2 = Velocity of the Flow Stream into the Catchment Area

+ Water flow going into the catchment Area from Mekong River

- Water flow from the catchment Area going to Mekong River

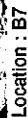
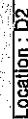
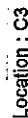
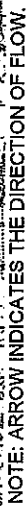


NOTE: ARROW INDICATES THE DIRECTION OF FLOW.

RECORDING DATE: 13-JULY-2000

WATER LEVEL @ MEKONG BRIDGE (13.40 M.)

LOCATION PHOTOGRAPH



NOTE:

$V1$ = Velocity of the Main Stream Flow of

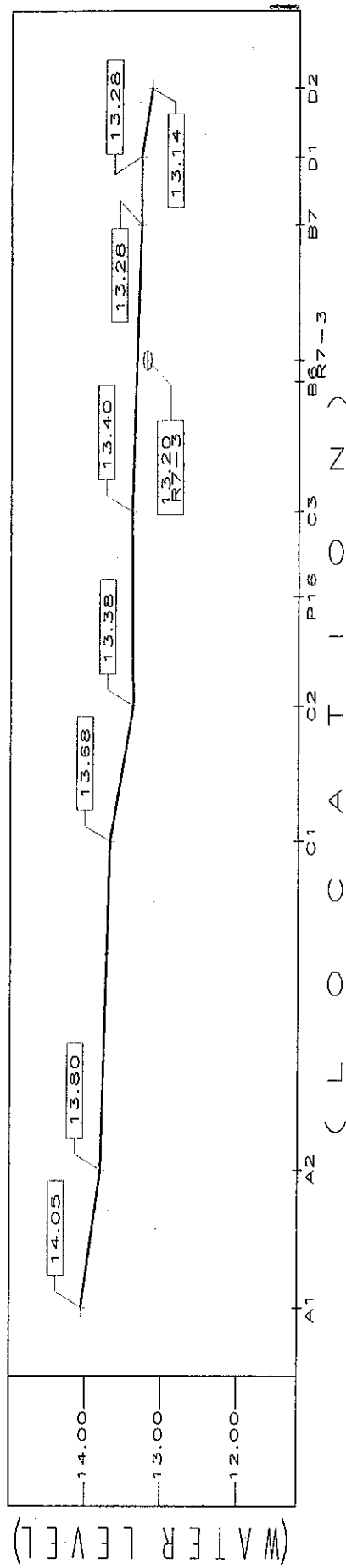
Mekon River

V2 = Velocity of the Flow Stream into the Catchment Area

Water flow going inn to the catchment

Area from mekong River

Water flow from the catchment Area going to mekong River



RECORDING DATE: 15-JULY-2000
WATER LEVEL @ MEKONG BRIDGE (14.38 M.)



NOTE:

$V1$ = Velocity of the Main Stream Flow of

Mekong River

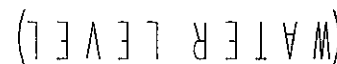
v_2 = Velocity of the Flow Stream into the

Catchment Area

Water flow going inn to the catchment

Area from mekong River

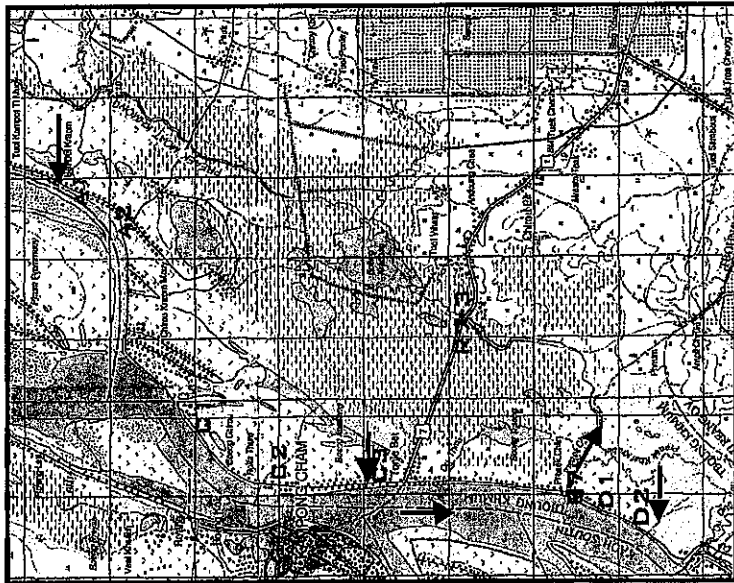
Water flow from the catchment Area



FLOODING SURVEY ON MEKONG RIVER

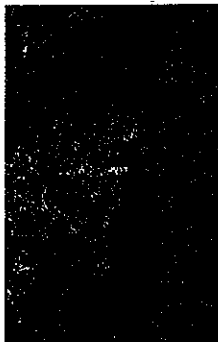
RECORDING DATE: 17-JULY-2000
WATER LEVEL @ MEKONG BRIDGE (14.82 M.)

MAP LOCATION



NOTE: ARROW INDICATES THE DIRECTION OF FLOW.

LOCATION PHOTOGRAPH



Location: A1



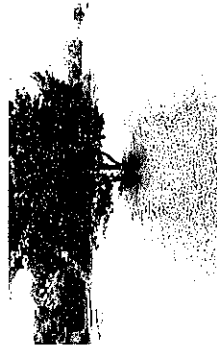
Location: C2



Location: D1



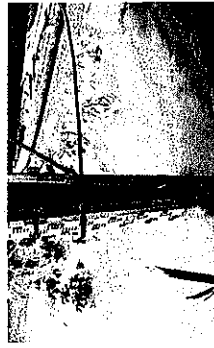
Location: A2



Location: C3



Location: D2



Location: B7

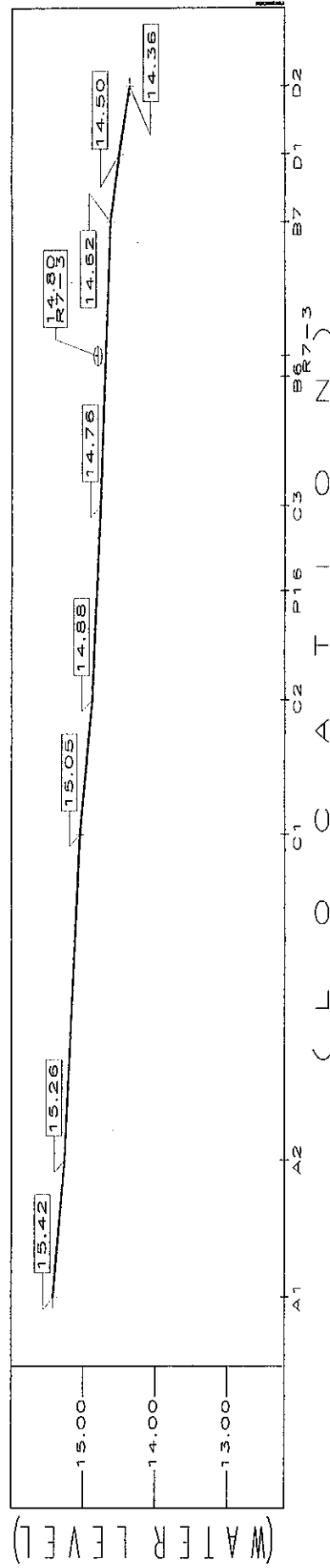


Location: R7 Moat Khmung Bridge

STA.	WATER LEVEL (M)		VELOCITY (m/s)		FLOW DIRECTION OF V2
	V1	V2	V1	V2	
A1	15.420	2.062	0.597	-	-
A2	15.260	1.706			
C1	15.050	2.288			
C2	14.880	1.563			
C3	14.760	1.372			
B7	14.620	0.69	0.280	+	+
D1	14.500	0.914			
D2	14.360	0.456	0.199	-	-
B6					
R7-1					
R7-2					
R7-3	14.800	2.309	1.949		
R7-4					
R7-5					
R7-6					

NOTE:

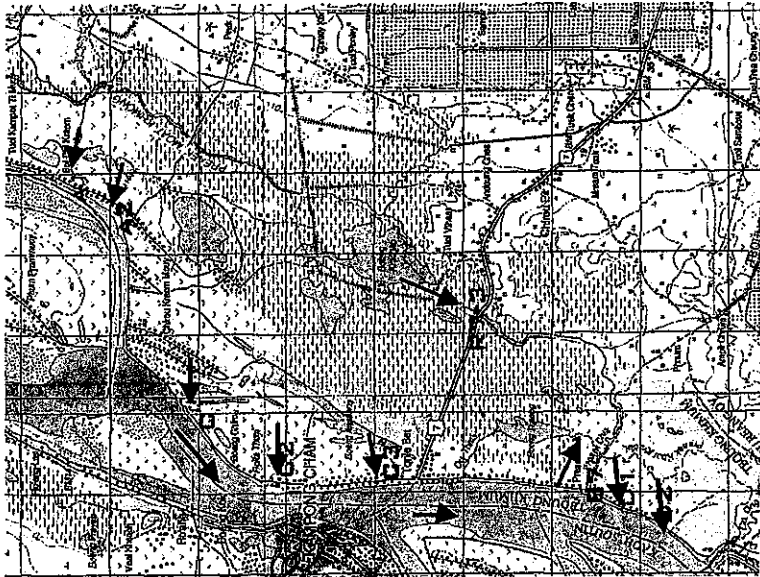
- V1 = Velocity of the Main Stream Flow of Mekong River
- V2 = Velocity of the Flow Stream into the Catchment Area
- + Water flow going into the catchment Area from Mekong River
- Water flow from the catchment Area going to Mekong River



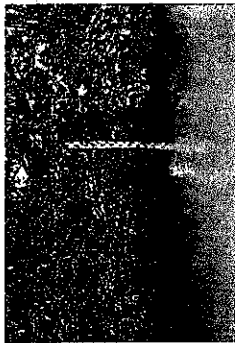
FLOODING SURVEY ON MEKONG RIVER

RECORDING DATE: 19-JULY-2000
WATER LEVEL @ MEKONG BRIDGE (15.26 M.)

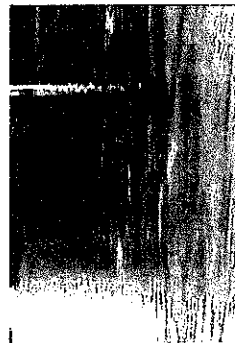
MAP LOCATION



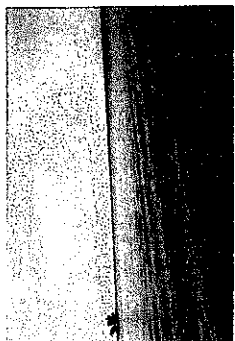
LOCATION PHOTOGRAPH



Location: A1



Location: C2



Location: D1



Location: A2



Location: C3



Location: D2



Location: C1



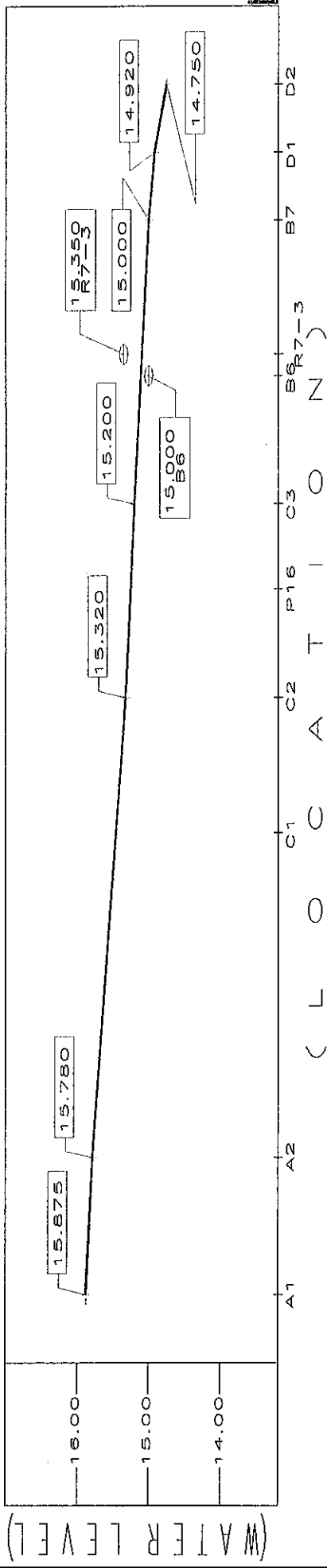
Location: B7



Location: R7-3 Moat Khmung Bridge

STA.	RECORDING DATA			FLOW DIRECTION OF V2
	WATER LEVEL (M)	VELOCITY (m/s)	V2	
A1	15.875	1.637	0.776	-
A2	15.780	1.930	0.593	-
C1	NONE	1.703		-
C2	15.320	1.806	1.745	-
C3	15.200	1.650	1.503	-
B7	15.000	1.801	0.647	+
D1	14.920	1.684	1.404	-
D2	14.750	1.648	0.943	-
B6	15.000			-
R7-1				-
R7-2				-
R7-3	15.350	2.369	1.949	-
R7-4				-
R7-5				-
R7-6				-
B.C.	15.460		0.728	-
A-2	15.480		1.205	-

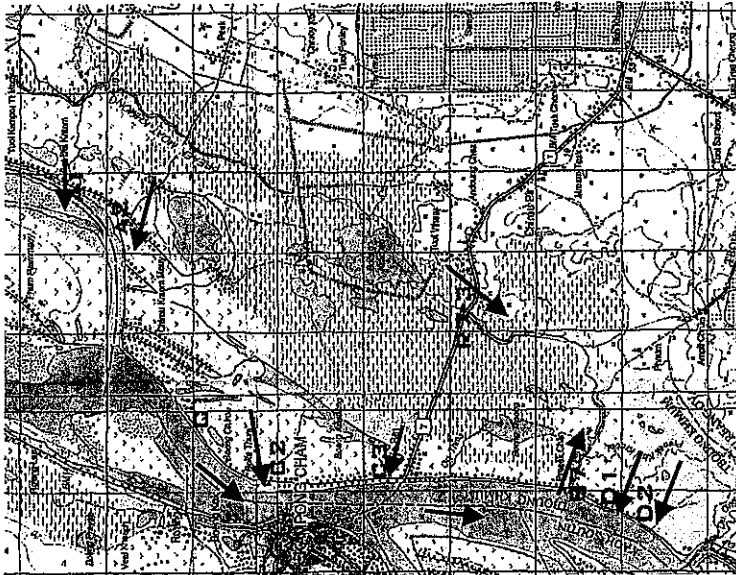
NOTE:
V1 = Velocity of the Main Stream Flow of Mekong River
V2 = Velocity of the Flow Stream into the Catchment Area
+ Water flow going inn to the catchment Area from Mekong River
- Water flow from the catchment Area going to Mekong River



FLOODING SURVEY ON MEKONG RIVER

RECORDING DATE: 22-JULY-2000
WATER LEVEL @ MEKONG BRIDGE (15.47 M.)

MAP LOCATION



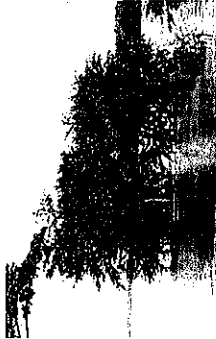
LOCATION PHOTOGRAPH



Location: A1



Location: C2



Location: D1



Location: A2



Location: C3



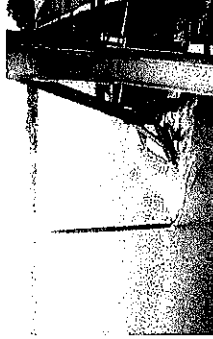
Location: D2



Location: C1



Location: B7

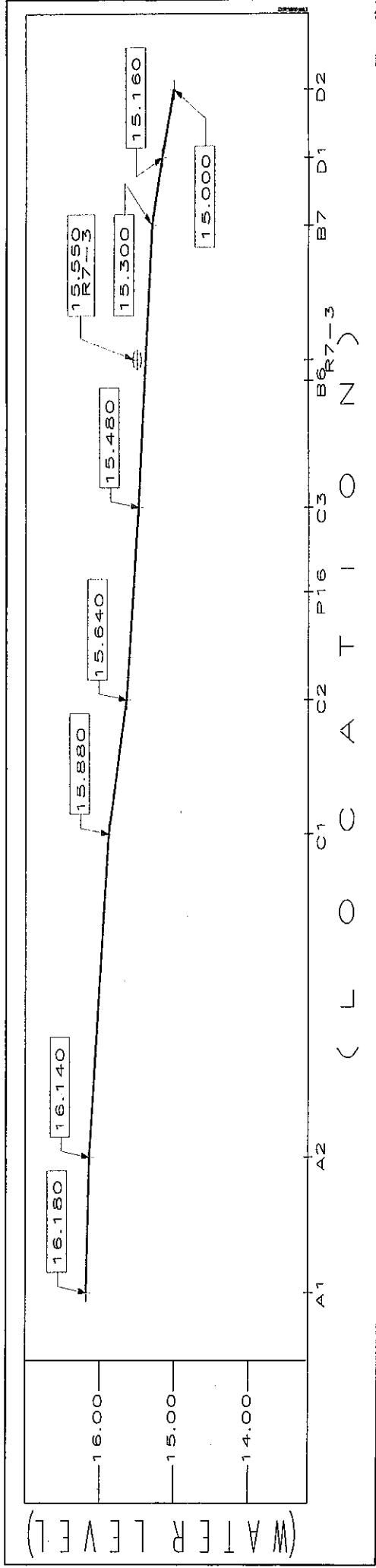


Location: R7-3 Moat Khmung Bridge

RECORDING DATA				FLOW DIRECTION OF V2
STAT.	WATER LEVEL (M)	VELOCITY (m/s)	V1	V2
A1	16.180	1.989	1.219	-
A2	16.140	1.155	1.219	-
C1	15.880	0.924		-
C2	15.640	1.728	0.624	-
C3	15.480	2.106	1.324	-
B7	15.300	1.923	0.763	+
D1	15.160	2.266	0.48	-
D2	15.000	2.278	0.491	-
B6				
R7-1				
R7-2				
R7-3	15.550	2.429	2.729	-
R7-4				
R7-5				
R7-6				

NOTE:

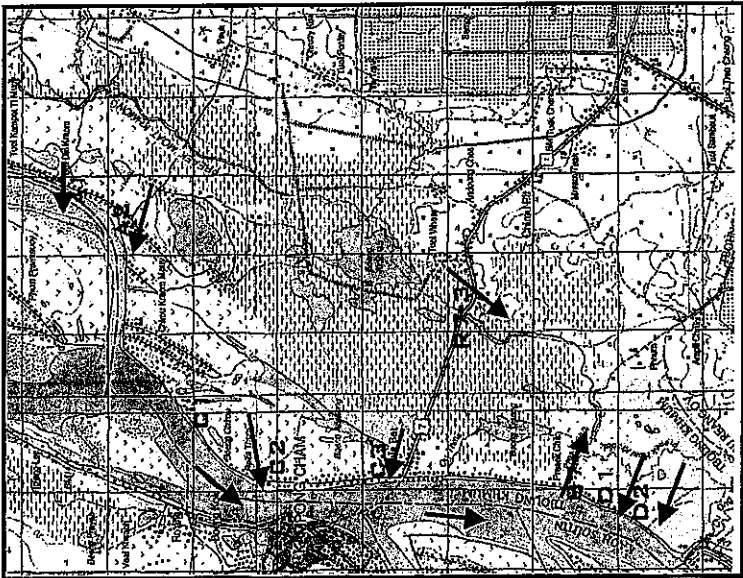
- V1 = Velocity of the Main Stream Flow of Mekong River
- V2 = Velocity of the Flow Stream into the Catchment Area
- + Water flow going inn to the catchment Area from mekong River
- Water flow from the catchment Area going to mekong River



FLOODING SURVEY ON MEKONG RIVER

RECORDING DATE: 26-JULY-2000
WATER LEVEL @ MEKONG BRIDGE (15.04 M.)

MAP LOCATION



LOCATION PHOTOGRAPH



Location: A1



Location: C2



Location: D1



Location: A2



Location: C3



Location: D2



Location: C1



Location: B7



Location :R7-3 Moat Khmung Bridge

RECORDING DATA				
STAT.	WATER LEVEL (M)	VELOCITY (m/s)		FLOW DIRECTION OF V2
		V1	V2	
A1	15.590	1.852	0.300	-
A2	15.500	1.110	1.193	-
C1	15.300	1.612		
C2	15.140	1.362	1.355	-
C3	15.000	0.900	1.235	-
B7	14.820	1.729	0.184	+
D1	14.740	1.164	0.514	-
D2	14.550	1.028	0.712	-
B6	14.800			
R7-1	15.250			
R7-2	15.290			
R7-3	15.000		2.129	-
R7-4				
R7-5				
R7-6				

NOTE:

V1 = Velocity of the Main Stream Flow of MekonRiver

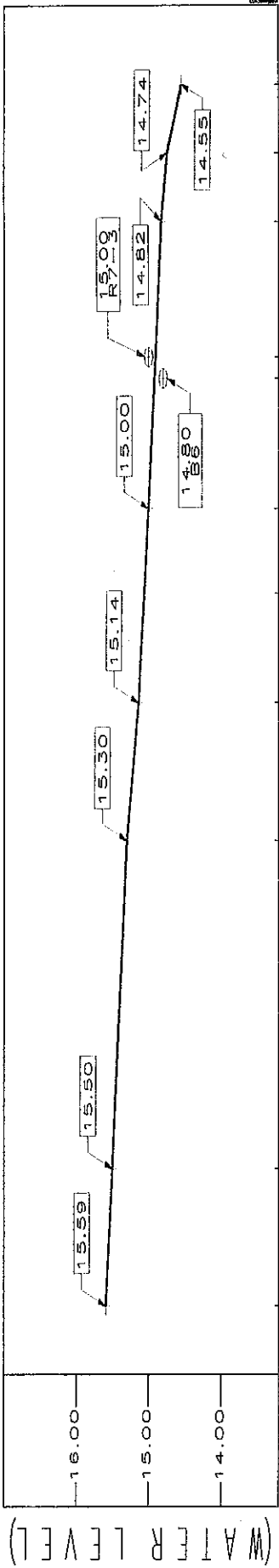
V2 = Velocity of the Flow Stream into the Catchment Area

+ Water flow going inn to the catchment

- Water flow from mekong River

- Water flow from the catchment Area going to mekong River

NOTE: ARROW INDICATES THE DIRECTION OF FLOW.

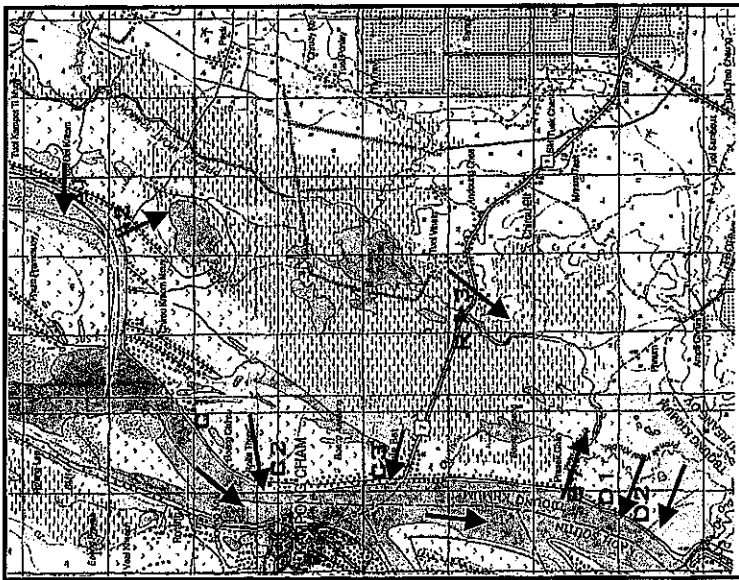


FLOODING SURVEY ON MEKONG RIVER

RECORDING DATE: 01-AUGUST-2000

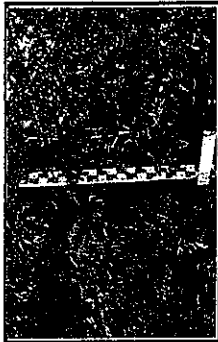
WATER LEVEL @ MEKONG BRIDGE (14.64 M.)

MAP LOCATION



NOTE: ARROW INDICATES THE DIRECTION OF FLOW.

LOCATION PHOTOGRAPH



Location: A1



Location: C2



Location: D1



Location: A2



Location: C3



Location: D2



Location: C1



Location: B7



Location: R7-3 Moat Khmung Bridge

STAT.	RECORDING DATA			FLOW DIRECTION OF V2
	WATER LEVEL (M)	VELOCITY (m/s)	V2	
A1	15.160	1.543	0.277	-
A2	15.000	0.668	0.312	+
C1	14.880	0.872		
C2	14.760	1.238	1.157	-
C3	14.620	0.517	0.789	-
B7	14.460	1.697	0.239	+
D1	14.380	1.227	0.897	-
D2	14.200	0.637	0.905	-
B6				
R7-1				
R7-2				
R7-3	14.600	2.008	1.849	-
R7-4				
R7-5				
R7-6				

NOTE:

V1 = Velocity of the Main Stream Flow of Mekong River

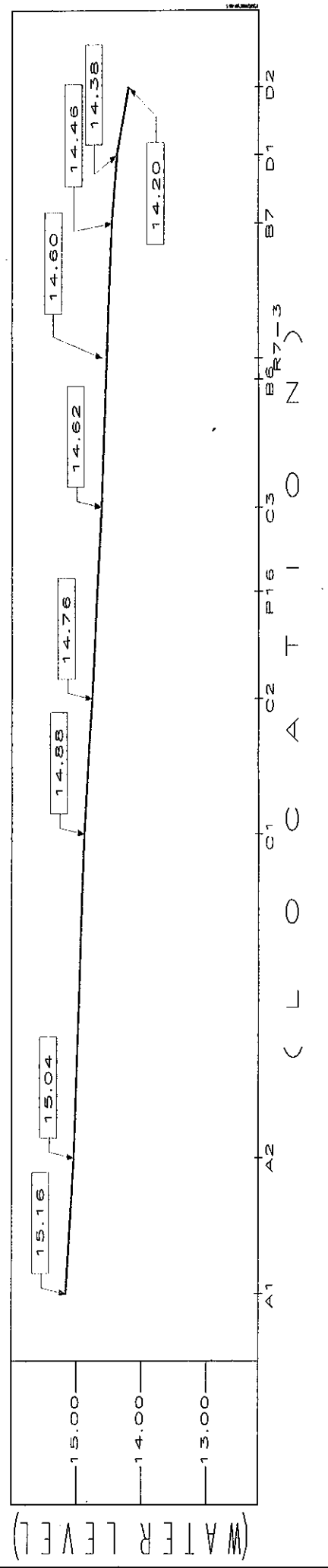
V2 = Velocity of the Flow Stream into the Catchment Area

+

-

Water flow going inn to the catchment Area from mekong River

Water flow from the catchment Area going to mekong River

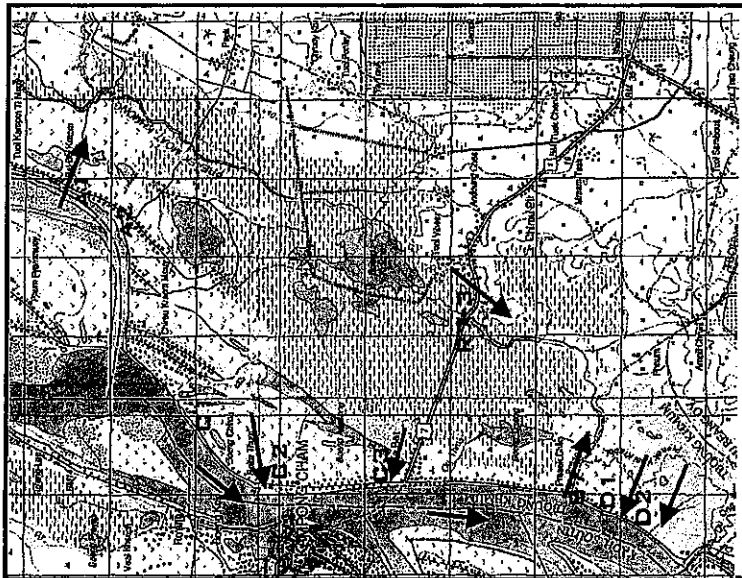


FLOODING SURVEY ON MEKONG RIVER

RECORDING DATE: 08-AUGUST-2000

WATER LEVEL @ MEKONG BRIDGE (13.78 M.)

MAP LOCATION



NOTE: ARROW INDICATES THE DIRECTION OF FLOW.

LOCATION PHOTOGRAPH



Location: A1



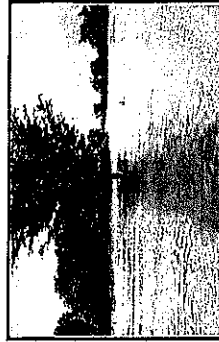
Location: C2



Location: D1



Location: A2



Location: C3



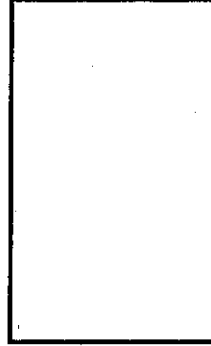
Location: D2



Location: C1



Location: B7



Location: R7-3 Moat Khmung Bridge

RECORDING DATA				
STAT.	WATER LEVEL (M)	VELOCITY (m/s)		FLOW DIRECTION OF V2
		V1	V2	
A1	14.200	1.609	1.482	+
A2	14.050	1.424		
C1	13.930	1.022		
C2	13.840	1.317		-
C3	13.750	0.892	0.763	-
B7	13.670	1.368	1.110	+
D1	13.550	1.344	1.053	-
D2	13.350	0.947	0.839	-
B6				
R7-1				
R7-2				
R7-3				
R7-4				
R7-5				
R7-6				

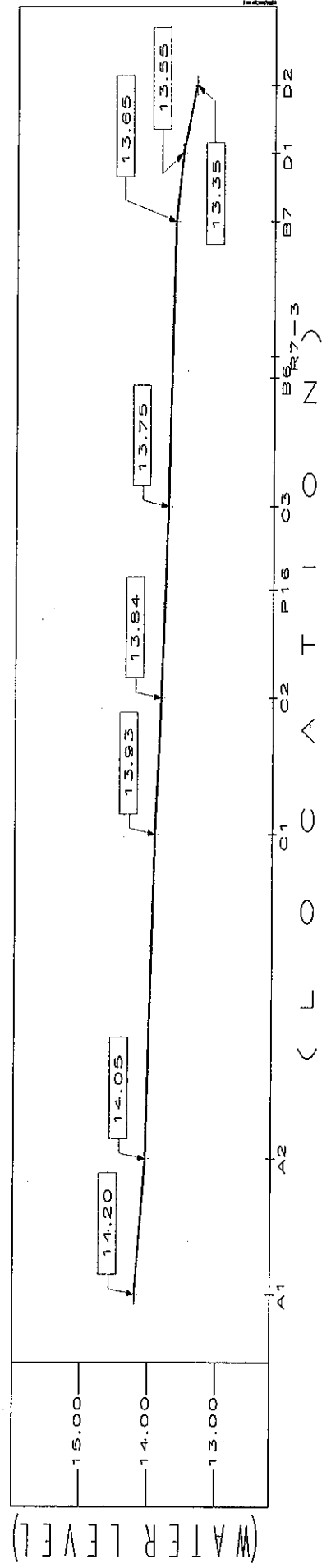
NOTE:

V1 = Velocity of the Main Stream Flow of Mekong River

V2 = Velocity of the Flow Stream Into the Catchment Area

+ Water flow going into the catchment Area from Mekong River

- Water flow from the catchment Area going to Mekong River

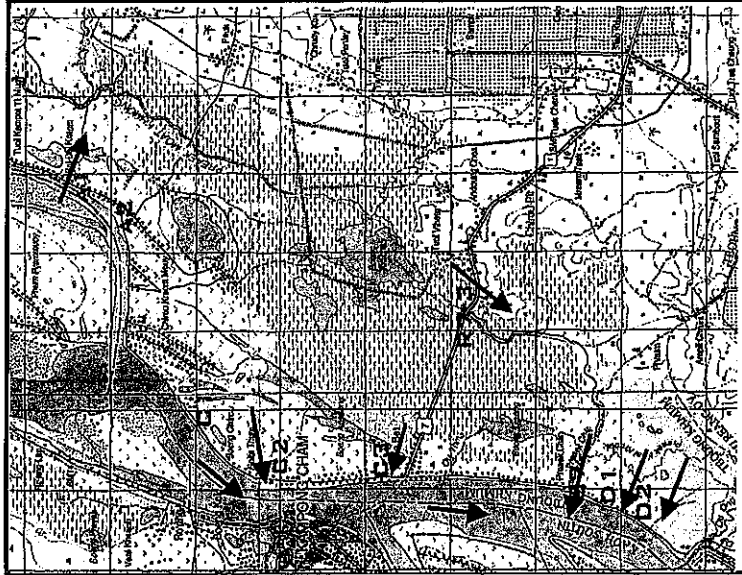


FLOODING SURVEY ON MEKONG RIVER

RECORDING DATE: 15-AUGUST-2000

WATER LEVEL @ MEKONG BRIDGE (13.25 M.)

MAP LOCATION



LOCATION PHOTOGRAPH



Location : A1



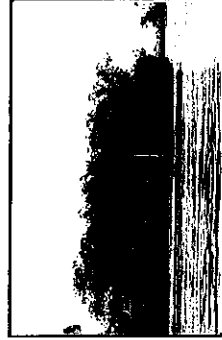
Location : C2



Location : D1



Location : A2



Location : C3



Location : D2



Location : C1



Location : B7



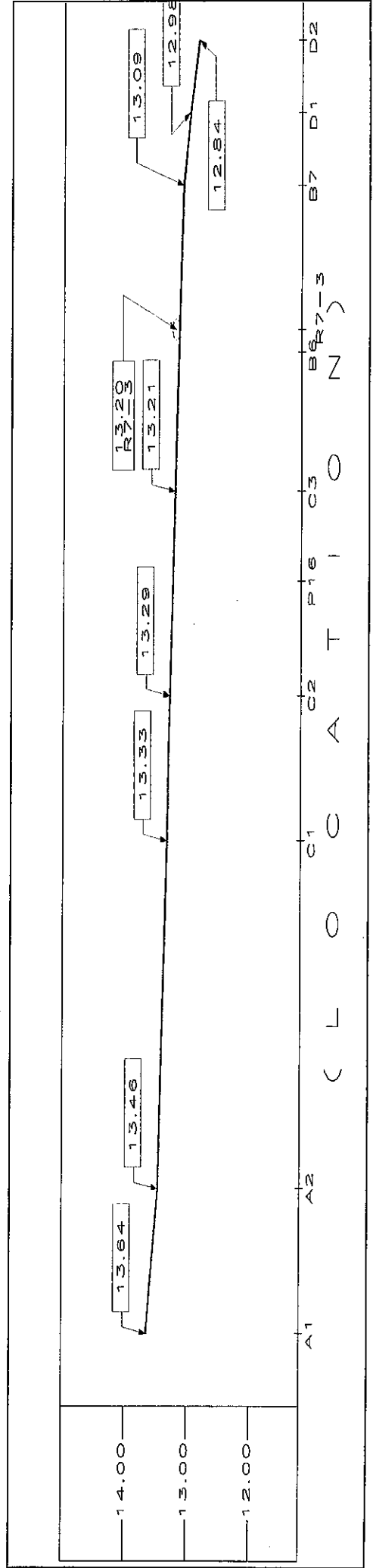
Location :R7-3 Moat Khmung Bridge

RECORDING DATA				
STAT.	WATER LEVEL (M)	VELOCITY (m/s)		FLOW DIRECTION OF V2
		V1	V2	
A1	13.640	1.572	1.009	+
A2	13.460	1.275		
C1	13.330	0.618		
C2	13.290	1.277		
C3	13.210	0.294	0.368	-
B7	13.090	1.208	0.567	-
D1	12.980	0.779	0.670	-
D2	12.840	0.857	1.637	-
B6				
R7-1	13.300			
R7-2				
R7-3	13.200	1.229	0.749	-
R7-4				
R7-5				
R7-6				

NOTE:

- V1 = Velocity of the Main Stream Flow of Mekong River
- V2 = Velocity of the Flow Stream into the Catchment Area
- + Water flow going into the catchment Area from Mekong River
- Water flow from the catchment Area going to Mekong River

NOTE: ARROW INDICATES THE DIRECTION OF FLOW.



FLOODING SURVEY ON MEKONG RIVER

RECORDING DATE: 18-AUGUST-2000
WATER LEVEL @ MEKONG BRIDGE (13.05 M.)

RECORDING DATA				
STAT.	WATER LEVEL (M)	VELOCITY (m/s)		FLOW DIRECTION OF V2
		V1	V2	
A1	13.440	1.651	1.382	+
A2	13.270	1.692		
C1	13.180	1.711		
C2	13.100	0.829		
C3	13.000	0.859	0.839	-
B7	12.920	0.475	0.839	-
D1	12.800	1.496	0.745	-
D2	12.640	0.970	1.542	-
B6	12.920			
R7-1	13.080			
R7-2	12.900			
R7-3	13.050	0.569	0.989	-
R7-4				
R7-5				
R7-6				

NOTE:

- V1 = Velocity of the Main Stream Flow of Mekong River
- V2 = Velocity of the Flow Stream into the Catchment Area
- + Water flow going inn to the catchment Area from mekong River
- Water flow from the catchment Area going to mekong River

LOCATION PHOTOGRAPH



Location : D1



Location: C2



Location: A1



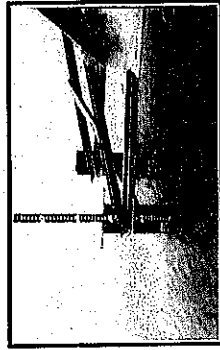
Location : D2



Location : C3



Location: A2



Location :B7 Moat Khmung Bridge

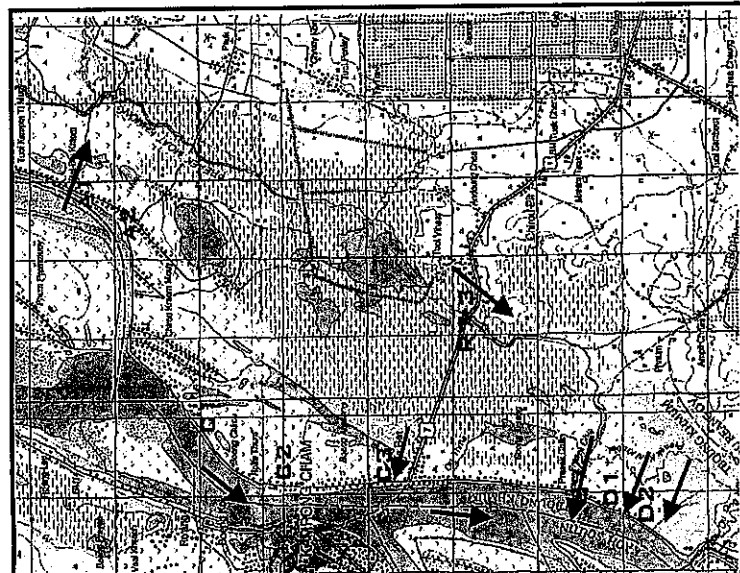


Location : B7

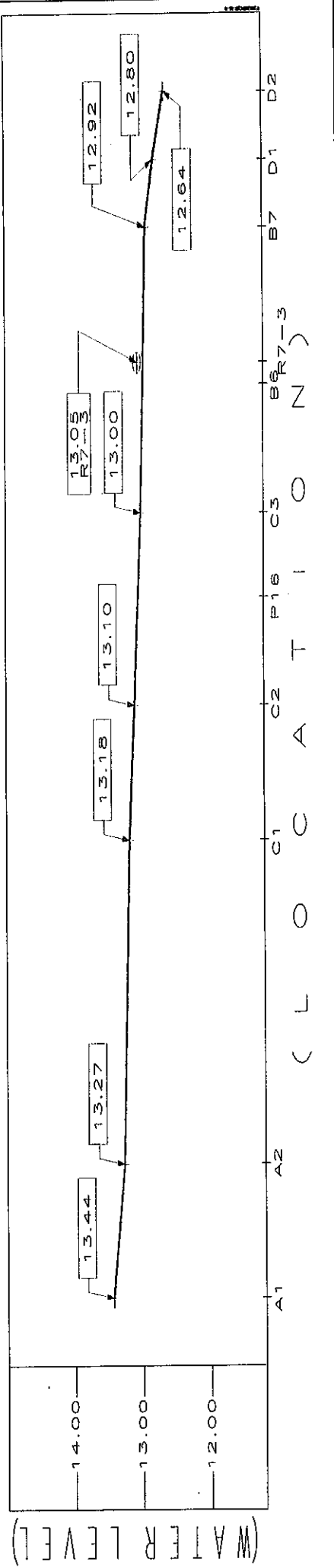


Location : C1

MAP LOCATION



NOTE: ARROW INDICATES THE DIRECTION OF FLOW.



6-3 Investigation of Geology

15

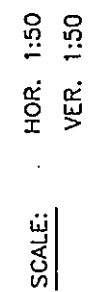


Figure 5 Meream Teak Bridge Geological Profile

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Table 1 SUMMARY OF SOIL TEST No.1 (I)

Site : Bridge, Approach Road

Sample Location	Sample No.	Depth(m)		Soil Type	Grain Size (%)			W _c (%)	e	n	Atterberg Limit (%)			Unit Weight (t/m ³)		q _u (t/m ²)	Triaxial		Consolidation		
		From	To		0%	50%	100%				LL	PL	PI	γ _t	γ _d		C	φ	C _c	P _e	C _v
B1	B1-1	5.00	6.00	CL				2.68	0.70	0.41	35.57	20.62	14.95	1.97	1.59	9.17			0.189	21.00	34.415
B2	B2-1	6.00	7.00	CL				2.60	0.96	0.49	52.82	22.73	30.09	1.86	1.38	10.57			0.372	16.00	10.547
	B2-2	7.00	8.00	CL				2.64	0.77	0.44	35.09	18.81	16.28	1.95	1.52	8.23			0.252	50.00	4.448
B3	B3-1	6.00	7.00	CL				2.62	0.83	0.45	31.79	22.33	9.46	1.93	1.48	16.02			0.188	17.00	21.735
	B3-2	7.00	8.00	CL				2.63	0.70	0.41	45.02	19.37	25.65	1.98	1.59	13.37			0.210	30.00	96.99

Remark :

CLAY

SILT

SAND

C_v values are considered at the overburden pressure approximate 10.00 t/m²

Note

G_s : Specific Gravity

W_c : Water Content

e : Void Ratio

LL : Liquid Limit

PL : Plasticity limit

PI : Plasticity index

n : Porosity Ratio

γ_d : Dry Density

γ_t : Wet Density

q_u : Unconfined Compressive Strength

C : Cohesion

φ : Internal frictional angle

C_c : Compressive coefficient

P_e : Maximum Past Pressure

C_v : Coefficient of Consolidation

STS INSTRUMENTS CO., LTD

Table 2 SUMMARY OF SOIL TEST No. 2 (II)

Site : Moat Khmung Bridge

Sample Location	Sample No.	Depth		Soil Type	Grain Size (%)			G_s	W_c (%)	e	n	Atterberg Limit (%)			Unit Weight (t/m^3)		q_u (t/m^2)	Triaxial			Consolidation	
		From	To		0%	50%	100%					LL	PL	PI	γ_t	γ_d		C	ϕ (deg.)	C_c	P_e (t/m^2)	C_v (cm^2/s)
Riverbed	D1			CL				2.58	40.50	1.07	0.52				1.75	1.25						
	D2			CL				2.54	32.98	0.83	0.45				1.85	1.39						
	D3			CL				2.58	43.08	1.15	0.53				1.72	1.20						
	D4			CL				2.55	43.72	1.08	0.52				1.76	1.23						
	D5			CL				2.59	44.62	1.16	0.54				1.74	1.20						
	D6			CL				2.57	39.75	1.06	0.51				1.74	1.25						
Remark : <div> <div></div>CLAY <div></div>SILT <div></div>SAND </div>																						

Note G_s : Specific Gravity W_c : Water Content e : Void Ratio
 LL : Liquid Limit PL : Plasticity limit PI : Plasticity index
 n : Porosity Ratio γ_d : Dry Density γ_t : Wet Density
 q_u : Unconfined Compressive Strength C : Cohesion ϕ : Internal frictional angle
 C_c : Compressive coefficient P_e : Maximum Past Pressure C_v : Coefficient of Consolidation

STS INSTRUMENTS CO., LTD

Table 2 SUMMARY OF SOIL TEST No.2 (II) (continue)

Site : Approach Road (Existing Road Embankment)

Sample Location	Sample No.	Depth(m)		Soil Type	Grain Size (%)			G_s	W_c (%)	e	n	Atterberg Limit (%)			Unit Weight (t/m^3)		q_u $\frac{1}{2}$ (t/m^2)	Triaxial		Consolidation		
		From	To		0%	50%	100%					LL	PL	PI	γ_t	γ_d		C	ϕ (deg.)	C_c	P_c (t/m^2)	C_v (cm^2/s)
3+820	E1	2.00	3.00	CL					29.23	0.74	0.42				1.92	1.55		4.20	0.00	0.198	16.00	47.909
3+910	E2	3.00	4.00	CL					26.74	0.72	0.42				1.94	1.57		4.40	1.72	0.186	21.00	54.189
4+140	E3	2.00	3.00	CL					22.95	0.62	0.38				2.03	1.67		4.05	3.29	0.149	36.00	20.353

Remark : C_v values are considered at the overburden pressure approximate 5.00 t/m^2

Note G_s : Specific Gravity
 W_c : Water Content
 e : Void Ratio

LL : Liquid Limit
PL : Plasticity limit
PI : Plasticity index

n : Porosity Ratio
 γ_d : Dry Density
 γ_t : Wet Density

q_u : Unconfined Compressive Strength
 C : Cohesion
 ϕ : Internal frictional angle

C_c : Compressive coefficient
 P_c : Maximum Past Pressure
 C_v : Coefficient of Consolidation

STS INSTRUMENTS CO., LTD

Table 2 SUMMARY OF SOIL TEST No.2 (II) (continue)

Site : Existing Road Embankment and Borrow Pit Area

Sample Location	Sample No.	Depth(m)		Soil Type	Grain Size (%)			G_s	W_c (%)	e	n	Atterberg Limit (%)			Unit Weight (γ/m^3)		q_u (γ/m^2)	Triaxial		Consolidation		
		From	To		0%	50%	100%					LL	PL	PI	γ_t	γ_d		C	ϕ (deg.)	C_c	P_e (γ/m^2)	C_v (cm^2/s)
2+899	C1	1.0	1.5	CL					16.46						1.86	1.60		11.20	25.52			
12+072	C2	1.0	1.5	CL					24.15						1.83	1.47		3.98	33.73			
BP. I	C3	1.0	1.5	CL					20.38						1.83	1.52		6.57	17.33			
BP. IV	C4	1.0	1.5	CL					20.83						1.82	1.51		5.13	12.10			
BP. VII	C5	1.0	1.5	CL					27.55						1.77	1.39		9.09	36.64			

Note G_s : Specific Gravity LL : Liquid Limit n : Porosity Ratio q_u : Unconfined Compressive Strength C_c : Compressive coefficient
 W_c : Water Content PL : Plasticity limit γ_d : Dry Density C : Cohesion P_e : Maximum Past Pressure
 e : Void Ratio PI : Plasticity index γ_t : Wet Density ϕ : Internal frictional angle C_v : Coefficient of Consolidation

Table 3 Summary of Field CBR and Field Density Test Results

Station	Location	Field CBR %			Field Density			Moisture Content (%)
		No	at 2.50 mm	at 5.00 mm	No.	γ_d (t/m ³)	γ_a (t/m ³)	
0 + 087 (L)	Point No. 1	CBR - 1	46	37	F - 1	1.98	1.67	18.73
		CBR - 2	17	14	F - 2	1.92	1.56	22.52
		CBR - 3	7	6	F - 3	1.73	1.40	23.85
1 + 171 (R)	Point No. 2	CBR - 4	23	19	F - 4	1.94	1.67	16.29
		CBR - 5	25	20	F - 5	1.77	1.56	13.47
		CBR - 6	10	8	F - 6	1.54	1.31	18.17
2 + 899 (L)	Point No. 3	CBR - 7	24	20	F - 7	2.03	1.74	16.45
		CBR - 8	2	3	F - 8	1.89	1.49	27.08
		CBR - 9	2	2	F - 9	1.87	1.43	30.72
3 + 916 (R)	Point No. 4	CBR - 10	65	55	F - 10	1.33	1.08	23.29
		CBR - 11	28	23	F - 11	1.93	1.60	20.63
		CBR - 12	12	11	F - 12	1.67	1.48	12.80
4 + 346 (R)	Point No. 5	CBR - 13	36	31	F - 13	2.08	1.73	20.38
		CBR - 14	9	7	F - 14	1.59	1.34	18.63
		CBR - 15	7	6	F - 15	1.60	1.33	20.46
4 + 531 (L)	Point No. 6	CBR - 16	59	55	F - 16	2.40	2.20	9.15
		CBR - 17	11	10	F - 17	1.70	1.42	19.89
		CBR - 18	5	6	F - 18	1.52	1.40	8.49
5 + 009 (L)	Point No. 7	CBR - 19	30	23	F - 19	2.21	1.85	19.00
		CBR - 20	28	21	F - 20	2.25	1.81	24.26
		CBR - 21	12	9	F - 21	2.21	1.75	26.20
5 + 875 (R)	Point No. 8	CBR - 22	20	17	F - 22	1.91	1.53	25.23
		CBR - 23	8	7	F - 23	1.85	1.38	34.18
		CBR - 24	2	2	F - 24	1.73	1.22	42.11
6 + 645 (L)	Point No. 9	CBR - 25	25	18	F - 25	2.36	1.90	24.00
		CBR - 26	10	8	F - 26	2.37	1.85	28.35
		CBR - 27	5	4	F - 27	2.12	1.60	32.42
7 + 493 (R)	Point No. 10	CBR - 28	57	51	F - 28	2.18	1.97	10.70
		CBR - 29	15	10	F - 29	2.38	1.90	25.21
		CBR - 30	4	3	F - 30	2.40	1.88	27.62
8 + 293 (L)	Point No. 11	CBR - 31	55	44	F - 31	2.21	1.82	21.52
		CBR - 32	17	13	F - 32	2.11	1.70	23.89
		CBR - 33	7	7	F - 33	2.02	1.47	36.75
9 + 096 (R)	Point No. 12	CBR - 34	24	18	F - 34	2.17	1.74	24.73
		CBR - 35	5	4	F - 35	1.84	1.32	38.93
		CBR - 36	5	4	F - 36	1.89	1.31	44.57
9 + 893 (L)	Point No. 13	CBR - 37	14	11	F - 37	1.98	1.51	30.66
		CBR - 38	7	5	F - 38	1.86	1.40	32.92
		CBR - 39	6	5	F - 39	1.82	1.37	32.74
9 + 997 (R)	Point No. 14	CBR - 40	74	59	F - 40	2.01	1.82	10.58
		CBR - 41	23	16	F - 41	2.19	1.76	24.17
		CBR - 42	14	11	F - 42	1.90	1.50	26.21
10 + 735 (L)	Point No. 15	CBR - 43	29	23	F - 43	2.10	1.79	17.20
		CBR - 44	12	9	F - 44	2.16	1.69	28.11
		CBR - 45	4	3	F - 45	1.86	1.32	40.19
11 + 548 (R)	Point No. 16	CBR - 46	17	14	F - 46	1.94	1.69	15.12
		CBR - 47	15	12	F - 47	1.81	1.45	24.89
		CBR - 48	2	2	F - 48	1.70	1.14	48.56
12 + 072 (L)	Point No. 17	CBR - 49	96	80	F - 49	2.13	1.78	19.57
		CBR - 50	65	53	F - 50	1.92	1.57	22.69
		CBR - 51	36	31	F - 51	1.62	1.30	24.89
0 + 168 (R) Road No.11	Point No. 18	CBR - 52	57	44	F - 52	1.82	1.49	21.96
		CBR - 53	13	11	F - 53	1.90	1.50	26.42

Table 4 Summary of Laboratory Compaction Test Results

Sampling Location	Sample No	Soil Type	Compaction Test Results	
			Maximum Dry Density $\gamma_{d,max}$ (t/m ³)	Optimum Water Content W_{opt} (%)
1+171 (R)	1	Brown Laterite	2.03	12.60
2+899 (L)	2	Brown Silty Clay	1.78	14.50
5+009 (L)	3	Red Laterite	2.05	11.50
6+645 (L)	4	Brown Laterite	1.87	12.90
9+893 (L)	5	Dark Sandy Clay	1.63	21.20
12+072 (L)	6	Grey Clay	1.63	24.00

Table 5 Summary of Laboratory CBR Test Results

Sampling Location	Sample No	Soil Type	Laboratory CBR Test Results				
			Unsoaked Sample		Soaked Sample		Swell %
			CBR % at 2.50mm	CBR % at 5.00mm	CBR % at 2.50mm	CBR % at 5.00mm	
1+171 (R)	1	Brown Laterite	53	55	43	38	0.292
2+899 (L)	2	Brown Silty Clay	58	56	2	2	5.492
5+009 (L)	3	Red Laterite	40	40	36	29	1.187
6+645 (L)	4	Brown Laterite	68	72	46	43	0.252
9+893 (L)	5	Dark Sandy Clay	20	16	2	2	3.746
12+072 (L)	6	Gray Clay	22	22	17	17	0.110

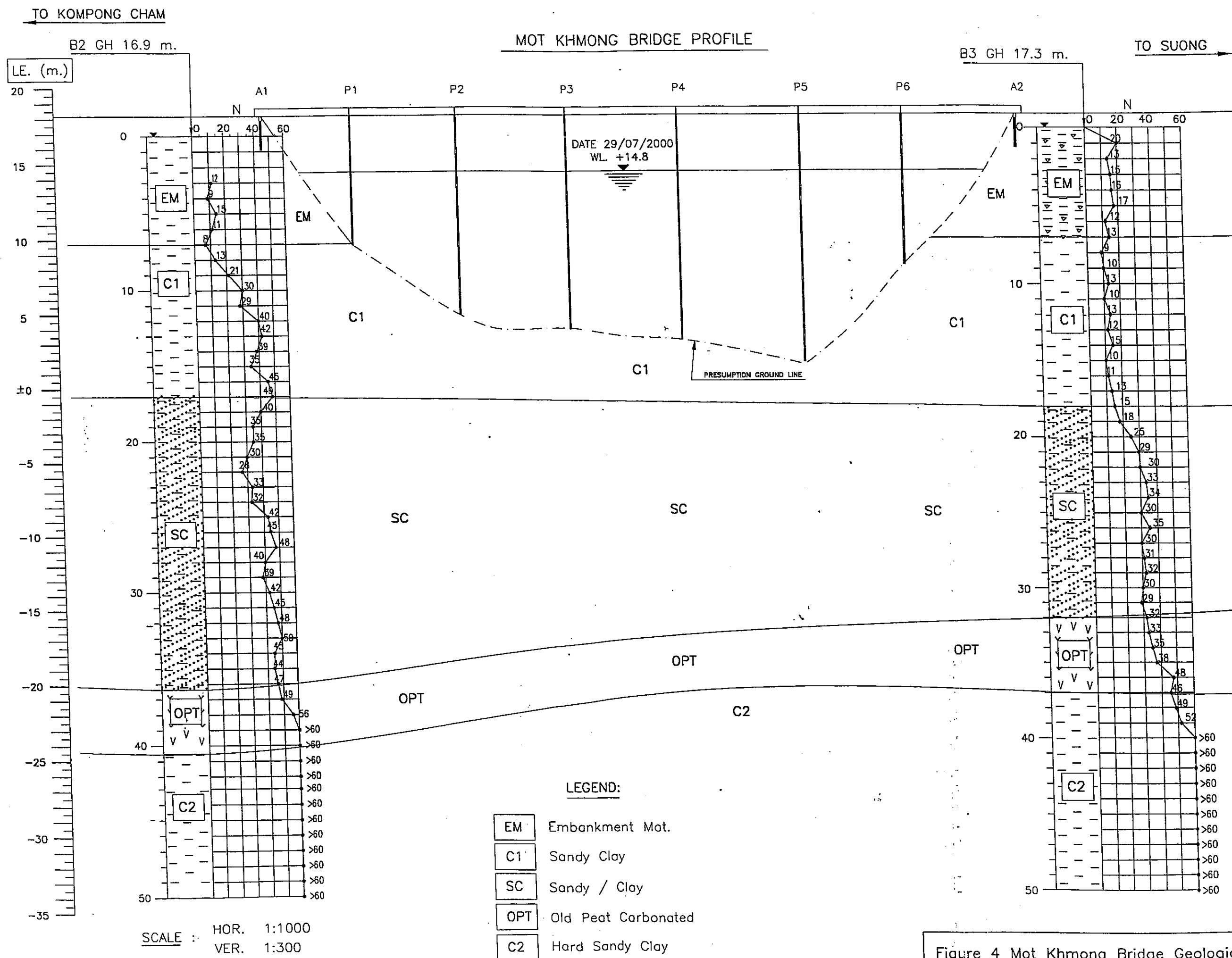


Figure 4 Mot Khmong Bridge Geological Profile

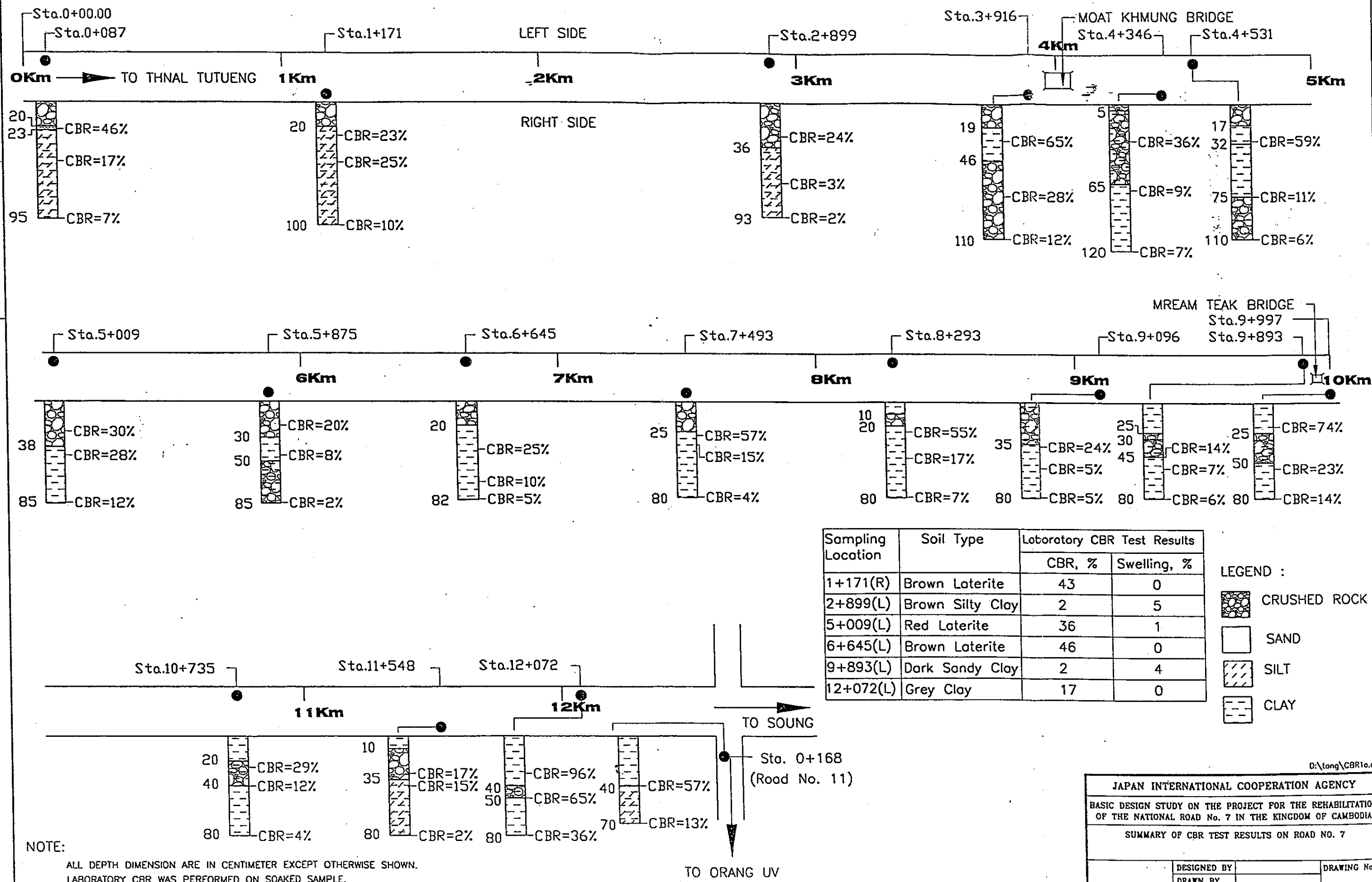


Figure 06 Summary of CBR Test Results on Road No. 7

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JAPAN INTERNATIONAL COOPERATION AGENCY		
BASIC DESIGN STUDY ON THE PROJECT FOR THE REHABILITATION OF THE NATIONAL ROAD No. 7 IN THE KINGDOM OF CAMBODIA		
SUMMARY OF CBR TEST RESULTS ON ROAD NO. 7		
DESIGNED BY		DRAWING No.
DRAWN BY		1 OF 1
DATE		
PROJECT MANAGER	SCALE	Not to Scale
NIPPON KOEI CO., LTD AND PACIFIC CONSULTANTS INTERNATIONAL		