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Table-1 ECONOMIC TARGET OF SIXTH ECONOMIC
AND SOCIAL DEVELOPMENT 5-YEAR PLAN

Category	Fifth Plan Targets (1982-1986)	Sixth Plan Targets (1987-1991)
1. <u>Trade Deficit (current prices)</u>		
1.1. Average value per year (million baht)	55,600	35,900
1.2. Trade deficit/GDP (%)	5.8	2.7
2. <u>Current Account Deficit (current prices)</u>		
2.1. Average value per year (million baht)	36,000	11,800
2.2. Current account deficit/GDP (%)	3.8	0.9
3. <u>Export of Goods and Services</u>		
3.1. Value growth rate (%)	9.8	9.9
3.2. Volume growth rate (%)	8.4	7.4
4. <u>Export of Goods</u>		
4.1. Value growth rate (%)	8.4	10.7
4.2. Volume growth rate (%)	8.3	8.1
4.3. Average value per year (million baht)	177,500	290,700
5. <u>Income from Tourism (current prices)</u>		
5.1. Value growth rate (%)	12.2	7.4
6. <u>Import of Goods and Services</u>		
6.1. Value growth rate (%)	3.7	9.3
6.2. Volume growth rate (%)	2.0	4.5
7. <u>Import of Goods</u>		
7.1. Value growth rate (%)	2.9	9.5
7.2. Volume growth rate (%)	2.9	4.6
7.3. Average value per year (million baht)	233,100	326,700
8. <u>Economic Growth (%/yr a constant prices)</u>		
8.1. Agriculture	2.1	2.9
8.2. Manufacturing	5.1	6.6
8.3. Mining	6.1	6.4
8.4. GDP	4.4	5.0
9. <u>Government Revenue/GDP (%)</u>	14.8	15.8
10. <u>Population Growth Rate (%)</u>	1.7 ^{*1}	1.3 ^{*2}
10.1. Municipal districts	(2.7)	(2.5)
10.2. Sanitary districts	(2.1)	(2.4)
10.3. Villages	(1.4)	(0.8)
11. <u>Inflation Rate (%)</u>	2.9	2.3
12. <u>Per Capita Income (baht)</u>	21,395 ^{*1}	27,783 ^{*2}

Note: *1 ... In 1986, *2 ... In 1991

Source: National Economic and Social Development Board

Table-2 METEOROLOGICAL DATA AT BANGKOK

AT BANGKOK

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
<u>Pressure (-1000 or 900 mbs.)</u>													
Mean	12.47	10.99	09.96	08.40	06.85	06.34	06.46	06.51	07.56	09.75	11.60	12.63	09.13
Ext. Max.	26.50	20.96	20.97	17.74	14.06	13.00	13.34	13.50	14.33	18.02	20.33	21.32	26.50
Ext. Min.	04.42	02.27	02.08	09.66	09.40	07.76	08.78	09.36	08.20	01.22	04.60	03.87	07.76
Mean daily range	4.81	4.80	4.85	4.83	4.46	3.80	3.75	3.93	4.39	4.43	4.28	4.51	4.40
<u>Temperature (°C)</u>													
Mean	25.6	27.2	28.6	29.6	29.3	28.7	28.1	27.9	27.6	27.5	26.7	25.5	27.7
Mean Max.	31.9	32.8	33.9	34.9	34.2	33.1	32.6	32.4	32.0	31.8	31.5	31.4	32.7
Mean Min.	20.6	23.1	24.8	25.9	25.6	25.3	24.9	24.8	24.5	24.3	23.0	20.9	24.0
Ext. Max.	35.7	36.6	39.8	40.0	39.5	37.7	37.8	36.3	36.0	35.3	35.1	35.2	40.0
Ext. Min.	11.5	14.9	16.5	19.9	21.1	21.7	22.2	21.2	21.6	18.3	14.2	10.5	10.5
<u>Relative Humidity (%)</u>													
Mean	72.1	75.7	76.0	76.0	78.4	78.5	79.3	80.2	82.8	82.2	77.5	72.5	77.6
Mean Max.	90.6	92.2	91.6	90.7	92.2	91.5	91.8	93.2	94.8	94.3	92.5	90.0	92.1
Mean Min.	48.6	53.4	55.2	55.8	60.1	62.3	63.5	63.9	66.0	65.6	59.4	52.1	58.8
Ext. Min.	27.0	17.0	23.0	28.0	30.0	38.0	43.0	47.0	49.0	36.0	36.0	31.0	17.0
<u>Dew Point (°C)</u>													
Mean	19.6	22.1	23.6	24.5	24.8	24.2	23.9	23.9	24.2	23.9	22.1	19.7	23.0
<u>Evaporation (mm)</u>													
Mean - Pan	135.9	141.1	182.1	187.5	171.4	150.1	147.9	147.1	130.4	127.9	125.8	133.3	1780.5
<u>Cloudiness (0 - 10)</u>													
Mean	5.9	6.5	6.8	7.0	8.2	8.5	8.6	8.9	9.0	8.2	6.8	5.9	7.5
<u>Sunshine Duration (hr.)</u>													
Mean	276.6	252.5	270.0	256.0	222.4	178.5	169.1	159.4	152.6	202.0	242.6	266.1	2647.8
<u>Visibility (km)</u>													
0700 L.T.S.	5.2	4.9	5.9	7.5	8.6	8.7	8.4	8.1	8.0	8.0	8.1	7.5	7.4
Mean	9.6	9.2	9.4	10.7	11.9	12.1	11.9	11.6	8.6	11.4	11.7	11.2	10.8
<u>Wind (knots)</u>													
Prevailing wind	NE	S	S	S	S	S	SW	SW	SW	SW	NE	NE	-
Mean wind speed	2.6	4.1	5.0	4.6	3.8	3.8	3.5	3.6	2.7	2.3	2.3	2.4	-
Max. wind speed	31 NNW	37 N	48 ENE	52 E.	41 SSW	41 W	41 W, S	43 E	44 SSW	40 NE	37 SE	31 SE	52 E.
				ESE			NW, WNW				ESE	NNE	ESE
<u>Rainfall (mm)</u>													
Mean	9.3	29.1	26.2	66.4	189.9	156.1	158.7	204.6	339.4	239.3	48.3	9.7	1477.0
Mean rainy days	1.3	2.9	3.0	6.4	15.7	16.7	18.1	20.6	21.5	17.0	5.9	1.3	130.4
Greatest in 24 hr.	39.3	73.0	88.4	89.7	124.2	167.3	108.6	97.8	153.7	123.2	81.2	32.0	167.3
Day/Year	31/61	11/64	30/82	29/57	15/66	13/79	28/76	26/71	23/68	5/60	2/69	8/72	13/79
<u>Number of days with</u>													
Haze	19.1	15.9	16.3	9.3	2.9	1.3	0.8	0.8	1.0	2.2	6.3	11.8	87.7
Fog	3.5	1.2	0.4	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.3	0.7	6.4
Hail	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Thunderstorm	0.5	0.8	2.4	8.1	15.8	9.7	10.3	11.0	16.3	14.7	3.7	0.7	94.0
Squall	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2

Remarks : Evaporation 1965 - 1985

Table-3 PLANTED AREAS AND YIELDS OF RANGSIT
NUA AND RANSIT TAI PROJECT AREAS

Location	1981			1986		
	Planted Area	Production	Yield	Planted Area	Production	Yield
	(ha)	(ton)	(kg/ha)	(ha)	(ton)	(kg/ha)

Paddy (Rainy Season)

NR	54,575	120,394	2,206	40,981	125,947	3,073
SR	71,372	151,224	2,119	63,342	157,884	2,493

Paddy (Dry Season)

NR	32,205	148,543	4,612	26,595	107,127	4,028
SR	28,211	107,621	3,815	23,103	81,998	3,549

Upland Crops (1981)

	Maize	Cassava	Sugar-cane	Mungbean	Sorghum	Soy bean	Ground-nuts	Total
NR	-	-	-	107	-	-	-	107
SR	142	9,697	1,131	37	-	62	68	11,137

Upland Crops (1986)

	Maize	Cassava	Sugar-cane	Mungbean	Sorghum	Soy bean	Ground-nuts	Total
NR	-	-	-	96	-	-	-	96
SR	526	7,430	835	9	25	155	37	9,017

Note: NR: North Rangsit, SR: South Rangsit

Table-4 WATER LEVEL AT CHULALONGKORN REGULATOR

(unit:M,S,L)

<u>(1987)</u>					<u>(1988)</u>				
<u>Mon</u>	<u>Maximum</u>		<u>Minimum</u>		<u>Mon</u>	<u>Maximum</u>		<u>Minimum</u>	
	<u>In</u>	<u>Out</u>	<u>In</u>	<u>Out</u>		<u>In</u>	<u>Out</u>	<u>In</u>	<u>Out</u>
1	1.25	1.40	0.69	-0.10	1	1.21	1.30	0.52	0.01
2	1.04	1.25	0.22	0.20	2	1.02	1.18	0.47	-0.16
3	0.96	1.05	0.47	-0.23	3	1.07	1.18	0.45	-0.17
4	0.87	0.94	0.39	-0.15	4	1.14	1.27	0.48	-0.17
5	1.04	1.03	0.54	-0.35	5	1.39	1.25	0.75	-0.15
6	1.15	1.13	0.62	-0.62	6	1.50	1.30	0.62	-0.40
7	0.89	0.84	0.21	-0.59	7	1.38	1.07	0.53	-0.60
8	0.86	1.06	0.31	-0.37	8	1.28	1.21	0.75	0.06
9	1.81	1.79	0.31	-0.50	9	1.68	1.66	0.90	0.07
10	1.86	1.85	1.70	0.49	10	2.02	2.06	1.29	0.62
11	2.00	1.43	1.80	0.43	11	2.03	2.07	1.32	0.42
12	1.84	1.68	1.19	0.32	12	1.93	1.68	1.05	0.38

Note: In: Water Level at Inside of Chulalong Korn Lock
 Out: Water Level at Outside of Chulalong Korn Lock

Table-5 LOCATION AND DIMENSIONS OF STRUCTURES
CROSSING RANGSIT CANAL

No.	Crossing Structure	Distance		Bridge			Reference Chao Phra Ya Riv.
		I. km	L. km	M.	H. m	B. m	
1		3.5	3.5	C	6.5	8.0	
2		2.5	6.0	C	6.5	8.0	
3	Railway	1.0	7.0	S	5.5	7.2	
	Navigation Lock	0.5	7.5				
4		0.2	7.7	W	6.5		
5	Highway	0.8	8.5	C	7.0	13.0	
6	Highway	0.0	8.5	S	4.8	13.0	
	K long 1	0.7	9.2				
7		0.2	9.4	C	5.8	8.0	
8		0.3	9.7	C	6.1	8.0	
9		1.0	10.7	C	6.6	8.0	
10		0.5	11.2	C	6.3	8.0	
	K long 2	0.3	11.5				
11		0.2	11.7	C	6.8	8.0	
12		0.3	12.0	C	6.3	8.0	
13		0.2	12.2	C	6.4	8.0	
14		0.3	12.5	C	5.4	8.0	
15		0.3	12.8	C	7.0	8.0	
16		0.2	13.0	C	6.4	8.0	
	K long 3	0.9	13.9				
17		0.2	14.1	W	5.7	8.0	
18		0.2	14.3	C	5.8	8.0	
19		0.4	14.7	C	5.9	8.0	
20		0.6	15.3	W	2.9	8.0	To be destroyed
	K long 4	1.3	16.6			7.0	
21		0.1	16.7	C	6.2	8.0	
22		0.1	16.7	W	5.5	8.0	
23		2.2	18.9	W	5.6	8.0	Φ100 pipe for Temple
	K long 5	0.2	19.1				

No.	Crossing Structure	Distance		Bridge			Reference
		I. km	L. km	M.	H. m	B. m	
							Chao Phra Ya Riv.
24		0.9	20.0	C	5.7	8.0	
25		0.4	20.4	C	6.2	8.0	
26		1.0	21.4	W	5.4	7.0	under Repair Work
27		0.3	21.7	C	5.4	10.0	
	K long 6	0.1	21.8				
28		0.3	22.1	W	5.3	7.5	
29		1.3	23.4	W	5.4	8.0	to Temple, many weeds
30		0.6	24.0	C	5.8	8.0	
	K long 7	0.6	24.6				
31		0.2	24.8	W	5.6	8.5	
	K long 8	2.4	27.2				
32		0.1	27.3	W	5.9	8.0	
	Regulator	0.7	28.0			7.0	removable gate
	K long 9	1.8	29.8				
33		0.3	30.1	W		7.5	many weeds
34		1.4	31.5	C			under construction, weeds
	K long 10	0.9	32.4				
35		0.2	32.6	W	6.5	8.0	
36		2.3	34.9	C	6.3	10.0	
37		0.0	34.9	W	6.2	8.0	
	K long 11	0.1	35.0				
38		0.5	35.5	C	5.8	8.0	to Temple
39		1.7	37.2	C	5.8	8.0	
	K long 12	0.4	37.6				
40		0.1	37.7	W	5.5	7.5	
41		1.2	38.9	C	6.0	10.0	
42		0.7	39.6	W	6.2	7.5	
	K long 13	0.5	40.1				

(Continued)

No.	Crossing Structure	Distance		Bridge			Reference
		l. km	L. km	M.	H. m	B. m	
							Chao Phra Ya Riv.
43		0.0	40.1	C	7.5	10.0	Automatic Gage (JIKA)
44		0.9	41.0	C	6.8	8.0	many weeds
	K long 14	1.6	42.7				
45		1.3	44.0	W	6.0	7.0	
	K long 15	2.1	46.1				Dredgers base
46		1.4	47.5	C	6.9	8.0	
	K long 16	0.5	48.0				
47		0.5	48.5	C	5.5	10.0	
48		4.4	52.9	C	6.0	8.0	many weeds
	Navigation Lock	0.1	53.0				
49		0.3	53.8	W	5.0	7.0	to Temple
			54.0				Nakon Nayok Riv.

Note:

No.	No. of bridge on the Rangsit Canal
l.	Distance Between Structures
L.	Accumulated Distance
M.	Material of bridge (C=Concrete, W=Wood, S=Steel)
H.	Height of bridge above Mean Sea Level
B.	span of pier

Table-6 LIST OF RID'S EQUIPMENT FOR DREDGING

Thai Calender 2532 = A.D.1989

DREDGER No.	TYPE of DREDGER	MANUFACTURER	B.E.of PURCHASE	CAPACITY M ³ /HOUR	DIMENSIONS WIDTHxLENGTHxHEIGHT m x m x m	TOTAL
						ENGINE CAP. (Hp)
1	MULTI-BUCKETS DREDGER	WARF GOSTO, HOLLAND.	2448	17,000	5.21x28.35x4.71	170
2	SUCTION PIPE DREDGER Ø 14"	RID.	2529	38,000		480
3	MULTI-BUCKETS DREDGER	WARF GOSTO, HOLLAND.	2449	17,000	5.21x28.35x4.71	170
5	SUCTION PIPE DREDGER Ø 12"	RID.	-	-		300
6	SUCTION PIPE DREDGER Ø 12"	RID.	2506	28,000	5.65x15.50x14.00	340
7	MULTI-BUCKETS DREDGER	RID.	2504	20,000	5.50x17.41x7.00	205
9	SUCTION PIPE DREDGER Ø 12"	BUYRUS CO., U.S.A.	2461	24,000	5.80x27.45x7.60	250
11	SHOVEL DREDGER	FLEMING & FERGUSON PAISIEY, SCOTTLAND	2474	32,000	11.92x29.80x4.60	240
12	MULTI-BUCKETS DREDGER	RID.	2493	7,000	4.42x9.00x3.00	56
14	MULTI-BUCKETS DREDGER	CARL B.HOFFMANN., DENMARK	2493	7,000	3.58x8.45x3.10	56
15	MULTI-BUCKETS DREDGER	CARL B.HOFFMANN., DENMARK	2493	7,000	3.58x8.45x3.10	56
16	MULTI-BUCKETS DREDGER	CARL B.HOFFMANN., DENMARK	2493	7,000	3.58x8.45x3.10	56
17	MULTI-BUCKETS DREDGER	CARL B.HOFFMANN., DENMARK	2493	7,000	3.58x8.45x3.10	56
18	MULTI-BUCKETS DREDGER	CARL B.HOFFMANN., DENMARK	2493	7,000	3.58x8.45x3.10	56
19	SHOVEL DREDGER	FLEMING & FERGUSON PAISIEY, SCOTTLAND	2495	32,000	11.92x29.80x4.60	324
20	SHOVEL DREDGER	FLEMING & FERGUSON PAISIEY, SCOTTLAND	2495	32,000	11.92x29.80x4.60	324
21	MULTI-BUCKETS DREDGER	B.F. De GROOT., HOLLAND	2498	20,000	5.00x12.00x7.00	139
22	MULTI-BUCKETS DREDGER	B.F. De GROOT., HOLLAND	2498	20,000	5.00x12.00x7.00	139
23	SUCTION PIPE DREDGER Ø 12"	ORENSTEIN KOPPEL & LUEBECKER., GERMANY.	2496	30,000	5.49x15.50x3.23	250
24	SUCTION PIPE DREDGER Ø 12"	ORENSTEIN KOPPEL & LUEBECKER., GERMANY.	2496	30,000	5.49x15.50x3.23	250
25	SUCTION PIPE DREDGER Ø 16"	RID.	2502	35,000	9.29x27.35x6.34	595
26	SUCTION PIPE DREDGER Ø 16"	RID.	2504	35,000	9.29x27.35x6.34	595
27	SUCTION PIPE DREDGER Ø 12"	ELLCOTT. U.S.A.	2504	30,000	4.87x12.80x4.60	390
28	SUCTION PIPE DREDGER Ø 12"	ELLCOTT. U.S.A.	2505	30,000	4.87x12.80x4.60	390
29	SUCTION PIPE DREDGER Ø 14"	AMHCO. U.S.A.	2507	35,000	5.52x12.20x6.43	454
30	SUCTION PIPE DREDGER Ø 14"	AMHCO. U.S.A.	2507	35,000	5.52x12.20x6.43	454
31	SUCTION PIPE DREDGER Ø 14"	AMHCO. U.S.A.	2507	35,000	5.52x12.20x6.43	454
32	SUCTION PIPE DREDGER Ø 14"	AMHCO. U.S.A.	2507	35,000	5.52x12.20x6.43	454
33	SUCTION PIPE DREDGER Ø 14"	AMHCO. U.S.A.	2507	35,000	5.52x12.20x6.43	454
34	SUCTION PIPE DREDGER Ø 14"	AMHCO. U.S.A.	2507	35,000	5.52x12.20x6.43	454
35	SUCTION PIPE DREDGER Ø 14"	AMHCO. U.S.A.	2507	35,000	5.52x12.20x6.43	454
36	SUCTION PIPE DREDGER Ø 14"	AMHCO. U.S.A.	2507	35,000	5.52x12.20x6.43	454
37	SUCTION PIPE DREDGER Ø 12"	AMHCO. U.S.A.	2511	35,000	5.44x13.65x6.10	335

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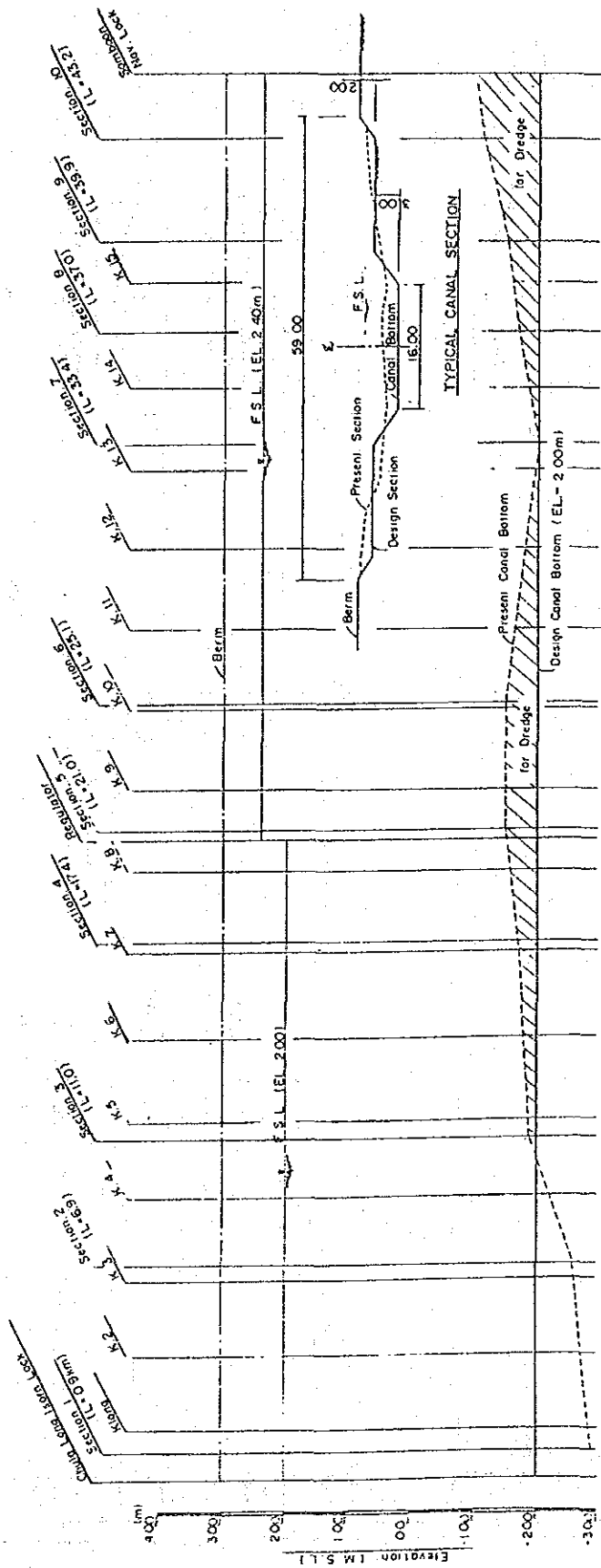
Thai Calendar 2532 = A.D. 1989

DREDGER No.	TYPE of DREDGER	MANUFACTURER	B.E. of PERCHASE	CAPACITY M ³ /MONTH	DIMENSIONS			TOTAL ENGINE CAP. (No)
					WIDTH	LENGTH	HEIGHT	
38	SUCTION PIPE DREDGER Ø 12"	AMMCO. U.S.A.	2511	35,000	5.44x13.65x6.10			335
39	SUCTION PIPE DREDGER Ø 12"	AMMCO. U.S.A.	2511	35,000	5.44x13.65x6.10			335
40	SUCTION PIPE DREDGER Ø 12"	AMMCO. U.S.A.	2511	35,000	5.44x13.65x6.10			335
41	SUCTION PIPE DREDGER Ø 20"	I.H.C. HOLLAND.	2511	67,000	9.50x44.50x6.40			2,500
42	SUCTION PIPE DREDGER Ø 14"	DIXIE DREDGE. U.S.A.	2512	35,000	4.50x15.25x6.40			335
43	SUCTION PIPE DREDGER Ø 14"	DIXIE DREDGE. U.S.A.	2512	35,000	4.50x15.25x6.40			335
44	SUCTION PIPE DREDGER Ø 14"	DIXIE DREDGE. U.S.A.	2512	35,000	4.50x15.25x6.40			335
45	SUCTION PIPE DREDGER Ø 14"	DIXIE DREDGE. U.S.A.	2512	35,000	4.50x15.25x6.40			335
46	SUCTION PIPE DREDGER Ø 14"	D.H.I. U.S.A.	2518	38,000	4.50x15.25x6.40			335
47	SUCTION PIPE DREDGER Ø 14"	D.H.I. U.S.A.	2518	38,000	4.50x15.25x6.40			335
48	SUCTION PIPE DREDGER Ø 8"	MUD-CAT. U.S.A.	2519	6,000	4.87x12.80x4.60			175
49	SUCTION PIPE DREDGER Ø 8"	MUD-CAT. U.S.A.	2519	6,000	4.87x12.80x4.60			175
50	SUCTION PIPE DREDGER Ø 6"	KURIMOTO. JAPAN.	2520	7,000	4.87x12.80x4.60			180
51	SUCTION PIPE DREDGER Ø 6"	KURIMOTO. JAPAN.	2520	7,000	4.87x12.80x4.60			180
52	SUCTION PIPE DREDGER Ø 6"	RID.	2526	24,000	4.87x12.80x4.60			300
53	BACKHOC DREDGER 3/4 CU.YARD	RID.	2532	20,000	5.00x11.95x2.00			115
54	BACKHOC DREDGER 3/4 CU.YARD	RID.	2532	20,000	5.00x11.95x2.00			115
55	SUCTION PIPE Ø 14"	KURIMOTO. JAPAN.	2528	38,000	4.50x15.25x6.40			576
56	SUCTION PIPE Ø 14"	KURIMOTO. JAPAN.	2528	38,000	4.50x15.25x6.40			576
57	BACKHOE DREDGER 400 LITE	CONVER B.V. NETHERLAND	2529	11,000	2.50x7.00x2.00			65
58	BACKHOE DREDGER 400 LITE	CONVER B.V. NETHERLAND	2529	11,000	2.50x7.00x2.00			65
59	BACKHOE DREDGER 3/4 CU.YARD	KATO JAPAN	2530	20,000	5.00x11.95x2.00			98
60	BACKHOE DREDGER 3/4 CU.YARD	KATO JAPAN	2530	20,000	5.00x11.95x2.00			98
61	SUCTION PIPE DREDGER Ø 8"	KURIMOTO. JAPAN.	2530	15,000	4.87x12.80x4.60			330
62	SUCTION PIPE DREDGER Ø 8"	KURIMOTO. JAPAN.	2530	15,000	4.87x12.80x4.60			330
63	SUCTION PIPE DREDGER Ø 8"	KURIMOTO. JAPAN.	2530	15,000	4.87x12.80x4.60			330
64	BACKHOE DREDGER 3/4 CU.YARD	CATERPILLAR. BELGIUM	2530	20,000	5.00x11.95x4.60			115
TOTAL OF DREDGER 60 SETS				TOTAL CAPACITY	1,508,000 M ³ /MONTH			
					15,000,000 M ³ /YEAR			
77.1	WATER HYACINTH REMOVER	AQUAMARINE H-650 HARVESTER U.S.A.	2518	1,800 TANS/MONTH				
77.2	WATER HYACINTH REMOVER	AQUAMARINE AQUATRIO H-650 U.S.A.	2522	1,300 TANS/MONTH				
77.3	WATER HYACINTH REMOVER	AQUAMARINE AQUATRIO H-650 U.S.A.	2522	1,800 TANS/MONTH				
77.4	-	AQUAHARVESTER HITSUI JAPAN	2528	-				
77.5	CUTTER BOAT	RID.	2530	-				

Table-7 RECORDS OF DREDGING IN RANGSIT CANAL

Canal	Section (km)	Location		Length (km)	Quantity (m ³)	Period		Equipment
		From (km)	To (km)			From	To	
Rangsit	6.17	20.10	21.73	1.63	169,000	24/11/81	24/8/82	Bucket Dredger (W:5.5xL:17.47x H:7.0m) (1960)
		22.20	23.44	1.24				
		23.48	23.77	0.29				
	4.38	24.00	27.01	3.01	146,000	3/3/82	31/8/82	Bucket Dredger (W:5.0xL:12.0x H:7.0m) (1954)
		17.36	17.92	0.56				
		18.18	20.00	1.82				
	9.56	27.06	27.51	0.45	201,000	3/3/82	24/8/83	Bucket Dredger (-ditto-)
		28.02	29.57	1.55				
		29.57	37.58	8.01				
	4.62	37.65	39.20	1.55	95,000	9/1/83	31/8/83	Suction Pipe Dredger (ø 300 mm) (W:5.49xL:15.5xH:3.23 m) (1952)
		11.82	16.44	4.62				
		39.28	39.88	0.60				
	13.50	39.93	40.41	0.48	292,000	1/11/82	28/7/83	Suction Pipe Dredger (ø 400 mm) (W:9.29xL:27.35H:6.34 m) (1958)
20.49		40.66	0.17					
40.74		41.63	0.89					
Total	38.23	41.72	44.28	2.56	903,000			
		44.40	53.20	8.80				

Figure-2 PROFILE OF RANGSIT CANAL

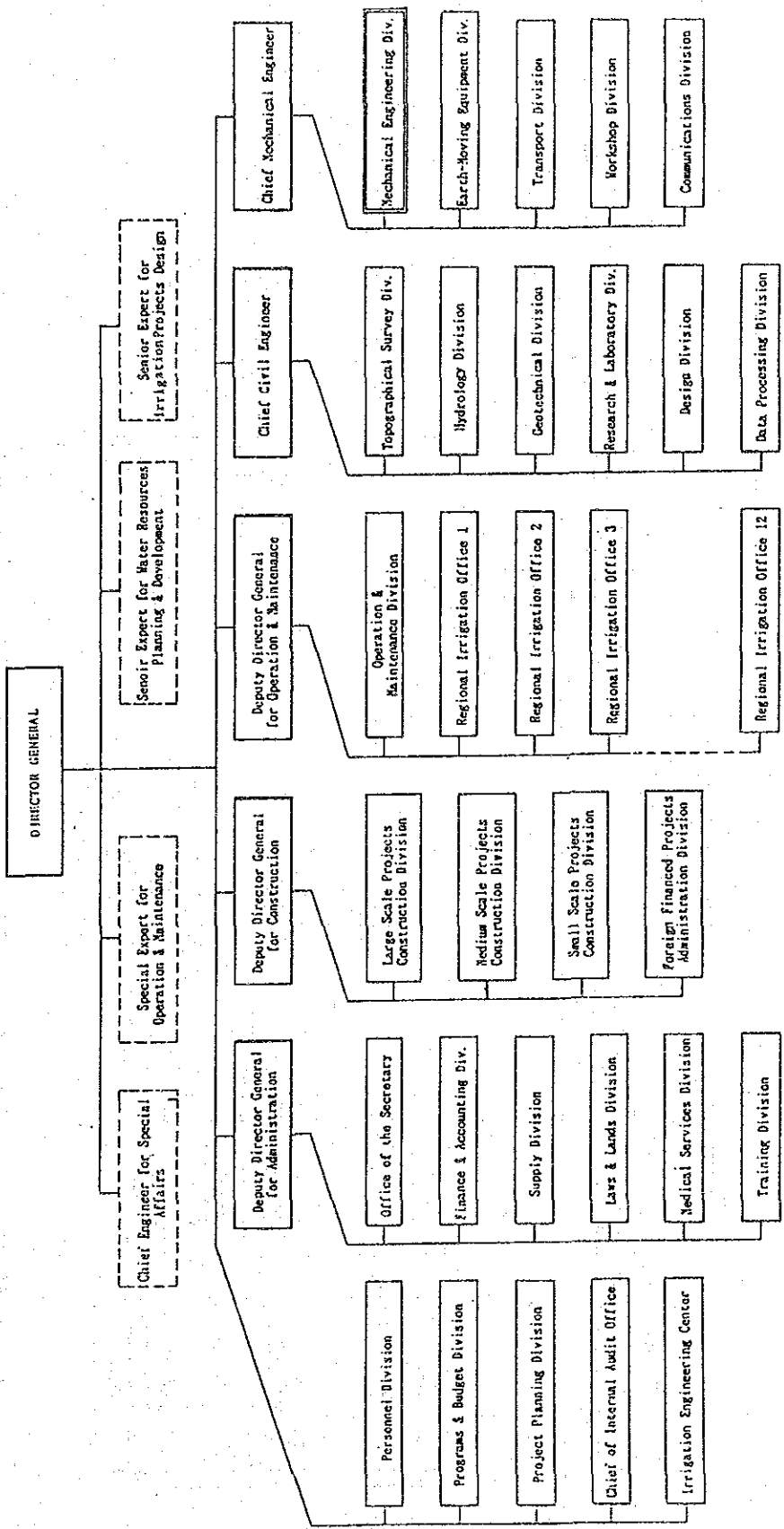


LEGEND
 K-----NO OF KILOM.
 Section-----Surveyed for
 Cross Section
 EL-----Elevation from the
 Mean Sea Level

Elevation of Design Section	EL = 3.00m		F.S.L. (EL = 2.40m)		EL = 2.00m		Distance (km)	Distance (km) from Chula Long Korn Lock
	Berm Level (m)	Full Supply Level (m)	Canal Bottom Level (m)	Canal Bottom Elevation (m) at Present	Distance (km)	Distance (km)		
				2.40	2.60	2.60	1.0	1.0
				2.40	2.60	2.60	2.0	2.0
				2.40	2.60	2.60	3.0	3.0
				2.40	2.60	2.60	4.0	4.0
				2.40	2.60	2.60	5.0	5.0
				2.40	2.60	2.60	6.0	6.0
				2.40	2.60	2.60	7.0	7.0
				2.40	2.60	2.60	8.0	8.0
				2.40	2.60	2.60	9.0	9.0
				2.40	2.60	2.60	10.0	10.0
				2.40	2.60	2.60	11.0	11.0
				2.40	2.60	2.60	12.0	12.0
				2.40	2.60	2.60	13.0	13.0
				2.40	2.60	2.60	14.0	14.0
				2.40	2.60	2.60	15.0	15.0
				2.40	2.60	2.60	16.0	16.0
				2.40	2.60	2.60	17.0	17.0
				2.40	2.60	2.60	18.0	18.0
				2.40	2.60	2.60	19.0	19.0
				2.40	2.60	2.60	20.0	20.0
				2.40	2.60	2.60	21.0	21.0
				2.40	2.60	2.60	22.0	22.0
				2.40	2.60	2.60	23.0	23.0
				2.40	2.60	2.60	24.0	24.0
				2.40	2.60	2.60	25.0	25.0
				2.40	2.60	2.60	26.0	26.0
				2.40	2.60	2.60	27.0	27.0
				2.40	2.60	2.60	28.0	28.0
				2.40	2.60	2.60	29.0	29.0
				2.40	2.60	2.60	30.0	30.0
				2.40	2.60	2.60	31.0	31.0
				2.40	2.60	2.60	32.0	32.0
				2.40	2.60	2.60	33.0	33.0
				2.40	2.60	2.60	34.0	34.0
				2.40	2.60	2.60	35.0	35.0
				2.40	2.60	2.60	36.0	36.0
				2.40	2.60	2.60	37.0	37.0
				2.40	2.60	2.60	38.0	38.0
				2.40	2.60	2.60	39.0	39.0
				2.40	2.60	2.60	40.0	40.0
				2.40	2.60	2.60	41.0	41.0
				2.40	2.60	2.60	42.0	42.0
				2.40	2.60	2.60	43.0	43.0
				2.40	2.60	2.60	44.0	44.0
				2.40	2.60	2.60	45.0	45.0
				2.40	2.60	2.60	46.0	46.0

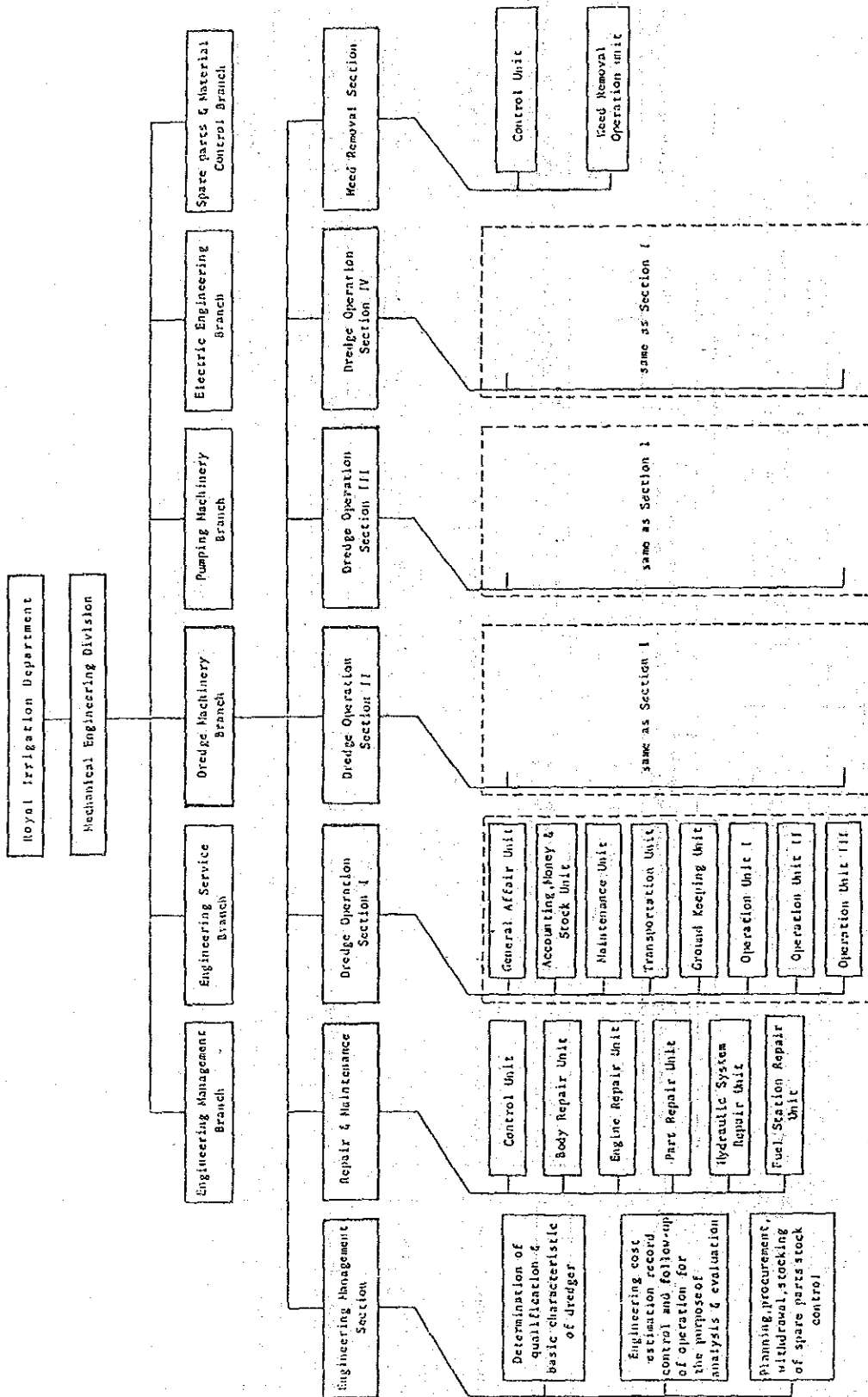
PROFILE OF RANGSIT CANAL (Chula Long Korn ~ Somborn)

Figure-4 Organization of RID



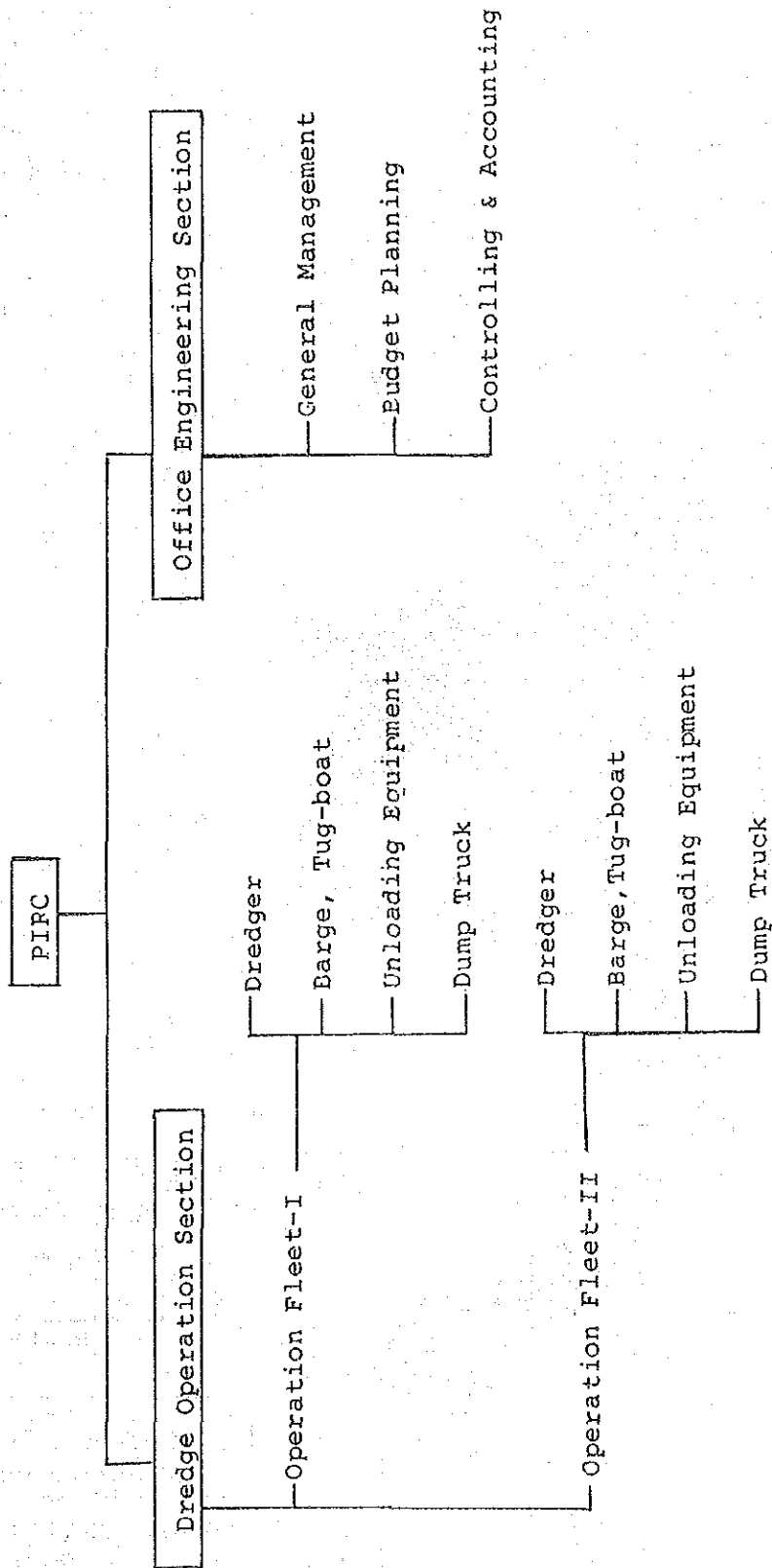
ORGANIZATION OF ROYAL IRRIGATION DEPARTMENT

Figure-5 Organization of MED



ORGANIZATION OF DREDGE OPERATION SECTION
MECHANICAL ENGINEERING DIVISION, RID

Figure-6 Proposed Organization of PIRC



Note: PIRC: The Project for the Improvement of Rangsit Canal

Figure-7 SERVICE BOUNDARY OF DREDGE OPERATION SECTIONS 1 - 4

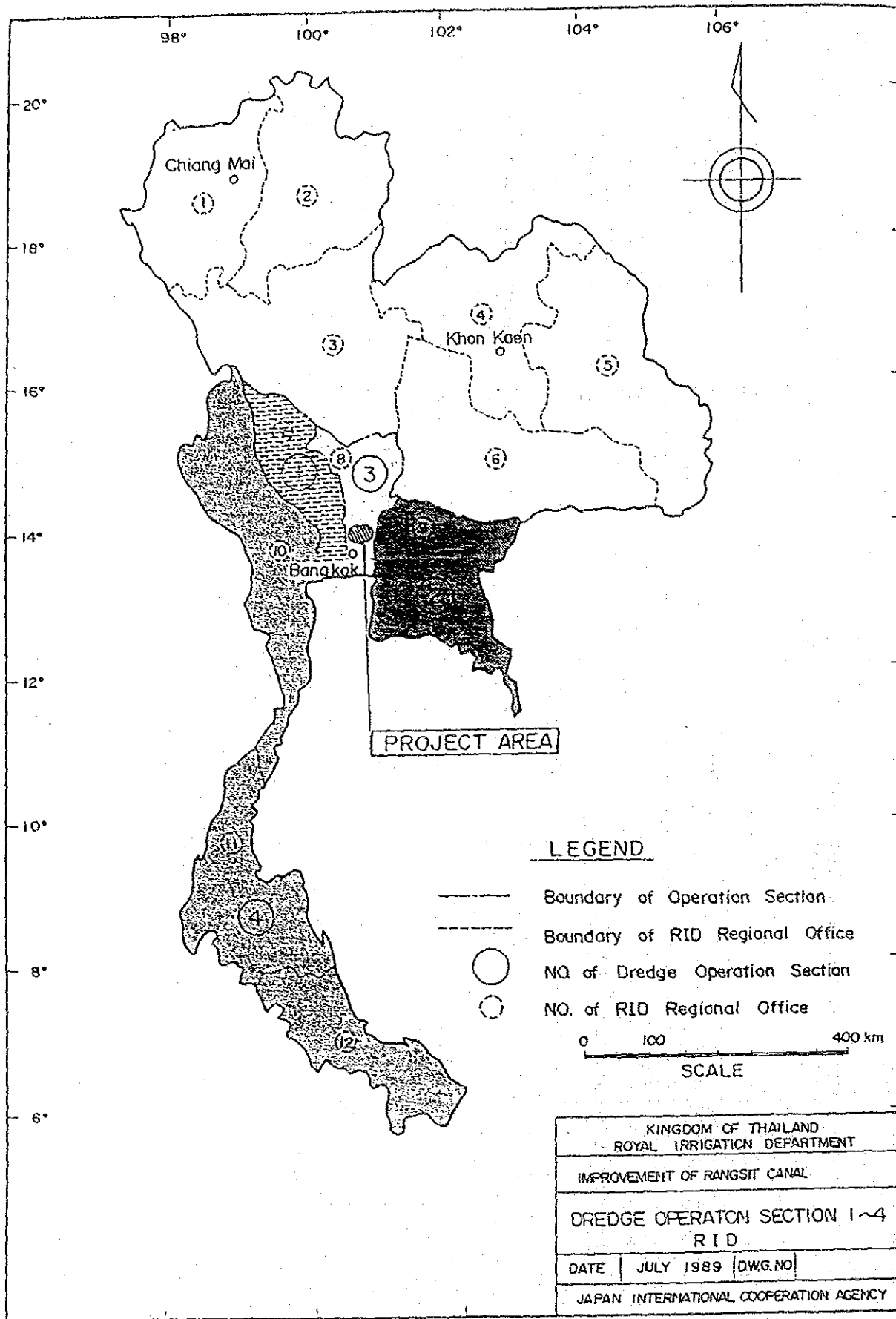


Figure-8 PROJECT IMPLEMENTATION SCHEDULE

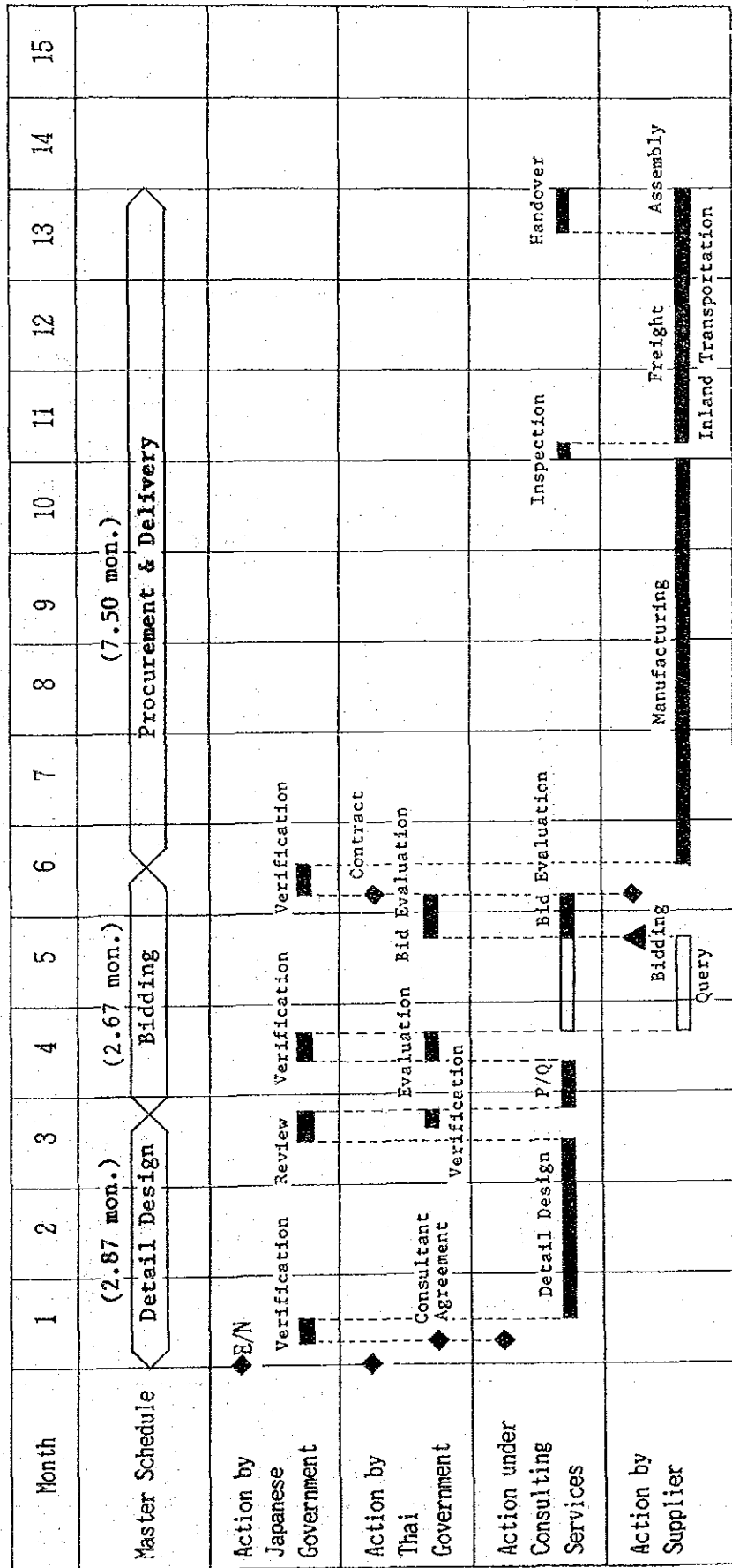


Figure-9 BACKHOE DREDGER BOAT

PRINCIPAL PARTICULARS

LENGTH 12^M00.
 BREADTH 5^M60
 DEPTH 1^M50
 BUCKET CAPACITY 0.6 m³
 MAX. DREDGE DEPTH 5^M90

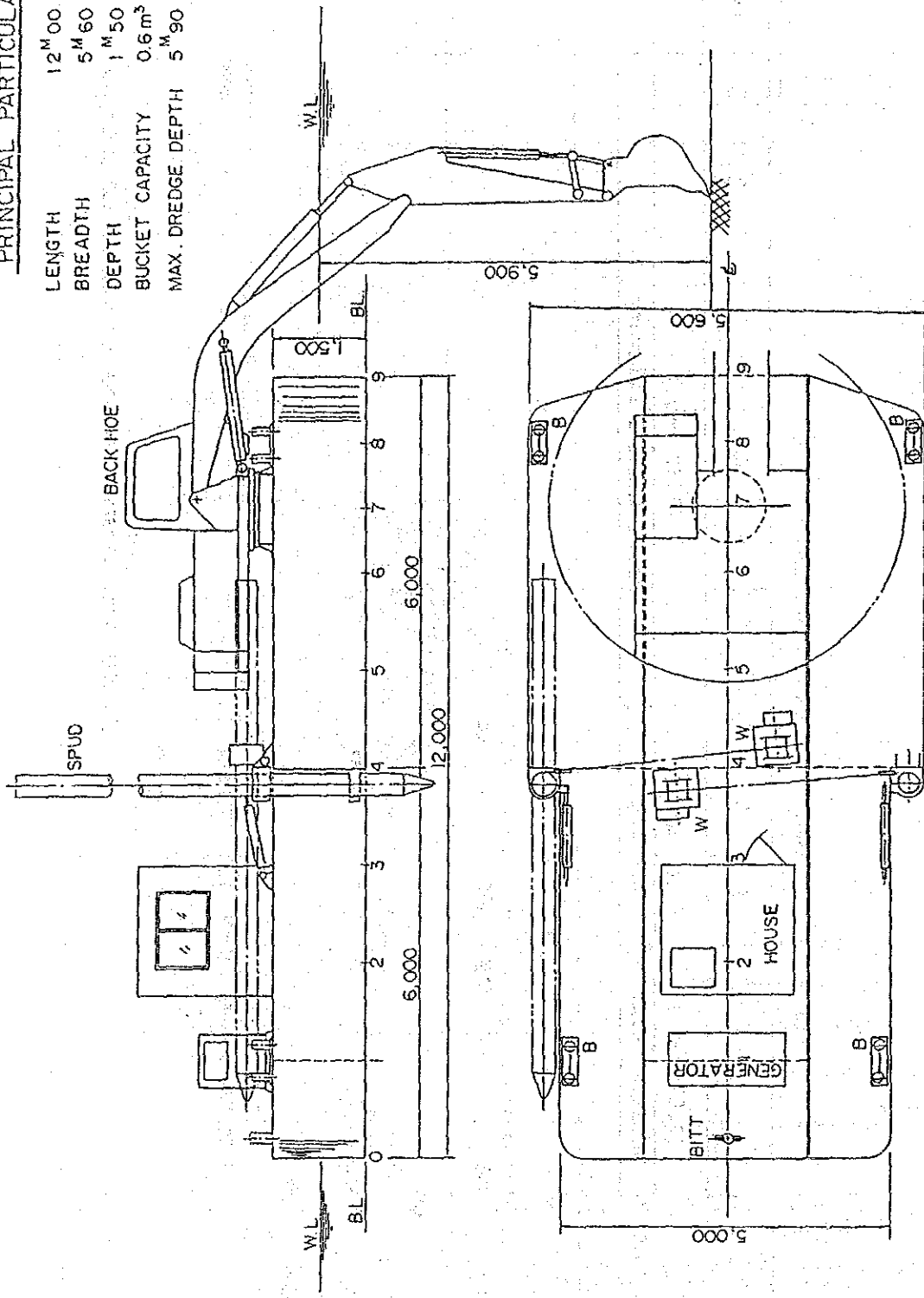


Figure-10 BARGE

PRINCIPAL DIMENSIONS

LENGTH 12^m00~13^m00
 BREADTH 4^m50
 DEPTH 1^m50
 HOLD CAPACITY 20^m3

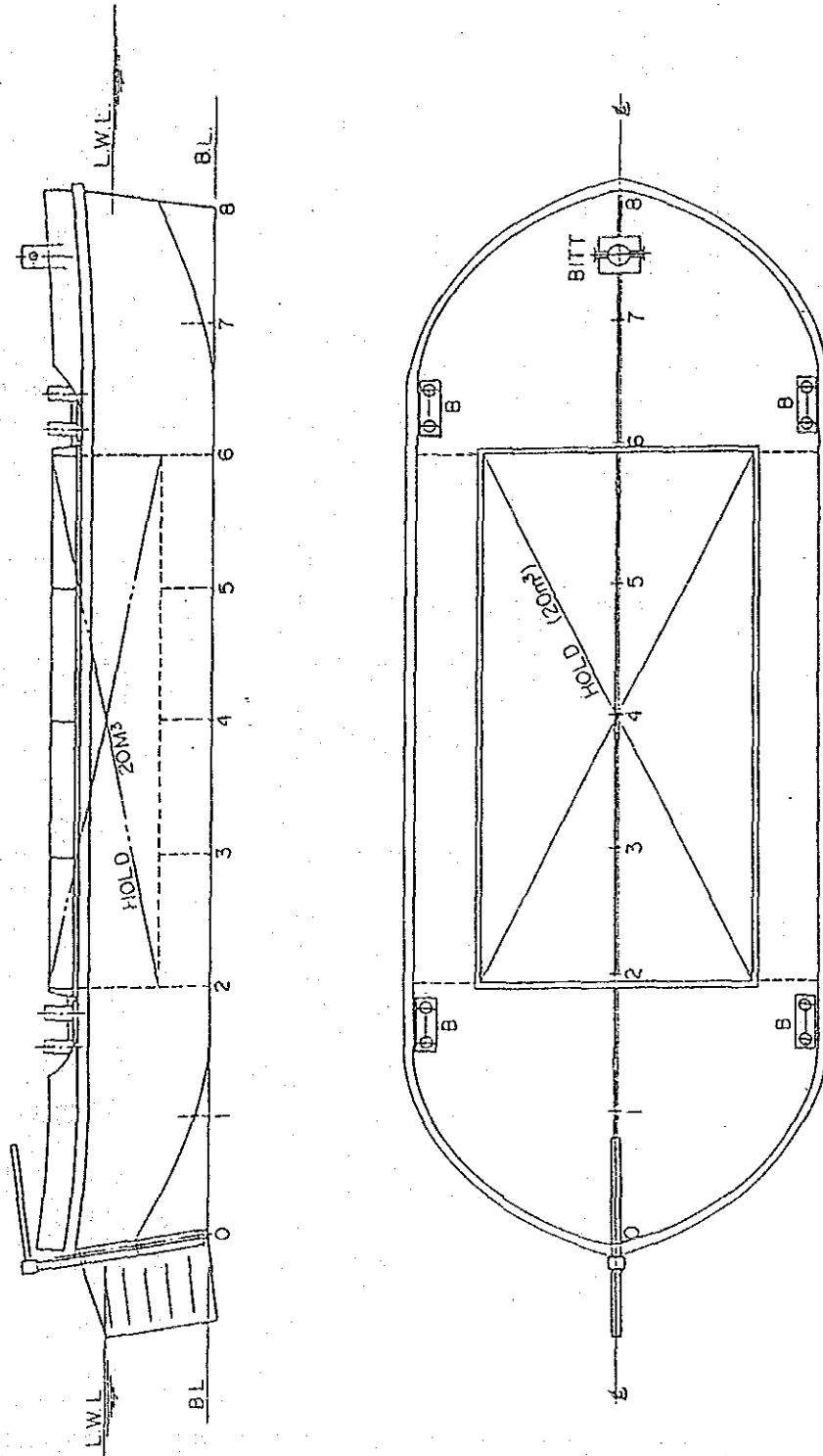


Figure-11 TUG BOAT

PRINCIPAL PARTICULARS

LENGTH (O.A) 7^M500~9^M000
 BREADTH 2^M500~3^M000
 DEPTH 1^M000~1^M500
 MAIN ENGINE (abi) 150^{PS} x 1SET.

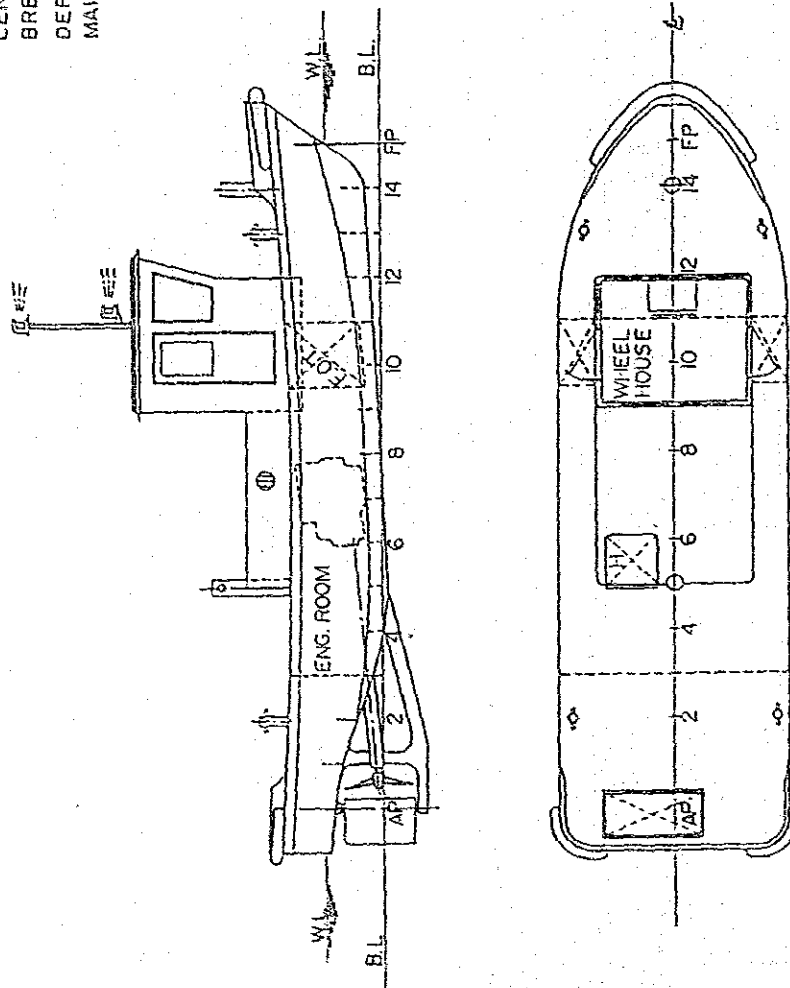
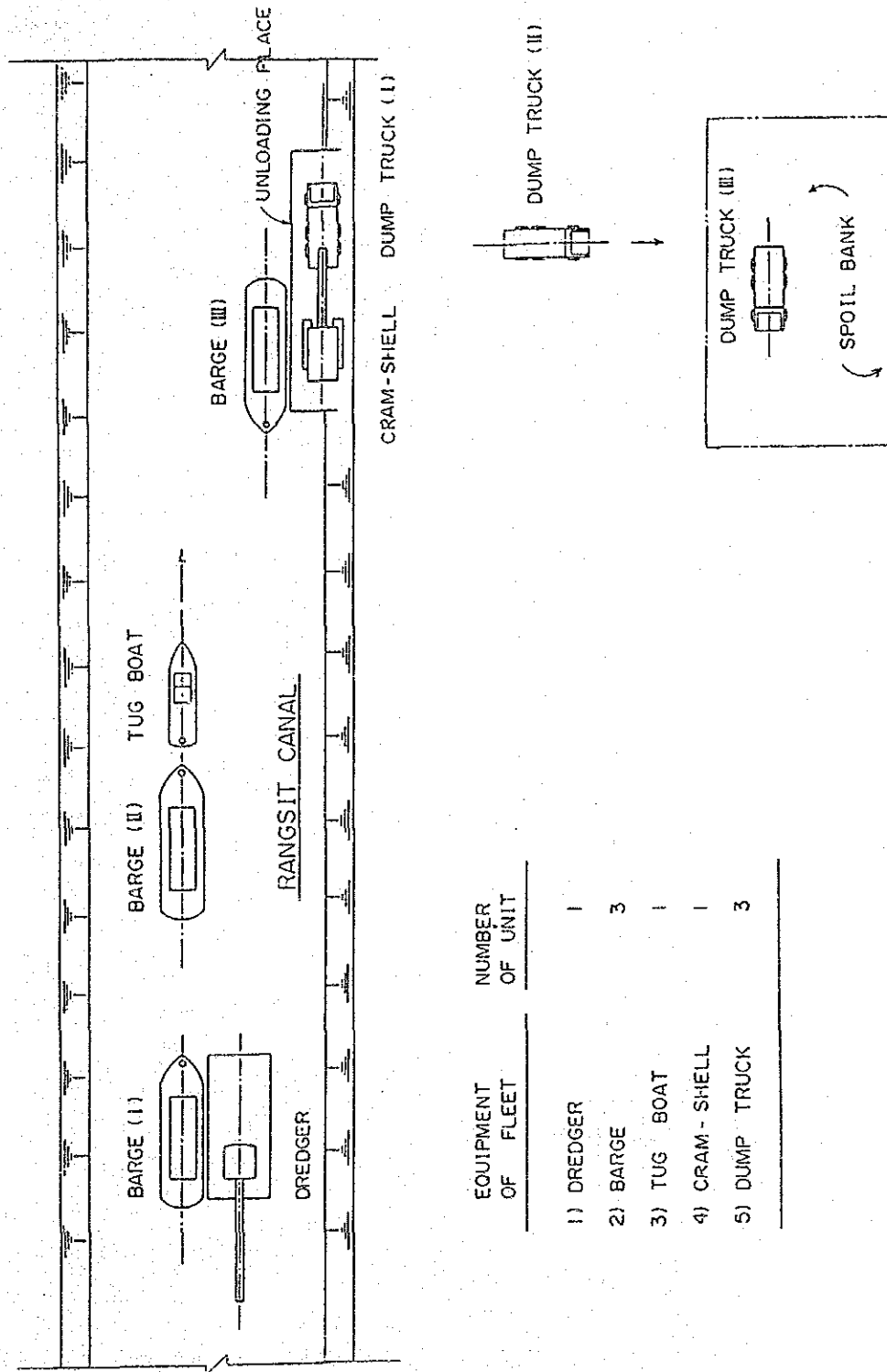


Figure-12 DREDGING OPERATION SYSTEM



EQUIPMENT OF FLEET	NUMBER OF UNIT
1) DREDGER	1
2) BARGE	3
3) TUG BOAT	1
4) CRAM - SHELL	1
5) DUMP TRUCK	3

APPENDIX

1. Members of the Study Team
2. Itinerary for the Study
3. List of Persons Interviewed
4. Minutes of Discussions

1. Members of the Study Team

1-1 Member of Basic Design Survey Team

Team Leader	OUCHI Akira	Grant Aid Div. Economic Coop. Bureau, Min. of Foreign Affairs, Japan
Water Utilization Planning	NAKAZIMA Nobuyoshi	Chief of Develop. Sec. Const. Dep. Japan Agri. Land Develop. Agency
Canal Improve- ment Planning	INOUE Koichi	Sanyu Consultants Inc.
Canal Dredging	KUME Yakao	-ditto-
Intake Facilities	WATANABE Masamichi	-ditto-

1-2 Explanation Team of Draft Final Report

Team Leader	MATSUDA Norio	First Project Management Division JICA
Canal Improve- ment Planning	INOUE Koichi	Sanyu Consultants Inc.
Intake Structures	WATANABE Masayoshi	-ditto-

2. Itinerary for the Study

APPENDIX-2

1/4

Month	Date	Day	Trip	Member of Party	Remarks
Mar.	19	Sun.	Trip		Tokyo-BKK
	20	Mon.	BKK		
			JICA Office	Mr. ENDO Mr. YAMASHITA	Courtesy Call
			Embassy	Mr. HIRASHIMA (First Secretary	
			RID	Mr. NIT Kesjumbol (Chief of Mech. Engineering Division, RID) Mr. SUTHI Songvoravit (Chief of PPS-1, RID)	
	21	Tue	Field Survey	Mr. PRECHA Kanjananuson (Mech. Eng. Dredger, MED,RID) Mr. VISOOT Kungsamant (Dredge branch MED, RID) Mr. YONGYUTHYonpian (Dredge Branch MED,RID) Mr. KUSOL Utasshawa (PPD-1, RID) Mr. YAMASHITA Mr. MATSUO (Colombo Plan Expert)	Rangsit
	22	Wed	Workshop RID	Mr. BANCHONG Vadhan, (Expert of Workshop Division, RID) Mr. PRECHA Mr. VISOOT Mr. KUSOL	Chulalong Korn
	23	Thu	RID	Mr. NIT Mr. PRAYUT Chuen (Director, MED, RID) Mr. KID Seiyaramya (Chief, MED,RID) Mr. SUCHI Mrs. SAEWANEE Thamnsara (Weed Con- trol and research Branch, Research & Labo. Div.RID)	Meeting

Month	Date	Day	Trip	Member of Party	Remarks
Mar.	23	Thu	RID	Mr. NIPAT Plana yovit (Project manager Rangsit O/M Div. RID) Mr. PRECHA Mr. THANOW Klajayai (Water Control, O/M Div. RID) Mr. VISOOT Mr. MATSUO , Mr. ARAKI	
	24	Fri	RID	Mr. NIT Mr. SUTHI Mr. PRAYUT Mr. YONGYUTH Mr. NIPAT Mr. PRECHA Mr. THANOM Mr. VISOOT	Meeting on Minutes of Dis.
	25	Sat.	Field	Mr. PRECHA Mr. VISOOT Mr. KUSOL Mr. MATSUO	San Song Canal
	26	Sun	BKK		Staff Meeting
	27	Mon	RID	Mr. NIT Mr. SUTHI Mr. PRAYUT Mr. YONGYUTH Mrs. SAEWANEE Mr. NIPAT Mr. PRECHA Mr. THANOM Mr. VISOOT Mr. MATSUO. Mr. ARAKI Mr. HIRASHIMA Mr. YAMASHITA	Sign of Minutes
			Jap. Embassy JICA, BKK		

Month	Date	Day	Trip	Member of Party	Remarks
	28	Tue	Trip	(Team Leader, Mr. NAKAJIMA)	BKK-Tokyo
			Pakkret	Mr. PRAYUT	Meeting
				Mr. YONGYUTH	
				Mr. NIPAT	
				Mr. PRECHA	
			Pakkret	Mr. VISOOT	
	29	Wed			
Apr.	6	Thu	Rangsit.	Mr. NIPAT	Field Survey and
				Mr. VISOOT	Meeting
				Mr. PRECHA	
				Mr. SUTHI	
				Mr. PRAYUT	
				Mr. YONGYUTH	
	7	Fri	RID	Mr. NIT	Courtesy Call
			JICA	Mr. YAMASHITA	
				Mr. MATSUD	
	8	Sat	Trip		BKK-Tokyo

Month	Date	Day	Trip	Member of Party	Remarks
June	4	Sun	Tokyo-BKK		Trip
	5	Mon		Mr. YAMASHITA (JICA) Mr. HIRASHIMA (Embassy) Mr. NIT (Chief of MED,RID) Mr. SUTHI (Chief of PPS-1,RID)	Courtesy call
	6	Tue		Mr. NIT (RID) Mr. SUTHI (-do-) Mr. PRAYUT (-do-) Mr. YONGYUTH (-do-) Mr. PRECHA (-do-) Mr. VISOOT (-do-) Mrs. SAEWANEE (-do-) Mr. ARAKI (Colombo Plan Expert)	Explanation of Report
	7	Wed		Mr. NIT (RID) Mr. SUTHI (-do-) Mr. ARAKI (CPE)	Meeting on Minutes of Discussions
	8	Thu		Mr. NIT (RID) Mr. SUTHI (RID) Mr. ARAKI (CPE)	Signing of Minutes
	9	Fri		Mr. YAMASHITA (JICA) Mr. HIRASHIMA (Embassy)	Courtesy call
	10	Sat	BKK-Tokyo		Trip

List of Persons Interviewed

From June 4 1989

To June 10 1989

1. RID

Mr. Nit Kesjumbol	Chief of Mechanical Engineering Division, RID.
Mr. Suthi Songvoravit	Chief of Project Planning Section-1, RID.
Mr. Prayut Chuensamran	Director, Mechanical Engineering Division, RID.
Mr. Yongyuth Yonpian	Chief of Dredging Branch, Mechanical Engineering Division, RID.
Mr. Precha Kanjananuson	Manager, Dredge Operation Section-III MED, RID.
Mr. Visoot Kungsamaut	Engineer, Dredge Operation Section-III MED, RID.
Mrs. Saewanee Thamnsara	Weed Control & Research Branch, Research and Laboratory Division, RID.

2. Japanese Embassy

Mr. Kazuo Hirashima	First Secreary Embassy of Japan
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3. JICA

Mr. Kiyonori Yamashita	JICA, BKK Office
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4. Experts

Mr. Kazushige Matsuo	Colombo Plan Expert
Mr. Fumio Araki	-ditto-

4-1 Minutes of Discussion

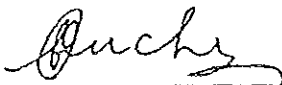
MINUTES OF DISCUSSIONS
ON
THE PROJECT FOR THE IMPROVEMENT OF RANGSIT CANAL'S CONDITION
IN
THE KINGDOM OF THAILAND

In response to the request made by the Government of the Kingdom of Thailand for a Grant Aid on the Project for the Improvement of Rangsit Canal's Condition (hereinafter referred to as "the Project"), the Government of Japan decided to conduct a basic design study on the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Thailand the Basic Design Study Team (hereinafter referred to as "the Team") headed by Mr. Akira OUCHI, Official, Grand Aid Division, Ministry of Foreign Affairs, to carry out the study from March 19 to April 8, 1989.

The Team had a series of discussions on the Project with the officials concerned of the Government of Thailand.

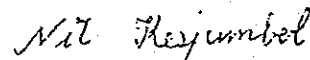
As a result of the study, both parties have agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Bangkok, March 27, 1989



Akira OUCHI

Leader of the Basic Design Study Team,
The Japan International Cooperation Agency



Nit Kesjumbol

Chief Mechanical Engineer,
Royal Irrigation Department

ATTACHMENT

1. Objective

The objective of the Project is to improve Rangsit Canal's condition in order to distribute irrigation water smoothly in the area and to drain easily out of the area by supplying necessary equipment.

2. Executing Agency

The Royal Irrigation Department (hereinafter referred to as "RID") which is the implementing agency of the Government of Thailand, is responsible for the administration and execution of the Project.

3. Understanding of Japan's Grant Aid System

The Thai side has understood Japan's Grant Aid system explained by the Team.

4. Request by the Government of Thailand

The Team will convey to the Government of Japan the desire of the Government of Thailand that the former takes necessary measures to co-operate by providing equipment shown in Annex I within the scope of Japanese Economic Cooperation Program in grand form.

5. Measures to be taken by the Government of Thailand

The Government of Thailand will take the necessary measures listed in Annex II on condition that a Grant Aid by the Government of Japan would be extended to the Project.

ANNEX I

Major equipment requested by the Government of Thailand for the Project are as follows:

1. Dredging boats
2. Barges
3. Tug boats
4. Cranes
5. Dump trucks
6. Sheet piles, etc.

A. Q.

N/A

ANNEX II

Necessary measures to be taken by the Government of Thailand:

1. To ensure prompt unloading and customs clearance at the port of disembarkation in Thailand.
2. To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
3. To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contracts such facilities as may be necessary for their entry into Thailand and stay therein for the performance of their work.
4. To maintain and use properly and effectively the products purchased under Japan's Grant Aid.
5. To bear all the expenses other than those to be borne by the Grant necessary for the execution of the Project.
6. To exempt Japanese nationals involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Thailand with respect to the supply of the products and services under the verified contracts.
7. To ensure the necessary budget and personnel for the proper and effective operation and maintenance of the equipment provided under Japan's Grant Aid.
8. To secure the unloading place from barges and spoil bank for the removed soil and weeds.
9. To make the facilities available for the assembly of the equipment provided under Japan's Grant Aid.

MINUTES OF DISCUSSION

ON

THE DRAFT FINAL REPORT OF THE BASIC DESIGN STUDY

ON

THE PROJECT FOR THE IMPROVEMENT OF RANGSIT CANAL

THE KINGDOM OF THAILAND

In response to the request made by the Government of the Kingdom of Thailand, the Government of Japan decided to conduct a basic design study on the Project for the Improvement of Rangsit Canal (hereinafter referred to as "the Project") and entrusted the study to Japan International Cooperation Agency (JICA). JICA subsequently sent a study team to Thailand from March 19 to April 8, 1989.

As the result of the study, JICA prepared a draft final report and dispatched a team, headed by Mr. Norio Matsuda, First Project Management Div., Grant Aid Project management Dept., JICA from June 4 to 10, 1989 for presentation and discussions thereon.

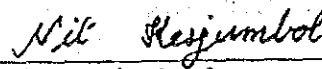
The team had a series of discussions on the Project with the officials concerned of the Government of Thailand headed by Mr. Nit Kesjumbol, Chief Mechanical Engineer, Royal Irrigation Department, Ministry of Agriculture and Cooperatives, the Kingdom of Thailand.

After clarifying contents of the report, both parties herein agreed to recommend to their respective Governments that the major points of understanding reached by and between them, attached herewith, should be examined towards materialization of the Project.

8th June, 1989



Norio Matsuda
Leader
The Study Team
JICA



Nit Kesjumbol
Chief Mechanical Engineer
RID, MOAC
The Kingdom of Thailand

- Attachment - 1: Major Points of Understanding
- 2: List of Equipment and Material

ATTACHMENT - 1MAJOR POINTS OF UNDERSTANDING

1. The Thai side agreed in principle to the basic design proposed in the Draft Final Report. The items of proposed equipment and material are shown in Attachment - 2.
2. The Thai side understood the system of Japan's Grant Aid Program and reconfirmed the measures to be taken by the Thai side towards materialization of the Project as agreed upon in the "Minutes of Discussion" concluded and signed by the both parties on March 27, 1989.
3. The Thai side shall secure budget allocation , staff appointment and operation and maintenance/repair plans required for prompt improvement of Rangsit Canal by efficient use of the granted equipment.
4. Ten (10) copies of the Final Report on the Project will be prepared by JICA and presented to the Government of Thailand by the end of July, 1989.

ATTACHMENT - 2LIST OF EQUIPMENT AND MATERIAL

Two (2) fleets of equipment of Rangsit Irrigation and Drainage Canal, each fleet of which consists of the followings.

Per-fleet equipment

- | | |
|-------------------------|---------|
| 1. Backhoe dredger boat | 1 unit |
| 2. Barges | 3 units |
| 3. Tugboat | 1 unit |
| 4. Cramshell | 1 unit |
| 5. Dump trucks | 3 units |

Material for re-loading platform

6. Steel sheet piles

