CHAPTER 8

STUDY ON OPERATION AND MAINTENANCE SYSTEM

APPENDIX 8.2-1 EXSAMPLES OF GOVERNMENT SUBSIDY

1. Japan Highway Public Corporation (JHPC), Tokyo, Japan

Japan Highway Public Corporation (JHPC) was established in 1956, pursuant to the Nihon Doro Kodan Law as a non-profit government corporation with the objectives of constructing and operating toll motorways throughout Japan. As at September 30, 1993, the lengths of motorways extend 5,404 km. in operation, 1,299 km. under construction, 2,900 km. under survey and 1917 km. in location planning, with a total of 11,520 km.

Regarding the sources of funds, JHPC has had a variety of financing sources since it establishment up to the fiscal year of 1993 as shown below in Table 1.

TABLE 1 RESOURCES OF FUNDS EXCLUDING OPERATING REVENUE

Item	[Unit:Billion Yen] Amount	Share (%)
BONDS		
Publicly Offered Bonds	4,490.0	13.58
Bonds Placed to Gov't Funds	22,471.6	67.97
Privately Placed Bonds	1,871.0	5.66
Foreign Currency Bonds	414.1	1.25
Bonds Total	29,247.6	88.46
BORROWINGS		
Trust Fund Bureau	25.9	nil
Industrial Inv. Spe. A/C	18.7	nil
Financial Institutions	2,017.5	6.10
IBRD	136.8	0.41
Borrowing Total	2,198.9	6.65
GOVERNMENT SUBSIDIES	774.9	2.34
GOVERNMENT CAPITAL FUNDS	838.0	2.53
OTHERS	0.7	nil
GRAND TOTAL	33,060.1	100.00

2. Indonesian Highway Corporation

Indonesian Highway Corporation (P. T. Jasa Marga) was created by the Indonesian government in 1978 as a state-owned company in charge of financing, constructing, operating and monitoring toll roads throughout Indonesia. In financing the project, the Government is responsible for land acquisition, and Jasa Marga seeks the funds from the following sources:

- Toll revenues
- Government equity
  The government has converted the soft loans from multilateral and bilateral sources into the equity of Jasa Marga.
- Bonds on domestic financial market since 1983

- Joint-operation with private companies
- Joint-venture with private investors

The investment in toll roads by private investors should be in cooperation with P.T. Jasa Marga in the form of joint venture or joint-operation. The joint venture agreement is based on a "Build, Operate, Transfer (BOT)" scheme.

3. Expressway and Rapid Transit Authority of Thailand (ETA)

The Expressway and Rapid Transit Authority of Thailand (ETA) was created in 1972 as one of the State Enterprises of the Kingdom under the Revolutionary Party's Announcement No. 290, and is now financing, planning, constructing, operating and managing the expressway systems in and around Bangkok Metropolis, under the supervision of the Ministry of Interior. The sources of funds of this state enterprise since its establishment are as follows:

- Capital contribution from government
- Long term loans

ETA's bond
Government Saving Bank
Ministry of Finance
OECF
Yen loan

APPENDIX 8.3-1 SYSTEM CONFIGURATION ON TOLL COLLECTION SYSTEM

The system configuration of the proposed toll collection are described as follows (refer to Figures 1, 2 and 3 of following pages):

In this toll collection, the concept of an independent lane controller is used, that is, each lane controller operates independently. The lane controllers (LCL) in the lanes and the Station Processors (SPC) in the supervisory building are arranged in a hub-and-spoke configuration.

The peripheral lane equipment is comprised of the following: Toll Collector Terminal (TCT), Receipt Printer (RPR), Automatic Vehicle Classification Unit (AVC), Toll Fare Indicator (TFI), Lane Traffic Light (LTL), Overhead Traffic Light (OTL), Amber Security Beacon (ASB), and Lane Closure Barrier (LCB). These are all interfaced and controlled by the LCL.

Each LCL can operate either in a normal on-line mode with the Station Processor or in an off-line more.

The LCL transmits data at the end of the shift of lane, summarizing all the toll collector's transaction data. Also, by the polling from the SPC, the transaction data from each LCL can be sent one by one. In the event of failure of the SPC or data transmission line, up to twenty-four end-of-shift data can be accumulated in the LCL, which are to be sent automatically when the SPC is restored. If the SPC is not returned to normal operating condition within the storage capacity of the LCL or within 24 hours shifts, it is possible to obtain the data from the tour-of-duty tickets, using the LCL.

The SPC processes the data from the LCL and transforms the data into audit reports.

In the Control Room of station building, there is a Toll Monitor that is connected with the LCL via independent communication lines. The Toll Monitor Console (TMC) polls each LCL to acquire lane status information and displays it for the supervisor's toll-monitoring.

The indicators and switches on the TMC monitor and control the toll equipment and other facilities at the toll station. These include the standby generator, overhead traffic (canopy) lights, etc.

A Clock System is used to synchronize the time throughout the toll stations, in which the Master Clock Unit provides the standard time to the SPC. The system also provides the display signal for the slave clocks within the station building.

The SPC and the LCL also have built-in clock functions to ensure the continuity of records, should the Master Clock fail.

A Booth Communication System provides communication between each toll gate and the toll station supervisor. The system, however, does not support intercommunication between the toll gates.

If there is a power failure, the Uninterruptible Power Supply System (UPS) provides thirty minutes of power for the toll system and the emergency telephone equipment.

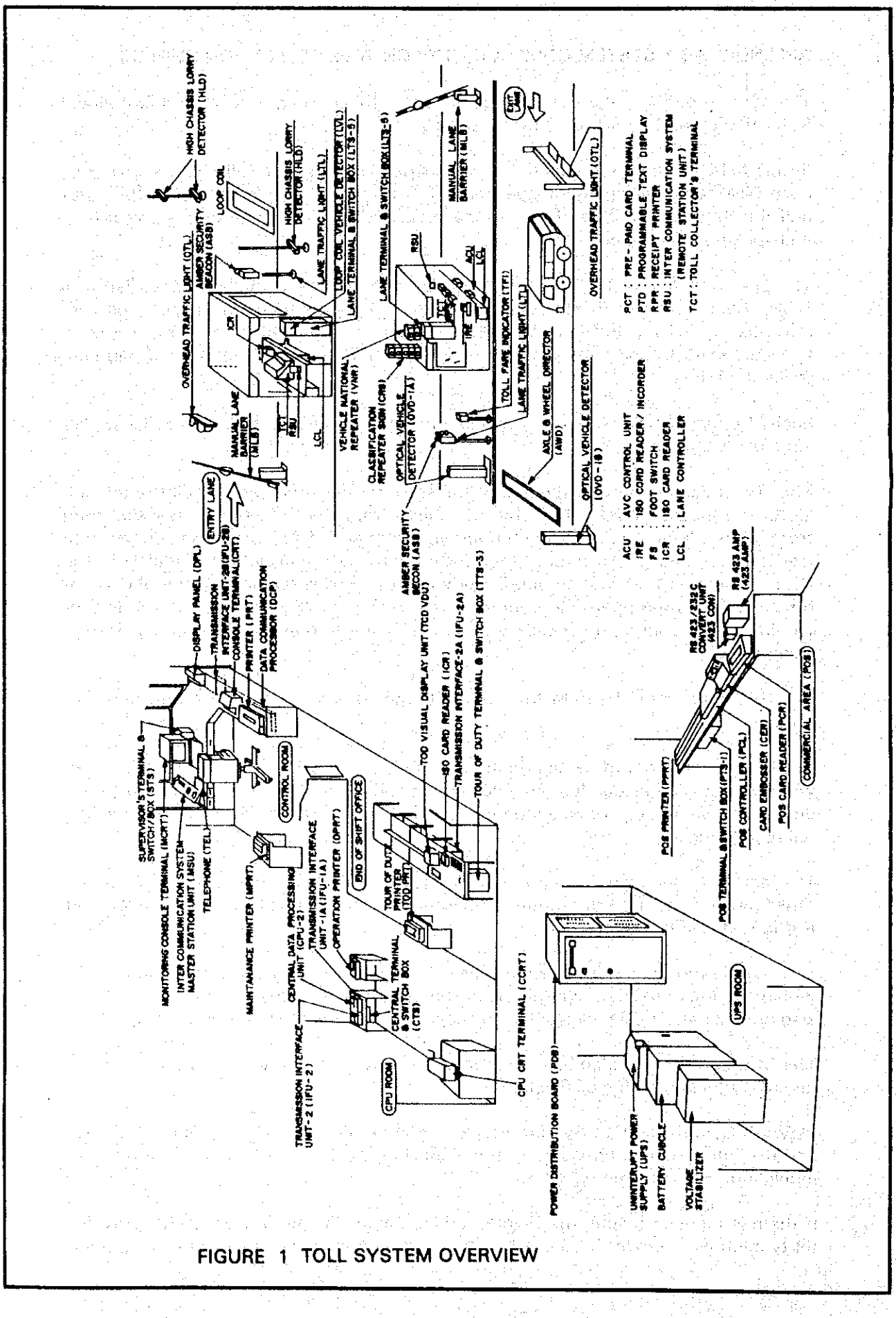


FIGURE 1 TOLL SYSTEM OVERVIEW

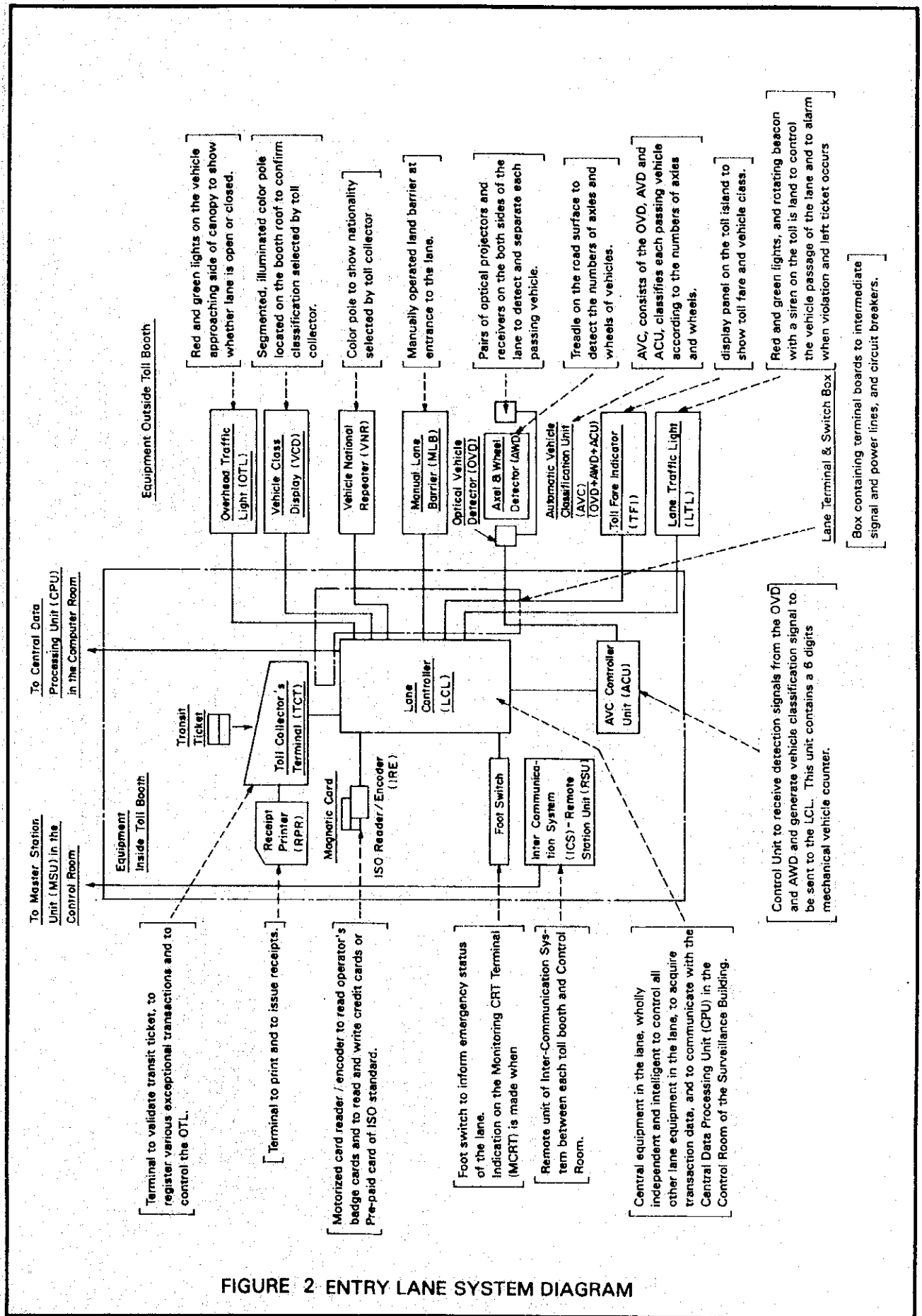


FIGURE 2 ENTRY LANE SYSTEM DIAGRAM

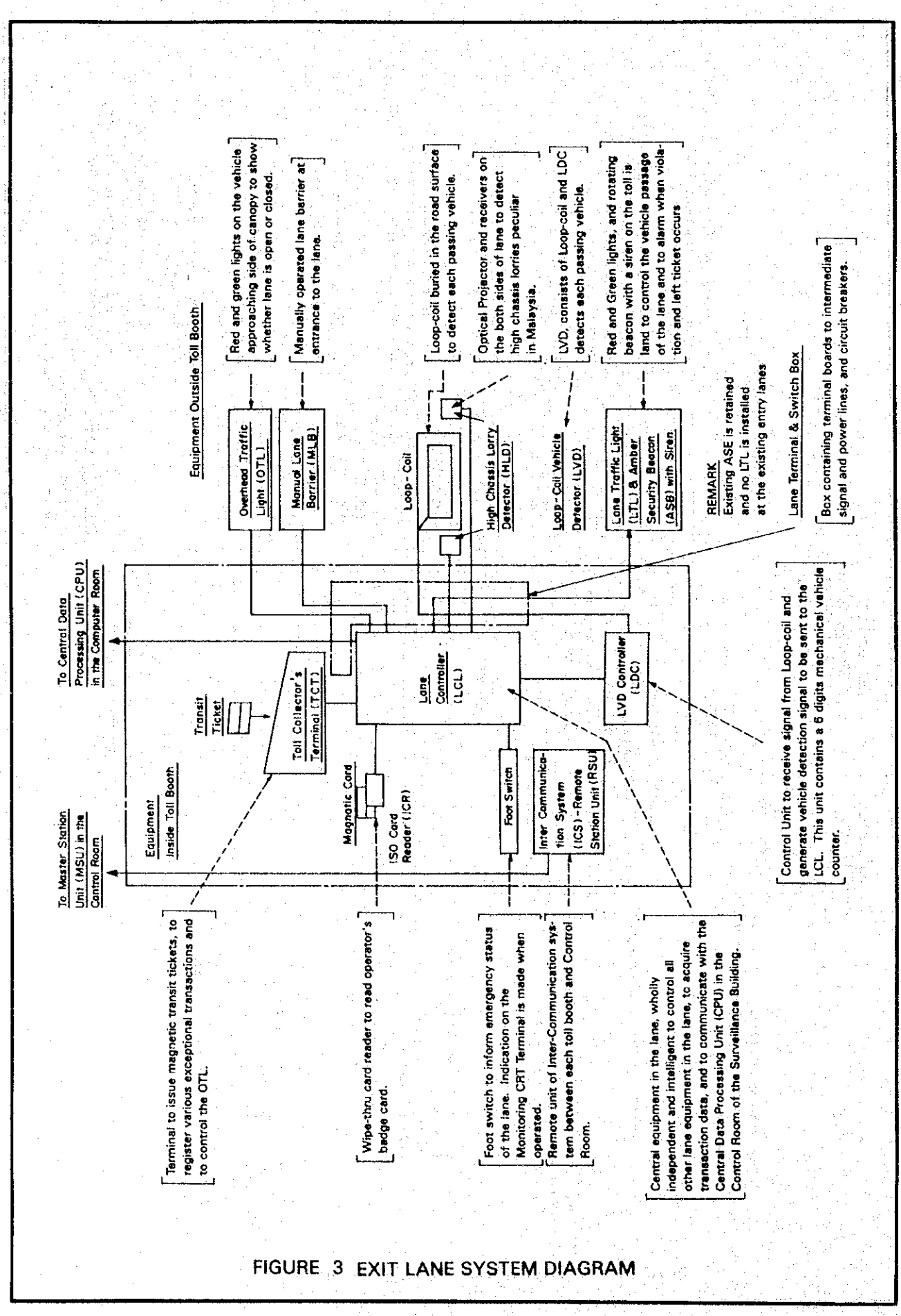
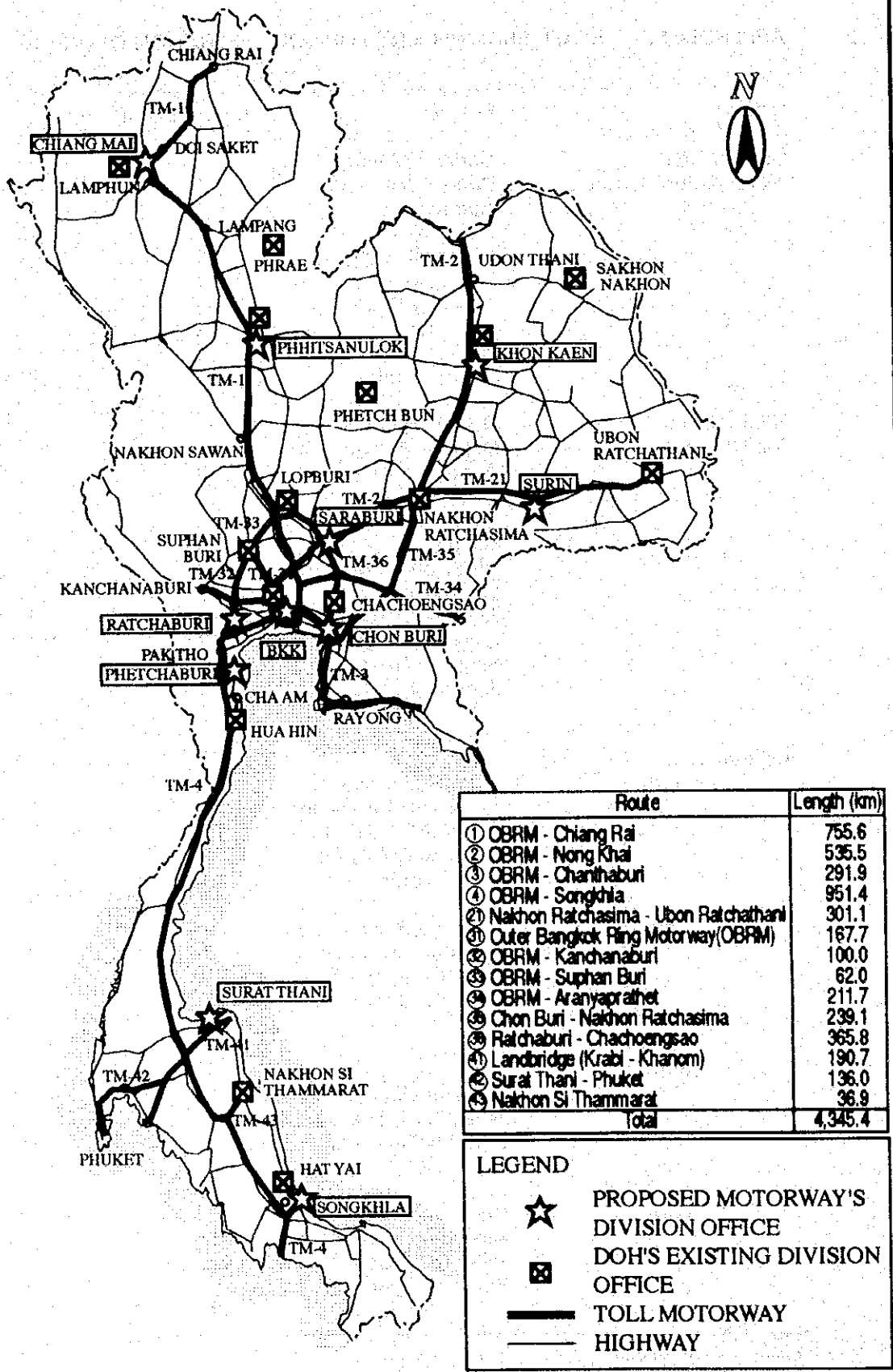


FIGURE 3 EXIT LANE SYSTEM DIAGRAM

APPENDIX 8.3-2 STAFF REQUIREMENT FOR TOLL OPERATION OFFICES

Office	Position	Number of Staff
Division Toll Management Office	General Manager	1
	Deputy Manager	1
	Auditor	1
	Comptroller	1
	Financial Analyst	1
	Secretary	1
	Auditing Clerk	2
	Clerk/Typist	3
	Janitor	1
	Total	12
Field District Toll Office	Office Manager	1
	Deputy Manager	1
	Accountant (x)	3
	Cashier (x)	3
	Bookkeeper (x)	3
	Supply Officer (x)	3
	Dispatcher (x)	3
	Electrician (x)	3
	Accounting Clerk (x)	6
	Clerk/Typist (x)	3
	Security Guard (x)	6
	Janitor (x)	3
	Total	38
Toll Plaza		
2-booth	Chief Supervisor	1
	Assistant Supervisor (x)	3
	Teller (2 + 2) x 3 (x)	12
	Security Guard (x)	3
	Total1	19
4-booth	Chief Supervisor	1
	Assistant Supervisor (x)	3
	Teller (4 + 3) x 3 (x)	21
	Security Guard (x)	3
	Total	28
6-booth	Chief Supervisor	1
	Assistant Supervisor (x)	5
	Teller (6 + 4) x 3 (x)	30
	Security Guard (x)	3
	Total	39
8-booth	Chief Supervisor	1
	Assistant Supervisor (x)	6
	Teller (8 + 6) x 3 (x)	42
	Security Guard (x)	6
	Total	55

Note: 1. (x) = 3-shift
2. Staffing of Toll Plaza with more than 10-booth can be calculated similarly referring to above staffing arrangement.



Route	Length (km)
① OBRM - Chiang Rai	755.6
② OBRM - Nong Khai	535.5
③ OBRM - Chanthaburi	291.9
④ OBRM - Songkhla	951.4
㉑ Nakhon Ratchasima - Ubon Ratchathani	301.1
㉛ Outer Bangkok Ring Motorway(OBRM)	167.7
㉜ OBRM - Kanchanaburi	100.0
㉝ OBRM - Suphan Buri	62.0
㉞ OBRM - Aranyaprathet	211.7
㉟ Chon Buri - Nakhon Ratchasima	239.1
㊱ Ratchaburi - Chachoengsao	365.8
㊶ Landbridge (Krabi - Khanom)	190.7
㊷ Surat Thani - Phuket	136.0
㊸ Nakhon Si Thammarat	36.9
Total	4,345.4

LEGEND

- PROPOSED MOTORWAY'S DIVISION OFFICE
- DOH'S EXISTING DIVISION OFFICE
- TOLL MOTORWAY
- HIGHWAY

FEASIBILITY STUDY ON THE INTER-CITY TOLL MOTORWAY PROJECTS	APPENDIX 8.4-1 LOCATION MAP OF OPERATIONAL DIVISION OFFICES

APPENDIX 8.4-2 STAFFING FOR OPERATIONAL DIVISION AND DISTRICT OFFICES

Position	Number of Staff
Division Office	
Division Director	1
Deputy Director	1
Chief, General Affairs Section	1
Chief, Traffic Control & Management Section	1
Chief, Maintenance and Engineering	1
Chief, Toll Collection Section	1
Accountant	1
Accounting Clerk/Bookkeeper	2
Cashier	1
Clerk/General Affairs	3
Traffic Engineer	3
Civil Engineer	3
Electric Engineer	2
Mechanical Engineer	2
Traffic Technician	6
Civil Technician	10
Electric Technician	6
Mechanical Technician	6
Clerk/Traffic Control & Maintenance Section	2
Clerk/Maintenance and Engineering Section	5
Clerk/Property Maintenance	2
Clerk/Machinery Maintenance	3
Clerk/Vehicle Maintenance	4
Toll Accountant	1
Toll Accounting Clerk	5
Security Guard	3
Janitor	3
Total	71
District Office	
District Manager	1
Deputy Manager	1
Accountant (x)	3
Cashier (x)	3
Bookkeeper (x)	3
Supply Officer (x)	3
Dispatcher (x)	3
Traffic Engineer (x)	3
Civil Engineer (x)	6
Electric Engineer (x)	3
Mechanical Engineer (x)	3
Accounting Clerk (x)	6
Security Guard (x)	6
Janitor (x)	3
Total	47
Toll Plaza	
[4-Booth]	
Chief Supervisor	1
Assistant Supervisor (x)	3
Teller (4 + 3) x 3 (x)	21
Security Guard (x)	3
Total	28
[6-Booth]	
Chief Supervisor	1
Assistant Supervisor (x)	5
Teller (6 + 4) x 3 (x)	30
Security Guard (x)	3
Total	39
[8-Booth]	
Chief Supervisor	1
Assistant Supervisor (x)	6
Teller (8 + 6) x 3 (x)	42
Security Guard (x)	6
Total	55
[10-Booth]	
Chief Supervisor	1
Assistant Supervisor (x)	8
Teller (10 + 8) x 3 (x)	54
Security Guard (x)	8
Total	71

Note: (x) 3-shift

APPENDIX 8.4-3 MAINTENANCE FACILITIES AND EQUIPMENT AT DISTRICT OFFICE

Facilities and Equipment	Quantity
Length of Motorway in charge	about 50 km
Office Site	30,000 sq. m.
Building	3,000 sq. m.
Office	1,500 sq. m.
Garage	1,500 sq. m.
Parking Lot	8,000 sq. m.
Vehicles:	
Liaison Car	3
Patrol Car	8
Maintenance Car	3
Truck	5
light truck (1)	
heavy truck (4)	
Water Truck	2
Sweeper	1
Lift Truck	1
Sign Truck	8
Tow Truck	1
Others (for special district offices)	
Tunnel Cleaning Truck	1
Jet Cleaner	1
Beam Lifter	1
Equipment:	
Plow	5
Spreader	3

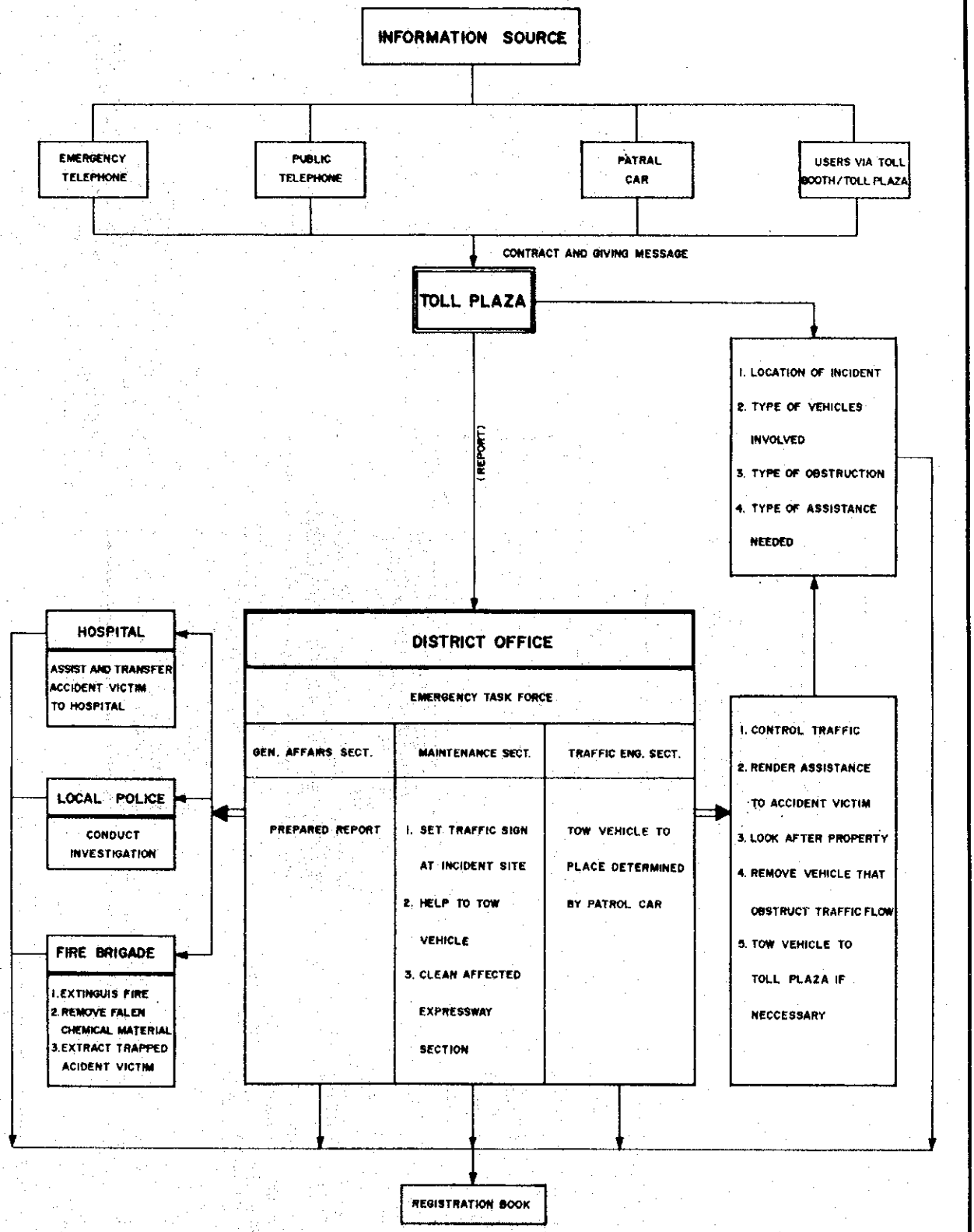
APPENDIX 8.4-4 FREQUENCY OF MAINTENANCE ACTIVITY

Item	Activity	Frequency	Standard of Judgment
1. Grass Cutting			
1)Shoulder		Once/4 weeks	Height 50 mm
2)Slope		Once/10 weeks	Height 100 mm
3)Loop area		Once/4 weeks	Height 100 mm
4)Special area (near temple, etc.)		Once/2 weeks at slope & b.fence	
5)Rest areas		Once/4 weeks at flat areas	Height 150 mm
		Once/10 weeks at slope	Height 100 mm
2. Weeding	Removal/ trimming	Once/10 weeks	
3. Drainage			
1)Lined drain	Cleaning/ Desilting	Once/4 months	-Free flowing at design capacity -Silt built-up to 1/5 depth drain structure & no standing water/ continued flow for more than 24 hrs.
2)Unlined drain,	Reshaping	Yearly	
	Reshaping in padi field	Half Year	
3)Horizontal drain	Flushing with high pressure jet	Yearly	
4)Subsoil drain	Outlet clean-	Yearly	
5)Weep hole	Vegetation cleaning	Yearly	
6)Culvert	General clean- ing to design discharge point (inspection: Once/3 months)	Yearly	
4. Pavement Marking		Once/3 years	Check with supply- er on life span
5. Guard Rail	Cleaning	Yearly	
6. Bridge Parapet	Repairing of steel railing & post	Once/2 years	
7. R-O-W Fence	Vegetation removal off fences	Once/10 weeks	
8. Traffic Signs	Cleaning in heavy traffic areas	Half yearly	
	Cleaning in town areas	Once/3 months	
	Repairing of posts	Once/2 years	
9. Delineators	Cleaning	Half yearly	
10.Kilometer Post/ Hectometer Marker	Cleaning	Once/3 years	
11.Hectometer Pist	Repairing	Once/3 years	
12.Tunnel Lining	Cleaning	Once/2 weeks	
13.Animal Carcasses	Removal	Daily, if any	
14.Toll Plaza/Adm. Building	Repainting	Once/3 years	
15.Toll Booth	Cleaning	Daily	

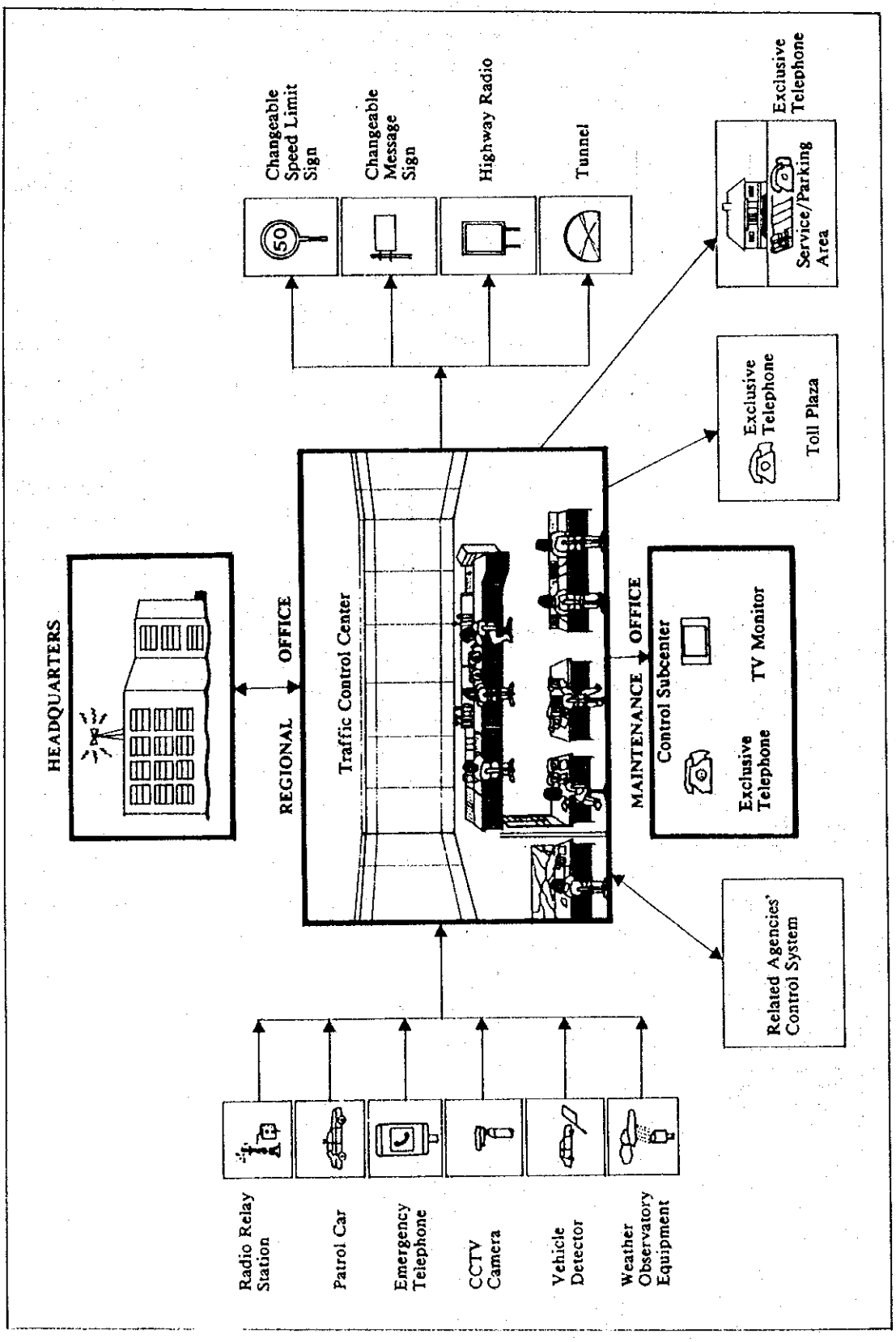
APPENDIX 8.5-1 DETAILED ACTIVITIES OF TRAFFIC CONTROL AND OPERATIONS

Main Activities	Contents	Responsible Office		
		Head Office	Division Office	District Office
1. Planning & Programming	a. Planning	o		
	b. Road construction:planning, design & execution of maintenance work	o	o	
	c. Location setting & basic design of interchange, rest areas, bus stops	o	o	
	d. Implementation plan of traffic control and management system	o	o	
	e. Administration and redemption survey and planning	o		
2. Traffic Engineering & Safety	a. Setting of standards & management level	o		
	b. Road and traffic engineering R & D	o	o	
	c. Future traffic demand forecasting	o		
	d. Execution of traffic survey	o planning	o execution	o
	e. Statistical data processing	o processing	o	o collection
3. Traffic Control	a. Basic planning	o	o	o
	b. Traffic control	management		execution
4. Maintenance	a. Standards setting, supervision & consultation works,	o		
	b. Maintenance works		o execution	o
5. Coordination & Public Relations	a. Coordination with relevant agencies	o national	o divisional	o local
	b. Response activities	o national	o divisional	o local

APPENDIX 8.5-2 OUTLINE OF TRAFFIC CONTROL AND MANAGEMENT SYSTEM



APPENDIX 8.5-3 TRAFFIC CONTROL SYSTEM CONCEPT



CHAPTER 9

COST ESTIMATES

No.	Item		UNIT	F/C (%)	L/C (%)	Unit Price (Baht)	Remarks
General Items for Roadway Works							
1	Cement (Type I)		ton	30.0%	70.0%	1,400	
2	Sand for Embankment		cum	35.0%	65.0%	160	
3	Soil Aggregate		cum	42.0%	58.0%	180	
4	Cruched Rock Aggregate		cum	36.0%	64.0%	200	
5	Precast Concrete Pile	S220	lm	35.0%	65.0%	250	Not incl. driving
6	Asphaltic Prime Coat (MC/70)		ton	90.0%	10.0%	10,200	
7	Asphaltic Cement (AC 60/70)		ton	90.0%	10.0%	7,500	
8	Reinforced Steel		ton	40.0%	60.0%	21,000	
9	Wire #18		kg	30.0%	70.0%	25	
10	Prestressing Wire (single)		ton	90.0%	10.0%	21,000	
11	Grass		sqm	25.0%	75.0%	15	
Super Structure							
1	Anchor Bar	D28	ton	40.0%	60.0%	21,000	
2	Concrete	Cl.Special B	cum	35.0%	65.0%	2,100	
3	Concrete	Class A	cum	35.0%	65.0%	3,000	
4	Formwork	Inside	sqm	25.0%	75.0%	340	
5	Formwork	Outside	sqm	25.0%	75.0%	430	
6	PC-Cable		ton	90.0%	10.0%	137,000	
7	PC-I Girder	l=25 m	ea.	65.0%	35.0%	210,000	
8	PC-I Girder	l=27.5 m	ea.	65.0%	35.0%	275,000	
9	PC-I Girder	l=35 m	ea.	65.0%	35.0%	502,000	
10	Reinforcing Bar	SD30,D19,D16	ton	40.0%	60.0%	21,000	
11	Steel Truss	SM50	ton	90.0%	10.0%	150,000	
Sub Structure							
1	Approach Slab		sqm	35.0%	65.0%	600	
2	Concrete	Cl.Special B	cum	35.0%	65.0%	2,400	incl. Formwork
3	Concrete	Class A	cum	35.0%	65.0%	3,200	incl. Formwork
4	P.C. Pile	S400	lm	35.0%	65.0%	1,200	
5	Reinforcing Bar		ton	40.0%	60.0%	21,000	
6	Scaffolding		cum	35.0%	65.0%	150	
7	Slope Protection		sqm	30.0%	70.0%	290	
8	Steel Frame Works	H-250	ton	80.0%	20.0%	3,660	
9	Steel Frame Works	L-100	ton	80.0%	20.0%	2,700	
10	Structural Backfill		cum	38.0%	62.0%	270	
11	Structural Excavation		cum	38.0%	62.0%	50	
Other Structures							
1	Concrete	Class A(3/4)	cum	35.0%	65.0%	2,150	
2	Concrete	Class B(3/4)	cum	35.0%	65.0%	2,220	
3	Concrete	Class C	cum	32.0%	68.0%	1,700	
4	Formwork		cum	25.0%	75.0%	340	
5	Reinforcing Bar	SD30,D16	kg	40.0%	60.0%	21	
6	Excavation		cum	65.0%	35.0%	50	
7	Foundation	Crushed Rock	cum	42.0%	58.0%	540	
8	Backfill		cum	42.0%	58.0%	270	

Owning and Operating Cost of Construction Equipment

Type	Model/ Size HP (HP)	Life of Equip. yr. (N)	Working Hr./Yr. hr. (HR)	Price Baht (P)	Owning Cost Inv. Cost Bht./hr.	Deprecia. Bht./hr. (D)	Tires Baht (TP)	Tire Life (TL)	Tyre Wear Bht./hr. (TP/TL)	Operating Cost Fuel Bht./hr. (FC)	Lube Bht./hr.	Repair Factor (RF)	Mtn.Cost	Operator Wage	Total Bht./hr.	Moving Parts Blade Bht./set	Ripper Bht./set	Total Bht./hr.	Remark
Bulldozer Tractor D9	410	10	2000	7,500,000.00	357.00	337.50				632.84	94.93	0.13	975.00	31.00	2,090.77	63.55	119.47	2,273.79	+Ripper
Bulldozer Tractor D8	300	10	2000	5,500,000.00	261.80	247.50				463.06	69.46	0.13	715.00	31.00	1,549.31	63.55	119.47	1,723.33	+Ripper
Bulldozer Tractor D8	300	12	2000	5,500,000.00	258.50	206.25				463.06	69.46	0.09	495.00	31.00	1,317.01	63.55		1,380.56	
Bulldozer Tractor D7	200	12	2000	4,400,000.00	206.80	165.00				175.40	26.31	0.09	396.00	31.00	835.51	63.55		899.06	
Bulldozer Tractor D6	180	12	2000	3,500,000.00	164.50	131.25				157.96	23.68	0.09	315.00	31.00	692.04	63.55		755.59	
Bulldozer Tractor D6	140	12	2000	3,000,000.00	141.00	112.50				219.09	32.41	0.13	390.00	31.00	810.51	63.55	119.47	993.53	+Ripper
Bulldozer Tractor D6	140	12	2000	3,000,000.00	141.00	112.50				122.78	18.42	0.07	210.00	31.00	523.20	63.55		586.75	
Bulldozer Tractor D4	120	12	2000	2,300,000.00	131.60	105.00				105.24	15.79	0.07	198.00	31.00	479.63	63.55		543.18	
Back hoe	100	10	2000	2,500,000.00	119.00	112.50				87.70	13.16	0.06	150.00	21.00	390.86			390.86	
Back hoe	85	10	2000	2,350,000.00	111.98	105.75				74.55	11.18	0.06	141.00	21.00	359.59			359.59	
Motor Grader	140	10	2000	3,500,000.00	166.60	157.50	53,400.00	2000	26.70	122.73	18.42	0.05	175.00	39.00	548.50	94.30		642.80	
Motor Grader	120	10	2000	3,000,000.00	142.80	135.00	53,400.00	2000	26.70	105.24	15.79	0.05	150.00	39.00	479.53	94.30		573.83	
Crawler Loader	140	10	1600	3,500,000.00	208.25	196.88				122.78	18.42	0.07	245.00	23.00	817.45			817.45	
Wheel Loader	120	10	1400	3,000,000.00	204.00	192.86	43,400.00	1500	28.93	105.24	15.79	0.06	180.00	23.00	556.96			556.96	
Rubber-tyred Roller	80	10	2000	1,700,000.00	80.92	76.50	37,800.00	1500	25.20	70.16	10.52	0.05	85.00	12.00	283.80			283.80	
Steel Wheel Roller	80	12	2000	1,500,000.00	70.50	56.25				70.16	10.52	0.06	90.00	12.00	253.18			253.18	
Steel Wheel Roller	60	12	2000	1,300,000.00	61.10	48.75				52.62	7.89	0.05	65.00	12.00	198.61			198.61	
Vibration Roller	130	8	2000	2,350,000.00	117.50	178.25				114.01	17.10	0.08	141.00	15.00	404.61			404.61	
Steel Wheel Vibrating Roller	30	8	2000	750,000.00	37.50	56.25				26.31	3.95	0.05	37.50	15.00	120.26			120.26	
Water Truck 10000 L	150	10	2000	1,300,000.00	61.88	58.50	50,204.00	2000	25.10	131.55	19.73	0.05	85.00	21.00	324.28			324.28	
Water Truck 6000 L	120	10	2000	870,000.00	41.41	39.15	34,740.00	20001	17.37	105.24	15.79	0.05	43.50	21.00	244.31			244.31	
Asphaltic Distributor 6000 L	140	10	1600	1,650,000.00	98.18	92.81	34,740.00	2000	17.37	122.78	18.42	0.06	99.00	36.00	393.74			393.74	
Farm Tractor	65	8	1600	390,000.00	23.64	27.42	43,400.00	2000	21.70	57.01	8.55	0.06	23.40	12.00	146.30			146.30	
Power Broom	65	8	1600	350,000.00	21.22	24.61	30,250.00	2000	15.13	57.01	8.55	0.05	17.50	15.00	134.40			134.40	
Blower	95	8	1600	550,000.00	33.34	38.67	27,700.00	2000	13.85	74.55	11.18	0.05	27.50	15.00	175.42			175.42	
Pre-cast Machine		8	1600	350,000.00	21.22	24.61				30.00	4.50	0.06	21.00	30.00	106.72			106.72	
Mixer 20 KW,30 cu/hr Spreader Box	187	8	1600	2,340,000.00	141.86	164.53	7,800.00	2000	3.90	184.00	24.80	0.08	140.40	54.00	528.78			528.78	
Asphaltic Stock Tank 1000 L		10	2000	300,000.00	14.28	13.50				0.00	0.00	0.05	0.00		14.28			14.28	
Dump Truck 6 wheel	100	12	2000	738,250.00	34.70	27.69	34,710.00	2000	17.37	87.70	13.16	0.05	36.91	31.00	220.84			220.84	
Dump Truck 10 wheel	150	12	2000	1,186,646.00	55.73	44.46	50,210.00	2000	25.12	131.55	19.73	0.05	59.28	31.00	322.41			322.41	
Asphaltic Concrete Plant 8 t/hr. 160 KW	105	10	2000	10,300,000.00	490.28	460.50				92.09	13.81	0.05	515.00		1,111.18			1,111.18	
Asphaltic Heating Plant, hot-oil		10	2000	1,000,000.00	47.60	45.00				0.00	0.00	0.05	50.00		97.60			97.60	
Asphaltic Concrete Paver	105	10	2000	5,325,000.00	253.47	239.63				92.09	13.81	0.05	266.25		825.62			825.62	
Concrete Mixing Plant,60 cum/hr		10	1600	7,500,000.00	446.25	421.88				100.00	45.00	0.05	375.00		1,166.25			1,166.25	
Concrete Mixing Truck	240	10	1600	1,800,000.00	107.10	101.25	50,204.00	2000	25.10	219.48	31.57	0.05	90.00	31.00	495.25			495.25	
Concrete Spreader, 20 KW	17	10	1600	2,600,000.00	154.70	146.25				14.91	2.24	0.05	130.00		301.85			301.85	
Concrete Finisher	12	5	1600	50,000.00	3.20	5.63				10.52	1.58	0.05	2.50		17.80			17.80	
Concrete Scraader	8	5	1600	50,000.00	3.20	5.60				7.02	1.05	0.05	2.50		13.77			13.77	
Concrete Sawing Machine	15	5	1600	40,000.00	2.56	4.50	20,000.00	250	80.00	13.16	1.97	0.06	2.40		100.09			100.09	
Joint Sealer	15	5	1600	10,000.00	0.64	1.13				13.16	1.97	0.06	0.60		16.37			16.37	
Steel Formwork		5	1600	520.00	0.03	0.06				0.00	0.00	0	0.00		0.03			0.03	
Concrete Vibrator	15	10	1600	15,000.00	0.89	0.84				13.16	1.97	0.05	0.90		16.92			16.92	
Electric Generator		12	2000	1,500,000.00	70.50	56.25				298.00	44.70	0.05	75.00		488.20			488.20	
Air Compressor,600 cfm	152	12	2000	1,750,000.00	82.25	65.831				133.90	20.00	0.05	87.50		323.05			323.05	
Drilling Machine		10	2000	1,500,000.00	71.40	67.50				0.00	0.00	0.05	75.00		146.40			146.40	
Stabilization Plant	150	10	2000	7,000,000.00	333.20	315.00				131.55	19.73	0.05	350.00	87.71	902.19			902.19	

No.	Item	Description	Type	Unit Price(baht)			RC A				PC B-1				PC B-2				PC B-3			
								Unit Price(baht)				Unit Price(baht)				Unit Price(baht)				Unit Price(baht)		
			Unit	F/C	L/C	Total	Q'ty	F/C	L/C	Total	Q'ty	F/C	L/C	Total	Q'ty	F/C	L/C	Total	Q'ty	F/C	L/C	Total
1	PC-I Girder	l=25 m	ea.	136,500	73,500	210,000	0.000	0	0	0	6.000	819,000	441,000	1,260,000	0.000	0	0	0	0.000	0	0	0
2	PC-I Girder	l=27.5 m	ea.	178,750	96,250	275,000	0.000	0	0	0	0.000	0	0	0	6.000	1,072,500	577,500	1,650,000	0.000	0	0	0
3	PC-I Girder	l=35 m	ea.	325,300	175,700	502,000	0.000	0	0	0	0.000	0	0	0	0.000	0	0	0	6.000	1,957,800	1,054,200	3,012,000
4	Concrete	Cl.Special B	cum	735	1,365	2,100	195.300	143,546	266,585	410,130	106.000	77,910	144,690	222,600	117.090	86,061	159,828	245,889	148.570	109,199	202,798	311,997
5	Reinforcing Bar	SD30,D19	ton	8,400	12,600	21,000	40.712	341,981	512,971	854,952	21.783	182,977	274,466	457,443	24.036	201,902	302,854	504,756	30.497	256,175	384,262	640,437
6	Formwork	Outside	sqm	108	323	430	286.880	30,840	92,519	123,358	363.740	39,102	117,306	156,408	399.980	42,998	128,994	171,991	508.700	54,685	164,056	218,741
7	Bearing Pad		ea.		0			117,000	0	117,000		32,340	0	32,340		39,000	0	39,000		39,000	0	39,000
8			ea.					0	0	0		48,000	0	48,000		55,200	0	55,200		55,200	0	55,200
9	Anchor Bar	D28	ton	8,400	12,600	21,000	1.655	13,902	20,853	34,755	1.529	12,844	19,265	32,109	1.529	12,844	19,265	32,109	2.287	19,211	28,816	48,027
10	Drainage		ea.	694	2,776	3,470	4.000	2,776	11,104	13,880	4.000	2,776	11,104	13,880	6.000	4,164	16,656	20,820	6.000	4,164	16,656	20,820
	Sub total							650,044	904,032	1,554,076		1,214,949	1,007,831	2,222,780		1,514,669	1,205,096	2,719,765		2,495,434	1,650,788	4,346,222
	Unit Length		m							15				25.0				27.5				35.0
	Unit Cost		baht/sqm					3,600	5,000	8,600		4,000	3,400	7,400		4,600	3,700	8,300		5,900	4,400	10,300

No.	Item	Description	Type	Unit Price(baht)			PC Box Girder(B-4)			
								Unit Price(baht)		
			Unit	F/C	L/C	Total	Q'ty	F/C	L/C	Total
1	PC-Cable		ton	123,300	13,700	137,000	30	3,699,000	411,000	4,110,000
2	Concrete	Class A	cum	1,050	1,950	3,000	573.000	601,650	1,117,350	1,719,000
3	Concrete	Cl.Special B	cum	735	1,365	2,100	33.500	24,623	45,728	70,350
4	Reinforcing Bar	SD30,D19	ton	8,400	12,600	21,000	126.360	1,061,424	1,592,136	2,653,560
5	Formwork	Outside	sqm	108	323	430	843.000	90,623	271,868	362,490
6		Inside	sqm	85	255	340	1,523.340	129,484	388,452	517,936
7	Bearing Pad		ea.	14,000	0	14,000	6.000	84,000	0	84,000
8			ea.	17,400	0	17,400	6.000	104,400	0	104,400
9	Anchor Bar	D34, l=60 cm	ton	8,400	12,600	21,000	4.574	38,422	57,632	96,054
10	Drainage		ea.	800	3,200	4,000	6.000	4,800	19,200	24,000
	Sub total							5,838,425	3,903,365	9,741,790
	Unit Length		m							50
	Unit Cost		baht/sqm					9,700	6,500	16,200

No.	Item	Description	Type	Unit Price(baht)			Steel Truss(MC)			
								Unit Price(baht)		
			Unit	F/C	L/C	Total	Q'ty	F/C	L/C	Total
1	Steel Truss	SM50	ton	135,000	15,000	150,000	459.0	61,965,000	6,885,000	68,850,000
2	Concrete	Cl.Special B	cum	735	1,365	2,100	403.650	296,683	550,982	847,665
3	Reinforcing Bar	SD30,D19,D16	ton	8,400	12,600	21,000	82.958	696,847	1,045,271	1,742,118
4	Bearing Pad		ton	108,000	0	108,000	3.200	345,600	0	345,600
5	FormWork	Outside	sqm	108	323	430	1,449.980	155,873	467,619	623,491
6	Drainage		ea.	1,360	5,440	6,800	10.000	13,600	54,400	68,000
	Sub total							63,473,603	9,003,272	72,476,875
	Unit Length		m							90
	Unit Cost		baht/sqm					58,800	8,300	67,100

No.	Item	Description	Type	Unit Price(baht)			A-1				A-2				A-3				A-4			
				F/C	L/C	Total	Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)		
			Unit					F/C	L/C	Total		F/C	L/C	Total		F/C	L/C	Total		F/C	L/C	Total
1	Concrete	Cl.Special B	cum	840	1,560	2,400	14,820	12,449	23,119	35,568	19,500	16,380	30,420	46,800	26,965	22,651	42,065	64,716	24,000	20,160	37,440	57,600
2	Concrete	Class A	cum	1,120	2,080	3,200	4,500	5,040	9,360	14,400	4,500	5,040	9,360	14,400	6,000	6,720	12,480	19,200	5,250	5,880	10,920	16,800
3	Reinforcing Bar		ton	8,400	12,600	21,000	2,493	20,941	31,412	52,353	3,195	26,838	40,257	67,095	4,405	37,002	55,503	92,505	3,915	32,886	49,329	82,215
4	P.C. Pile	S400	lm	420	780	1,200	73,500	30,870	57,330	88,200	73,500	30,870	57,330	88,200	73,500	30,870	57,330	88,200	84,000	35,280	65,520	100,800
5	Slope Protection		sqm	87	203	290	511,200	44,474	103,774	148,248	0.000	0	0	0	569,858	49,578	115,681	165,259	0.000	0	0	0
6	Structural Backfill		cum	103	167	270	1,355.000	139,023	226,827	365,850	0.000	0	0	0	1,538.800	157,881	257,595	415,476	0.000	0	0	0
7	Approach Slab		sqm	210	390	600	192.000	40,320	74,880	115,200	0.000	0	0	0	83.750	17,588	32,663	50,250	0.000	0	0	0
8	Subtotal							293,117	526,702	819,819		79,128	137,367	216,495		322,289	573,317	895,606		94,206	163,209	257,415
9	Incidental	30%						0	0			23,736	41,210			0	0			28,262	48,963	
10								293,100	526,700	819,800		102,900	178,600	261,500		322,300	573,300	895,600		122,500	212,200	334,700

No.	Item	Description	Type	Unit Price(baht)			B-1				B-2				B-3			
				F/C	L/C	Total	Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)		
			Unit					F/C	L/C	Total		F/C	L/C	Total		F/C	L/C	Total
1	Concrete	Cl.Special B	cum	840	1,560	2,400	126.600	106,344	197,496	303,840	276.000	231,840	430,560	662,400	443.125	372,225	691,275	1,063,500
2	Scaffolding		cum	53	98	150	126.600	6,647	12,344	18,990	276.000	14,490	26,910	41,400	443.125	23,264	43,205	66,469
3	Reinforcing Bar		ton	8,400	12,600	21,000	13.458	113,047	169,571	282,618	28.660	240,744	361,116	601,860	44.331	372,380	558,571	930,951
4	Structural Excavation		cum	19	31	50	157.600	2,994	4,886	7,880	365.760	6,949	11,339	18,288	665.315	12,641	20,625	33,266
5	Structural Backfill		cum	103	167	270	112.600	11,553	18,849	30,402	232.760	23,881	38,964	62,845	565.315	58,001	94,634	152,635
	Total							240,600	403,100	643,700		517,900	868,900	1,386,800		838,500	1,408,300	2,246,800

FEASIBILITY STUDY
ON
THE INTER-CITY TOLL MOTORWAY PROJECTS

APPENDIX A 9.2-3(2/3)
DETAILED CALCULATIONS OF UNIT PRICE OF SUBSTRUCTURES

No.	Item	Description	Type	Unit Price(baht)			C				D-1				D-2				E			
								Unit Price(baht)				Unit Price(baht)				Unit Price(baht)				Unit Price(baht)		
			Unit	F/C	L/C	Total	Q'ty	F/C	L/C	Total	Q'ty	F/C	L/C	Total	Q'ty	F/C	L/C	Total	Q'ty	F/C	L/C	Total
1	Concrete	Cl.Special B	cum	840	1,560	2,400	219.334	184,241	342,161	526,402	270.520	227,237	422,011	649,248	442.625	371,805	690,495	1,062,300	353.050	296,562	550,758	847,320
2	Scaffolding		cum	53	98	150	219.334	11,515	21,385	32,900	270.520	14,202	26,376	40,578	442.625	23,238	43,156	66,394	353.050	18,535	34,422	52,958
3	Reinforcing Bar		ton	8,400	12,600	21,000	23.180	194,712	292,068	486,780	29.071	244,196	366,295	610,491	47.364	397,858	596,786	994,644	35.400	297,360	446,040	743,400
4	Structural Excavation		cum	19	31	50	322.560	6,129	9,999	16,128	335.440	6,373	10,399	16,772	436.940	8,302	13,545	21,847	530.775	10,085	16,454	26,539
5	Structural Backfill		cum	103	167	270	200.560	20,577	33,574	54,151	255.440	26,208	42,761	68,969	286.940	29,440	48,034	77,474	303.975	31,188	50,885	82,073
Total								417,200	699,200	1,116,400		518,200	867,800	1,386,000		830,600	1,392,000	2,222,600		653,700	1,098,600	1,752,300

No.	Item	Description	Type	Unit Price(baht)			F-1				F-2				Remarks
								Unit Price(baht)				Unit Price(baht)			
			Unit	F/C	L/C	Total	Q'ty	F/C	L/C	Total	Q'ty	F/C	L/C	Total	
1	Concrete	Cl.Special B	cum	840	1,560	2,400	1,248.100	1,048,404	1,947,036	2,995,440	732.100	614,964	1,142,076	1,757,040	
2	Scaffolding		cum	53	98	150	1,248.100	65,525	121,690	187,215	732.100	38,435	71,380	109,815	
3	Reinforcing Bar		ton	8,400	12,600	21,000	169.935	1,427,454	2,141,181	3,568,635	100.335	842,814	1,264,221	2,107,035	
4	Steel Frame Works	H-250	ton	2,928	732	3,660	90.272	264,316	66,079	330,396	48.464	141,903	35,476	177,378	20 times use
5		L-100	ton	2,160	540	2,700	25.416	54,899	13,725	68,623	16.092	34,759	8,690	43,448	20 times use
Total								2,860,600	4,289,700	7,150,300		1,672,900	2,521,800	4,194,700	

No.	Item	Description	Type / Unit	Unit Price(baht) F/C	Unit Price(baht) L/C	Unit Price(baht) Total	L-D Route Q'ty	L-D Route Unit Price(baht) F/C	L-D Route Unit Price(baht) L/C	L-D Route Unit Price(baht) Total	B-C Route Q'ty	B-C Route Unit Price(baht) F/C	B-C Route Unit Price(baht) L/C	B-C Route Unit Price(baht) Total
1	Super Structure													
2	RC A		sqm	3,600	5,000	8,600	160.000	576,000	800,000	1,376,000	160.000	576,000	800,000	1,376,000
3	B-1		sqm	4,000	3,400	7,400	800.000	3,200,000	2,720,000	5,920,000	1,200.000	4,800,000	4,080,000	8,880,000
	Sub Total							3,776,000	3,520,000	7,296,000		5,376,000	4,880,000	10,256,000
4	Sub Structure(E)													
5	Concrete	Cl.Special B	cum	840	1,560	2,400	73.661	61,875	114,911	176,786	73.661	61,875	114,911	176,786
6	Reinforcing Bar		ton	8,400	12,600	21,000	7.773	65,293	97,940	163,233	7.773	65,293	97,940	163,233
7	Structural Excavation		cum	19	31	50	69.939	1,329	2,168	3,497	69.939	1,329	2,168	3,497
8	Structural Backfill		cum	103	167	270	107.666	11,047	18,023	29,070	107.666	11,047	18,023	29,070
9	P.C. Pile	S400	lm	420	780	1,200	200.000	84,000	156,000	240,000	200.000	84,000	156,000	240,000
	Sub Total							223,544	389,042	612,586		223,544	389,042	612,586
			ea				5.000	1,117,719	1,945,212	3,062,931	7.000	1,564,807	2,723,297	4,288,103
10	Sub Structure(A)													
11	Concrete	Cl.Special B	cum	840	1,560	2,400	10.330	8,677	16,115	24,792	10.330	8,677	16,115	24,792
12		Class A	cum	1,120	2,080	3,200	2.250	2,520	4,680	7,200	2.250	2,520	4,680	7,200
13	Reinforcing Bar		ton	8,400	12,600	21,000	1.685	14,154	21,231	35,385	1.685	14,154	21,231	35,385
14	P.C. Pile	S400	lm	420	780	1,200	42.000	17,640	32,760	50,400	42.000	17,640	32,760	50,400
15	Slope Protection		sqm	87	203	290	511.200	44,474	103,774	148,248	511.200	44,474	103,774	148,248
16	Structural Backfill		cum	103	167	270	1,355.000	139,023	226,827	365,850	1,355.000	139,023	226,827	365,850
17	Approach Slab		sqm	210	390	600	40.000	8,400	15,600	24,000	40.000	8,400	15,600	24,000
	Sub Total							234,889	420,986	655,875		234,889	420,986	655,875
			ea				2.000	469,777	841,973	1,311,750	2.000	469,777	841,973	1,311,750
18	Earth Works													
19	Clearing & Gribbing		sqm	1.04	0.96	2.00	6,500.000	6,760	6,240	13,000	6,500.000	6,760	6,240	13,000
20	Embankment 10%		cum	121.50	148.50	270.00	9.844	1,196	1,462	2,658	9.844	1,196	1,462	2,658
21	Sub Base Course		cum	170.00	170.00	340.00	755.000	128,350	128,350	256,700	755.000	128,350	128,350	256,700
22	Aggregate Base Course		cum	226.80	313.20	540.00	472.000	107,050	147,830	254,880	472.000	107,050	147,830	254,880
23	Aggregate 10 cm Blanket		cum	122	149	270	297.000	36,086	44,105	80,190	297.000	36,086	44,105	80,190
24	Concrete Pav.	t=25 cm	sqm	288.10	381.90	670.00	1,820.000	524,342	695,058	1,219,400	1,820.000	524,342	695,058	1,219,400
25	Asphalt Wearing	t=5 cm	sqm	101.50	43.50	145.00	260.000	26,390	11,310	37,700	260.000	26,390	11,310	37,700
	Sub Total							830,173	1,034,355	1,864,528		830,173	1,034,355	1,864,528
26	Incidental Works													
27	Steel Guard Rail		lm	630	270	900	240.000	151,200	64,800	216,000	340.000	214,200	91,800	306,000
	Sub Total							151,200	64,800	216,000		214,200	91,800	306,000
28	Total							6,344,869	7,406,339	13,751,209		8,454,957	9,571,424	18,026,381
29	Total(Ajusted)							6,345,000	7,406,000	13,751,000		8,455,000	9,571,000	18,026,000

FEASIBILITY STUDY
ON
THE INTER-CITY TOLL MOTORWAY PROJECTS

APPENDIX A 9.2-4(1/2)
DETAILED CALCULATIONS OF UNIT PRICE OF OVERBRIDGES AND CANAL BRIDGE(1/2)

No.	Item	Description	Type	Unit Price(baht)			OV for Cut Section				Canal Bridge			
							Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)		
			Unit	F/C	L/C	Total		F/C	L/C	Total		F/C	L/C	Total
1	Super Structure													
2	B-1		sqm	4,000	3,400	7,400	400.000	1,600,000	1,360,000	2,960,000	0.000	0	0	0
3	B-3		sqm	5,900	4,400	10,300	0.000	0	0	0	280.000	1,652,000	1,232,000	2,884,000
	Sub Total							1,600,000	1,360,000	2,960,000		1,652,000	1,232,000	2,884,000
4	Sub Structure(E)													
5	Concrete	Cl.Special B	cum	840	1,560	2,400	73.661	61,875	114,911	176,786	0.000	0	0	0
6	Reinforcing Bar		ton	8,400	12,600	21,000	7.773	65,293	97,940	163,233	0.000	0	0	0
7	Structural Excavation		cum	19	31	50	69.939	1,329	2,168	3,497	0.000	0	0	0
8	Structural Backfill		cum	103	167	270	107.666	11,047	18,023	29,070	0.000	0	0	0
9	P.C. Pile	S400	lm	420	780	1,200	200.000	84,000	156,000	240,000	0.000	0	0	0
	Sub Total							223,544	389,042	612,586		0	0	0
			ea				2.000	447,088	778,085	1,225,172				
10	Sub Structure(A)													
11	Concrete	Cl.Special B	cum	840	1,560	2,400	10.330	8,677	16,115	24,792	10.330	8,677	16,115	24,792
12		Class A	cum	1,120	2,080	3,200	2.250	2,520	4,680	7,200	2.250	2,520	4,680	7,200
13	Reinforcing Bar		ton	8,400	12,600	21,000	1.685	14,154	21,231	35,385	1.685	14,154	21,231	35,385
14	P.C. Pile	S400	lm	420	780	1,200	42.000	17,640	32,760	50,400	42.000	17,640	32,760	50,400
15	Slope Protection		sqm	87	203	290	511.200	44,474	103,774	148,248	511.200	44,474	103,774	148,248
16	Structural Backfill		cum	103	167	270	1,355.000	139,023	226,827	365,850	1,355.000	139,023	226,827	365,850
17	Approach Slab		sqm	210	390	600	40.000	8,400	15,600	24,000	40.000	8,400	15,600	24,000
	Sub Total							234,889	420,986	655,875		234,889	420,986	655,875
			ea				2.000	469,777	841,973	1,311,750	2.000	469,777	841,973	1,311,750
18	Incidental Works													
19	Steel Guard Rail		lm	630	270	900	100.000	63,000	27,000	90,000	100.000	63,000	27,000	90,000
20	Insidental	20%	ls					503,373	596,012	1,099,384		424,355	414,795	839,150
	Sub Total							566,373	623,012	1,189,384		63,000	27,000	90,000
21	Total							3,083,238	3,603,069	6,686,307		2,184,777	2,100,973	4,285,750
22	Total(Ajusted)							3,083,000	3,603,000	6,686,000		2,185,000	2,101,000	4,286,000

FEASIBILITY STUDY
ON
THE INTER-CITY TOLL MOTORWAY PROJECTS

APPENDIX A 9.2-4(2/2)
DETAILED CALCULATIONS OF UNIT PRICE OF OVERBRIDGES AND CANAL BRIDGE(2/2)

No.	Item	Description	Type	Unit Price(baht)			R.Wall T type(H=8 m)				R.Wall Lean type(H=8 m)				R.Wall Gravity type(H=3 m)				R.Wall C.Block type(H=5 m)			
							Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)		
			Unit	F/C	L/C	Total		F/C	L/C	Total		F/C	L/C	Total		F/C	L/C	Total		F/C	L/C	Total
1	Concrete	Class A(3/4)	cum	753	1,398	2,150	0.000	0	0	0	0.000	0	0	0	0.000	0	0	0	0.000	0	0	0
2	Concrete	Class B(3/4)	cum	777	1,443	2,220	10.025	7,789	14,466	22,256	0.000	0	0	0	0.000	0	0	0	1.957	1,521	2,824	4,345
3	Concrete	Class C	cum	544	1,156	1,700	0.000	0	0	0	11.001	5,985	12,717	18,702	3.000	1,632	3,468	5,100	0.990	539	1,144	1,683
4	Formwork		sqm	85	255	340	16.610	1,412	4,236	5,647	17.118	1,455	4,365	5,820	6.119	520	1,560	2,080	0.450	38	115	153
5	Reinforcing Bar	SD30,D16	kg	8	13	21	804.505	6,758	10,137	16,895	0.000	0	0	0	0.000	0	0	0	0.000	0	0	0
6	Excavation		cum	33	18	50	16.800	546	294	840	7.500	244	131	375	0.000	0	0	0	0.000	0	0	0
7	Foundation	Crushed Rock	cum	227	313	540	0.580	132	182	313	0.610	138	191	329	0.180	41	56	97	0.150	34	47	81
8	Backfill		cum	113	157	270	31.700	3,595	4,964	8,559	4.515	512	707	1,219	0.000	0	0	0	2.655	301	416	717
	Sub total							20,231	34,278	54,510		8,334	18,112	26,445		2,193	5,085	7,278		2,432	4,546	6,978
	Incidental	10%						2,023	3,428			833	1,811			219	508			243	455	
	Total							22,300	37,700	60,000		9,200	19,900	29,100		2,400	5,600	8,000		2,700	5,000	7,700

No.	Item	Description	Type	Unit Price(baht)			2.0x1.5				3.0x1.2				3.0x1.5				3.5x1.5				3.5x1.8			
							Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)			Q'ty	Unit Price(baht)		
			Unit	F/C	L/C	Total		F/C	L/C	Total		F/C	L/C	Total		F/C	L/C	Total		F/C	L/C	Total		F/C	L/C	Total
1	Concrete	Class A(3/4)	cum	753	1,398	2,150	0.000	0	0	0	0.000	0	0	0	0.000	0	0	0	0.000	0	0	0	0.000	0	0	0
2	Concrete	Class B(3/4)	cum	777	1,443	2,220	0.000	0	0	0	0.000	0	0	0	0.000	0	0	0	0.000	0	0	0	0.000	0	0	0
3	Concrete	Class C	cum	544	1,156	1,700	3.500	1,904	4,046	5,950	4.320	2,350	4,994	7,344	4.500	2,448	5,202	7,650	5.000	2,720	5,780	8,500	5.800	3,155	6,705	9,860
4	Formwork		sqm	85	255	340	12.000	1,020	3,060	4,080	12.800	1,088	3,264	4,352	14.000	1,190	3,570	4,760	15.000	1,275	3,825	5,100	16.200	1,377	4,131	5,508
5	Reinforcing Bar	SD30,D16	kg	8	13	21	105.000	882	1,323	2,205	130.000	1,092	1,638	2,730	150.000	1,260	1,890	3,150	150.000	1,260	1,890	3,150	156.000	1,310	1,966	3,276
6	Excavation		cum	33	18	50	11.500	374	201	575	11.792	383	206	590	4.000	130	70	200	15.250	496	267	763	17.752	577	311	888
7	Foundation	Crushed Rock	cum	227	313	540	2.200	499	689	1,188	3.200	726	1,002	1,728	3.200	726	1,002	1,728	3.700	839	1,159	1,998	3.700	839	1,159	1,998
8	Backfill		cum	113	157	270	5.000	567	783	1,350	3.872	439	606	1,045	5.000	567	783	1,350	5.000	567	783	1,350	6.272	711	982	1,693
	Sub total							5,246	10,102	15,348		6,078	11,711	17,789		6,321	12,517	18,838		7,157	13,704	20,861		7,970	15,253	23,223
	Headwall	10%						525	1,010			608	1,171			632	1,252			716	1,370			797	1,525	
	Total							5,800	11,100	16,900		6,700	12,900	19,600		7,000	13,800	20,800		7,900	15,100	23,000		8,800	16,800	25,600

	Unit/ type	Lampang IC (0+000) DT	Contract Package for Roadway(CPR) N1 Flat	N2 Mountainous	T1T2 Tunnel	N3 Mountainous	Mae Tha IC (41+400) ST	CPR T3 Tunnel	N4 Flat	Lamphun IC (60+140) DT	ChiangMai IC (82+155) DT	CPR N5 Flat	TOTAL	Remarks
Excavation Volume														
(1)Common	cum	0	204,090	4,469,908	145,584	983,481	195,000	411,383	289,836	0	0	4,110	6,703,392	L=1.25,L/C=1.60
(2)Soft Rock	cum	0	0	1,250,198	43,675	244,638	0	123,415	29	0	0	0	1,661,955	L=1.60,L/C=1.60
(3)Hard Rock	cum	0	0	125,020	4,368	24,464	0	13,705	0	0	0	0	167,557	L=1.70,L/C=1.60
(4)Tunnel Excav.(Soft Rock)		0	0	0	688,319	0	0	121,818	0	0	0	0	810,137	
Conv. Compacted vol.	cum	0	159,000	4,875,000	850,000	1,039,000	152,000	581,000	226,000	0	0	3,000	7,885,000	
Supply Side Packages: Lampang IC		0											0	
N1		0	159,000										159,000	
N2		612,000	1,643,000	1,073,000					814,000	733,000			4,875,000	
T1T2		0			19,000	59,000	648,000			124,000			850,000	
N3		0				1,039,000							1,039,000	
Mae Tha IC		0					152,000						152,000	
T3		0						23,000	558,000				581,000	
N4		0							226,000				226,000	
Lamphun IC		0											0	
ChaingMai IC		0											0	
N5		0										3,000	3,000	
Balance		0	0	0	0	0	0	0	-613,000	0	-186,000	-1,361,000		
Embankment Volume		612,000	1,802,000	1,073,000	19,000	1,098,000	800,000	23,000	2,211,000	857,000	186,000	1,364,000	10,045,000	
(1)Common	cum	612,000	1,802,000	1,073,000	19,000	1,098,000	800,000	23,000	1,598,000	857,000	0	3,000	7,885,000	
(2)Borrow Material	cum	0	0	0	0	0	0	0	613,000	0	186,000	1,361,000	2,160,000	
(3)Removal of Soil	cum	0	0	0	0	0	0	0	0	0	0	0	0	

FEASIBILITY STUDY
ON
THE INTER-CITY TOLL MOTORWAY PROJECTS

APPENDIX A 9.3-1
MASS HAUL OF LAMPONG - DOI SAKET ROUTE

Work Items	Discription Class	Unit/ type	Lampang IC (0+000)	Contract Package for Roadway				Mae Tha IC (41+400)			Lamphun IC (60+140)	ChiangMai IC (82+155)		TOTAL	Remarks
			DT	N1 Flat	N2 Mountainous	T1T2 Tunnel	N3 Mountainous	ST	T3 Tunnel	N4 Flat	DT	DT	N5 Flat		
1.Preparation Works															
(1)Clearing	catchpoint	sqm	404,200	741,100	0	0	0	282,600	0	875,400	294,300	405,900	706,066	3,709,566	
(2)Grubbing (Rolling & Mt. Area)	t=1.0m	sqm	0	105,550	613,065	27,860	444,690	39,300	52,575	313,195	0	0	0	1,596,235	
3.Roadway Excavation															
(1)Common		cum	0	204,090	4,469,908	145,584	983,481	195,000	411,383	289,836	0	0	4,110	6,703,392	L=1.25,L/C=1.60
(2)Soft Rock		cum	0	0	1,250,198	43,675	244,638	0	123,415	29	0	0	0	1,661,955	L=1.60,L/C=1.60
(3)Hard Rock		cum	0	0	125,020	4,368	24,464	0	13,705	0	0	0	0	167,557	L=1.70,L/C=1.60
(4)Unsuitable Material(Grubbing)		cum	1,000	105,550	613,065	27,860	445,340	1,000	52,575	313,195	1,000	1,000	0	1,561,585	L=1.25,L/C=1.60
4.Embankment			612,000	1,801,651	1,072,559	18,540	1,098,037	800,000	22,677	2,210,768	857,000	186,000	1,364,164	10,043,396	
(1)Common		cum	612,000	1,801,651	1,072,559	18,540	1,098,037	800,000	22,677	1,601,472	857,000	0	3,211	7,887,147	
(2)Borrow Material		cum	0	0	0	0	0	0	0	609,296	0	186,000	1,360,953	2,156,249	
(3)Removal of Surplus soil		cum	0	0	0	0	0	0	0	0	0	0	0	0	Bank Volume
5.Pavement															
(1)Concrete Pavement	t=25 cm	sqm	56,000	269,325	145,425	4,050	117,300	60,000	6,300	377,460	44,000	26,000	75,075	1,180,935	
(2)Concrete Pavement	t=30 cm	sqm													
(3)Asphalt Concrete Wearing	t=5 cm	sqm	45,000	161,595	87,255	2,430	70,380	52,000	3,780	226,476	34,000	36,000	45,045	763,961	
(4)Soil Aggregate Subbase Course		cum	30,300	129,276	69,804	1,944	56,304	33,600	3,024	181,181	23,400	18,600	36,036	583,469	
(5)Crushed Rock Base Course		cum	29,200	118,503	63,987	1,782	51,612	32,800	2,772	166,082	22,400	19,600	33,033	541,771	
6.Plantation															
(1)Buffer Zone		sqm	14,700	251,370	135,730	3,780	109,480	0	5,880	352,296	10,900	0	70,070	954,206	
(2)Median/Gardening		sqm	14,100	125,685	69,065	3,050	61,740	21,600	4,740	183,068	13,500	0	35,035	531,583	
(3)Grassing		sqm	236,600	0	0	0	0	50,100	0	0	117,300	220,200	0	624,200	
7.Slope Protection Works															
(1)Seeding		sqm	0	12,230	19,299	0	8,600	0	323	15,300	0	0	0	55,752	
(2)Sodding		sqm	29,800	187,412	62,583	960	88,404	59,700	5,860	257,364	34,500	10,000	136,261	872,844	
(3)Protection Frame with Sack		sqm	0	0	160,076	9,566	32,141	0	11,627	0	0	0	0	213,410	
8.Bridge Works															
(1)Viaduct(L-D Route)		m	0	1,520	3,095	0	1,980	760	0	2,110	1,320	650	80	11,515	
(4)Bridges(4 Lanes)		m	0	225	190	0	0	0	0	466	0	55	155	1,091	
(5)Bridges(Rampway 2 Lanes)		m	60					120			70	150			
(6)Bridges(Rampway 1 Lanes)		m	0					0			0	400			
(7)Over Bridge(L-D Route)	l =120m	each	0	10	0	0	1	0	0	7	1	1	6	26	
(9)Over Bridge(cut section)	l =50m	each	0	0	3	0	3	0	0	1	0	0	0	7	
(10)Canal Bridge	l =15m	each	0	2	2	0	0	0	0	2	0	0	0	6	
9.Tunnel Works		m		0	0	7,640	0		1,470	0			0	9,110	
10.Misellanous Works															
(1)Re-located Road		m	0	5,980	0	0	0	0	0	5,080	0	0	4,640	15,700	
(2)Re-located Water Way		m	0	0	0	0	0	0	0	0	0	320	0	320	
(3)Construction Road for Tunnel		m		0	0	20,000	0		2,000	0			0	22,000	
11.Retaining Wall Works															
(1)T-type Retaining Wall	H=8.0m	m		0	280	100	0		0	0			130	510	
(2)Leaning Retaining Wall	H=8.0m	m		0	1,600	270	800		5	0			0	2,675	
(3)Gravity Retaining Wall	H=3.0m	m		400	0	0	0		0	0			0	400	
(4)Concrete Block Mesonry	H=5.0m	m		660	200	360	1,830		0	1,000			2,500	6,550	
12.Culvert Works															
(1)Box Culvert			0	0	108	0	3	0	0	72	0	0	108	291	
	2.0x1.5	m		0	0	0	0		0	36			108	144	
	3.0x1.2	m		0	0	0	0		0	0			0	0	
	3.0x1.5	m		0	108	0	3		0	36			0	147	
	3.5x1.5	m		0	0	0	0		0	0			0	0	
	3.5x1.8	m		0	0	0	0		0	0			0	0	
(2)Pipe Culvert			0	8,296	2,240	125	1,806	0	194	11,626	0	0	2,312	26,599	
	Dia. 1.0	m		4,938	1,333	74	1,075		116	6,920			1,376	15,832	
	Dia.1.0 x 2	m		988	267	15	215		23	1,384			275	3,167	
	Dia. 1.5	m		1,975	533	30	430		46	2,768			551	6,333	
	Dia.1.5 x 2	m		395	107	6	86		9	554			110	1,267	
16.Lighting															
(2)Other Section		each		140	410	0	350		40	170			50	1,160	
19.Rest Area		l.s.	0	1	1	0	0	1	0	2	0	0	1	6	
24.Land Acquisition		sqm	466,000	1,189,000	829,000	38,000	667,000	358,000	65,000	1,622,000	294,000	486,000	973,000	6,987,000	

Work Items	Discription Class	Unit	Ban Pong JC (0+000) TB	S1 Flat	Ban Pong IC (8+460) DT	Photharam IC (21+000) DT	S2 Flat	Rachaburi IC (42+000) ST	S3 Flat	Pak Tho IC (61+445) DT	S4 Flat	S5 Flat	Phetchaburi IC (91+000) ST	Tha Yang IC (104+512) ST	S6 Flat	S7 Flat	Cha Am IC (133+736) ST	TOTAL	Remarks
1.Preparation Works																			
(1)Clearing	catchpoint	sqm	375,800	759,625	338,200	416,000	895,200	166,000	966,225	292,900	1,022,050	1,014,275	350,300	344,400	785,500	609,600	428,300	8,764,375	
(2)Grubbing (Rolling & Mt. Area)	t=1.0m	sqm																	
2.Foundation Improvement Works																			
(1)Cement Stabilization	t=2.0m	sqm	0	0	0	0	760,190	243,000	966,829	148,500	1,023,055	271,745	0	0	0	0	0	3,413,319	
(2)Bearing Unit Piles		sqm	0	0	0	0	35,640	11,880	11,880	11,880	47,520	11,880	0	0	0	0	0	130,680	
3.Roadway Excavation																			
(1)Common		cum	0	0	0	0	0	0	240	0	0	0	0	0	220	0	0	460	L=1.25,L/C=1.60
(4)Unsuitable Material(Grubbing)		cum	1,000		1,000	1,000		1,000		1,000			1,000	1,000			1,000	8,000	L=1.25,L/C=1.60
4.Embankment			183,000	1,838,000	243,000	273,000	1,535,745	197,000	1,717,323	256,000	2,253,885	2,126,408	375,000	576,000	1,562,970	1,146,660	336,000	14,619,991	
(1)Common		cum	0	0	0	0	0	0	188	0	0	0	0	0	172	0	0	360	
(2)Borrow Material		cum	183,000	1,838,000	243,000	273,000	1,535,745	197,000	1,717,135	256,000	2,253,885	2,126,408	375,000	576,000	1,562,798	1,146,660	336,000	14,619,631	
(3)Removal of Surplus soil		cum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bank Volume
5.Pavement																			
(1)Concrete Pavement	t=25 cm	sqm																	
(2)Concrete Pavement	t=30 cm	sqm	34,000	304,718	26,000	22,000	377,483	53,000	407,588	37,000	421,268	412,290	60,000	51,000	325,170	255,758	69,000	2,856,275	
(3)Asphalt Concrete Wearing	t=5 cm	sqm	33,000	121,887	27,000	30,000	150,993	36,000	163,035	27,000	168,507	164,916	55,000	40,000	130,068	102,303	42,000	1,291,709	
(4)Soil Aggregate Subbase Course		cum	20,100	127,982	15,900	15,600	158,543	26,700	171,187	19,200	176,933	173,162	34,500	27,300	136,571	107,418	33,300	1,244,396	
(5)Crushed Rock Base Course		cum	25,000	137,123	20,000	20,500	169,867	31,250	183,415	22,750	189,571	185,531	42,500	32,750	146,327	115,091	38,250	1,359,925	
6.Plantation																			
(1)Buffer Zone		sqm	5,300	189,602	3,100	0	234,878	12,100	253,610	4,200	262,122	256,536	21,700	22,400	202,328	159,138	21,700	1,648,716	
(2)Median/Gardening		sqm	1,800	94,801	2,000	0	117,439	15,400	126,805	8,100	131,061	128,268	27,900	0	101,164	79,569	29,900	864,208	
(3)Grassing		sqm	217,400	0	200,700	247,200	0	84,400	0	191,900	0	0	175,300	139,300	0	0	258,000	1,514,200	
7.Slope Protection Works																			
(1)Seeding		sqm		0			0		0		0	0			0	0		0	
(2)Sodding		sqm	16,200	172,120	16,400	13,300	168,755	32,900	188,718	16,500	215,255	220,300	23,300	53,000	168,360	118,560	21,400	1,445,068	
(3)Protection Frame with Sack		sqm																	
8.Bridge Works																			
(2)Viaduct(B-C Route)		m	1,200	1,200	2,650	3,100	87	1,400	36	1,050	850	1,000	0	1,200	12	800	0	14,585	
(3)Bridges(6 Lanes)		m	0	107	0	0	236	0	199	0	127	126	0	0	136	33	0	964	
(5)Bridges(Rampway 2 Lanes)		m	0		55	110		60		75			260	0			230	790	
(6)Bridges(Rampway 1 Lanes)		m	1,540		395	960		0		225			125	0			0	3,245	
(8)Over Bridge(B-C Route)	l=170m	each	0	5	0	0	6	0	6	0	6	6	1	0	6	3	0	39	
(10)Canal Bridge	l=15m	each	0	4	0	0	4	0	5	0	4	4	0	0	3	1	0	25	
10.Misellanous Works																			
(1)Re-located Road		m	1,500	2,620	0	920	2,740	0	5,600	0	5,910	5,040	0	0	4,750	0	0	29,080	
(2)Re-located Water Way		m	0	0	0	0	0	0	0	0	400	0	0	0	0	0	410	810	
12.Culvert Works																			
(1)Box Culvert			0	0	0	0	200	0	0	0	0	80	0	0	80	40	0	400	
	2.0x1.5	m		0			0		0		0	0			40	0		40	
	3.0x1.2	m		0			0		0		0	80			0	0		80	
	3.0x1.5	m		0			160		0		0	0			0	40		200	
	3.5x1.5	m		0			0		0		0	0			40	0		40	
	3.5x1.8	m		0			40		0		0	0			0	0		40	
(2)Pipe Culvert			0	6,257	0	0	7,751	0	8,370	0	8,651	8,466	0	0	6,677	5,251	0	51,423	
	Dia. 1.0	m		3,724			4,614		4,982		5,149	5,039			3,974	3,126		30,608	
	Dia.1.0 x 2	m		745			923		996		1,030	1,008			795	625		6,122	
	Dia. 1.5	m		1,490			1,845		1,993		2,060	2,016			1,590	1,250		12,244	
	Dia.1.5 x 2	m		298			369		399		412	403			318	250		2,449	
16.Lighting																			
(2)Other Section		each		280			80		60		220	150			50	150		990	
19.Rest Area		l.s.	0	1	0	0	1	0	1	0	1	2	0	0	0	1	0	7	
20.Bus Stop		l.s.	1	0	1	1	0	1	0	1	1	0	1	1	1	1	1	11	
24.Land Acquisition		sqm	503,000	1,040,000	465,000	537,000	1,197,000	467,000	1,285,000	386,000	1,379,000	1,362,000	338,000	243,000	1,022,000	854,000	375,000	11,453,000	

No.	STA. Start	STA. End	Length (m)	Number of Spans	spans	Q'ty of Super Structure (m)						Q'ty of Sub Structure (each)								Q'ty of Foundation (each)				
						A	B-1	B-2	B-3	B-4	MC	A-1	B-1	B-2	B-3	C	D-1	F-1	F-2	C-1	C-2	C-3	D	E
1	0 + 300	1 + 200	900	18@50	18					900		2		6	11							17		
2	17 + 180	17 + 550	370	9@35+2@27.5	11			55	315			2	2	8						10				
3	17 + 800	18 + 50	250	1@40+6@35	7				210	40		2	4		2					4	2			
4	27 + 230	27 + 310	80	1@30+2@25	3		50		30			2	2							2				
5	27 + 480	28 + 40	560	2@20+2@35+10@45	14		40		70	450		2	4	9						13				
6	28 + 350	28 + 440	90	2@25+1@40	3		50			40		2		2							2			
7	28 + 840	29 + 120	280	4@70	4						280	2							3				3	
8	29 + 920	30 + 40	120	1@50+2@35	3				70	50		2						2					2	
9	30 + 110	30 + 190	80	2@20+1@40	3		40			40		2						2					2	
10	30 + 460	30 + 760	300	10@30	10				300			2	2	7										9
11	31 + 200	31 + 600	400	5@80	5						400	2							4				2	2
12	31 + 675	31 + 730	55	1@20+1@35	2		20		35			2		1										1
13	31 + 770	31 + 980	210	3@70	3						210	2							2				1	1
14	32 + 20	32 + 360	340	4@80+1@20	5		20				320	2						1	3				3	1
15	31 + 770	32 + 350	580	2@20+6@90	8		40				540	2			1				6				6	1
16	36 + 550	37 + 30	480	12@40	12					480		2			11									11
17	36 + 550	37 + 100	550	2@25+10@50	12		50			500		2		2	9								9	2
18	37 + 460	37 + 550	90	3@30	3				90			2		2										2
19	37 + 500	37 + 600	100	2@20+2@30	4		40		60			2		3										3
20	38 + 0	38 + 400	400	5@80	5						400	2						4					4	
21	38 + 100	38 + 400	300	5@60	5						300	2						4					4	
22	40 + 50	40 + 110	60	2@30	2			60				2		1										1
23	40 + 370	40 + 770	400	5@80	5						400	2							4				4	
24	40 + 820	40 + 900	80	2@30+1@20	3		20		60			2		2										2
25	41 + 620	41 + 900	280	4@20+5@40	9		80			200		2		2	6								6	2
26	43 + 850	44 + 800	950	1@20+11@80+2@25	14		70				880	2		1					12				12	1
27	47 + 75	47 + 105	30	1@30	1				30			2												
28	45 + 800	46 + 600	800	4@20+18@40	22		80			720		2	2		19								19	2
29	48 + 250	48 + 285	35	1@35	1				35			2												
30	48 + 700	48 + 735	35	1@35	1				35			2												
31	50 + 770	51 + 700	930	1@10+1@20+8@80+4@45+2@40	16	10	20			260	640	2			5	1			9				9	6
32	50 + 800	51 + 700	900	1@20+9@80+4@40	14		20			160	720	2		1					12				12	1
30	54 + 860	55 + 0	140	4@35	4				140			2		3						3				
31	56 + 100	56 + 140	40	2@20	2		40					2	1							1				
32	56 + 900	57 + 0	100	4@25	4		100					2				3				3				
33	59 + 280	60 + 600	1320	4@40+30@35+5@22	39		110		1050	160		2	3	30	5					33	5			
34	81 + 800	82 + 450	650	2@25+16@30+2@35+1@50	21		50		550	50		2		18	2					18		2		
35	84 + 500	84 + 580	80	2@30+1@20	3		20		60			2	1	1						2				

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APPENDIX A 9.3-3(1/7)
QUANTITIES OF VIADUCTS OF LAMPONG - DOI SAKET ROUTE

No.	STA. Start	STA. End	Length (m)	Number of Spans	spans	Q'ty of Super Structure (m)						Q'ty of Sub Structure (each)									Q'ty of Foundation (each)				
						A	B-1	B-2	B-3	B-4	MC	A-3	A-4	B-1	B-2	B-3	D-2	E	F-1	F-2	C-1	C-2	C-3	D	E
1	0 + 600	1 + 800	1200	40@30	40				1200			2						39			39				
2	3 + 200	4 + 400	1200	40@30	40				1200			2					39					39			
3	6 + 750	9 + 400	2650	64@35+2@50+5@40+3@30+1@20	75		20		2330	300		2						74			66	5	3		
4	19 + 400	22 + 500	3100	16@30+72@35+2@50	90				3000	100		2						89			86		3		
5	27 + 400	27 + 417	17	1@17	1		17					2													
6	32 + 750	32 + 786	36	1@36	1				36			2													
7	35 + 750	35 + 772	22	1@22	1		22					2													
8	36 + 600	36 + 612	12	1@12	1	12						2													
9	39 + 600	41 + 0	1400	32@32.5+8@45	40				1040	360		2					39				30		9		
10	58 + 700	58 + 736	36	2@18	2		36					2						1			1				
11	60 + 650	61 + 700	1050	24@35+4@40+1@50	29				840	210		2						28			22	4	2		
12	63 + 200	64 + 0	800	18@35+2@45+2@40	22				630	170		2						21			16	2	3		
13	66 + 800	66 + 817	17	1@17	1		17					2													
14	73 + 670	73 + 690	20	2@10	2	20						2						1			1				
15	80 + 250	80 + 263	13	1@13	1	13						2													
16	86 + 750	87 + 650	900	5@30+20@35+1@50	26				850	50		2						25			23		2		
17	102 + 930	103 + 30	100	4@25	4		100					2						3			3				
18	103 + 450	103 + 750	300	10@30	10		300					2					9				9				
19	104 + 300	105 + 200	900	30@30	30				900			2						29			29				
20	112 + 500	112 + 512	12	1@12	1	12						2													
21	125 + 0	125 + 800	800	10@35+1@50+10@35+2@25	23		50		700	50		2						22			20		2		

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APPENDIX A 9.3-3(2/7)
QUANTITIES OF VIADUCTS OF BANG PONG - CHA AM ROUTE

No.	STA. Start	STA. End	Length (m)	Number of Spans	Type Super-structure	Type Sub-structure	Q'ty of Super Structure (m) A	B-1	B-2	B-3	B-4	Q'ty of Sub Structure (each) A-1	A-2
1	11 + 920	11 + 950	30	2 @ 15	A	A-1 A-2	30	0	0	0	0	2	1
2	15 + 130	15 + 140	10	1 @ 10	A	A-1	10	0	0	0	0	2	0
3	15 + 320	15 + 350	30	3 @ 10	A	A-1 A-2	30	0	0	0	0	2	2
4	15 + 700	15 + 705	5	1 @ 5	A	A-1	5	0	0	0	0	2	0
5	15 + 900	15 + 950	50	2 @ 25	B-1	A-1 A-2	0	50	0	0	0	2	1
6	16 + 280	16 + 300	20	1 @ 20	B-1	A-1	0	20	0	0	0	2	0
7	16 + 370	16 + 390	20	1 @ 20	B-1	A-1	0	20	0	0	0	2	0
8	16 + 740	16 + 770	30	2 @ 15	A	A-1 A-2	30	0	0	0	0	2	1
9	19 + 300	19 + 330	30	2 @ 15	A	A-1 A-2	30	0	0	0	0	2	1
10	22 + 480	22 + 530	50	2 @ 25	B-1	A-1 A-2	0	50	0	0	0	2	1
11	22 + 660	22 + 750	90	3 @ 30	B-3	A-1 A-2	0	0	0	90	0	2	2
12	25 + 920	25 + 970	50	2 @ 25	B-1	A-1 A-2	0	50	0	0	0	2	1
13	57 + 650	57 + 680	30	2 @ 15	A	A-1 A-2	30	0	0	0	0	2	1
14	63 + 460	63 + 520	60	3 @ 20	B-1	A-1 A-2	0	60	0	0	0	2	2
15	66 + 750	66 + 770	20	1 @ 20	B-1	A-1	0	20	0	0	0	2	0
16	68 + 120	68 + 140	20	2 @ 10	A	A-1 A-2	20	0	0	0	0	2	1
17	71 + 550	71 + 576	26	2 @ 13	A	A-1 A-2	26	0	0	0	0	2	1
18	72 + 520	72 + 580	60	3 @ 20	B-1	A-1 A-2	0	60	0	0	0	2	2
19	73 + 20	73 + 40	20	2 @ 10	A	A-1 A-2	20	0	0	0	0	2	1
20	74 + 20	74 + 50	30	2 @ 15	A	A-1 A-2	30	0	0	0	0	2	1
21	74 + 380	74 + 400	20	2 @ 10	A	A-1 A-2	20	0	0	0	0	2	1
22	75 + 530	75 + 600	70	2 @ 25 2 @ 10	A B-1	A-1 A-2	50	20	0	0	0	2	3
23	78 + 160	78 + 240	80	4 @ 20	B-1	A-1 A-2	0	80	0	0	0	2	3
24	79 + 990	80 + 20	30	3 @ 10	A	A-1 A-2	30	0	0	0	0	2	2
25	80 + 390	80 + 405	15	1 @ 15	A	A-1	15	0	0	0	0	2	0
26	81 + 220	81 + 260	40	2 @ 20	B-1	A-1 A-2	0	40	0	0	0	2	1
27	82 + 840	82 + 940	100	4 @ 25	B-1	A-1 A-2	0	100	0	0	0	2	3
28	84 + 760	84 + 795	35	1 @ 35	B-3	A-1	0	0	0	35	0	2	0
29	87 + 720	87 + 740	20	2 @ 10	A	A-1 A-2	20	0	0	0	0	2	1

No.	STA. Start	STA. End	Length (m)	Number of Spans	Type: Super-structure	Type: Sub-structure	Q'ty of Super Structure (m): A	B-1	B-2	B-3	B-4	Q'ty of Sub Structure (each): A-3	A-4
1	4 + 830	4 + 841	11	1 @ 11.0	A	A-3	11	0	0	0	0	2	0
2	10 + 620	10 + 641	21	1 @ 21.0	B-1	A-3	0	21	0	0	0	2	0
3	11 + 970	11 + 985	15	2 @ 7.5	A	A-3 A-4	15	0	0	0	0	2	1
4	13 + 850	13 + 856	6	1 @ 6.0	A	A-3	6	0	0	0	0	2	0
5	15 + 470	15 + 487	17	2 @ 8.5	A	A-3 A-4	17	0	0	0	0	2	1
6	17 + 880	17 + 894	14	1 @ 14.0	A	A-3	14	0	0	0	0	2	0
7	17 + 970	17 + 987	17	2 @ 8.5	A	A-3 A-4	17	0	0	0	0	2	1
8	19 + 0	19 + 6	6	1 @ 6.0	A	A-3	6	0	0	0	0	2	0
9	23 + 500	23 + 509	9	1 @ 9.0	A	A-3	9	0	0	0	0	2	0
10	24 + 500	24 + 517	17	1 @ 17.0	B-1	A-3	0	17	0	0	0	2	0
11	33 + 300	33 + 309	9	1 @ 9.0	A	A-3	9	0	0	0	0	2	0
12	33 + 460	33 + 467	7	1 @ 7.0	A	A-3	7	0	0	0	0	2	0
13	33 + 930	33 + 939	9	1 @ 9.0	A	A-3	9	0	0	0	0	2	0
14	37 + 650	37 + 665	15	2 @ 7.5	A	A-3 A-4	15	0	0	0	0	2	1
15	39 + 50	39 + 220	170	2 @ 25.0 4 @ 30.0	B-1 B-3	A-3 A-4	0	50	0	120	0	2	5
16	42 + 510	42 + 550	40	2 @ 20.0	B-1	A-3 A-4	0	40	0	0	0	2	1
17	43 + 100	43 + 112	12	1 @ 12.0	A	A-3	12	0	0	0	0	2	0
18	44 + 280	44 + 290	10	1 @ 10.0	A	A-3	10	0	0	0	0	2	0
19	46 + 300	46 + 312	12	1 @ 12.0	A	A-3	12	0	0	0	0	2	0
20	46 + 630	46 + 650	20	1 @ 20.0	B-1	A-3	0	20	0	0	0	2	0
21	48 + 570	48 + 579	9	1 @ 9.0	A	A-3	9	0	0	0	0	2	0
22	49 + 230	49 + 240	10	1 @ 10.0	A	A-3	10	0	0	0	0	2	0
23	51 + 930	51 + 939	9	1 @ 9.0	A	A-3	9	0	0	0	0	2	0
24	52 + 700	52 + 719	19	1 @ 19.0	B-1	A-3	0	19	0	0	0	2	0
25	53 + 800	53 + 813	13	1 @ 13.0	A	A-3	13	0	0	0	0	2	0
26	55 + 300	55 + 308	8	1 @ 8.0	A	A-3	8	0	0	0	0	2	0
27	57 + 100	57 + 111	11	1 @ 11.0	A	A-3	11	0	0	0	0	2	0
28	57 + 760	57 + 766	6	1 @ 6.0	A	A-3	6	0	0	0	0	2	0
29	59 + 100	59 + 110	10	1 @ 10.0	A	A-3	10	0	0	0	0	2	0
30	59 + 320	59 + 330	10	1 @ 10.0	A	A-3	10	0	0	0	0	2	0

No.	STA. Start	STA. End	(m)	of Spans	Type Super-structure	Type Sub-structure	(m) A	(m) B-1	(m) B-2	(m) B-3	(m) B-4	(each) A-3	(each) A-4
31	62 + 400	62 + 430	30	2 @ 15.0	A	A-3 A-4	30	0	0	0	0	2	1
32	64 + 910	64 + 915	5	1 @ 5.0	A	A-3	5	0	0	0	0	2	0
33	65 + 770	65 + 785	15	2 @ 7.5	A	A-3 A-4	15	0	0	0	0	2	1
34	66 + 100	66 + 105	5	1 @ 5.0	A	A-3	5	0	0	0	0	2	0
35	68 + 100	68 + 107	7	1 @ 7.0	A	A-3	7	0	0	0	0	2	0
36	74 + 460	74 + 467	7	1 @ 7.0	A	A-3	7	0	0	0	0	2	0
37	75 + 400	75 + 415	15	2 @ 7.5	A	A-3 A-4	15	0	0	0	0	2	1
38	77 + 280	77 + 288	8	1 @ 8.0	A	A-3	8	0	0	0	0	2	0
39	78 + 180	78 + 202	22	2 @ 11.0	A	A-3 A-4	22	0	0	0	0	2	1
40	79 + 400	79 + 406	6	1 @ 6.0	A	A-3	6	0	0	0	0	2	0
41	81 + 470	81 + 477	7	1 @ 7.0	A	A-3	7	0	0	0	0	2	0
42	82 + 370	82 + 382	12	2 @ 6.0	A	A-3 A-4	12	0	0	0	0	2	1
43	83 + 850	83 + 856	6	1 @ 6.0	A	A-3	6	0	0	0	0	2	0
44	85 + 900	85 + 906	6	1 @ 6.0	A	A-3	6	0	0	0	0	2	0
45	86 + 480	86 + 504	24	2 @ 12.0	A B-3	A-3 A-4	24	0	0	0	0	2	1
46	88 + 650	88 + 657	7	1 @ 7.0	A	A-3	7	0	0	0	0	2	0
47	95 + 870	95 + 880	10	1 @ 10.0	A	A-3	10	0	0	0	0	2	0
48	97 + 200	97 + 220	20	1 @ 20.0	B-1	A-3	0	20	0	0	0	2	0
49	101 + 40	101 + 49	9	1 @ 9.0	A	A-3	9	0	0	0	0	2	0
50	102 + 730	102 + 762	32	2 @ 16.0	B-1	A-3 A-4	0	32	0	0	0	2	1
51	107 + 100	107 + 140	40	2 @ 20.0	B-1	A-3 A-4	0	40	0	0	0	2	1
52	107 + 160	107 + 167	7	1 @ 7.0	A	A-3	7	0	0	0	0	2	0
53	109 + 850	109 + 864	14	1 @ 14.0	A	A-3	14	0	0	0	0	2	0
54	112 + 150	112 + 168	18	1 @ 18.0	B-1	A-3	0	18	0	0	0	2	0
55	115 + 160	115 + 178	18	2 @ 9.0	A	A-3 A-4	18	0	0	0	0	2	1
56	117 + 50	117 + 61	11	1 @ 11.0	A	A-3	11	0	0	0	0	2	0
57	117 + 70	117 + 92	22	1 @ 22.0	B-1	A-3	0	22	0	0	0	2	0
58	118 + 670	118 + 676	6	1 @ 6.0	A	A-3	6	0	0	0	0	2	0
59	124 + 600	124 + 622	22	1 @ 22.0	B-1	A-3	0	22	0	0	0	2	0
60	124 + 630	124 + 641	11	1 @ 11.0	A	A-3	11	0	0	0	0	2	0

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APPENDIX A 9.3-3(5/7)
QUANTITIES OF BRIDGES OF BANG PONG - CHA AM ROUTE(2/2)

Rampway Bridges 2 Lanes L-D Route

No.		Length (m)	Nos of Lanes	Number of Spans		Type Super-structure		Type Sub-structure		Q'ty of Super Structure (m) A	B-1	B-2	B-3	B-4	Q'ty of Sub Structure (each) A-1	A-2
1	Lampang IC	60	2	3 @ 20.0		B-1		A-1	A-2	0	60	0	0	0	2	2
2	Mae Tha IC	120	2	6 @ 20.0		B-1		A-1	A-2	0	120	0	0	0	2	5
3	Lumphun IC	70	2	2 @ 10.0	2 @ 25.0	A	B-1	A-1	A-2	20	50	0	0	0	2	3
4	Chaingmai IC	150	2	6 @ 25.0		B-1		A-1	A-2	0	150	0	0	0	2	5
	L-D Route Total	400								20	380	0	0	0	8	15

Rampway Bridges 1 Lane L-D Route

No.		Length (m)	Nos of Lanes	Number of Spans		Type Super-structure		Type Sub-structure		Q'ty of Super Structure (m) A	B-1	B-2	B-3	B-4	Q'ty of Sub Structure (each) A-1	A-2
1	Chaingmai IC	130	1	2 @ 15.0	4 @ 25.0	A	B-1	A-1	A-2	30	100	0	0	0	2	5
2		125	1	5 @ 25.0		B-1		A-1	A-2	0	125	0	0	0	2	4
3		95	1	1 @ 15.0	4 @ 20.0	A	B-1	A-1	A-2	15	80	0	0	0	2	4
4		50	1	2 @ 25.0		B-1		A-1	A-2	0	50	0	0	0	2	1
	L-D Route Total	400								45	355	0	0	0	8	14

Rampway Bridges 2 Lanes B-C Route

No.		Length (m)	Nos of Lanes	Number of Spans		Type Super-structure		Type Sub-structure		Q'ty of Super Structure (m) A	B-1	B-2	B-3	B-4	Q'ty of Sub Structure (each) A-1	A-2
1	Ban pong IC	55	2	2 @ 27.5		B-2		A-1	A-2	0	0	55	0	0	2	1
2	Photharam IC	110	2	1 @ 10.0	4 @ 25.0	A	B-1	A-1	A-2	10	100	0	0	0	2	4
3	Ratchaburi IC	60	2	3 @ 20.0		B-1		A-1	A-2	0	60	0	0	0	2	2
4	Pak Tho IC	75	2	3 @ 25.0		B-1		A-1	A-2	0	75	0	0	0	2	2
5	Petchaburi IC	260	2	13 @ 20.0		B-1		A-1	A-2	0	260	0	0	0	2	12
6	Cha Am IC	30	2	1 @ 30.0		B-3		A-1		0	0	0	30	0	2	0
7		200	2	10 @ 20.0		B-1		A-1	A-2	0	200	0	0	0	2	9
	B-C Route Total	790								10	695	55	30	0	14	30

Rampway Bridges 1 Lane1 B-C Route

No.		Length (m)	Nos of Lanes	Number of Spans		Type Super-structure		Type Sub-structure		Q'ty of Super Structure (m) A	B-1	B-2	B-3	B-4	Q'ty of Sub Structure (each) A-1	A-2
1	Ban pong JC	1,150	1	46 @ 25.0		B-1		A-1	A-2	0	1150	0	0	0	2	45
2		280	1	14 @ 20.0		B-1		A-1	A-2	0	280	0	0	0	2	13
3		110	1	2 @ 15.0	4 @ 20.0	A	B-1	A-1	A-2	30	80	0	0	0	2	5
		1,540								30	1,510	0	0	0	6	63
4	Ban pong IC	70	1	2 @ 15.0	2 @ 20.0	A	B-1	A-1	A-2	30	40	0	0	0	2	3
5		90	1	2 @ 15.0	3 @ 20.0	A	B-1	A-1	A-2	30	60	0	0	0	2	4
6		125	1	5 @ 25.0		B-1		A-1	A-2	0	125	0	0	0	2	4
7		110	1	2 @ 15.0	4 @ 20.0	A	B-1	A-1	A-2	30	80	0	0	0	2	5
		395								90	305	0	0	0	8	16
8	Photharam IC	265	1	3 @ 15.0	11 @ 20.0	A	B-1	A-1	A-2	45	220	0	0	0	2	13
9		285	1	3 @ 15.0	12 @ 20.0	A	B-1	A-1	A-2	45	240	0	0	0	2	14
10		210	1	2 @ 15.0	9 @ 20.0	A	B-1	A-1	A-2	30	180	0	0	0	2	10
11		200	1	10 @ 20.0		B-1		A-1	A-2	0	200	0	0	0	2	9
		960								120	840	0	0	0	8	46
12	Pak Tho IC	63	1	2 @ 10.0	2 @ 20.0	A	B-1	A-1	A-2	20	40	0	0	0	2	3
13		60	1	2 @ 10.0	2 @ 20.0	A	B-1	A-1	A-2	20	40	0	0	0	2	3
14		70	1	2 @ 15.0	2 @ 20.0	A	B-1	A-1	A-2	30	40	0	0	0	2	3
15		32	1	2 @ 20.0		B-1		A-1	A-2	0	40	0	0	0	2	1
		225								70	160	0	0	0	8	10
16	Petchaburi IC	125	1	5 @ 25.0		B-1		A-1	A-2	0	125	0	0	0	2	4
	B-C Route Total	3,245								310	2,940	0	0	0	32	139

FEASIBILITY STUDY
ON
THE INTER-CITY TOLL MOTORWAY PROJECTS

APPENDIX 9.3-3(7/7)
QUANTITIES OF RAMPWAY BRIDGES
OF BANG PONG - CHA AM ROUTE

Quantities of NO. 1 Tunnel

Item	unit	A-line	B-line	Total
Tunnel Pattern B	m	1,314	1,637	2,951
Tunnel Pattern CI	m	969	689	1,658
Tunnel Pattern CII	m	763	740	1,503
Tunnel Pattern DI(i)	m	660	620	1,280
Tuunel Pattern BL	m	62	62	124
Tunnel Pattern CL	m	62	62	124
Tunnel Pattern Dust C.Cham	m	314	314	628
Tunnel Pattern Evac.Tunnel	m	74	74	148
Total of Tunneling Length	m	4,218	4,198	8,416
Items of Pattern				
[Net volume]				
Tunnel Excavation B	m3	106,944	133,232	240,176
Tunnel Excavation CI	m3	79,980	56,869	136,849
Tunnel Excavation CII	m3	62,977	61,079	124,056
Tunnel Excavation DI(i)	m3	55,240	51,892	107,132
Tuunel Excavation BL	m3	6,649	6,649	13,298
Tunnel Excavation CL	m3	6,731	6,731	13,462
Tunnel Excavation Dust C.C	m3	25,917	25,917	51,834
Tunnel Excavation Evac.Tn.	m3	756	756	1,512
Total of Tunnel Excavation	m3	345,194	343,125	688,319
[Upper-halh for pay line]				
Tunnel Excavation B	m3	65,435	81,519	146,954
Tunnel Excavation CI	m3	49,120	34,926	84,046
Tunnel Excavation CII	m3	38,677	37,511	76,188
Tunnel Excavation DI(i)	m3	34,290	32,212	66,502
Tuunel Excavation BL	m3	4,299	4,299	8,598
Tunnel Excavation CL	m3	4,326	4,326	8,652
Tunnel Excavation Dust C.C	m3	15,917	15,917	31,834
Tunnel Excavation Evac.Tn.	m3	856	856	1,712
Total of Upper-half	m3	212,920	211,566	424,486
[Lower-halh for pay line]				
Tunnel Excavation B	m3	46,077	57,403	103,480
Tunnel Excavation CI	m3	34,251	24,354	58,605
Tunnel Excavation CII	m3	26,970	26,157	53,127
Tunnel Excavation DI(i)	m3	23,588	22,159	45,747
Tuunel Excavation BL	m3	2,678	2,678	5,356
Tunnel Excavation CL	m3	2,685	2,685	5,370
Tunnel Excavation Dust C.C	m3	11,099	11,099	22,198
Tunnel Excavation Evac.Tn.	m3	0	0	0
Total of Lower-half	m3	147,348	146,535	293,883
Invert Excavation (Rock)	m3	7,119	2,157	9,276
Lining Concrete 180kg/cm2	m3	38,008	37,829	75,837
Invert Concrete 180kg/cm2	m3	3,801	3,571	7,372
Total of Concrete class A	m3	41,809	41,400	83,209
Form work for lining conc. Lining Form	m2	91,418	90,981	182,399

FEASIBILITY STUDY ON THE INTER-CITY TOLL MOTORWAY PROJECTS	APPENDIX 9.3-4(1/4) QUANTITIES OF NO.1 TUNNEL (1/2)

(NO.1 Tn)

Item	unit	A-line	B-line	Total
Shotcrete t= 5cm	m2	30,569	37,926	68,495
Shotcrete t=10cm	m2	48,204	41,304	89,508
Shotcrete t=15cm	m2	16,634	15,722	32,356
Reinforcing mesh ϕ 5x150^2	m2	12,574	11,888	24,462
Water proofing sheet	m2	95,407	94,950	190,357
Rock Bolt ϕ D25mm x 2.0m	each	294	294	588
Rock Bolt ϕ D25mm x 3.0m	each	31,756	30,404	62,160
Rock Bolt ϕ D25mm x 4.0m	each	13,238	12,518	25,756
Total	each	45,288	43,216	88,504
Steel Arch Support H-125	kg	620,460	590,870	1,211,330
Exclude Items in Pattern				
Concrete Pavement t=20cm	m2	37,790	37,618	75,408
Subbase Course t=27cm	m2	37,790	37,618	75,408
Blind Drainage ϕ 300	m	3,830	3,810	7,640
Blind Drainage ϕ 150	m	950	950	1,900
Side ditch ϕ 200	m	7,660	7,620	15,280
Filter Mat 150*300	m	7,660	7,620	15,280
Curb stone	m	3,830	3,810	7,640
Inspection Gallery	m	3,830	3,810	7,640
Entrance/Exit Reinforcing	m	210	210	420
Reinforce at connect.w/DCC	m	120	120	240
Reinforce at connect.w/ETn	m	40	40	80

Quantities of NO. 3 Tunnel

Item	unit	A-line	B-line	Total
Tunnel Pattern CI	m	550	500	1,050
Tunnel Pattern DI(i)	m	200	220	420
Total of Tunneling Length	m	750	720	1,470
Items of Pattern				
[Net volume]				
Tunnel Excavation CI	m3	45,396	41,270	86,666
Tunnel Excavation DI(i)	m3	16,739	18,413	35,152
Total of Tunnel Excavation	m3	62,135	59,683	121,818
[Upper-halh for pay line]				
Tunnel Excavation CI	m3	27,880	25,346	53,226
Tunnel Excavation DI(i)	m3	10,391	11,430	21,821
Total of Upper-half	m3	38,271	36,776	75,047
[Lower-halh for pay line]				
Tunnel Excavation CI	m3	19,441	17,674	37,115
Tunnel Excavation DI(i)	m3	7,148	7,863	15,011
Total of Lower-half	m3	26,589	25,537	52,126
Invert Excavation (Rock)	m3	2,157	2,373	4,530
Lining Concrete 180kg/cm2	m3	6,739	6,470	13,209
Invert Concrete 180kg/cm2	m3	1,152	1,267	2,419
Total of Concrete class A	m3	7,891	7,737	15,628
Form work for lining conc. Lining Form	m2	16,377	15,722	32,099
Shotcrete t= 5cm	m2	---	---	0
Shotcrete t=10cm	m2	12,528	11,389	23,917
Shotcrete t=15cm	m2	4,556	5,011	9,567
Reinforcing mesh ϕ 5x150^2	m2	3,431	3,774	7,205
Water proofing sheet	m2	17,084	16,400	33,484
Rock Bolt ϕ D25mm x 2.0m	each	---	---	0
Rock Bolt ϕ D25mm x 3.0m	each	5,872	5,328	11,200
Rock Bolt ϕ D25mm x 4.0m	each	3,600	3,960	7,560
Total	each	9,472	9,288	18,760
Steel Arch Support H-125	kg	109,000	119,900	228,900

(NO.3 Tn)

Item	unit	A-line	B-line	Total
Exclude Items in Pattern				
Concrete Pavement t=20cm	m2	6,450	6,192	12,642
Subbase Course t=27cm	m2	6,450	6,192	12,642
Blind Drainage φ300	m	750	720	1,470
Blind Drainage φ150	m	180	180	360
Side ditch φ200	m	1,500	1,440	2,940
Filter Mat 150*300	m	1,500	1,440	2,940
Curb stone	m	750	720	1,470
Inspection Gallery	m	750	720	1,470
Entrance/Exit Reinforcing	m	40	40	80

Work Items	Discription Class	Unit/ type	Lampang IC (0+000)	Contract Package for Roadway				Mae Tha IC (41+400)			Lamphun IC (60+140)	ChiangMai IC (82+155)		TOTAL	Remarks
			DT	N1 Flat	N2 Mountainous	T1|2 Tunnel	N3 Mountainous	ST	T3 Tunnel	N4 Flat	DT	DT	N5 Flat		
1.Preparation Works															
(1)Clearing	catchpoint	sqm	808,400	1,482,200	0	0	0	565,200	0	1,750,800	588,600	811,800	1,412,132	7,419,132	
(2)Grubbing (Rolling & Mt. Area)	t=1.0m	sqm	0	422,200	2,452,260	111,440	1,778,760	157,200	210,300	1,252,780	0	0	0	6,384,940	
3.Roadway Excavation															
(1)Common		cum	0	20,409,000	446,990,800	14,558,400	98,348,100	19,500,000	41,138,300	28,983,600	0	0	411,000	670,339,200	Hauling 20 km
(2)Soft Rock		cum	0	0	187,529,700	6,551,250	36,695,700	0	18,512,250	4,350	0	0	0	249,293,250	Hauling 20 km
(3)Hard Rock		cum	0	0	23,753,800	829,920	4,648,160	0	2,603,950	0	0	0	0	31,835,830	Hauling 20 km
(4)Unsuitable Material(Grubbing)		cum	60,000	6,333,000	36,783,900	1,671,600	26,720,400	60,000	3,154,500	18,791,700	60,000	60,000	0	93,695,100	Hauling 10 km
4.Embankment															
(1)Common		cum	0	27,024,765	16,088,385	278,100	15,584,640	2,285,160	340,155	3,396,945	0	0	48,165	65,046,315	from Excv., compaction only
(2)Borrow Material		cum	165,240,000	0	0	0	15,946,470	174,867,120	0	535,762,350	231,390,000	50,220,000	367,457,310	1,540,883,250	Hauling 20 km
(3)Removal of Surplus soil		cum	0	0	0	49,878,180	0	0	33,410,880	0	0	0	0	83,289,060	Bank Volume, Hauling 10 km
5.Pavement															
(1)Concrete Pavement	t=25 cm	sqm	37,520,000	180,447,750	97,434,750	2,713,500	78,591,000	40,200,000	4,221,000	252,898,200	28,480,000	17,420,000	50,300,250	791,226,450	
(2)Concrete Pavement	t=30 cm	sqm													
(3)Asphalt Concrete Wearing	t=5 cm	sqm	6,525,000	23,431,275	12,651,975	352,350	10,205,100	7,540,000	548,100	32,839,020	4,930,000	5,220,000	6,531,525	110,774,345	
(4)Soil Aggregate Subbase Course		cum	10,302,000	43,953,840	23,733,360	660,960	19,143,360	11,424,000	1,028,160	61,601,540	7,956,000	6,324,000	12,252,240	198,379,460	Hauling 20 km
(5)Crushed Rock Base Course		cum	15,768,000	63,991,620	34,552,980	962,280	27,870,480	17,712,000	1,496,880	89,684,280	12,096,000	10,584,000	17,837,820	292,556,340	Hauling 20 km
6.Plantation															
(1)Buffer Zone		sqm	735,000	12,568,500	6,786,500	189,000	5,474,000	0	294,000	17,614,800	545,000	0	3,503,500	47,710,300	
(2)Median/Gardening		sqm	1,128,000	10,054,800	5,525,200	244,000	4,939,200	1,728,000	379,200	14,645,440	1,080,000	0	2,802,800	42,526,640	
(3)Grassing		sqm	4,732,000	0	0	0	0	1,002,000	0	0	2,346,000	4,404,000	0	12,484,000	
7.Slope Protection Works															
(1)Seeding		sqm	0	122,300	192,990	0	86,000	0	3,230	153,000	0	0	0	557,520	
(2)Sodding		sqm	596,000	3,748,240	1,251,660	19,200	1,768,080	1,194,000	117,200	5,147,280	690,000	200,000	2,725,220	17,456,880	
(3)Protection Frame with Sack		sqm	0	0	160,076,000	9,566,000	32,141,000	0	11,627,000	0	0	0	0	213,410,000	
8.Bridge Works															
(1)Viaduct(L-D Route)		m	0	676,541,200	2,706,040,200	0	3,011,644,000	1,140,897,960	0	1,417,644,600	607,377,920	303,228,460	28,808,200	9,892,182,540	
(4)Bridges(4 Lanes)		m	0	76,738,800	52,097,600	0	0	0	0	138,754,800	0	22,662,210	42,629,600	332,883,010	
(5)Bridges(Rampway 2 Lanes)		m	7,530,600					13,703,100			8,968,100	16,367,100		46,568,900	
(6)Bridges(Rampway 1 Lanes)		m	0					0			0	25,433,580		25,433,580	
(7)Over Bridge(L-D Route)	l=120m	each	0	137,510,000	0	0	13,751,000	0	0	96,257,000	13,751,000	13,751,000	82,506,000	357,526,000	
(9)Over Bridge(cut section)	l=50m	each	0	0	20,058,000	0	20,058,000	0	0	6,686,000	0	0	0	46,802,000	
(10)Canal Bridge	l=15m	each	0	8,572,000	8,572,000	0	0	0	0	8,572,000	0	0	0	25,716,000	
9.Tunnel Works		ls		0	0	2,998,287,892	0		666,506,775	0			0	3,664,794,667	
10.Misellanous Works															
(1)Re-located Road		m	0	35,880,000	0	0	0	0	0	30,480,000	0	0	27,840,000	94,200,000	
(2)Re-located Water Way		m	0	0	0	0	0	0	0	0	0	1,760,000	0	1,760,000	
(3)Construction Road for Tunnel		m	0	0	0	86,000,000	0	0	8,600,000	0	0	0	0	94,600,000	
SUBTOTAL(a)			250,945,000	1,329,231,490	3,842,572,060	3,172,874,072	3,425,393,450	1,432,835,740	794,191,880	2,762,920,485	921,278,620	478,446,150	647,065,762	19,057,764,709	
11.Retaining Wall Works			1,505,670					8,597,014			5,527,672	2,870,677		18,501,033	0.6 % of SUBTOTAL(a)
(1)T-type Retaining Wall	H=8.0m	m		0	16,800,000	6,000,000	0		0	0			7,800,000	30,600,000	
(2)Leaning Retaining Wall	H=8.0m	m		0	46,560,000	7,857,000	23,280,000		145,500	0			0	77,842,500	
(3)Gravity Retaining Wall	H=3.0m	m		3,200,000	0	0	0		0	0			0	3,200,000	
(4)Concrete Block Mesonry	H=5.0m	m		5,082,000	1,540,000	2,772,000	14,091,000		0	7,700,000			19,250,000	50,435,000	
12.Culvert Works			1,254,725					7,164,179			4,606,393	2,392,231		15,417,628	0.5 % of SUBTOTAL(a)
(1)Box Culvert															
	2.0x1.5	m		0	0	0	0		0	608,400			1,825,200	2,433,600	
	3.0x1.2	m		0	0	0	0		0	0			0	0	
	3.0x1.5	m		0	2,235,600	0	62,100		0	745,200			0	3,042,900	
	3.5x1.5	m		0	0	0	0		0	0			0	0	
	3.5x1.8	m		0	0	0	0		0	0			0	0	
(2)Pipe Culvert															
	Dia. 1.0	m		12,048,720	3,252,520	180,560	2,623,000		283,040	16,884,800			3,357,440	38,630,080	
	Dia.1.0 x 2	m		4,781,920	1,292,280	72,600	1,049,600		111,329	6,698,560			1,331,000	15,328,280	
	Dia. 1.5	m		7,406,250	1,998,750	112,500	1,612,500		172,500	10,380,000			2,066,250	23,748,750	
	Dia.1.5 x 2	m		2,962,500	802,500	45,000	645,000		67,500	4,155,000			825,000	9,502,500	
13.Drainage Works		l.s.	1,254,725	6,646,157	38,425,721	872,931	34,253,935	7,164,179	638,426	13,814,602	4,606,393	2,392,231	3,235,329	113,304,629	0.5 %of SUBTOTAL(a)*1
14.Road Sign		l.s.	752,835	3,987,694	11,527,716	523,759	10,276,180	4,298,507	383,055	8,288,761	2,763,836	1,435,338	1,941,197	46,178,878	0.3 % of SUBTOTAL(a)
15.Road Marking		l.s.	501,890	2,658,463	7,685,144	349,172	6,850,787	2,865,671	255,370	5,525,841	1,842,557	956,892	1,294,132	30,785,919	0.2 % of SUBTOTAL(a)
16.Lighting															
(1)IC/JC Section		l.s.	8,783,075					50,149,251			32,244,752	16,745,615		107,922,693	3.5 % of SUBTOTAL(a)
(2)Other Section		each		2,800,000	8,200,000	0	7,000,000		800,000	3,400,000			1,000,000	23,200,000	
17.Safety Facility Works		l.s.	2,509,450	13,292,315	38,425,721	1,745,862	34,253,935	14,328,357	1,276,851	27,629,205	9,212,786	4,784,462	6,470,658	153,929,602	1.0 % of SUBTOTAL(a)
18.Environmental Protection		l.s.	2,509,450	13,292,315	38,425,721	1,745,862	34,253,935	14,328,357	1,276,851	27,629,205	9,212,786	4,784,462	6,470,658	153,929,602	1.0 % of SUBTOTAL(a)
19.Rest Area		each	0	67,500,000	67,500,000	0	0	67,500,000	0	135,000,000	0	0	67,500,000	405,000,000	
20.Bus Stop		each	3,500,000	3,500,000	3,500,000	0	3,500,000	0	0	3,500,000	3,500,000	3,500,000	3,500,000	28,000,000	
SUBTOTAL (b)			273,516,820	1,478,389,824	4,130,743,733	9,195,151,318	3,599,136,422	1,609,231,255	799,602,293	3,034,880,059	994,795,795	518,308,058	774,932,626	20,408,688,203	
21.Miscellaneous		l.s.	19,146,177	103,487,288	289,152,051	223,660,592	251,939,550	112,646,188	55,972,161	212,441,604	69,635,706	36,281,564	54,245,284	1,428,608,174	7.0 % of SUBTOTAL(b)
SUBTOTAL (c)			292,662,997	1,581,877,112	4,419,895,784	3,418,811,910	3,851,075,972	1,721,877,443	855,574,454	3,247,321,663	1,064,431,501	554,589,622	829,177,910	21,837,296,377	
22. Fysical Contingencies		l.s.	29,266,300	158,187,711	441,989,579	341,881,191	385,107,597	172,187,744	85,557,445	324,732,166	106,443,150	55,458,962	82,917,791	2,183,729,638	10.0 % of SUBTOTAL(c)
DIRECT CONSTRUCTION COST(d)			321,929,297	1,740,064,823	4,861,885,373	3,760,693,101	4,236,183,569	1,894,065,187	941,131,899	3,572,053,829	1,170,874,651	610,048,584	912,095,701	24,021,026,015	
23.Maintnance & Operation		l.s.	6,438,586	34,801,296	97,237,707	75,213,862	84,723,671	37,881,304	18,822,638	71,441,077	23,417,493	12,200,972	18,241,914	480,420,520	2.0 % of TOTAL(d)
24.Land Acquisition		l.s.	74,516,400	106,996,500	49,724,400	1,886,000	40,011,000	34,819,200	3,272,000	194,628,000	72,936,900	312,375,000	729,654,000	1,620,819,400	
25. Engineering & Supervision		l.s.	19,315,758	104,403,889	291,713,122	225,641,586	254,171,014	113,643,911	56,467,914	214,323,230	70,252,479	36,602,915	54,725,742	1,441,261,561	6.0 % of TOTAL(d)
PROJECT COST			422,200,041	1,986,266,508	5,300,560,602	4,063,434,549	4,615,089,254	2,080,409,602	1,019,694,451	4,052,446,136	1,337,481,523	971,227,471	1,714,717,357	27,563,527,496	

*1) Drinage Works Percentage of Packages N2 and N3 is 1.0% because of mountainious area including large cut and high bank.

Work Items	Discription Class	Unit	Ban Pong JC (0+000) TB	S1 Flat	Ban Pong IC (8+460) DT	Photharam IC (21+000) DT	S2 Flat	Rachaburi IC (42+000) ST	S3 Flat	Pak Tho IC (61+445) DT	S4 Flat	S5 Flat	Photchaburi IC (91+000) ST	Tha Yang IC (104+512) ST	S6 Flat	S7 Flat	Cha Am IC (133+736) ST	TOTAL	Remarks
1.Preparation Works																			
(1)Clearing	catchpoint	sqm	751,600	1,519,250	676,400	832,000	1,790,400	332,000	1,932,450	585,800	2,044,100	2,028,550	700,600	688,800	1,571,000	1,219,200	856,600	17,528,750	
(2)Grubbing (Rolling & MI. Area)	l=1.0m	sqm																	
2.Foundation Improvement Works																			
(1)Cement Stabilization	l=2.0m	sqm	0	0	0	0	304,076,000	97,200,000	386,731,600	59,400,000	409,222,000	108,696,000	0	0	0	0	0	1,365,327,600	
(2)Bearing Unit Piles		sqm	0	0	0	0	71,280,000	23,760,000	23,760,000	23,760,000	95,040,000	23,760,000	0	0	0	0	0	261,360,000	
3.Roadway Excavation																			
(1)Common		cum	0	0	0	0	0	0	24,000	0	0	0	0	0	22,000	0	0	46,000	Hauling 10 km
(4)Unsuitable Material(Grubbing)		cum	60,000	0	60,000	60,000	0	60,000	0	60,000	0	0	60,000	60,000	0	0	60,000	480,000	
4.Embankment																			
(1)Common		cum	0	0	0	0	0	0	2,820	0	0	0	0	0	2,580	0	0	5,400	from Excv., compaction only
(2)Borrow Material		cum	49,410,000	496,260,000	65,610,000	73,710,000	414,651,150	53,190,000	463,626,450	69,120,000	608,548,950	574,130,160	101,250,000	155,520,000	421,955,460	309,598,200	90,720,000	3,947,300,370	Hauling 20 km
5.Pavement																			
(2)Concrete Pavement	t=30 cm	sqm	26,520,000	237,680,040	20,280,000	17,160,000	294,436,740	41,340,000	317,918,640	28,860,000	328,589,040	321,586,200	46,800,000	39,780,000	253,632,600	199,491,240	53,820,000	2,227,894,500	
(3)Asphalt Concrete Wearing	t=5 cm	sqm	4,785,000	17,673,615	3,915,000	4,350,000	21,893,985	5,220,000	23,640,075	3,915,000	24,433,515	23,912,820	7,975,000	5,800,000	18,859,860	14,833,964	6,090,000	187,297,834	
(4)Soil Aggregate Subbase Course		cum	6,834,000	43,513,880	5,406,000	5,304,000	53,904,620	9,078,000	58,203,580	6,528,000	60,157,220	58,875,080	11,730,000	9,282,000	46,434,140	36,522,120	11,322,000	423,094,640	
(5)Crushed Rock Base Course		cum	13,500,000	74,046,420	10,800,000	11,070,000	91,728,180	16,875,000	99,044,100	12,285,000	102,368,340	100,186,740	22,950,000	17,685,000	79,016,580	62,149,140	20,655,000	734,359,500	
6.Plantation																			
(1)Buffer Zone		sqm	265,000	9,480,116	155,000	0	11,743,916	605,000	12,680,516	210,000	13,106,116	12,826,800	1,085,000	1,120,000	10,116,400	7,956,916	1,085,000	82,435,778	
(2)Median/Gardening		sqm	144,000	7,584,092	160,000	0	9,395,132	1,232,000	10,144,412	648,000	10,484,892	10,261,440	2,232,000	0	8,093,120	6,365,532	2,392,000	69,136,622	
(3)Grassing		sqm	4,348,000	0	4,014,000	4,944,000	0	1,688,000	0	3,838,000	0	0	3,506,000	2,786,000	0	0	5,160,000	30,284,000	
7.Slope Protection Works																			
(1)Seeding		sqm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
(2)Sodding		sqm	324,000	3,442,400	328,000	266,000	3,375,100	658,000	3,774,360	330,000	4,305,100	4,406,000	466,000	1,060,000	3,367,200	2,371,200	428,000	28,901,360	
8.Bridge Works																			
(2)Viaduct(B-C Route)		m	722,519,760	635,237,200	1,585,980,360	1,812,470,160	38,351,500	932,459,040	17,020,600	645,665,040	430,625,700	473,585,100	0	696,991,200	6,833,200	379,400,600	0	8,377,139,460	
(3)Bridges(6 Lanes)		m	0	58,859,900	0	0	96,919,000	0	105,328,300	0	76,488,300	66,417,600	0	0	63,816,400	15,272,900	0	483,102,400	
(5)Bridges(Rampway 2 Lanes)		m	0		7,333,100	12,677,600		7,530,800		8,862,600			28,105,600	0			27,280,700	91,790,200	
(6)Bridges(Rampway 1 Lanes)		m	84,449,310		25,929,680	57,143,180		0		17,277,380			7,485,920	0			0	192,285,470	
(8)Over Bridge(B-C Route)	l=170m	each	0	90,130,000	0	0	108,156,000	0	108,156,000	0	108,156,000	108,156,000	18,026,000	0	108,156,000	54,078,000	0	703,014,000	
(10)Canal Bridge	l=15m	each	0	17,144,000	0	0	17,144,000	0	21,430,000	0	17,144,000	17,144,000	0	0	12,858,000	4,286,000	0	107,150,000	
10.Misellanous Works																			
(1)Re-located Road		m	9,000,000	15,720,000	0	5,520,000	16,440,000	0	33,600,000	0	35,460,000	30,240,000	0	0	28,500,000	0	0	174,480,000	
(2)Re-located Water Way		m	0	0	0	0	0	0	0	0	2,200,000	0	0	0	0	0	2,255,000	4,455,000	
SUBTOTAL			922,910,670	1,708,290,913	1,730,647,540	2,005,506,940	1,555,285,723	1,191,227,640	1,687,017,903	881,344,820	2,328,373,273	1,936,214,490	252,372,120	930,773,000	1,083,234,540	1,093,545,012	222,124,300	19,508,868,884	
11.Retaining Wall Works			5,537,464	10,249,745	10,383,885	12,033,042	9,331,714	7,147,366	10,122,107	5,288,069	13,970,240	11,617,287	1,514,233	5,584,638	6,379,407	6,561,270	1,332,746	117,053,213	0.6 %of SUBTOTAL(a)
12.Culvert Works			4,614,553		8,653,238	10,027,535		5,956,138		4,406,724			1,261,861	4,653,865			1,110,622	40,684,536	0.5 %of SUBTOTAL(a)
(1)Box Culvert																			
	2.0x1.5	m		0			0		0		0	0			676,000	0		676,000	
	3.0x1.2	m		0			0		0		0	1,568,000			0	0		1,568,000	
	3.0x1.5	m		0			3,312,000		0		0	0			0	828,000		4,140,000	
	3.5x1.5	m		0			0		0		0	0			920,000	0		920,000	
	3.5x1.8	m		0			1,020,000		0		0	0			0	0		1,020,000	
(2)Pipe Culvert																			
	Dia. 1.0	m		9,086,560			11,258,160		12,156,080		12,563,560	12,295,160			9,696,560	7,627,440		74,683,520	
	Dia.1.0 x 2	m		3,605,800			4,467,320		4,820,640		4,985,200	4,878,720			3,847,800	3,025,000		29,630,480	
	Dia. 1.5	m		5,587,500			6,918,750		7,473,750		7,725,000	7,560,000			5,962,500	4,687,500		45,915,000	
	Dia.1.5 x 2	m		2,235,000			2,767,500		2,992,500		3,090,000	3,022,500			2,385,000	1,875,000		18,367,500	
13.Drainage Works		l.s.	4,614,553	8,541,455	8,653,238	10,027,535	7,776,429	5,956,138	8,435,990	4,406,724	11,641,866	9,681,072	1,261,861	4,653,865	5,316,173	5,467,725	1,110,622	97,544,346	0.5 %of SUBTOTAL(a)
14.Road Sign		l.s.	2,766,792	5,124,873	5,191,943	6,016,521	4,665,857	3,573,683	5,061,054	2,644,034	6,985,120	5,808,643	757,116	2,792,319	3,189,704	3,280,635	666,373	58,526,607	0.3 % of SUBTOTAL(a)
15.Road Marking		l.s.	1,845,821	3,416,582	3,461,295	4,011,014	3,110,571	2,382,455	3,374,036	1,762,690	4,656,747	3,872,429	504,744	1,861,546	2,126,469	2,187,090	444,249	39,017,738	0.2 % of SUBTOTAL(a)
16.Lighting																			
(1)IC/JC Section		l.s.	32,301,873		60,572,664	70,192,743		41,692,967		30,847,069			8,833,024	32,577,055			7,774,351	284,791,746	3.5 % of SUBTOTAL(a)
(2)Other Section		each		5,600,000			1,600,000		1,200,000		4,400,000	3,000,000			1,000,000	3,000,000		19,800,000	
17.Safety Facility Works		l.s.	9,229,107	17,082,909	17,306,475	20,055,069	15,552,857	11,912,276	16,870,179	8,813,448	23,283,733	19,362,145	2,523,721	9,307,730	10,632,345	10,935,450	2,221,243	195,088,689	1.0 % of SUBTOTAL(a)
18.Environmental Protection		l.s.	9,229,107	17,082,909	17,306,475	20,055,069	15,552,857	11,912,276	16,870,179	8,813,448	23,283,733	19,362,145	2,523,721	9,307,730	10,632,345	10,935,450	2,221,243	195,088,689	1.0 % of SUBTOTAL(a)
19.Rest Area		l.s.	0	67,500,000	0	0	67,500,000	0	67,500,000	0	67,500,000	135,000,000	0	0	0	67,500,000	0	472,500,000	
20.Bus Stop		l.s.	3,500,000	0	3,500,000	3,500,000	0	3,500,000	0	3,500,000	3,500,000	0	3,500,000	3,500,000	3,500,000	3,500,000	3,500,000	38,500,000	
SUBTOTAL (b)			996,551,880	1,883,404,246	1,865,676,753	2,161,425,466	1,710,119,738	1,285,260,939	1,843,693,518	951,827,026	2,515,958,472	2,173,242,591	275,052,401	1,005,011,748	1,129,498,843	1,224,955,572	242,505,749	21,244,384,948	
21.Miscellaneous		l.s.	69,758,632	130,438,297	130,597,373	151,299,783	119,708,382	89,966,266	129,072,546	66,627,892	176,117,093	152,126,981	19,253,668	70,350,822	79,064,919	85,746,890	16,975,402	1,487,106,946	7.0 % of SUBTOTAL(b)
SUBTOTAL (c)			1,066,310,512	1,993,842,543	1,996,274,126	2,312,725,251	1,829,828,120	1,375,229,205	1,972,966,064	1,018,454,918	2,692,075,565	2,325,369,572	294,306,069	1,075,362,570	1,208,563,762	1,310,702,462	259,481,151	22,731,491,894	
22. Fysical Contingencies		l.s.	106,631,051	199,384,254	199,627,413	231,272,525	182,982,812	137,522,921	197,296,606	101,845,492	269,207,557	232,536,957	29,430,607	107,536,257	120,856,376	131,070,246	25,948,115	2,273,149,189	10.0 % of SUBTOTAL(c)
DIRECT CONSTRUCTION COST(d)			1,172,941,563	2,193,226,797	2,195,901,539	2,543,997,776	2,012,810,932	1,512,752,126	2,170,262,670	1,120,300,410	2,961,283,122	2,557,906,529	323,736,676	1,182,898,827	1,329,420,138	1,441,772,708	285,429,266	25,004,641,083	
23.Maintnance & Operation		l.s.	23,458,831	43,864,536	43,918,031	50,879,956	40,256,219	30,255,043	43,405,253	22,406,008	59,225,662	51,158,131	6,474,734	23,657,977	26,588,403	28,835,454	5,708,585	500,092,822	2.0 % of TOTAL(d)
24.Land Acquisition		l.s.	28,665,000	62,370,000	151,800,000	101,100,000	59,850,000	21,435,000	64,225,000	200,693,000	55,160,000	54,460,000	5,168,000	12,630,000	51,100,000	170,800,000	207,503,000	1,246,959,000	
25. Engineering & Supervision		l.s.	46,917,663	87,729,072	87,836,062	101,759,911	80,512,437	60,510,085	86,810,507	44,812,016	118,451,325	102,316,261	12,949,467	47,315,953	53,176,806	57,670,908	11,417,171	1,000,185,643	4.0 % of TOTAL(d)
PROJECT COST			1,271,983,057	2,387,190,405	2,479,455,632	2,797,737,643	2,193,429,588	1,624,952,254	2,364,703,430	1,388,211,434	3,194,120,109	2,765,840,921	348,328,877	1,266,502,757	1,460,285,347	1,699,079,070	510,058,022	27,751,878,548	

No.	STA. Start	STA. End	Length (m)	Number of Spans	spans	Cost of Super Structure (Baht) A	B-1	B-2	B-3	B-4	MC	Cost of Sub Structure (Baht) A-1	B-1	B-2	B-3	C	F-1	F-2	Cost of Foundation (Baht) C-1	C-2	C-3	D	E	Each Vaiduct Cost (Baht)
1	0 + 300	1 + 200	900	18@50	18	0	0	0	0	349,920,000	0	3,279,200	0	16,641,600	49,429,600	0	0	0	0	0	30,532,000	0	0	449,802,400
2	17 + 180	17 + 550	370	9@35+2@27.5	11	0	0	10,956,000	77,868,000	0	0	3,279,200	2,574,800	22,188,800	0	0	0	0	15,420,000	0	0	0	0	132,286,800
3	17 + 800	18 + 50	250	1@40+6@35	7	0	0	0	51,912,000	15,552,000	0	3,279,200	5,149,600	0	8,987,200	0	0	0	6,168,000	3,536,000	0	0	0	94,584,000
N1 Subtotal			1,520			0	0	10,956,000	129,780,000	365,472,000	0	9,837,600	7,724,400	38,830,400	58,416,800	0	0	0	21,588,000	3,536,000	30,532,000	0	0	676,673,200
4	27 + 230	27 + 310	80	1@30+2@25	3	0	8,880,000	0	7,416,000	0	0	3,279,200	2,574,800	0	0	0	0	0	3,084,000	0	0	0	0	25,234,000
5	27 + 480	28 + 40	560	2@20+2@35+10@45	14	0	7,104,000	0	17,304,000	174,960,000	0	3,279,200	5,149,600	24,962,400	0	0	0	0	20,046,000	0	0	0	0	252,805,200
6	28 + 350	28 + 440	90	2@25+1@40	3	0	8,880,000	0	0	15,552,000	0	3,279,200	0	5,547,200	0	0	0	0	0	3,536,000	0	0	0	36,794,400
7	28 + 840	29 + 120	280	4@70	4	0	0	0	0	0	450,912,000	3,279,200	0	0	0	0	0	25,168,200	0	0	0	8,904,000	0	488,263,400
8	29 + 920	30 + 40	120	1@50+2@35	3	0	0	0	17,304,000	19,440,000	0	3,279,200	0	0	0	0	28,601,200	0	0	0	0	5,936,000	0	74,560,400
9	30 + 110	30 + 190	80	2@20+1@40	3	0	7,104,000	0	0	15,552,000	0	3,279,200	0	0	0	0	28,601,200	0	0	0	0	5,936,000	0	60,472,400
10	30 + 460	30 + 760	300	10@30	10	0	0	0	74,160,000	0	0	3,279,200	2,574,800	19,415,200	0	0	0	0	0	0	0	0	17,028,000	116,457,200
11	31 + 200	31 + 600	400	5@80	5	0	0	0	0	0	644,160,000	3,279,200	0	0	0	0	0	33,557,600	0	0	0	5,936,000	3,784,000	690,716,800
12	31 + 675	31 + 730	55	1@20+1@35	2	0	3,552,000	0	8,652,000	0	0	3,279,200	0	2,773,600	0	0	0	0	0	0	0	0	1,892,000	20,148,800
13	31 + 770	31 + 980	210	3@70*A)	3	0	0	0	0	0	169,092,000	1,639,600	0	0	0	0	0	8,389,400	0	0	0	1,484,000	946,000	181,551,000
14	32 + 20	32 + 360	340	4@80+1@20*A)	5	0	296,000	0	0	0	257,664,000	1,639,600	0	0	0	0	7,150,300	12,584,100	0	0	0	4,452,000	946,000	284,732,000
15	31 + 770	32 + 350	580	2@20+6@90*B)	8	0	592,000	0	0	0	434,808,000	1,639,600	0	0	2,246,800	0	0	25,168,200	0	0	0	8,904,000	946,000	474,304,600
N2 Subtotal			3,095			0	36,408,000	0	124,836,000	225,504,000	1,956,636,000	34,431,600	10,299,200	52,698,400	2,246,800	0	64,352,700	104,867,500	23,130,000	3,536,000	0	41,552,000	25,542,000	2,706,040,200
16	36 + 550	37 + 30	480	12@40*A)	12	0	0	0	0	93,312,000	0	1,639,600	0	0	24,714,800	0	0	0	0	0	0	0	10,406,000	130,072,400
17	36 + 550	37 + 100	550	2@25+10@50*B)	12	0	740,000	0	0	97,200,000	0	1,639,600	0	2,773,600	20,221,200	0	0	0	0	0	0	13,356,000	1,892,000	137,822,400
18	37 + 460	37 + 550	90	3@30*A)	3	0	0	0	11,124,000	0	0	1,639,600	0	2,773,600	0	0	0	0	0	0	0	0	1,892,000	17,429,200
19	37 + 500	37 + 600	100	2@20+2@30*B)	4	0	592,000	0	7,416,000	0	0	1,639,600	0	4,160,400	0	0	0	0	0	0	0	0	2,838,000	16,646,000
20	38 + 0	38 + 400	400	5@80*A)	5	0	0	0	0	0	322,080,000	1,639,600	0	0	0	0	28,601,200	0	0	0	0	5,936,000	0	358,256,800
21	38 + 100	38 + 400	300	5@60*B)	5	0	0	0	0	0	241,560,000	1,639,600	0	0	0	0	28,601,200	0	0	0	0	5,936,000	0	277,736,800
22	40 + 50	40 + 110	60	2@30	2	0	0	11,952,000	0	0	0	3,279,200	0	2,773,600	0	0	0	0	0	0	0	0	1,892,000	19,896,800
N3 Subtotal(1)			1,980			0	1,332,000	11,952,000	18,540,000	190,512,000	563,640,000	13,116,800	0	12,481,200	44,936,000	0	57,202,400	0	0	0	0	0	25,228,000	18,920,000	957,860,400
23	40 + 370	40 + 770	400	5@80	5	0	0	0	0	0	845,460,000	4,262,960	0	0	0	0	0	43,624,880	0	0	0	15,433,600	0	908,781,440
24	40 + 820	40 + 900	80	2@30+1@20	3	0	4,662,000	0	15,759,000	0	0	4,262,960	0	7,211,360	0	0	0	0	0	0	0	0	4,919,200	36,814,520
25	41 + 620	41 + 900	280	4@20+5@40	9	0	18,648,000	0	0	102,060,000	0	4,262,960	0	7,211,360	35,050,080	0	0	0	0	0	0	23,150,400	4,919,200	195,302,000
Mae Tha IC Subtotal			760			0	23,310,000	0	15,759,000	102,060,000	845,460,000	12,788,880	0	14,422,720	35,050,080	0	0	43,624,880	0	0	0	38,584,000	9,838,400	1,140,897,960
26	43 + 850	44 + 800	950	1@20+11@80+2@25	14	0	12,432,000	0	0	0	1,417,152,000	3,279,200	0	2,773,600	0	0	0	100,672,800	0	0	0	35,616,000	1,892,000	1,573,817,600
27	47 + 75	47 + 105	30	1@30	1	0	0	0	7,416,000	0	0	3,279,200	0	0	0	0	0	0	0	0	0	0	0	10,695,200
28	45 + 800	46 + 600	800	4@20+18@40	22	0	14,208,000	0	0	279,936,000	0	3,279,200	2,574,800	0	85,378,400	0	0	0	0	0	0	56,392,000	3,784,000	445,552,400
29	48 + 250	48 + 285	35	1@35	1	0	0	0	8,652,000	0	0	3,279,200	0	0	0	0	0	0	0	0	0	0	0	11,931,200
30	48 + 700	48 + 735	35	1@35	1	0	0	0	8,652,000	0	0	3,279,200	0	0	0	0	0	0	0	0	0	0	0	11,931,200
N3 Subtotal(2)			1,850		3,830	0	26,640,000	0	24,720,000	279,936,000	1,417,152,000	16,396,000	2,574,800	2,773,600	85,378,400	0	0	100,672,800	0	0	0	92,008,000	5,676,000	2,053,927,600
N3 Subtotal(1+2)			3,830			0	27,972,000	11,952,000	43,260,000	470,448,000	1,980,792,000	29,512,800	2,574,800	15,254,800	130,314,400	0	57,202,400	100,672,800	0	0	0	117,236,000	24,596,000	3,011,788,000
31	50 + 770	51 + 700	930	1@10+1@20+8@80+4@45+2@40*A)	16	1,032,000	296,000	0	0	50,544,000	515,328,000	1,639,600	0	0	11,234,000	1,116,400	0	37,752,300	0	0	0	13,356,000	5,676,000	637,974,300
32	50 + 800	51 + 700	900	1@20+9@80+4@40*B)	14	0	296,000	0	0	31,104,000	579,744,000	1,639,600	0	1,386,800	0	0	0	50,336,400	0	0	0	17,808,000	946,000	683,260,800
30	54 + 860	55 + 0	140	4@35	4	0	0	0	34,608,000	0	0	3,279,200	0	8,320,800	0	0	0	0	4,626,000	0	0	0	0	50,834,000
31	56 + 100	56 + 140	40	2@20	2	0	7,104,000	0	0	0	0	3,279,200	1,287,400	0	0	0	0	0	1,542,000	0	0	0	0	13,212,600
32	56 + 900	57 + 0	100	4@25	4	0	17,760,000	0	0	0	0	3,279,200	0	0	0	6,698,400	0	0	4,626,000	0	0	0	0	32,363,600
N4 Subtotal			2,110			1,032,000	25,456,000	0	34,608,000	81,648,000	1,095,072,000	13,116,800	1,287,400	9,707,600	11,234,000	7,814,800	0	88,088,700	10,794,000	0	0	31,164,000	6,622,000	1,417,645,300
33	59 + 280	60 + 600	1320	4@40+30@35+5@22	39	0	25,641,000	0	275,782,500	81,648,000	0	4,262,960	5,020,860	108,170,400	29,208,400	0	0	0	66,151,800	11,492,000	0	0	0	607,377,920
Lamphun IC Subtotal			1,320			0	25,641,000	0	275,782,500	81,648,000	0	4,262,960	5,020,860	108,170,400	29,208,400	0	0	0	66,151,800	11,492,000	0	0	0	607,377,920
34	81 + 800	82 + 450	650	2@25+16@30+2@35+1@50	21	0	11,655,000	0	144,457,500	25,515,000	0	4,262,960	0	64,902,240	11,683,360	0	0	0	36,082,800	0	4,669,600	0	0	303,228,460
Chiang Mai IC Subtotal			650			0	11,655,000	0	144,457,500	25,515,000	0	4,262,960	0	64,902,240	11,683,360	0	0	0	36,082,800	0	4,669,600	0	0	303,228,460
35	84 + 500	84 + 580	80	2@30+1@20	3	0	3,552,000	0	14,832,000	0	0	3,279,200	1,287,400	2,773,600	0	0	0	0	3,084,000	0	0	0	0	28,808,200
N5 Subtotal			80			0	3,552,000	0	14,832,000	0	0	3,279,200	1,287,400	2,773,600	0	0	0	0	3,084,000	0	0	0	0	28,808,200
TOTAL COST			13,365			1,032,000	153,994,000	22,908,000	783,315,000	1,352,295,000	5,877,960,000	111,492,800	28,194,060	306,760,160	278,153,840	7,814,800	121,555,100	337,253,880	160,830,600	18,564,000	35,201,600	228,536,000	66,598,400	9,892,459,240
cost per meter			740,177																					9,892,459,240
						F/C	433,440	83,156,760	12,599,400	446,489,550	811,377,000	5,172,604,800	40,137,408	10,431,802	113,501,259	102,916,921	2,891,476	48,622,040	134,901,552	128,664,480	14,851,200	28,161,280	159,975,200	46,618,880	7,358,334,448	74.00%
						L/C	598,560	70,837,240	10,308,600	336,825,450	540,918,000	705,355,200	71,355,392	17,762,258	193,258,901	175,236,919	4,923,324	72,933,060	202,352,328	32,166,120	3,712,800	7,040,320	68,560,800	19,979,520	2,534,124,792	26.00%
																									9,892,459,240	100.00%

Note 1. *A) means only A-Line roadway,*B) means only B-Line roadway,

2. IC/JC section to be widened 3.75m,then for Superstructure (12+3.75), for Substructure and Foundation 30% up.

No.	STA. Start	STA. End	Length (m)	Number of Spans	spans	Cost of Super Structure (Baht) A	B-1	B-3	B-4	Cost of Sub Structure (baht) A-3	D-2	E	Cost of Foundation (Baht) C-1	C-2	C-3	Each Viaduct Cost (Baht)
1	0 + 600	1 + 800	1,200	40@30	40	0	0	482,040,000	0	4,298,880	0	164,015,280	72,165,600	0	0	722,519,760
	Ban Pong JC Subtotal		1,200			0	0	482,040,000	0	4,298,880	0	164,015,280	72,165,600	0	0	722,519,760
2	3 + 200	4 + 400	1,200	40@30	40	0	0	389,340,000	0	3,582,400	173,362,800	0	0	68,952,000	0	635,237,200
	S1 Subtotal		1,200			0	0	389,340,000	0	3,582,400	173,362,800	0	0	68,952,000	0	635,237,200
3	6 + 750	9 + 400	2,650	64@35+2@50+5@40+3@30+1@20	75	0	5,772,000	935,961,000	189,540,000	4,298,880	0	311,208,480	122,126,400	10,608,000	6,465,600	1,585,980,360
	Ban Pong IC Subtotal		2,650			0	5,772,000	935,961,000	189,540,000	4,298,880	0	311,208,480	122,126,400	10,608,000	6,465,600	1,585,980,360
4	19 + 400	22 + 500	3,100	16@30+72@35+2@50	90	0	0	1,205,100,000	63,180,000	4,298,880	0	374,291,280	159,134,400	0	6,465,600	1,812,470,160
	Photharam IC Subtotal		3,100			0	0	1,205,100,000	63,180,000	4,298,880	0	374,291,280	159,134,400	0	6,465,600	1,812,470,160
5	27 + 400	27 + 417	17	1@17	1	0	3,962,700	0	0	3,582,400	0	0	0	0	0	7,545,100
6	32 + 750	32 + 786	36	1@36	1	0	0	11,680,200	0	3,582,400	0	0	0	0	0	15,262,600
7	35 + 750	35 + 772	22	1@22	1	0	5,128,200	0	0	3,582,400	0	0	0	0	0	8,710,600
8	36 + 600	36 + 612	12	1@12	1	3,250,800	0	0	0	3,582,400	0	0	0	0	0	6,833,200
	S2 Subtotal		87			3,250,800	9,090,900	11,680,200	0	14,329,600	0	0	0	0	0	38,351,500
9	39 + 600	41 + 0	1,400	32@32.5+8@45	40	0	0	417,768,000	227,448,000	4,298,880	208,035,360	0	55,512,000	0	19,396,800	932,459,040
	Ratchaburi IC Subtotal		1,400			0	0	417,768,000	227,448,000	4,298,880	208,035,360	0	55,512,000	0	19,396,800	932,459,040
10	58 + 700	58 + 736	36	2@18	2	0	8,391,600	0	0	3,582,400	0	3,504,600	1,542,000	0	0	17,020,600
	S3 Subtotal		36			0	8,391,600	0	0	3,582,400	0	3,504,600	1,542,000	0	0	17,020,600
11	60 + 650	61 + 700	1,050	24@35+4@40+1@50	29	0	0	337,428,000	132,678,000	4,298,880	0	117,754,560	40,708,800	8,486,400	4,310,400	645,665,040
	Pak Tho IC Subtotal		1,050			0	0	337,428,000	132,678,000	4,298,880	0	117,754,560	40,708,800	8,486,400	4,310,400	645,665,040
12	63 + 200	64 + 0	800	18@35+2@45+2@40	22	0	0	204,403,500	86,751,000	3,582,400	0	73,596,600	24,672,000	3,536,000	5,388,000	401,929,500
13	66 + 800	66 + 817	17	1@17	1	0	3,962,700	0	0	3,582,400	0	0	0	0	0	7,545,100
14	73 + 670	73 + 690	20	2@10	2	5,418,000	0	0	0	3,582,400	0	3,504,600	1,542,000	0	0	14,047,000
15	80 + 250	80 + 263	13	1@13	1	3,521,700	0	0	0	3,582,400	0	0	0	0	0	7,104,100
	S4 Subtotal		850			8,939,700	3,962,700	204,403,500	86,751,000	14,329,600	0	77,101,200	26,214,000	3,536,000	5,388,000	430,625,700
16	86 + 750	87 + 650	900	5@30+20@35+1@50	26	0	0	275,782,500	25,515,000	3,582,400	0	87,615,000	35,466,000	0	3,592,000	431,552,900
17	102 + 930	103 + 30	100	4@25	4	0	23,310,000	0	0	3,582,400	0	10,513,800	4,626,000	0	0	42,032,200
	S5 Subtotal		1,000			0	23,310,000	275,782,500	25,515,000	7,164,800	0	98,128,800	40,092,000	0	3,592,000	473,585,100
18	103 + 450	103 + 750	300	10@30	10	0	86,580,000	0	0	4,298,880	48,008,160	0	16,653,600	0	0	155,540,640
19	104 + 300	105 + 200	900	30@30	30	0	0	361,530,000	0	4,298,880	0	121,960,080	53,661,600	0	0	541,450,560
	Tha Yang IC Subtotal		1,200			0	86,580,000	361,530,000	0	8,597,760	48,008,160	121,960,080	70,315,200	0	0	696,991,200
20	112 + 500	112 + 512	12	1@12	1	3,250,800	0	0	0	3,582,400	0	0	0	0	0	6,833,200
	S6 Subtotal		12			3,250,800	0	0	0	3,582,400	0	0	0	0	0	6,833,200
21	125 + 0	125 + 800	800	10@35+1@50+10@35+2@25	23	0	11,655,000	227,115,000	25,515,000	3,582,400	0	77,101,200	30,840,000	0	3,592,000	379,400,600
	S7 Subtotal		800			0	11,655,000	227,115,000	25,515,000	3,582,400	0	77,101,200	30,840,000	0	3,592,000	379,400,600
	TOTAL COST		14,585			15,441,300	148,762,200	4,848,148,200	750,627,000	80,245,760	429,406,320	1,345,065,480	618,650,400	91,582,400	49,210,400	8,377,139,460
	cost per meter		574,367													8,377,139,460
					F/C	6,485,346	80,331,588	2,763,444,474	450,376,200	28,888,474	158,880,338	497,674,228	494,920,320	73,265,920	39,368,320	4,593,635,208	55.00%
					L/C	8,955,954	68,430,612	2,084,703,726	300,250,800	51,357,286	270,525,982	847,391,252	123,730,080	18,316,480	9,842,080	3,783,504,252	45.00%
																8,377,139,460	100.00%

Note. IC/JC section to be widened 3.75m,then for Superstructure (15.75+3.75), for Substructure and Foundation 20% up.

No.	STA. Start	STA. End	Length (m)	Number of Spans	Type Super-structure	Type Sub-structure	Cost of Super Structure (Baht) A	B-1	B-2	B-3	B-4	Cost of Sub Structure (Baht) A-1	A-2	Each Bridge Cost (Baht)
1	11 + 920	11 + 950	30	2 @ 15	A	A-1 A-2	6,192,000	0	0	0	0	3,279,200	563,000	10,034,200
2	15 + 130	15 + 140	10	1 @ 10	A	A-1	2,064,000	0	0	0	0	3,279,200	0	5,343,200
3	15 + 320	15 + 350	30	3 @ 10	A	A-1 A-2	6,192,000	0	0	0	0	3,279,200	1,126,000	10,597,200
4	15 + 700	15 + 705	5	1 @ 5	A	A-1	1,032,000	0	0	0	0	3,279,200	0	4,311,200
5	15 + 900	15 + 950	50	2 @ 25	B-1	A-1 A-2	0	8,880,000	0	0	0	3,279,200	563,000	12,722,200
6	16 + 280	16 + 300	20	1 @ 20	B-1	A-1	0	3,552,000	0	0	0	3,279,200	0	6,831,200
7	16 + 370	16 + 390	20	1 @ 20	B-1	A-1	0	3,552,000	0	0	0	3,279,200	0	6,831,200
8	16 + 740	16 + 770	30	2 @ 15	A	A-1 A-2	6,192,000	0	0	0	0	3,279,200	563,000	10,034,200
9	19 + 300	19 + 330	30	2 @ 15	A	A-1 A-2	6,192,000	0	0	0	0	3,279,200	563,000	10,034,200
	N1 Subtotal		225				27,864,000	15,984,000	0	0	0	29,512,800	3,378,000	76,738,800
10	22 + 480	22 + 530	50	2 @ 25	B-1	A-1 A-2	0	8,880,000	0	0	0	3,279,200	563,000	12,722,200
11	22 + 660	22 + 750	90	3 @ 30	B-3	A-1 A-2	0	0	0	22,248,000	0	3,279,200	1,126,000	26,653,200
12	25 + 920	25 + 970	50	2 @ 25	B-1	A-1 A-2	0	8,880,000	0	0	0	3,279,200	563,000	12,722,200
	N2 Subtotal		190				0	17,760,000	0	22,248,000	0	9,837,600	2,252,000	52,097,600
13	57 + 650	57 + 680	30	2 @ 15	A	A-1 A-2	6,192,000	0	0	0	0	3,279,200	563,000	10,034,200
14	63 + 460	63 + 520	60	3 @ 20	B-1	A-1 A-2	0	10,656,000	0	0	0	3,279,200	1,126,000	15,061,200
15	66 + 750	66 + 770	20	1 @ 20	B-1	A-1	0	3,552,000	0	0	0	3,279,200	0	6,831,200
16	68 + 120	68 + 140	20	2 @ 10	A	A-1 A-2	4,128,000	0	0	0	0	3,279,200	563,000	7,970,200
17	71 + 550	71 + 576	26	2 @ 13	A	A-1 A-2	5,366,400	0	0	0	0	3,279,200	563,000	9,208,600
18	72 + 520	72 + 580	60	3 @ 20	B-1	A-1 A-2	0	10,656,000	0	0	0	3,279,200	1,126,000	15,061,200
19	73 + 20	73 + 40	20	2 @ 10	A	A-1 A-2	4,128,000	0	0	0	0	3,279,200	563,000	7,970,200
20	74 + 20	74 + 50	30	2 @ 15	A	A-1 A-2	6,192,000	0	0	0	0	3,279,200	563,000	10,034,200
21	74 + 380	74 + 400	20	2 @ 10	A	A-1 A-2	4,128,000	0	0	0	0	3,279,200	563,000	7,970,200
22	75 + 530	75 + 600	70	2 @ 25	2 @ 10 A B-1	A-1 A-2	10,320,000	3,552,000	0	0	0	3,279,200	1,689,000	18,840,200
23	78 + 160	78 + 240	80	4 @ 20	B-1	A-1 A-2	0	14,208,000	0	0	0	3,279,200	1,689,000	19,176,200
24	79 + 990	80 + 20	30	3 @ 10	A	A-1 A-2	6,192,000	0	0	0	0	3,279,200	1,126,000	10,597,200
	N4 Subtotal		466				46,646,400	42,624,000	0	0	0	39,350,400	10,134,000	138,754,800
25	80 + 390	80 + 405	15	1 @ 15	A	A-1	4,063,500	0	0	0	0	4,262,960	0	8,326,460
26	81 + 220	81 + 260	40	2 @ 20	B-1	A-1 A-2	0	9,324,000	0	0	0	4,262,960	748,790	14,335,750
	Chiang Mai IC Subtotal		55				4,063,500	9,324,000	0	0	0	8,525,920	748,790	22,662,210
27	82 + 840	82 + 940	100	4 @ 25	B-1	A-1 A-2	0	17,760,000	0	0	0	3,279,200	1,689,000	22,728,200
28	84 + 760	84 + 795	35	1 @ 35	B-3	A-1	0	0	0	8,652,000	0	3,279,200	0	11,931,200
29	87 + 720	87 + 740	20	2 @ 10	A	A-1 A-2	4,128,000	0	0	0	0	3,279,200	563,000	7,970,200
	N5 Subtotal		155				4,128,000	17,760,000	0	8,652,000	0	9,837,600	2,252,000	42,629,600
	Total Cost		1,091				82,701,900	103,452,000	0	30,900,000	0	97,064,320	18,764,790	332,883,010
	cost per meter		305,117											332,883,010
						F/C	34,734,798	43,449,840		12,978,000		40,767,014	7,881,212	139,810,864	42.00%
						L/C	47,967,102	60,002,160		17,922,000		56,297,306	10,883,578	193,072,146	58.00%
							82,701,900	103,452,000		30,900,000		97,064,320	18,764,790	332,883,010	100.00%

Note. IC/JC section to be widened 3.75m,then for Superstructure (12+3.75), for Substructure 30% up.

FEASIBILITY STUDY
ON
THE INTER-CITY TOLL MOTORWAY PROJECTS

APPENDIX A 9.4-2(3/7)
DETAILED COST OF BRIDGES OF LAMPONG - DOI SAKET ROUTE

No.	STA. Start	STA. End	Length (m)	Number of Spans	Type Super-structure	Type Sub-structure	Cost of Super Structure (Baht) A	B-1	B-2	B-3	B-4	Cost of Sub Structure (Baht) A-3	A-4	Each Bridge Cost (Baht)
1	4 + 830	4 + 841	11	1 @ 11.0	A	A-3	2,979,900	0	0	0	0	3,582,400	0	6,562,300
2	10 + 620	10 + 641	21	1 @ 21.0	B-1	A-3	0	4,895,100	0	0	0	3,582,400	0	8,477,500
3	11 + 970	11 + 985	15	2 @ 7.5	A	A-3 A-4	4,063,500	0	0	0	0	3,582,400	669,400	8,315,300
4	13 + 850	13 + 856	6	1 @ 6.0	A	A-3	1,625,400	0	0	0	0	3,582,400	0	5,207,800
5	15 + 470	15 + 487	17	2 @ 8.5	A	A-3 A-4	4,605,300	0	0	0	0	3,582,400	669,400	8,857,100
6	17 + 880	17 + 894	14	1 @ 14.0	A	A-3	3,792,600	0	0	0	0	3,582,400	0	7,375,000
7	17 + 970	17 + 987	17	2 @ 8.5	A	A-3 A-4	4,605,300	0	0	0	0	3,582,400	669,400	8,857,100
8	19 + 0	19 + 6	6	1 @ 6.0	A	A-3	1,625,400	0	0	0	0	3,582,400	0	5,207,800
S1 Subtotal			107				23,297,400	4,895,100	0	0	0	28,659,200	2,008,200	58,859,900
9	23 + 500	23 + 509	9	1 @ 9.0	A	A-3	2,438,100	0	0	0	0	3,582,400	0	6,020,500
10	24 + 500	24 + 517	17	1 @ 17.0	B-1	A-3	0	3,962,700	0	0	0	3,582,400	0	7,545,100
11	33 + 300	33 + 309	9	1 @ 9.0	A	A-3	2,438,100	0	0	0	0	3,582,400	0	6,020,500
12	33 + 460	33 + 467	7	1 @ 7.0	A	A-3	1,896,300	0	0	0	0	3,582,400	0	5,478,700
13	33 + 930	33 + 939	9	1 @ 9.0	A	A-3	2,438,100	0	0	0	0	3,582,400	0	6,020,500
14	37 + 650	37 + 665	15	2 @ 7.5	A	A-3 A-4	4,063,500	0	0	0	0	3,582,400	669,400	8,315,300
15	39 + 50	39 + 220	170	2 @ 25.0 4 @ 30.0	B-1 B-3	A-3 A-4	0	11,655,000	0	38,934,000	0	3,582,400	3,347,000	57,518,400
S2 Subtotal			236				13,274,100	15,617,700	0	38,934,000	0	25,076,800	4,016,400	96,919,000
16	42 + 510	42 + 550	40	2 @ 20.0	B-1	A-3 A-4	0	9,324,000	0	0	0	3,582,400	669,400	13,575,800
17	43 + 100	43 + 112	12	1 @ 12.0	A	A-3	3,250,800	0	0	0	0	3,582,400	0	6,833,200
18	44 + 280	44 + 290	10	1 @ 10.0	A	A-3	2,709,000	0	0	0	0	3,582,400	0	6,291,400
19	46 + 300	46 + 312	12	1 @ 12.0	A	A-3	3,250,800	0	0	0	0	3,582,400	0	6,833,200
20	46 + 630	46 + 650	20	1 @ 20.0	B-1	A-3	0	4,662,000	0	0	0	3,582,400	0	8,244,400
21	48 + 570	48 + 579	9	1 @ 9.0	A	A-3	2,438,100	0	0	0	0	3,582,400	0	6,020,500
22	49 + 230	49 + 240	10	1 @ 10.0	A	A-3	2,709,000	0	0	0	0	3,582,400	0	6,291,400
23	51 + 930	51 + 939	9	1 @ 9.0	A	A-3	2,438,100	0	0	0	0	3,582,400	0	6,020,500
24	52 + 700	52 + 719	19	1 @ 19.0	B-1	A-3	0	4,428,900	0	0	0	3,582,400	0	8,011,300
25	53 + 800	53 + 813	13	1 @ 13.0	A	A-3	3,521,700	0	0	0	0	3,582,400	0	7,104,100
26	55 + 300	55 + 308	8	1 @ 8.0	A	A-3	2,167,200	0	0	0	0	3,582,400	0	5,749,600
27	57 + 100	57 + 111	11	1 @ 11.0	A	A-3	2,979,900	0	0	0	0	3,582,400	0	6,562,300
28	57 + 760	57 + 766	6	1 @ 6.0	A	A-3	1,625,400	0	0	0	0	3,582,400	0	5,207,800
29	59 + 100	59 + 110	10	1 @ 10.0	A	A-3	2,709,000	0	0	0	0	3,582,400	0	6,291,400
30	59 + 320	59 + 330	10	1 @ 10.0	A	A-3	2,709,000	0	0	0	0	3,582,400	0	6,291,400
S3 Subtotal			199				32,508,000	18,414,900	0	0	0	53,736,000	669,400	105,328,300

No.	STA. Start	STA. End	Length (m)	Number of Spans	Type Super-structure	Type Sub-structure	Cost of Super Structure (Baht) A	B-1	B-2	B-3	B-4	Cost of Sub Structure (Baht) A-3	A-4	Each Bridge Cost (Baht)
31	62 + 400	62 + 430	30	2 @ 15.0	A	A-3 A-4	8,127,000	0	0	0	0	3,582,400	669,400	12,378,800
32	64 + 910	64 + 915	5	1 @ 5.0	A	A-3	1,354,500	0	0	0	0	3,582,400	0	4,936,900
33	65 + 770	65 + 785	15	2 @ 7.5	A	A-3 A-4	4,063,500	0	0	0	0	3,582,400	669,400	8,315,300
34	66 + 100	66 + 105	5	1 @ 5.0	A	A-3	1,354,500	0	0	0	0	3,582,400	0	4,936,900
35	68 + 100	68 + 107	7	1 @ 7.0	A	A-3	1,896,300	0	0	0	0	3,582,400	0	5,478,700
36	74 + 460	74 + 467	7	1 @ 7.0	A	A-3	1,896,300	0	0	0	0	3,582,400	0	5,478,700
37	75 + 400	75 + 415	15	2 @ 7.5	A	A-3 A-4	4,063,500	0	0	0	0	3,582,400	669,400	8,315,300
38	77 + 280	77 + 288	8	1 @ 8.0	A	A-3	2,167,200	0	0	0	0	3,582,400	0	5,749,600
39	78 + 180	78 + 202	22	2 @ 11.0	A	A-3 A-4	5,959,800	0	0	0	0	3,582,400	669,400	10,211,600
40	79 + 400	79 + 406	6	1 @ 6.0	A	A-3	1,625,400	0	0	0	0	3,582,400	0	5,207,800
41	81 + 470	81 + 477	7	1 @ 7.0	A	A-3	1,896,300	0	0	0	0	3,582,400	0	5,478,700
S4 Subtotal			127				34,404,300	0	0	0	0	39,406,400	2,677,600	76,488,300
42	82 + 370	82 + 382	12	2 @ 6.0	A	A-3 A-4	3,250,800	0	0	0	0	3,582,400	669,400	7,502,600
43	83 + 850	83 + 856	6	1 @ 6.0	A	A-3	1,625,400	0	0	0	0	3,582,400	0	5,207,800
44	85 + 900	85 + 906	6	1 @ 6.0	A	A-3	1,625,400	0	0	0	0	3,582,400	0	5,207,800
45	86 + 480	86 + 504	24	2 @ 12.0	A	B-3 A-3 A-4	6,501,600	0	0	0	0	3,582,400	669,400	10,753,400
46	88 + 650	88 + 657	7	1 @ 7.0	A	A-3	1,896,300	0	0	0	0	3,582,400	0	5,478,700
47	95 + 870	95 + 880	10	1 @ 10.0	A	A-3	2,709,000	0	0	0	0	3,582,400	0	6,291,400
48	97 + 200	97 + 220	20	1 @ 20.0	B-1	A-3	0	4,662,000	0	0	0	3,582,400	0	8,244,400
49	101 + 40	101 + 49	9	1 @ 9.0	A	A-3	2,438,100	0	0	0	0	3,582,400	0	6,020,500
50	102 + 730	102 + 762	32	2 @ 16.0	B-1	A-3 A-4	0	7,459,200	0	0	0	3,582,400	669,400	11,711,000
S5 Subtotal			126				20,046,600	12,121,200	0	0	0	32,241,600	2,008,200	66,417,600
51	107 + 100	107 + 140	40	2 @ 20.0	B-1	A-3 A-4	0	9,324,000	0	0	0	3,582,400	669,400	13,575,800
52	107 + 160	107 + 167	7	1 @ 7.0	A	A-3	1,896,300	0	0	0	0	3,582,400	0	5,478,700
53	109 + 850	109 + 864	14	1 @ 14.0	A	A-3	3,792,600	0	0	0	0	3,582,400	0	7,375,000
54	112 + 150	112 + 168	18	1 @ 18.0	B-1	A-3	0	4,195,800	0	0	0	3,582,400	0	7,778,200
55	115 + 160	115 + 178	18	2 @ 9.0	A	A-3 A-4	4,876,200	0	0	0	0	3,582,400	669,400	9,128,000
56	117 + 50	117 + 72	22	1 @ 22.0	B-1	A-3	2,979,900	0	0	0	0	3,582,400	0	6,562,300
57	117 + 50	117 + 61	11	1 @ 11.0	A	A-3	0	5,128,200	0	0	0	3,582,400	0	8,710,600
58	118 + 670	118 + 676	6	1 @ 6.0	A	A-3	1,625,400	0	0	0	0	3,582,400	0	5,207,800
S6 Subtotal			136				15,170,400	18,648,000	0	0	0	28,659,200	1,338,800	63,816,400
59	124 + 600	124 + 622	22	1 @ 22.0	B-1	A-3	0	5,128,200	0	0	0	3,582,400	0	8,710,600
60	124 + 600	124 + 611	11	1 @ 11.0	A	A-3	2,979,900	0	0	0	0	3,582,400	0	6,562,300
S7 Subtotal			33				2,979,900	5,128,200	0	0	0	7,164,800	0	15,272,900
Total Cost			964				141,680,700	74,825,100	0	38,934,000	0	214,944,000	12,718,600	483,102,400
cost per meter			501.144											483,102,400
						F/C	59,505,894	31,426,542		16,352,280		90,276,480	5,341,812	202,903,008 42.00%
						L/C	82,174,806	43,398,558		22,581,720		124,667,520	7,376,788	280,199,392 58.00%
							141,680,700	74,825,100		38,934,000		214,944,000	12,718,600	483,102,400 100.00%

FEASIBILITY STUDY
ON
THE INTER-CITY TOLL MOTORWAY PROJECTS

APPENDIX A 9.4-2(5/7)
DETAILED COST OF BRIDGES OF BANG PONG - CHAAM ROUTE(2/2)

Rampway Bridges 2 Lanes — B-C Route

No.		Length (m)	Nos of Lanes	Number of Spans	Type: Super-structure	Type: Sub-structure	Cost of Super Structure (bahts): A	B-1	B-2	B-3	B-4	Cost of Sub Structure (bahts): A-1	A-2	Cost of Each Bridge	
1		55	2	2 ● 27.5	B-2	A-1 A-2	0	0	5,478,000	0	0	1,639,600	261,500	7,399,100	
	Ban pong IC														
2		110	2	1 ● 10.0 4 ● 25.0	A B-1	A-1 A-2	1,032,000	8,660,000	0	0	0	1,639,600	1,126,000	12,677,600	
	Photharam IC														
3		60	2	3 ● 20.0	B-1	A-1 A-2	0	5,328,000	0	0	0	1,639,600	563,000	7,530,600	
	Ratchaburi IC														
4		75	2	3 ● 25.0	B-1	A-1 A-2	0	6,660,000	0	0	0	1,639,600	563,000	8,862,600	
	Pak Tho IC														
5		260	2	13 ● 20.0	B-1	A-1 A-2	0	23,088,000	0	0	0	1,639,600	3,378,000	28,105,600	
	Petchaburi IC														
6		30	2	1 ● 30.0	B-3	A-1	0	0	0	3,708,000	0	1,639,600	0	5,347,600	
7		200	2	10 ● 20.0	B-1	A-1 A-2	0	17,760,000	0	0	0	1,639,600	2,533,500	21,933,100	
	Cha Am IC	230					0	17,760,000	0	3,708,000	0	3,279,200	2,533,500	27,280,700	
	B-C Route Total	790					1,032,000	61,716,000	5,478,000	3,708,000	0	11,477,200	8,445,000	91,856,200	
	Cost per meter	116,274				F/C	433,440	25,920,720	2,300,760	1,557,360		4,820,424	3,546,900	38,579,604	42.00%
						L/C	598,560	35,795,280	3,177,240	2,150,640		6,656,776	4,898,100	53,276,596	58.00%
							1,032,000	61,716,000	5,478,000	3,708,000		11,477,200	8,445,000	91,856,200	100.00%

Rampway Bridges 1 Lane — B-C Route

No.		Length (m)	Nos of Lanes	Number of Spans	Type: Super-structure	Type: Sub-structure	Cost of Super Structure (bahts): A	B-1	B-2	B-3	B-4	Cost of Sub Structure (bahts): A-1	A-2	Cost of Each Bridge	
1		1,150	1	46 ● 25.0	El-1	A-1 A-2	0	51,060,000	0	0	0	1,147,720	8,867,250	61,074,970	
2		280	1	14 ● 20.0	B-1	A-1 A-2	0	12,432,000	0	0	0	1,147,720	2,561,650	16,141,370	
3		110	1	2 ● 15.0 4 ● 20.0	A B-1	A-1 A-2	1,548,000	3,552,000	0	0	0	1,147,720	985,250	7,232,970	
	Ban pong JC	1,540					1,548,000	67,044,000	0	0	0	3,443,160	12,414,150	84,449,310	
4		70	1	2 ● 15.0 2 ● 20.0	A B-1	A-1 A-2	1,548,000	1,776,000	0	0	0	1,147,720	591,150	5,062,870	
5		90	1	2 ● 15.0 3 ● 20.0	A B-1	A-1 A-2	1,548,000	2,664,000	0	0	0	1,147,720	788,200	6,147,920	
6		125	1	5 ● 25.0	B-1	A-1 A-2	0	5,550,000	0	0	0	1,147,720	788,200	7,485,920	
7		110	1	2 ● 15.0 4 ● 20.0	A B-1	A-1 A-2	1,548,000	3,552,000	0	0	0	1,147,720	985,250	7,232,970	
	Ban pong IC	395					4,644,000	13,542,000	0	0	0	4,590,880	3,152,800	25,929,680	
8		265	1	3 ● 15.0 11 ● 20.0	A B-1	A-1 A-2	2,322,000	9,768,000	0	0	0	1,147,720	2,561,650	15,799,370	
9		285	1	3 ● 15.0 12 ● 20.0	A B-1	A-1 A-2	2,322,000	10,656,000	0	0	0	1,147,720	2,758,700	16,884,420	
10		210	1	2 ● 15.0 9 ● 20.0	A B-1	A-1 A-2	1,548,000	7,992,000	0	0	0	1,147,720	1,970,500	12,658,220	
11		200	1	10 ● 20.0	B-1	A-1 A-2	0	8,880,000	0	0	0	1,147,720	1,773,450	11,801,170	
	Photharam IC	980					6,192,000	37,296,000	0	0	0	4,590,880	9,054,300	57,143,180	
12		63	1	2 ● 10.0 2 ● 20.0	A B-1	A-1 A-2	1,032,000	1,776,000	0	0	0	1,147,720	591,150	4,546,870	
13		60	1	2 ● 10.0 2 ● 20.0	A B-1	A-1 A-2	1,032,000	1,776,000	0	0	0	1,147,720	591,150	4,546,870	
14		70	1	2 ● 15.0 2 ● 20.0	A B-1	A-1 A-2	1,548,000	1,776,000	0	0	0	1,147,720	591,150	5,062,870	
15		32	1	2 ● 20.0	B-1	A-1 A-2	0	1,776,000	0	0	0	1,147,720	197,050	3,120,770	
	Pak Tho IC	225					3,612,000	7,104,000	0	0	0	4,590,880	1,970,500	17,277,380	
16		125	1	5 ● 25.0	B-1	A-1 A-2	0	5,550,000	0	0	0	1,147,720	788,200	7,485,920	
	Petchaburi IC														
	B-C Route Total	3,245					15,996,000	130,536,000	0	0	0	18,363,520	27,389,950	192,285,470	
	Cost per meter	59,266				F/C	6,718,320	54,825,120				7,712,678	11,503,779	80,759,897	42.00%
						L/C	9,277,680	75,710,880				10,650,842	15,886,171	111,525,573	58.00%
							15,996,000	130,536,000				18,363,520	27,389,950	192,285,470	100.00%

FEASIBILITY STUDY
ON
THE INTER-CITY TOLL MOTORWAY PROJECTS

APPENDIX A 9.4-2(7/7)
DETAILED COST OF RAMPWAY BRIDGES OF BANG PONG - CHAAM ROUTE

Rampway Bridges 2 Lanes L-D Route

No.		Length (m)	Nos of Lanes	Number of Spans		Type Super-structure		Type Sub-structure		Cost of Super Structure (bahts) A	B-1	B-2	B-3	B-4	Cost of Sub Structure (bahts) A-1	A-2	Cost of Each Bridge	
1	Lampang IC	60	2	3 @ 20.0		B-1		A-1	A-2	0	5,328,000	0	0	0	1,639,600	563,000	7,530,600	
2	Mae Tha IC	120	2	6 @ 20.0		B-1		A-1	A-2	0	10,656,000	0	0	0	1,639,600	1,407,500	13,703,100	
3	Lumphun IC	70	2	2 @ 10.0	2 @ 25.0	A	B-1	A-1	A-2	2,064,000	4,440,000	0	0	0	1,639,600	844,500	8,988,100	
4	Chaingmai IC	150	2	6 @ 25.0		B-1		A-1	A-2	0	13,320,000	0	0	0	1,639,600	1,407,500	16,367,100	
	L-D Route Total	400								2,064,000	33,744,000	0	0	0	6,558,400	4,222,500	46,588,900	
	Cost per meter	116,472						F/C		866,880	14,172,480				2,754,528	1,773,450	19,567,338	42.00%
								L/C		1,197,120	19,571,520				3,803,872	2,449,050	27,021,562	58.00%
										2,064,000	33,744,000	0	0	0	6,558,400	4,222,500	46,588,900	100.00%

Rampway Bridges 1 Lane L-D Route

No.		Length (m)	Nos of Lanes	Number of Spans		Type Super-structure		Type Sub-structure		Cost of Super Structure (bahts) A	B-1	B-2	B-3	B-4	Cost of Sub Structure (bahts) A-1	A-2	Cost of Each Bridge	
1	Chaingmai IC	130	1	2 @ 15.0	4 @ 25.0	A	B-1	A-1	A-2	1,548,000	4,440,000	0	0	0	1,147,720	985,250	8,120,970	
2		125	1	5 @ 25.0		B-1		A-1	A-2	0	5,550,000	0	0	0	1,147,720	788,200	7,485,920	
3		95	1	1 @ 15.0	4 @ 20.0	A	B-1	A-1	A-2	774,000	3,552,000	0	0	0	1,147,720	788,200	6,261,920	
4		50	1	2 @ 25.0		B-1		A-1	A-2	0	2,220,000	0	0	0	1,147,720	197,050	3,564,770	
		400								2,322,000	15,762,000	0	0	0	4,590,880	2,758,700	25,433,580	
	L-D Route Total	400								2,322,000	15,762,000	0	0	0	4,590,880	2,758,700	25,433,580	
	Cost per meter	63,584						F/C		975,240	6,620,040				1,928,170	1,158,654	10,682,104	42.00%
								L/C		1,346,760	9,141,960				2,662,710	1,600,046	14,751,476	58.00%
										2,322,000	15,762,000	0	0	0	4,590,880	2,758,700	25,433,580	100.00%

FEASIBILITY STUDY
ON
THE INTER-CITY TOLL MOTORWAY PROJECTS

APPENDIX A 9.4-2(6/7)
DETAILED COST OF RAMPWAY BRIDGES OF LAMPONG - DOI SAKET ROUTE

Direct cost of 2 carriageway 1 line (Yen & Baht) by JHPC Method.

No.			Yen Calculation				Ajust Thai Price	Convert to Baht		Assumed Percentage		F/C,L/C				Remarks
			T1	T2	T3(A)	T3(B)		T1T2	T3			T1T2		T3		
		length(m)	3,830	3,810	750	720	%	Total	Total	F/C	L/C	F/C	L/C	F/C	L/C	
1	Tunnel Body		5,527,088,320	5,393,889,390	1,203,494,250	1,155,354,480	80%	2,184,195,542	471,769,746	70.00%	30.00%	1,528,936,879	655,258,663	330,238,822	141,530,924	
2		Mouth	52,000,000	52,000,000	52,000,000	52,000,000	80%	20,800,000	20,800,000	50.00%	50.00%	10,400,000	10,400,000	10,400,000	10,400,000	
3		Hauling(20km	69,038,800	68,625,000	12,427,000	11,936,600										50 Baht/cum
4		Embankment	27,615,520	27,450,000	4,970,800	4,774,640										20 Baht/cum
5	Lighting		185,308,236	184,961,164	68,147,500	66,375,616	100%	92,567,350	33,630,779	90.00%	10.00%	83,310,615	9,256,735	30,267,701	3,363,078	
6	Interior Facing		340,870,000	339,090,000	66,750,000	64,080,000	100%	169,990,000	32,707,500	70.00%	30.00%	118,993,000	50,997,000	22,895,250	9,812,250	
7	Electric Building		76,310,000	75,970,000	23,950,000	23,440,000	100%	38,070,000	11,847,500	90.00%	10.00%	34,263,000	3,807,000	10,662,750	1,184,750	
8	Electric Facilities		163,024,000		60,602,000		100%	40,756,000	15,150,500	90.00%	10.00%	36,680,400	4,075,600	13,635,450	1,515,050	
9	Electric Generator		50,017,000	49,819,000	19,525,000	19,228,000	100%	24,959,000	9,688,250	90.00%	10.00%	22,463,100	2,495,900	8,719,425	968,825	
10	Watching Facilities		61,403,000	61,321,000	48,775,000	48,652,000	100%	30,681,000	24,356,750	90.00%	10.00%	27,612,900	3,068,100	21,921,075	2,435,675	
11	Traffic Safety Facilities		436,347,000	434,129,000	94,775,000	91,448,000	100%	217,619,000	46,555,750	70.00%	30.00%	152,333,300	65,285,700	32,589,025	13,966,725	
12	ITV Equipment		243,344,000	242,408,000	99,200,000	97,796,000										
13	Jet Fan		310,800,000	310,800,000	0	0	100%	155,400,000	0	90.00%	10.00%	139,860,000	15,540,000	0	0	
14	Air Pollution Measuring Instruments		46,500,000	46,500,000	0	0	100%	23,250,000	0	90.00%	10.00%	20,925,000	2,325,000	0	0	
15																
16																
	Total		7,249,667,556	6,948,479,554	1,638,018,750	1,520,578,096		2,998,287,892	666,506,775			2,175,778,194	822,509,698	481,329,496	185,177,277	
	(per meter)		1,892,864	1,823,748	2,184,025	2,111,914		100.00%	100.00%			73.00%	27.00%	72.00%	28.00%	

Assumed 1 Yen is 0.25 Baht These portions are deducted.

FEASIBILITY STUDY
ON
THE INTER-CITY TOLL MOTORWAY PROJECTS

APPENDIX A 9.4-3
DETAILED COST OF TUNNELS OF LAMPONG - DOI SAKET ROUTE