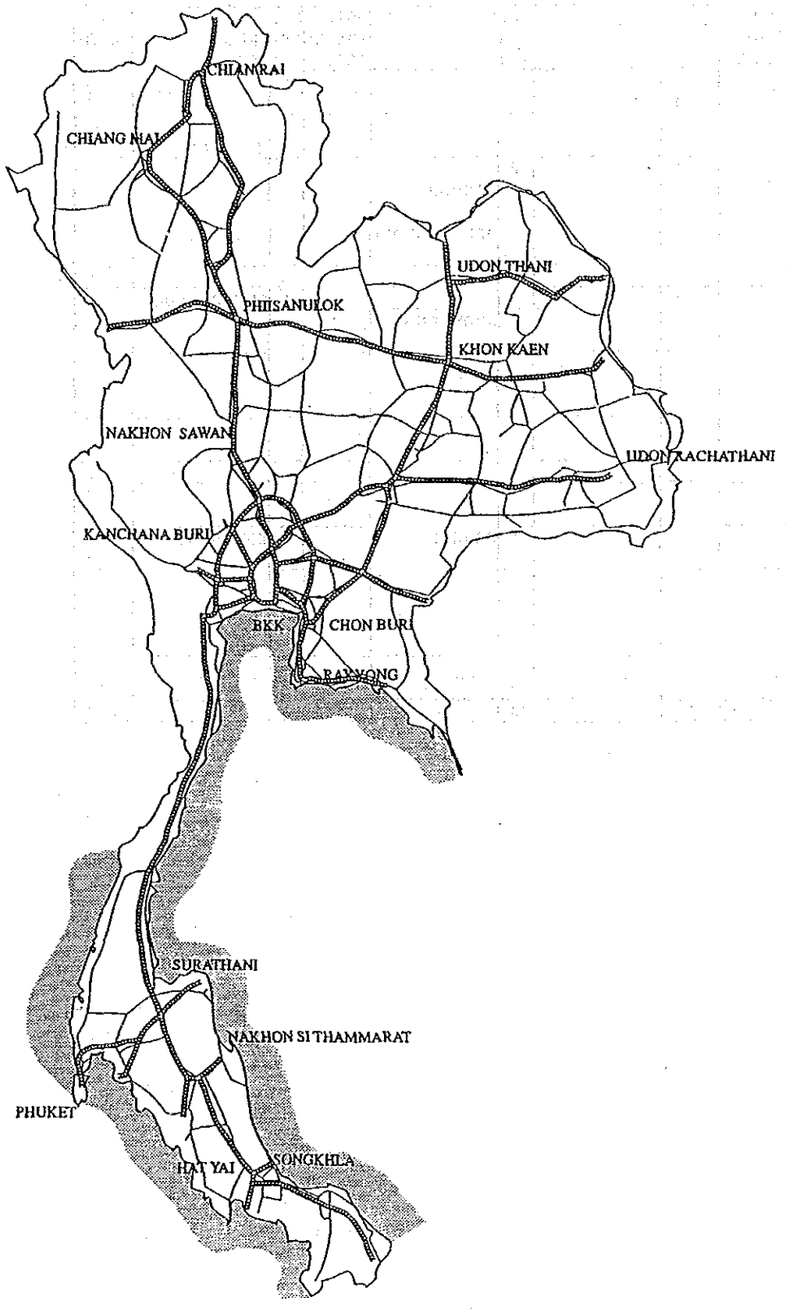
Appendix 7.4 TENTATIVE TOLL MOTORWAY NETWORK



TENTATIVE TOLL MOTORWAY NETWORK

Appendix 7.5 SUMMARY OF RESULTS OF TENTATIVE TOLL MOTORWAY ROUTING

STEP 1

1. Routes connecting Bangkok and Designated Cities (1st priority) to establish the nationwide arterial roads network.

No.	Origin, Destination (Changwats)
TR-1	OBRR (Bangkok), (Ayutthaya), (Ang Thong), (Sing Buri), (Chai Nat), (Nakhon Sawan), (Phichit), (Phrae), (Phitsanulok), (Uttaradit), (Lampang), (Lampun), Chiang Mai (Chiang Mai)
TR-2	OBRR (Bangkok), (Saraburi), (Nakhon Ratchasima), Khon Kaen (Khon Kaen)
TR-3	OBRR (Bangkok), (Chachoengsao), Chon Buri (Chonburi)
TR-4	OBRR (Bangkok), (Nakhon Pathum), (Ratchaburi), (Phetchaburi), (Prachuap Khiri khan), (Chumporn), (Surat Thani), (Nakhon Si Thammarat), (Phatthalung), Hat Yai - Songkhla (Songkhla)

2. Routes connecting Designated Cities (1st priority) and the border of the main neighbour countries to promote the international exchange between them.

No.	Origin, Destination (Changwats)
TR-2	Khon Kaen (Khon Kaen), (Udon Thani), Nong Khai (Nong Khai) ---------- Laos ----------
TR-4	Hat Yai (Songkhla), Khlong Pruan ---------- Malaysia ----------

Appendix 7.5 SUMMARY OF RESULTS OF TENTATIVE TOLL MOTORWAY ROUTING

3. Routes connecting Bangkok and National Industrial Development area, and linking between the main cities in the area.

No.	Origin, Destination (Changwats)
TR-3	Chon Buri (Chon Buri), Phattaya (Chon Buri), Map Ta Phut (Rayong), Rayong (Rayong), ----- Eastern Seaboard Development Area -----
TR-6	Krabi (Krabi), Distribution Centre (Surat Thani), Khanom (Nakhon Si Thammarat) ----- Southern Seaboard Development Area -----

4. Routes connecting Bangkok and the main international interesting places.

No.	Origin, Destination (Changwats)
	Bangkok - Ayutthaya - Chiang Ma covered by TR-1
	Bangkok - Hua Hin - Phattaya covered by TR-4

5. Routes forming Outer Bangkok Ring Road (OBRR) which has following roles :

- to reorganize the urban structure of Bangkok Metropolitan Region.
- to smoothly and effectively treat the extremely heavy traffic volume.
- to be Bypass for passing through traffic between regions.

No.	Origin, Destination (Changwats)
TR-5	---------- OBRR ----------

STEP 2

1. Routes connecting Designated Cities (2nd priority) and Bangkok, Designated Cities (1st priority) or the routes adopted in STEP 1.

No.	Origin, Destination (Changwats)
	Bangkok - Nakhon Sawan - Phitsanulok - Chiang Mai covered by TR-1
	Khon Kaen - Udon Thani covered by TR-2
	Bangkok - Ratchaburi - Surat Thani covered by TR-4
TR-41	(Surat Thani TR-4), (Krabi), (Phangnga), Phuket (Phuket)

2. Routes connecting the border of the neighbour countries and the routes adopted in STEP 1.

No.	Origin, Destination (Changwats)
TR-11	Uttaradit (Uttradit, TR-1) (Phayao), Mae Sai (Chiang Rai) ---------- Myanmar ----------
TR-12	Mae Sot (Tak), (Sukhothai), (Phitsanulok), (Phetchabun), (Khon Kaen), (Maha Sarakham), (Kalasin), (Roi Et), Mukdahan (Ubon Ratchathani) ---------- Myanmar, Laos ----------
TR-32	OBRR (Bangkok) (Pathum Thani), (Nakhon Nayok), Aranya Prathet (Prachin Buri) ---------- Kampuchea ----------
TR-42	Hat Yai (Songkhla, TR-4) (Pattani) Sungai Kolok (Narathiwat) ---------- Malaysia ----------

3. Routes connecting other international interesting places and the routes adopted in STEP 1.

No.	Origin, Destination (Changwats)
TR-33	Chon Buri (Chon Buri, TR-3), (Chachoengsao), (Prachin Buri), Nakhon Ratchasima (Nakhon Ratchasima)

Appendix 7.5 SUMMARY OF RESULTS OF TENTATIVE TOLL MOTORWAY ROUTING

4. Routes connecting other international interesting places and the routes adopted in STEP 1.

No.	Origin, Destination (Changwats)	
	Phitsanulok (TR-1) - Sukhothai	covered by TR-12
TR-31	Ratchaburi (Ratchaburi, TR-4), Kanchanaburi (Kanchanaburi)	
	(Surat Thani, TR-41), (Krabi), (Phang Nga), Phuket (Phuket)	covered by TR-41

STEP 3

1. Routes connecting Designated Cities (3rd priority) and the Routes adopted STEP 1 or STEP 2.

No.	Origin, Destination (Changwats)	
TR-101	Chiang Mai (Chiang mai), Chiang Rai (Chiang Rai)	
TR-201	Udon Thani (Udon Thani, TR-2), Sakhon Nakhon (Sakhon Nakhon)	
TR-202	Nakhon Ratchasima (Nakhon Ratchasima, TR-2), (Buriram), Surin (Surin)(Si Sa Ket), Ubon Ratchathani (Ubon Ratchathani)	
TR-401	A. Ron Phibun (Nakhon Si Thammarat, TR-4), Nakhon Si Thammarat (Nakhon Si Thammarat)	
	Lampang	covered by TR-1, TR-11
	Roi Et	covered by TR-12
	Saraburi	covered by TR-2
	Chachoengsao	covered by TR-33
	Rayong	covered by TR-3
	Kanchanaburi	covered by TR-31
	Phetchaburi	covered by TR-4
	Pattani	covered by TR-42

2. Routes bringing up the urban activities of satellite cities located within 50-100 km from Bangkok and encouraging the interrelation between them.

No.	Origin, Destination (Changwats)
TR-301	Ratchaburi, Tha Wung (Lop Buri)
TR-302	Tha Wung (Lop buri, Bang Pakong (Chachoengsao)
TR-303	OBRR, Suphan Buri (Suphan Buri)

STEP 4

1. Routes connecting Changwat Center with more than 30,000 population and the routes adopted in STEP 1 - STEP 3.

No.	Origin, Destination (Changwats)
TR-2001	Sakhon Nakhon (Sakhon Nakhon), Nakhon Phanom (Nakhon Phanom)
TR-3001	Rayong (Rayong), Chanthaburi
TR-4001	A. Thung Song (Nakhon Si thammarat), Trang (Trang)

Appendix 7.6 BASIC FACTORS OF DESIGN

1) Motorway Classification

Motorway classification system to be adopted for motorway design is defined in Table 7.6.1.

Table 7.6.1 MOTORWAY CLASSIFICATION

Class	Design Speed (KPH)	Design Traffic Volume (Veh/day)		
		Over 24,000	24,000-16,000	16,000-8,000
M-1	120 - 100	Flat and Hilly	Flat	
M-2	100 - 80	Mountainous	Hilly and Mountainous	Flat and Mountainous

A motorway classification system is necessary to adopt uniform design standards so as to maintain economical project cost as well as safety, comfort and continuity in the different conditions of surrounding terrain.

In the above classification, two classes of motorways are recommended in respect to the traffic volume and terrain. The design traffic volume affects the geometrical and structural design of the road. On the other hand, terrain and geographical conditions have their great influence regarding the difficulty in construction.

2) Design Unit

A design unit is a section classified by the system in Table 7.6.1, and is defined in the following manner:

a) A unit road section where its geographical and topographical conditions are homogeneous can be considered as one design unit.

b) A design unit should have enough length so that all motorcars can run safely and comfortably.

c) The connecting point between two different design units is standardized to be where the geographical, topographical or traffic conditions vary, or at main connecting points such as junctions.

d) Two successive design units having more than 20 KPH difference in design speeds can not be directly connected, except at interchanges, junctions or toll barriers.

The practical length of one design unit is defined so as to keep constant speed during a whole of the driving period within that unit. It depends also on the construction cost and vehicle operation cost. Table 7.6.2 gives the recommendable minimum length of one design unit.

Table 7.6.2 MINIMUM LENGTH OF ONE DESIGN UNIT

	Standard
Minimum length of one design unit	20 - 30 km

3) Design Speed

Standard and allowable design speeds are defined in Table 7.6.3 in accordance with the classification of motorways in Table 7.6.1.

Table 7.6.3 DESIGN SPEED

Class	Design Speed (KPH)	
	Standard	Allowable
M-1	120	100
M-2	100	80

The allowable design speed is adopted only in special cases depending on the topographical conditions.

Appendix 7.6 BASIC FACTORS OF DESIGN

Design speed is the maximum safe speed that can be maintained over a specific section of the motorway. Design features of the motorway are governed by the design speed which should be logical in respect to the topography.

Table 7.6.4 gives the maximum design speed of motorways in various countries. Most of the countries adopt more than 120 KPH as the maximum design speed and the highest adopted design speed is 180 KPH in Belgium.

Table 7.6.4 MAXIMUM DESIGN SPEED IN VARIOUS COUNTRIES

Name of Country	Maximum Design Speed(KPH)	
AUSTRIA	130	
BELGIUM	180	
FRANCE	120	
GERMANY	120	
ITALY	140	
MALAYSIA	120	
SPAIN	120	
U.K.	120	
U.S.A.	112	(70 MPH)

U.S.A. 112 (70 MPH)

4) Cross Section

Width of cross section elements of motorways are defined in Table 7.6.5, in accordance with the classification of motorways in Table 7.6.1.

Table 7.6.5 WIDTH OF CROSS SECTION ELEMENTS

Class	Lane Width (m) 4-Lane		6-Lane			Shoulder Width (m)		Median (m)
	Left	Right	Left	Middle	Right	Left	Right	
M-1	3.50	3.75	3.50	3.75	3.50	3.00	1.50	variable
M-2	3.50	3.50	3.50	3.75	3.50	3.00	1.50	@ 10.0

A cross section of the motorway consisting of through traffic lanes, shoulders and median, is illustrated in Figure 7.6.1.

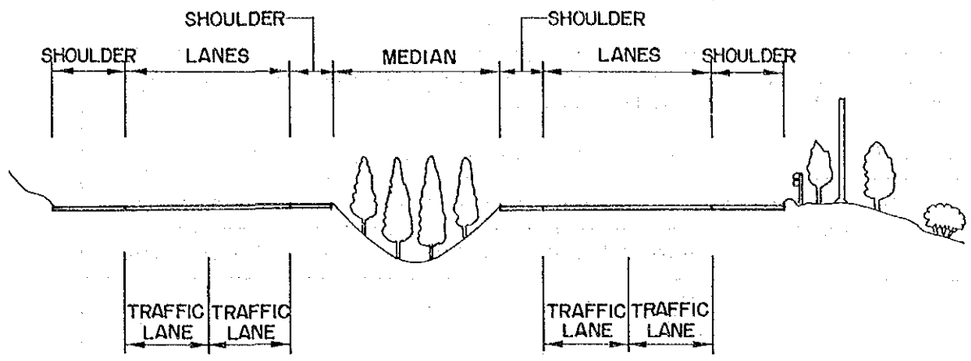


Figure 7.6.1 CROSS SECTION ELEMENTS

The typical cross sections of the 4-lane 2-way motorways in ITALY, JAPAN, U.S.A., KOREA and MALAYSIA and 6-lane 2-way in GERMANY are illustrated in Figure 7.6.2.

It is clear that the width of the outer lane ranges between 3.50 m to 3.75 m and the width of the inner lane ranges between 3.60 m to 3.75 m. The outer shoulder has a width of 3.0 m in general, while the inner one has different widths with a range of 0.25 m to 1.0 m.

a) Traffic Lane:

A traffic lane should have enough width so that a motorcar can overtake and run beside other cars safely. However, too wide traffic lane is undesirable to accommodate no more than one car. Since the width of a traffic lane affects traffic capacity, safety and comfort than other cross section elements, it should be designed carefully considering traffic volume, design speed, rate of heavy vehicles, etc.

The inner lanes in the 4-lane 2-way motorway M-1 and the middle lanes in the 6-lane 2-way motorways M-1 and M-2, which are expected to have heavy traffic volumes running at speeds more than 100 KPH, require a lane width of 3.75 m.

Appendix 7.6 BASIC FACTORS OF DESIGN

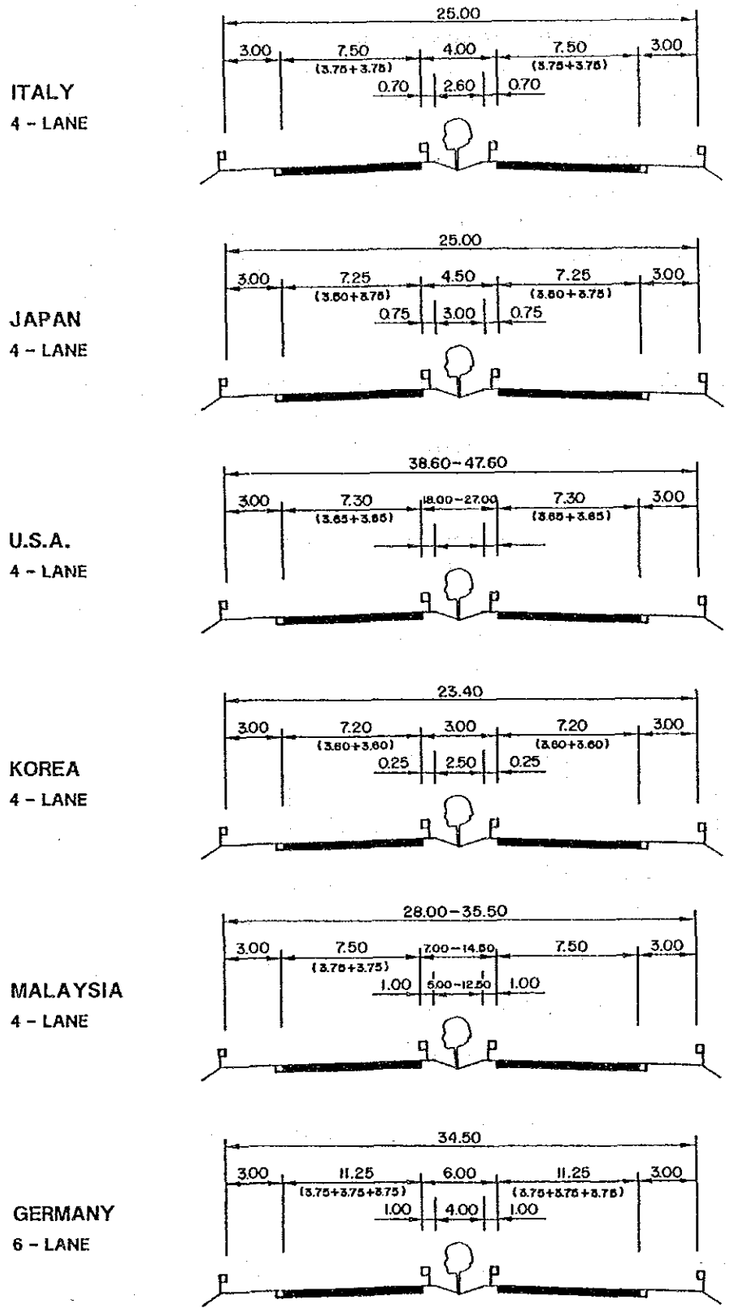


Figure 7.6.2 TYPICAL CROSS SECTIONS IN SELECTED COUNTRIES

b) Shoulder

A shoulder is the portion of the motorway contiguous with the traveled way for accommodation of stopped motorcars, for emergency use and for lateral support of subbase, base and surface courses. Shoulder may be surfaced either full or partial width to provide a better all-weather load support than that afforded by the native soils, as shown in Figure 7.6.3.

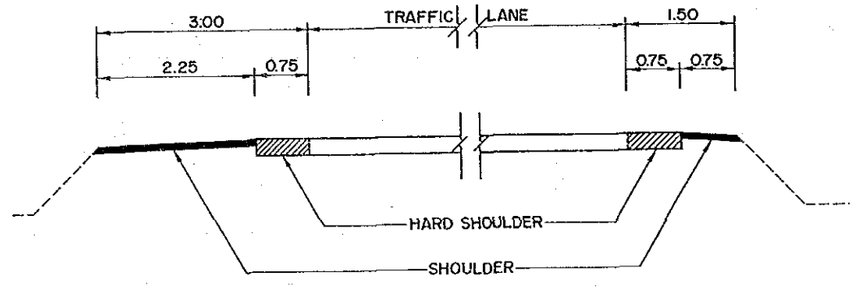


Figure 7.6.3 SURFACE OF SHOULDER

c) Median

A median is a highly desirable element on motorways carrying four or more lanes. A median is defined as the portion of a divided roadway separating the traveled way for traffic in opposing directions.

The principal functions of the median are to provide the desired freedom from the interference of opposing traffic, to provide a recovery area for out-of-control vehicles, to provide a stopping area in case of emergency, to minimize headlight glare, and to provide width for future lanes. For maximum efficiency, the median should be highly visible both night and day and in definite contrast to the through-traffic lanes.

In general, the median should be as wide as can be used advantageously, however, economic factors often limit the width of its median.

A median width of about 10 m for motorways in Thailand can be proposed through the consideration of experiences in various countries and of primary highways standard in Thailand.

5) Radius and Grade

Minimum radius to be adopted to the center line of curved sections is defined in Table 7.6.6 according to the design speed. Standard values of minimum radius in this table are adopted only in the special cases depending on the topographical conditions.

Table 7.6.6 MINIMUM RADIUS

Design Speed (KPH)	Desirable (m)	Standard (m)
120	1,000	710
100	700	460
80	400	280

Maximum grades to be adopted for sloped sections are defined in Table 7.6.7 according to the design speed. Maximum values in this table are adopted only in the special cases depending on the topographical conditions.

Table 7.6.7 MAXIMUM GRADE

Design Speed (KPH)	Standard (degree)	For Special Cases Grade (degree)	slope length (m)
120	2	5	400
100	3	6	400
80	4	7	400

Radius and grade, in general, should be designed through the following principal considerations:

- safety and comfort while driving
- drivers sight distance
- harmony with environment and landscape
- economical construction
- continuity of alignment

a) Minimum Radius

The minimum radius is a limiting value of curvature for a given design speed and is determined according to the maximum rate of superelevation and the maximum allowable side friction factor. Using of sharper curvature for that design speed would result in a superelevation beyond the practical limit, or for operation with tire friction beyond the safe limit, or both. Thus, the minimum radius is a significant value in the alignment procedure. The minimum radius is also a necessary and important control value for determination of superelevation rates for flatter curves.

Desirable values in Table 7.6.6 have been obtained by applying the side friction factors of 0.04 - 0.05 in all ranges of design speed, in order to maintain comfortable driving.

Standard values in Table 7.6.6 present the minimum radius at a maximum superelevation of 6 % in all ranges of design speed, and at allowable maximum side friction factors in accordance with design speed as shown in Figure 7.6.4.

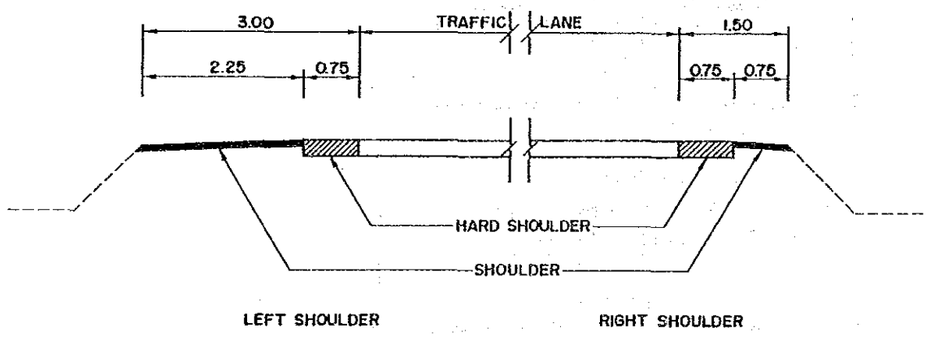


Figure 7.6.4 DESIGN SPEED AND SIDE FRICTION FACTOR

Superelevation (i) and side friction (f) for the desirable and standard values of the minimum radius and for different design speeds are listed in Table 7.6.8.

Appendix 7.6 BASIC FACTORS OF DESIGN

Table 7.6.8 SUPERELEVATION AND SIDE FRICTION FACTOR FOR MINIMUM RADIUS

Design speed	Desirable			Standard		
	i	f	R	i	f	R
120	0.06	0.05	1000	0.06	0.10	710
100	0.06	0.05	700	0.06	0.11	460
80	0.07	0.06	400	0.06	0.12	280

Equation: $R = V^2 / 127 (i + f)$

R : minimum radius (m)
V : design speed (KPH)
i : superelevation
f : side friction factor (Figure 3.16)

The following should be noticed when applying the values of the minimum radius in Table 7.6.6:

i. A small radius is undesirable to sections having high traffic volumes, since it will cause traffic congestion through lack of traffic capacity.

ii. Locally inserting small curve between smooth alignment sections should be avoided, since safe operation of motorcar can not be maintained and accidents may occur in such horizontal alignment. The horizontal alignment of sections between good and poor geographic conditions needs gradual and smooth changing.

iii. The horizontal alignment has to be designed in accordance with the surrounding conditions, such as geographical, environmental, social, etc.

iv. It is required to consider the harmony between both horizontal and vertical alignments.

b) Maximum Grade

A grade is mainly affected by the mechanical capacity of the motorcar while almost other design elements of a road are defined by the design speed. The mechanical capacity of motorcars, especially climbing performance, varies according to their categories, i.e. passenger car, truck, trailer, etc. It is undesirable, in the economical sense, to establish the unity criteria for any category of motorcars to maintain the design speed. Therefore, the following guidelines for establishing of economical criteria are needed:

i. The standard values of upgrade are defined in both of following conditions:

- The passenger car can climb at its average running speed.
- The full-loading truck can climb at a half of the design speed

For both cases, the climbing lengths are not taken into consideration.

ii. For the special cases, the values of the grade and maximum climbing lengths are defined in both of following conditions:

- The passenger car can maintain its average running speed at the top of grade, when its speed at the bottom is equal to the design speed.
- The full-loading truck can maintain a half of the design speed at the top of grade, when its speed at the bottom is equal to a design speed not more than 80 KPH.

The following should be noticed when applying the values of the maximum grade in Table 7.6.7.

i. The values of grades have been defined so as motorcars with low mechanical capacity can climb at speeds relatively lower than design speed, considering the serious influences of the construction cost. It is preferable that the grade is adopted as low degree as the geograph-

ical and other conditions allow. On the other hand, all types of motorcars can operate at speeds close to the design speed as much as possible. However, and in the special cases, the values of grade should be applied to the mountainous sections after careful consideration of the traffic conditions (traffic volume and composition of motorcar types), horizontal alignment, running speed, construction cost, etc.

ii. It is preferable to apply a grade of 0.3 - 0.5 % for drainage in the long flat-sections.

6) Design Standard Traffic Volume and Number of Lanes

Design standard traffic volume per one lane is defined in Table 7.6.9.

Table 7.6.9 DESIGN STANDARD TRAFFIC VOLUME

Class	Design standard volume / one lane	
	flat	mountainous
M-1 and M-2	12,000/day	9,000/day

A design standard traffic volume, in accordance to the basis of traffic capacity, is the basic value required to estimate the numbers of lane. The selection of the number of lane is carried out through a comparison between the following two traffic volumes:

- the traffic volume which is expected to pass on a road (planned traffic volume), expressed as hourly traffic volume.
- the traffic volume which can be handled by a road (design standard traffic volume), estimated from the design traffic capacity of the road.

Concerning the relation between the traffic capacity, volume and number of lanes, there may be some sections with different traffic capacity even in the same design unit, depending on the width of lane, lateral clearance, topographical and urbanized conditions of road sides, etc. Also, the planned traffic volume is a value estimated only through the trends of regional development and the future traffic demand.

Therefore, the number of lanes is preferably defined through the design standard traffic volume which is estimated according to the procedure shown in Figure 7.6.5.

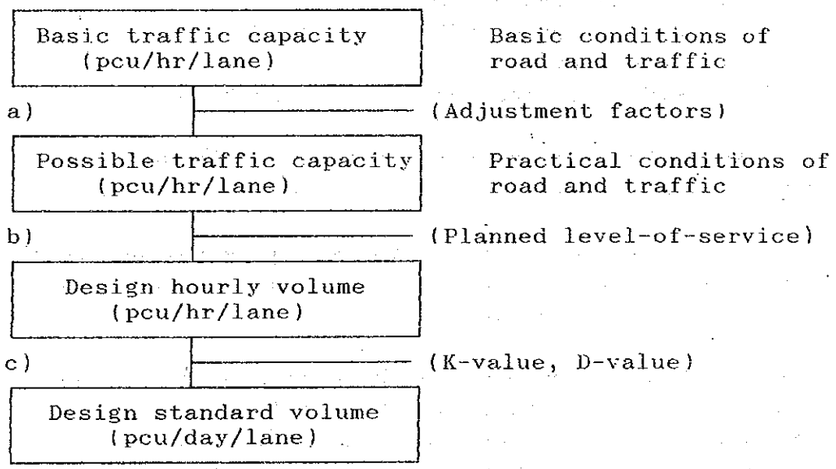


Figure 7.6.5 PROCEDURE FOR ESTIMATION OF DESIGN STANDARD TRAFFIC VOLUME

a) Possible traffic capacity

$$C_p = C_B * \tau_L * \tau_C * \tau_T$$

where C_p = possible traffic capacity (pcu/hr/lane)
C_B = basic traffic capacity (pcu/hr/lane)
= 2,200
τ_L = adjustment factor for lane width (Table 7.6.10)
τ_C = adjustment factor for lateral clearance (Table 7.6.11)

Appendix 7.6 BASIC FACTORS OF DESIGN

τ_T = adjustment factor for heavy vehicles

$\tau_T = 100/((100-T)+E_T * T)$

T = mixing ratio of heavy truck (%)

E_T = passenger car unit (Table 7.6.12)

Table 7.6.10 ADJUSTMENT FACTOR FOR LANE WIDTH (τ_L)

Lane Width W_L(m)	τ_L
over 3.25	1.00
3.00	0.94
2.75	0.88
2.50	0.82

Table 7.6.11 ADJUSTMENT FACTOR FOR LATERAL CLEARANCE (τ_C)

Width of Lateral Clearance Wc (m)	τ_C	
	One Side	Both Sides
over 0.75	1.00	1.00
0.50	0.98	0.95
0.25	0.95	0.91
0.00	0.93	0.86

Table 7.6.12 PASSENGER CAR UNIT (E_T)

Number of Lanes	E_T	
	urban or flat area	mountainous area
2-lane	2.0	3.5
Multi-lane	2.0	3.0

b) Design hourly volume

$$C_D = C_p * \tau_p$$

where: C_D = design hourly volume (pcu/hr/lane)

τ_p = adjustment factor of level-of-service (Table 7.6.13)

Table 7.6.13 ADJUSTMENT FACTOR OF LEVEL-OF-SERVICE

Level-of-service	P	
	Rural Area	Urban Area
1	0.75	0.80
2	0.85	0.90
3	1.00	1.00

Notes:

Level-of-service 1:
- The expected maximum hourly traffic volume does not exceed the design standard traffic volume.
- The 30th highest hourly traffic volume is stable without any changes in speed.

Level-of-service 2:
- The expected maximum hourly traffic volume exceeds the design standard traffic volume for about 10 hours / year, causing traffic congestions.
- The speed of the 30th highest hourly traffic volume is disturbed and varied.

Level-of-service 3:
- The expected maximum hourly traffic volume exceeds the design standard traffic volume for about 30 hours / year, causing heavy traffic congestions.
- The speed of the 30th highest hourly traffic volume is disturbed with stoppage situations.

c) Design standard traffic volume

$$V_D = 0.5 * C_D / (K/100) * (D/100)$$

$$= 5000 * C_D / K * D$$

where, V_D = design standard volume (pcu/day/lane)

K = traffic volume of 30th highest hour as a percentage of AADT (Figure 7.6.6)

D = Directional split ratio (Table 7.6.14)

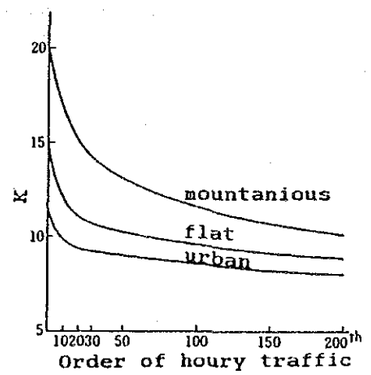


Figure 7.6.6 RANKED HOURLY VOLUME DISTRIBUTION

Appendix 7.6 BASIC FACTORS OF DESIGN

Table 7.6.14 DIRECTIONAL SPLIT RATIO (%)

Category	D
Urban (trunk road)	55.6
Urban (other road)	55.7
Rural (trunk road - flat)	55.6
Rural (trunk road - mountainous)	61.4
Recreational road	57.2
Average	56.4

In the above estimations, the design standard volumes are determined according to the procedure presented in Table 7.6.15.

Table 7.6.15 DETERMINATION OF DESIGN STANDARD VOLUME

Step	Factors						
a	C_B	τ_L	τ_C	τ_T		C_p	
				Flat	Mount.	Flat	Mount.
	2200	1.00	1.00	0.8	0.76	1,760	1,672
b	τ_p	C_p					
		Flat	Mount.				
	0.75	1,320	1,254				
c	K		D		V_D		
	Flat	Mount.	Flat	Mount.	Flat	Mount.	
	10	12	55%	60%	12,000	8,700 (≈9,000)	

Appendix 7.7 MOTORWAY FACILITIES

1) Interchanges and Junctions

Interchanges and junctions are distinguished by the types of crossing roads and the characteristics of usage, according to the following definitions:

- Junction: is to connect two or more motorways through the ramps having the functions of diverging and merging the traffic flow.

- Interchange: is to connect the motorway and other roads through the ramps having the functions of the entrance and exit to and from the motorway.

The locational planning of interchanges is carried out in following manner, through integrated considerations of traffic, social, environmental conditions, etc.:

a) To be located at or near intersections crossing important trunk roads, i.e. national highways.

b) To be located at areas in the suburbs of cities having more than 30,000 population, or where a population of 50,000-100,000 will be served by that interchange.

c) To be located at or near intersections crossing roads connected to the important sea ports, air ports, places of interest, transportation facilities and other major points.

d) To be located in the condition when the expected on-off traffic volume is less than 30,000/day.

e) To be located within an approximate distance range of 5 - 50 km between two successive interchanges.

In general, there are about 200 possible types of interchanges in the geometrical terms. Those types are widely classified into several groups named according to their plane shape, i.e. trumpet type, Y type, diamond type, cloverleaf type, etc.

Figure 7.7.1 shows the practical types of interchanges by the quantitative scale of traffic volume.

Type	Traffic Volume
Double Trumpet	Heavy
Single Trumpet	Medium
Y-Type	Light

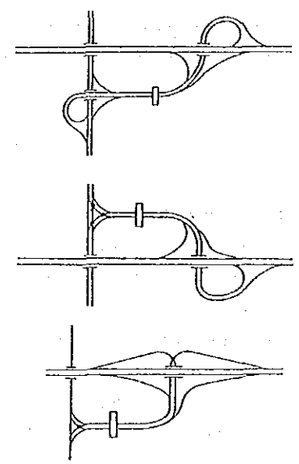


Figure 7.7.1 TYPES OF INTERCHANGE

2) Rest Facilities

The motorways are fully controlled for entry and exit, and their facilities are not available to outside users. This means that a motorway is a roadway with control of the number of the entering and exiting motorcars to the main traffic flow, in order to maintain a rapid, constant, comfortable and safe driving which is the original purpose of the motorway.

The provision of service facilities at proper intervals for comfortable and safe driving is indispensable to motorways users.

The types of rest facilities, which should be installed in appropriate combinations at various location intervals, are classified into the following two categories:

a) Service Area
To include: Restaurant, Parking Area, Public Lavatory, Gas Station, Free Rest Place, Route Information, Repair Shop, Garden.

b) Parking Area
To include: Vending machines, Parking Area, Public Lavatory, Garden.

In studying of the location of rest facilities, the following considerations should be given to the roadside conditions, such as topography and geometric design, and for the systematic combination between service areas and parking areas along the route through maintaining the proper interval between interchanges:

- Intervals between interchange and rest facilities

- Roadside conditions
  . Some objection may raise by local residents concerning the installation of nearby rest facilities.
  . A place with a convenient water supply and drainage is suitable to install rest facilities.

- Road structure conditions
  The structure of rest facilities may be adjusted according to the soil volume of the main road for the economical point of view.

- Route alignment conditions

Figures 7.7.2 and 7.7.3 show the typical types of service area and parking area respectively.

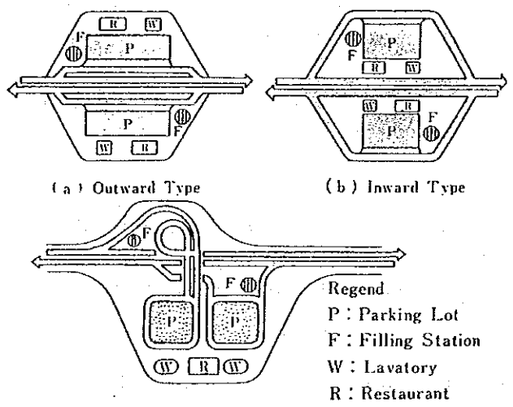


Figure 7.7.2 TYPICAL TYPES OF SERVICE AREA

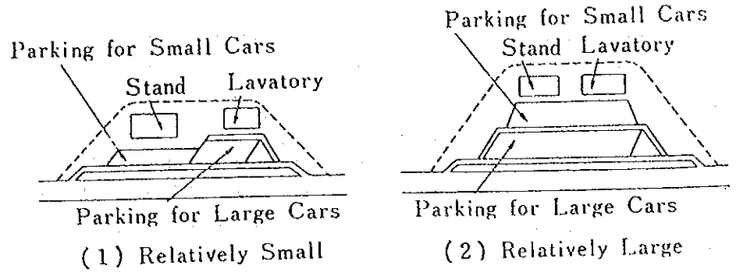


Figure 7.7.3 TYPICAL TYPES OF PARKING AREA

3) Bus stops

In order to promote maximum utilization of motorways, bus stops are installed at interchanges and at intermediate points along the route for buses operating between cities.

The bus stops provided on the motorways can offer a high speed transportation system to the communities along these roads by shortening the traveling time for route buses.

The bus stops on motorways are located at sufficient intervals, not to interfere with high speed bus operation by requiring too frequent stops and not to unnecessarily disturb the traffic flow in the main lanes by frequent bus entry.

The types of bus stops are classified into three by location as shown in Figure 7.7.4.

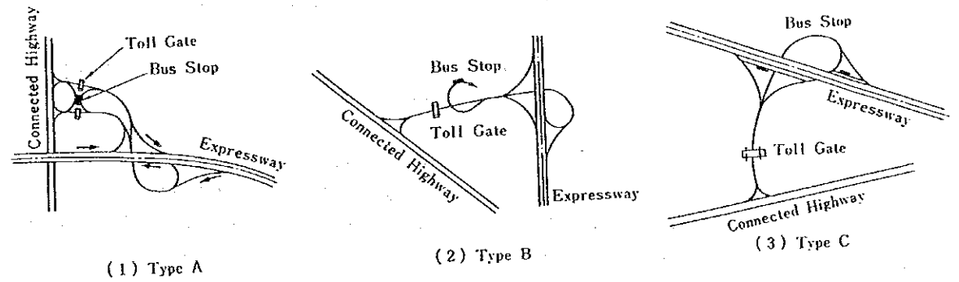
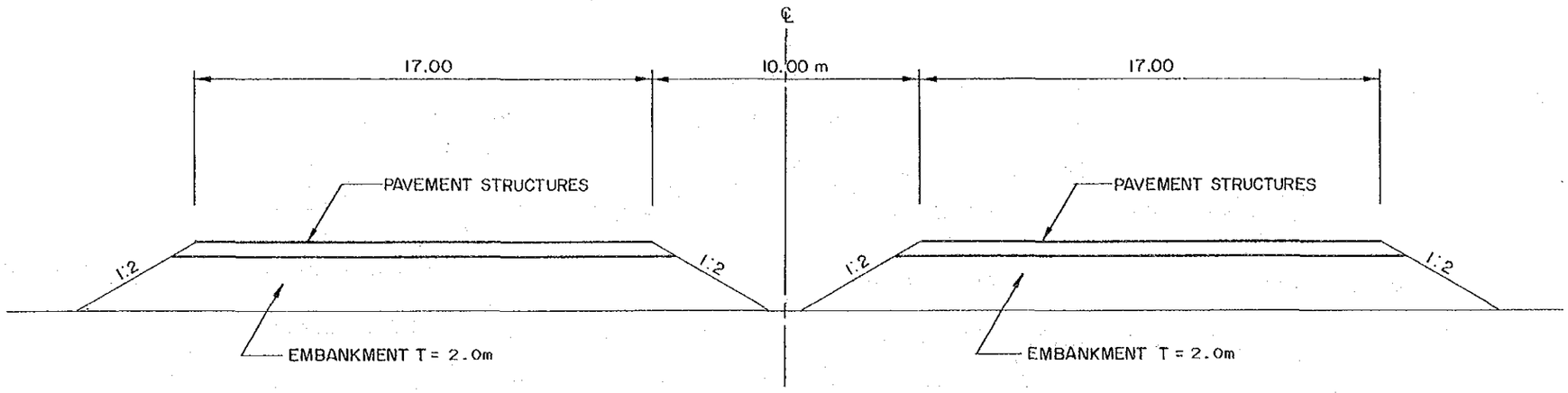
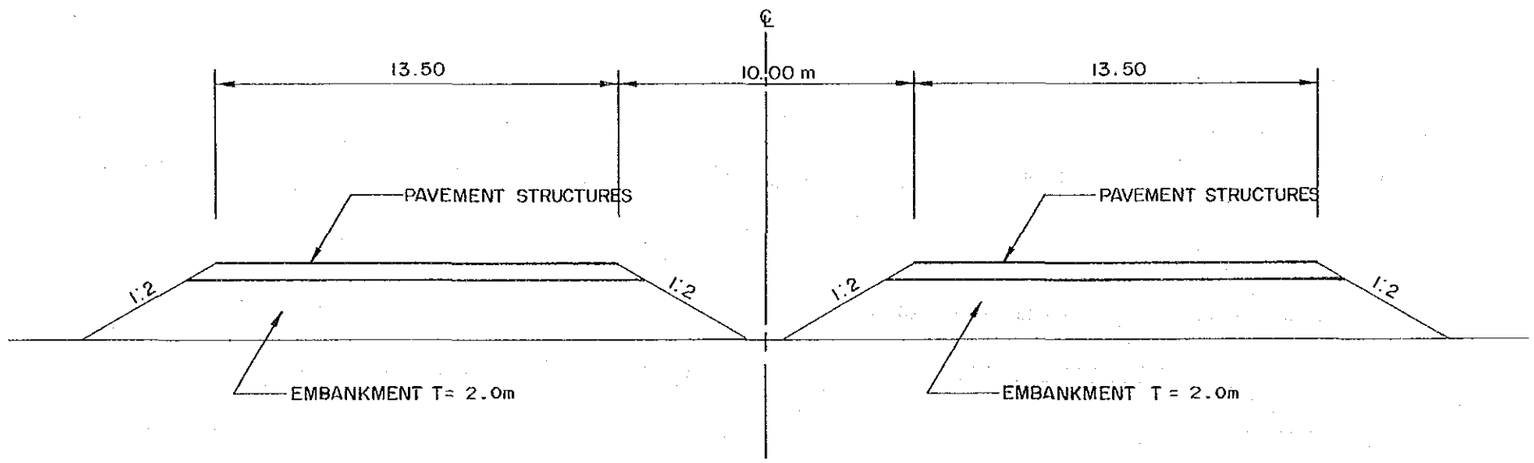


Figure 7.7.4 TYPES OF BUS STOPS AT INTERCHANGES

Appendix 10.1 TYPICAL CROSS SECTION

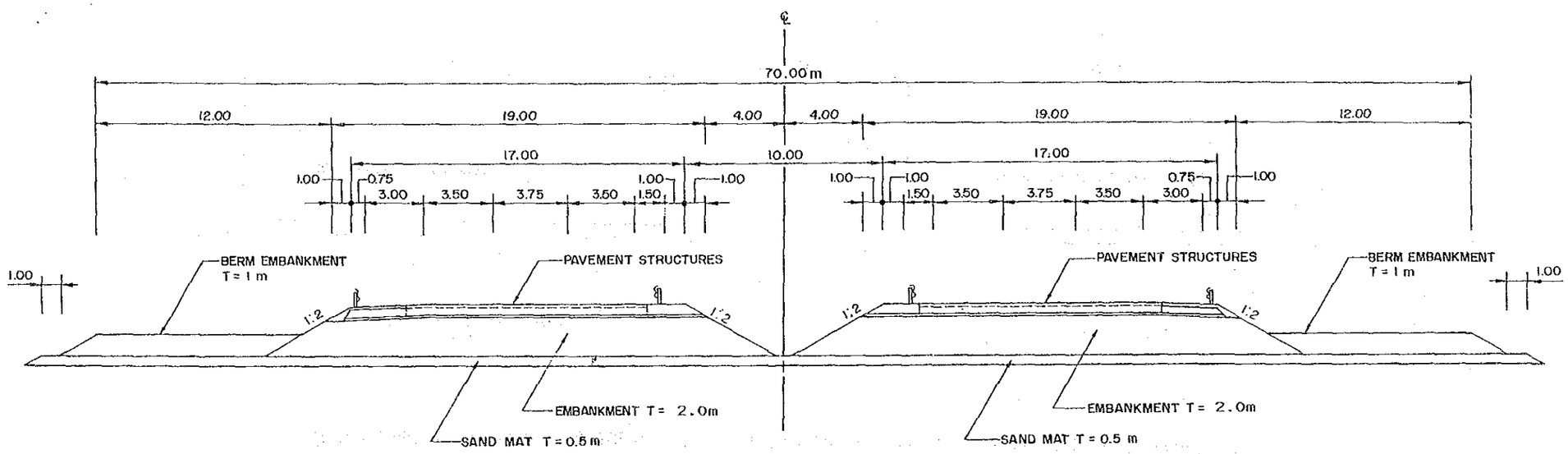


6 - LANE TYPICAL CROSS SECTION IN FLAT AREA (NORMAL GROUND CONDITION)

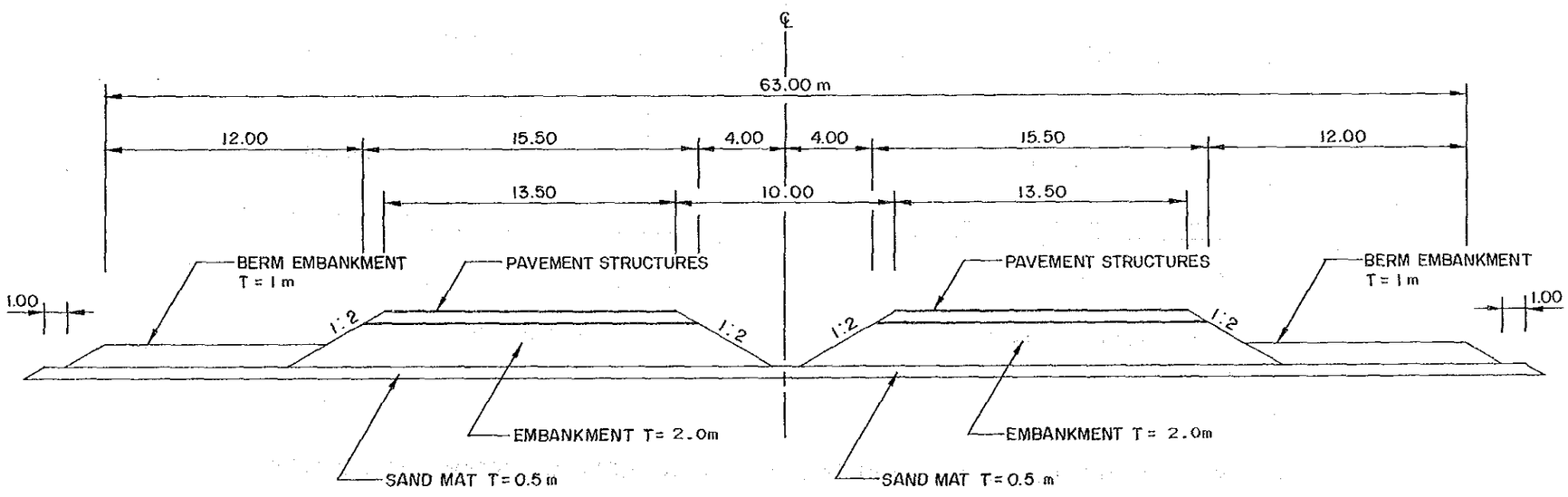


4-LANE TYPICAL CROSS SECTION IN FLAT AREA (NORMAL GROUND CONDITION)

Appendix 10.1 TYPICAL CROSS SECTION

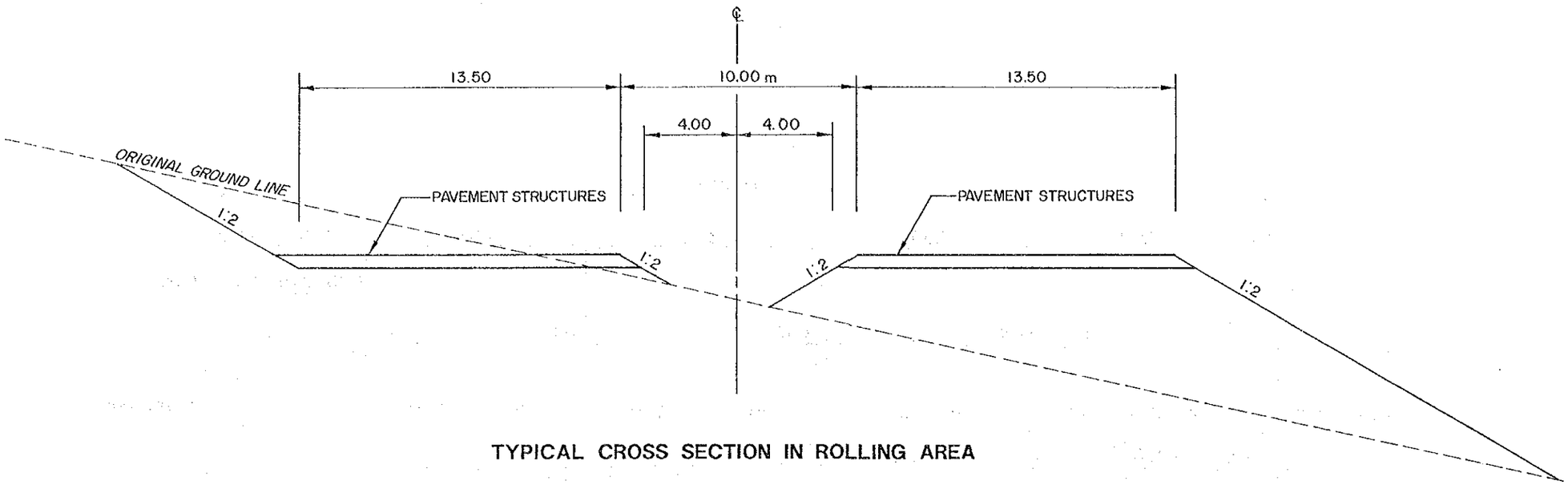


6 - LANE TYPICAL CROSS SECTION IN FLAT AREA (SOFT GROUND CONDITION)

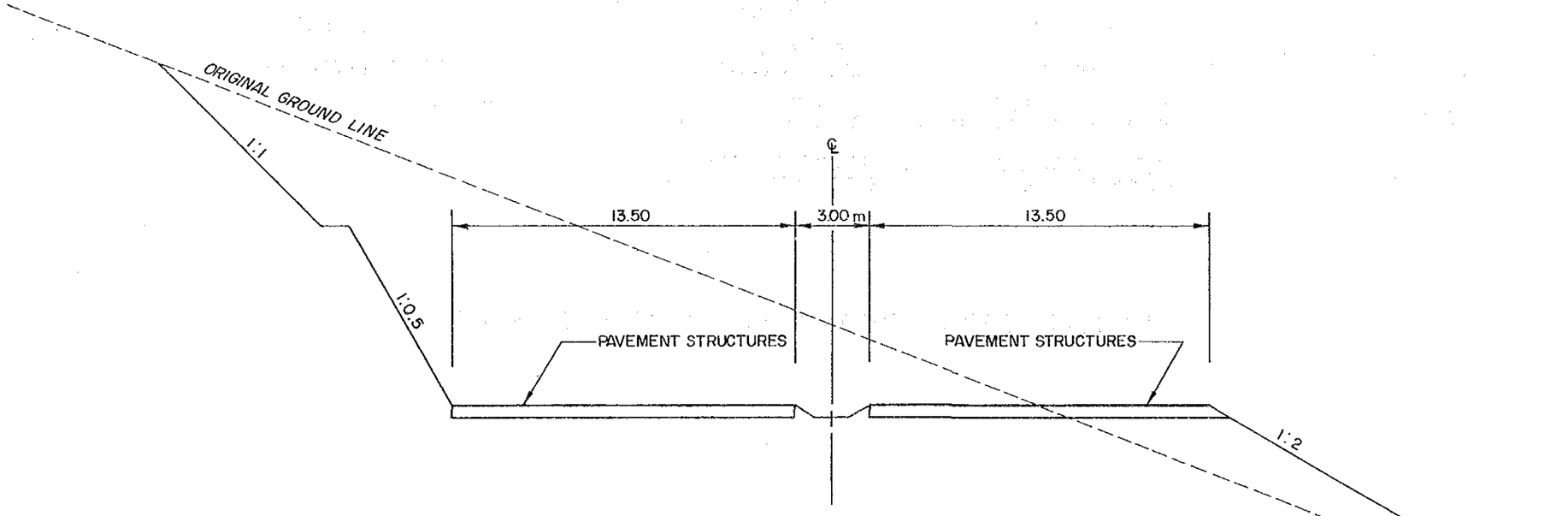


4 - LANE TYPICAL CROSS SECTION IN FLAT AREA (SOFT GROUND CONDITION)

Appendix 10.1 TYPICAL CROSS SECTION

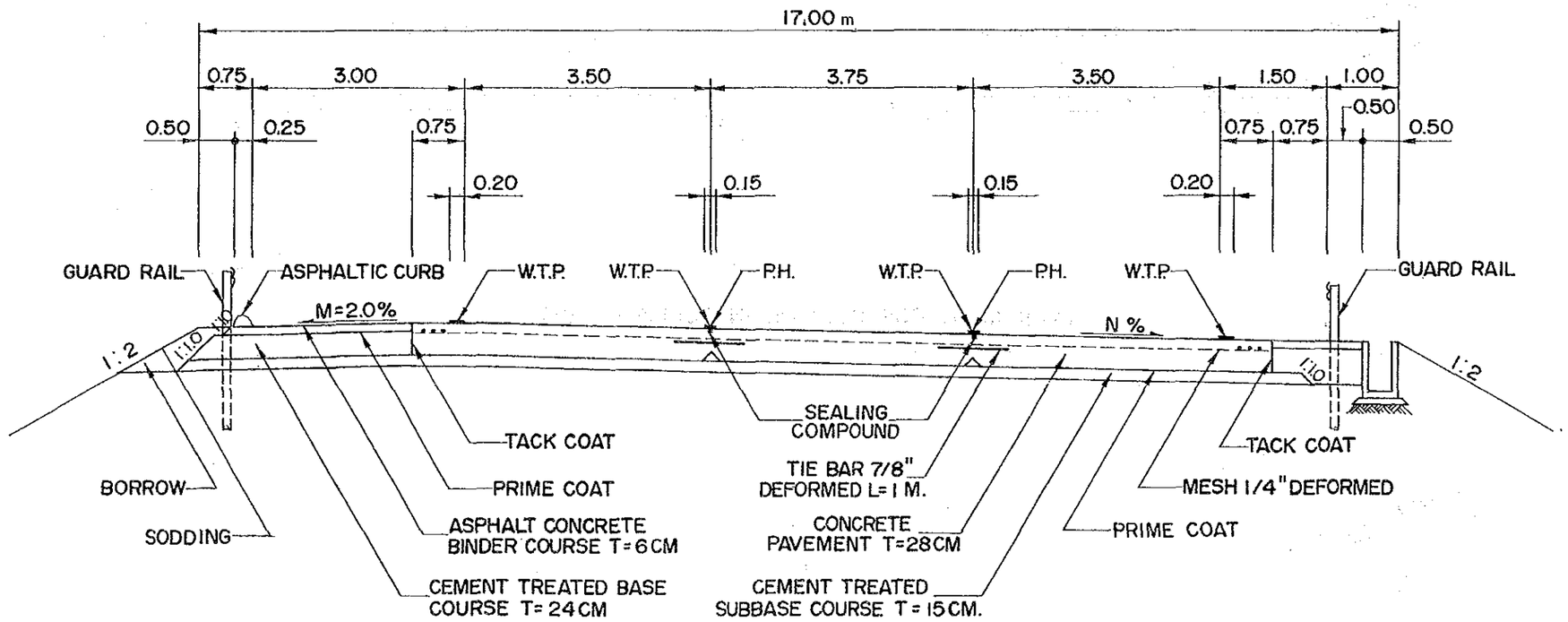


TYPICAL CROSS SECTION IN ROLLING AREA



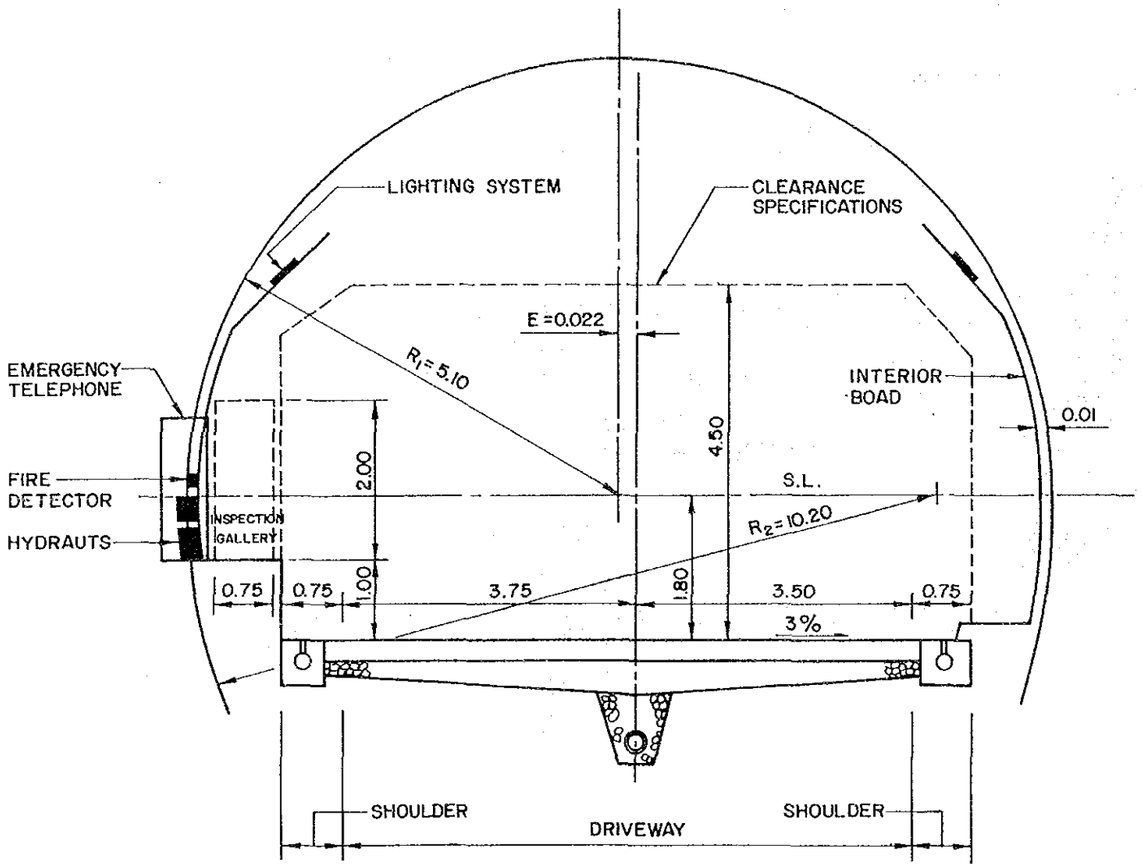
TYPICAL CROSS SECTION IN MOUNTAINCOUS AREA

Appendix 10.1 TYPICAL CROSS SECTION

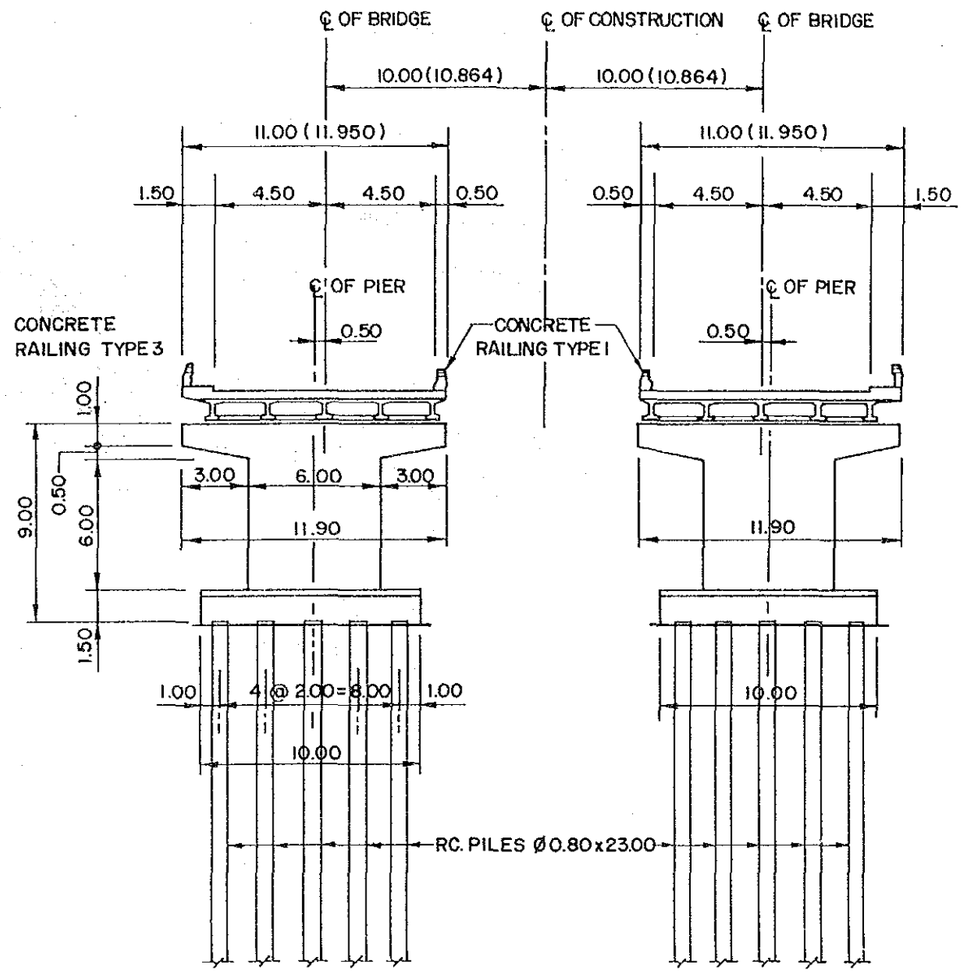


TYPICAL CROSS SECTION FOR PAVEMENT STRUCTURE

Appendix 10.1 TYPICAL CROSS SECTION



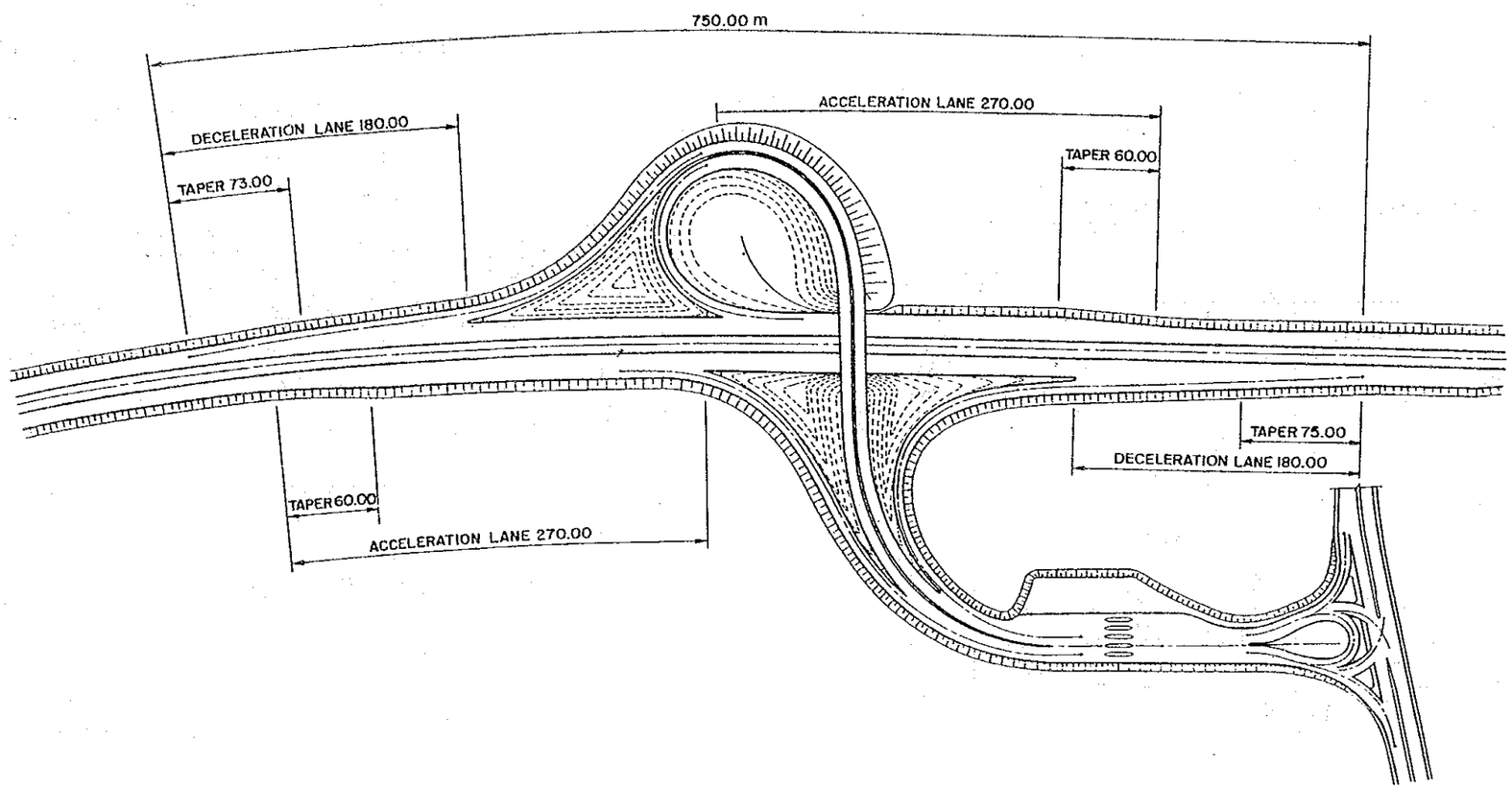
TUNNEL CROSS SECTION

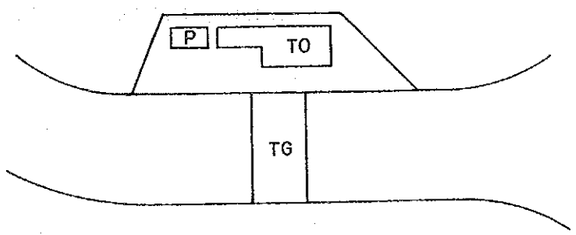


BRIDGE CROSS SECTION

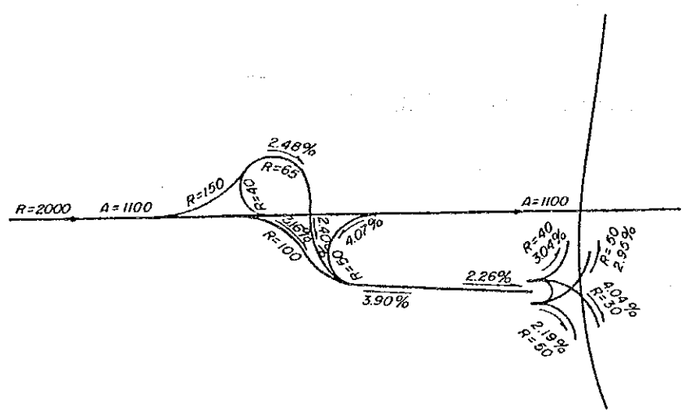
Appendix 10.1 TYPICAL CROSS SECTION

TYPICAL PLAN OF INTERCHANGE

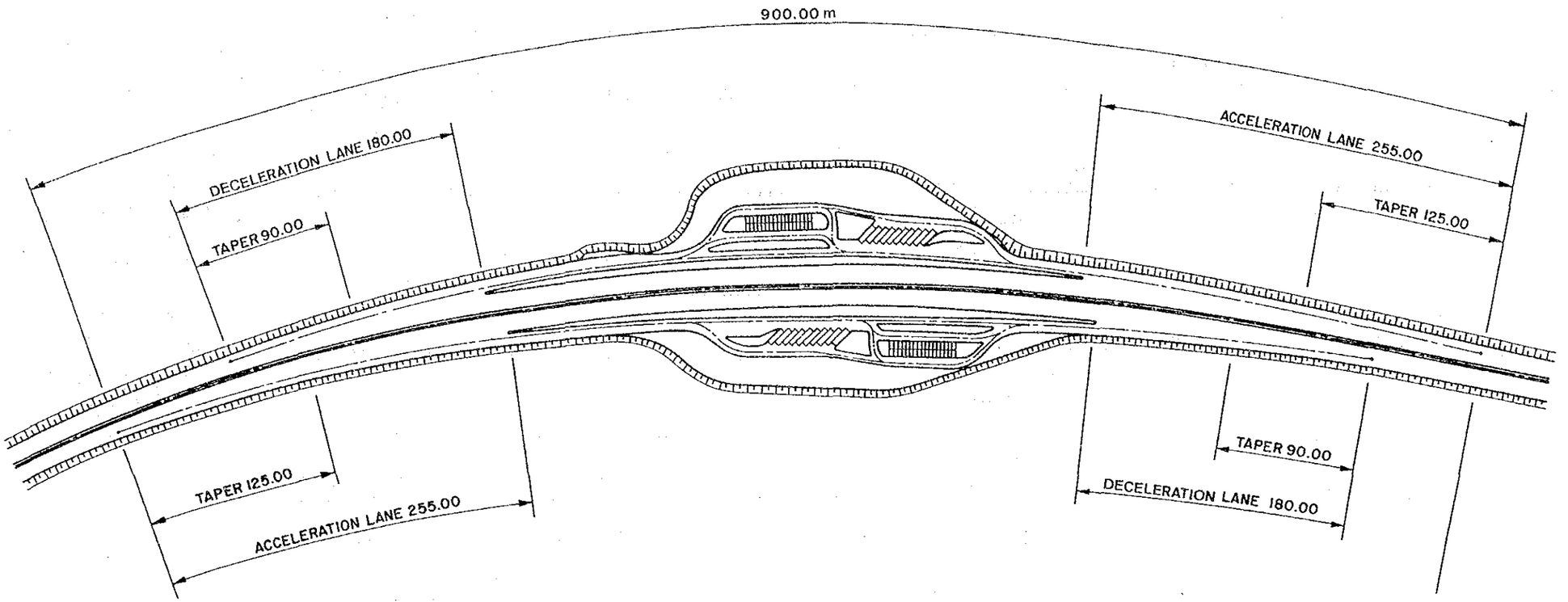


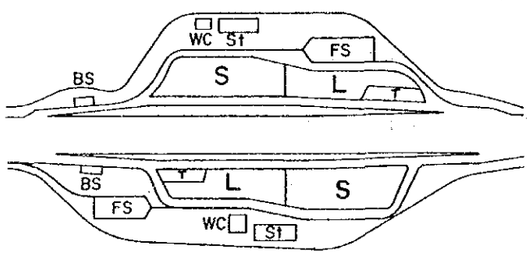


TO : Toll Office
TG : Toll Gate
P : Parking for Toll Office

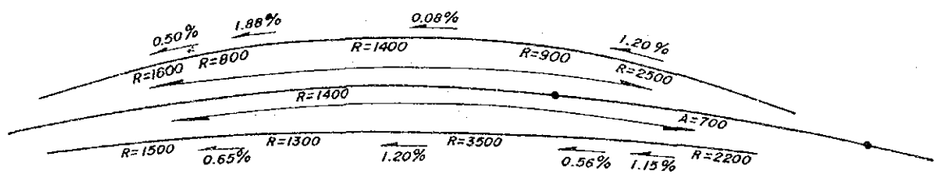


Appendix 10.1 TYPICAL CROSS SECTION





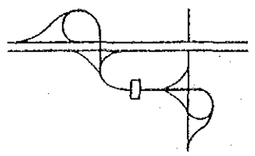
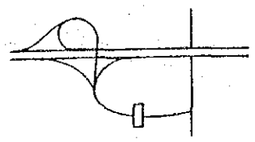
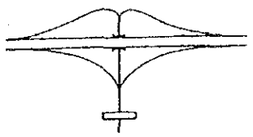
L : Parking for Large Vehicles
S : Parking for Small Vehicles
T : Parking for Trailers
BS : Bus Stop
FS : Food Store
WC : Water Closet



TYPICAL PLAN OF SERVICE AREA

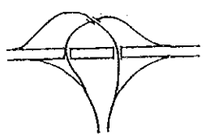
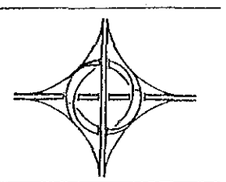
Appendix 10.2 UNIT COSTS

UNIT COSTS OF INTERCHANGE

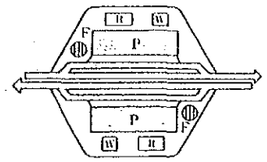
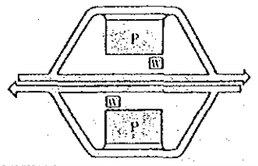
Type	Unit	Unit Cost (Baht)	Standard Required Area(m^2)	Illustration
Double Trumpet	each	180,000,000	113,000	
Single Trumpet	each	80,000,000	72,000	
At-Grade Y-Type	each	70,000,000	38,000	

Note : The above costs include all necessary facilities such as a toll collection office, toll gates, etc.

UNIT COSTS OF JUNCTION

Type	Unit	Unit Cost (Baht)	Standard Required Area (m^2)	Illustration
3-leg Junction	each	150,000,000	80,000	
4-leg Junction	each	800,000,000	100,000	

UNIT COSTS OF REST FACILITIES

Type	Unit	Unit cost costs (Baht)	Standard Required Area (m^2)	Illustration
Service Area	each	44,500,000	75,000	
Parking Area	each	20,500,000	30,000	

Notes: - The above costs include all necessary facilities such as parking lots, a restaurant, etc.

- In the above illustrations:
  - P : Parking Lot
  - F : Filling Station
  - W : Lavatory
  - R : Restaurant

UNIT COSTS OF SPECIAL STRUCTURES

Item	Unit	Unit Cost (Baht)
Long Span Bridge		
4-lane	m	526,000
6-lane	m	732,000
Tunnel (4-lane)	m	300,000
Main line Toll Facility	each	40,000,000

Note: Long span bridge presents one with more than 100 m of the span.

Appendix 10.2 UNIT COSTS

UNIT COSTS OF LAND ACQUISITION PER KILOMETER

Link	Unit Cost (Million Baht)	Remarks (Baht/Rai)
TM-1		
Bang Pa In-Angthong	10.0	200,000
Angthong-Nakhon Sawan	5.0	100,000
Nakhon Sawan-Si Satchanarai	3.0	60,000
Si Satchanarai-Lampang	1.0	20,000
Lampang-Chang Mai	7.5	150,000
Chiang Mai-Chiang Rai	1.5	30,000
TM-2		
Bang Pa In-Saraburi	10.0	200,000
Saraburi-Si Khiu	2.0	40,000
Si Khiu-Nong Khai	3.0	60,000
TM-3		
Phra Khanong-Rayong	25.0	500,000
Rayong-Chanthaburi	7.5	150,000
TM-4		
Phasi Charoin-Pak Tho	10.0	200,000
Pak Tho-Hua Hin	7.5	150,000
Hua Hin-Surat Thani	1.5	30,000
Surat Thani-Malaysia	5.0	100,000
TM-21	3.0	60,000
TM-31	(25.0)	(500,000)
TM-32	10.0	200,000
TM-33	10.0	200,000
TM-34		
Thanyaburi-Prachin Buri	10.0	200,000
Prachin Buri-Aranyaprathet	5.0	100,000
TM-35		
Chonburi-Kabin Buri	5.0	100,000
Kabin Buri-Nakhon Ratchasima	2.0	40,000
TM-36	10.0	200,000
TM-41	5.0	100,000
TM-42	5.0	100,000
TM-43	5.0	100,000

Notes: 1) Width of the right-of-way is 80 m.
2) TM-31 is to be constructed within the existing right of way.

Appendix 10.3 STANDARD COSTS OF TYPICAL SECTIONS

Work Item	Unit	Unit Cost (baht)	CONSTRUCTION QUANTITIES (PER KM)							CONSTRUCTION COST (1,000BAHT / KM)						
			4-lane				6-lane			4-lane				6-lane		
			Terrain	Flat		Rolling	Mountainous	Flat			Flat		Rolling	Mountainous	Flat		
				NG	SG			NG	SG	Outer Ring Motorway	NG	SG			NG	SG	Outer Ring Motorway
Earthwork																	
Clearing and Grubing	m2	2		49,000	69,000	54,000	58,000	56,000	76,000	45,600	98	138	108	116	112	152	91
Roadway Excavation (Earth)	m3	45		-	-	24,300	74,400	-	-	-	-	-	1,094	3,348	-	-	-
" " (Soft Rock)	m3	70		-	-	12,150	55,800	-	-	-	-	-	851	3,906	-	-	-
" " (Hard Rock)	m3	150		-	-	-	46,500	-	-	-	-	-	-	6,975	-	-	-
" " (Unstable)	m3	35		-	-	4,050	9,300	-	-	-	-	-	142	326	-	-	-
Soft Spot Excavation and Replacement	m3	320		820	1,230	-	-	960	1,440	864	262	394	-	-	307	461	276
Embankment (Excavation)	m3	70		-	-	36,450	31,000	-	-	-	-	-	2,552	2,170	-	-	-
Embankment (Borrow) d = 20 Km	m3	200		78,000	78,000	17,550	-	92,000	92,000	55,200	15,600	15,600	3,510	-	18,400	18,400	11,040
Embankment (Beam)	m3	100		-	40,000	-	-	-	40,000	24,000	-	4,000	-	-	-	4,000	2,400
Sand Mat	m3	280		-	34,000	-	-	-	37,500	22,500	-	9,520	-	-	-	10,500	6,300
Subbase and Base Course																	
Subbase	m3	280		900	900	900	900	900	900	540	252	252	252	252	252	252	151
Cement Stabilized Base	m3	450		4,700	4,700	4,700	4,700	5,735	5,735	3,441	2,115	2,115	2,115	2,115	2,581	2,581	1,548
Surface Course																	
Asphalt Prime Coat	m2	12		11,000	11,000	11,000	11,000	14,750	14,750	8,850	132	132	132	132	177	177	106
Asphalt Concrete	m3	1,900		225	225	225	225	225	225	135	428	428	428	428	428	428	257
Portland Cement Concrete Pavement (t=28cm) (including steel mesh)	m2	720		17,500	17,500	17,500	17,500	24,500	24,500	14,700	12,600	12,600	12,600	12,600	17,640	17,640	10,584
Structure																	
RC Pipe Culvert	m	2,070		250	370	540	260	320	440	264	518	766	1,118	538	662	911	546
RC Box Culvert	m	15,000		100	148	108	52	114	162	98	1,500	2,220	1,620	780	1,710	2,430	1,470
4-lane RC Bridge (Normal Ground)	m	161,000		10	-	5	5	-	-	-	1,610	-	805	805	-	-	-
" " (Soft Ground)	m	214,000		-	10	-	-	-	-	-	-	2,140	-	-	-	-	-
6-lane RC Bridge (Normal Ground)	m	209,000		-	-	-	-	10	-	-	-	-	-	-	2,090	-	-
" " (Soft Ground)	m	278,000		-	-	-	-	-	10	200	-	-	-	-	-	2,780	55,600
4-lane PC Bridge (Normal Ground)	m	221,000		20	-	10	10	-	-	-	4,420	-	2,210	2,210	-	-	-
" " (Soft Ground)	m	255,000		-	20	-	-	-	-	-	-	5,100	-	-	-	-	-
6-lane PC Bridge (Normal Ground)	m	285,000		-	-	-	-	20	-	-	-	-	-	-	5,700	-	-
" " (Soft Ground)	m	332,000		-	-	-	-	-	20	200	-	-	-	-	-	6,640	66,400
Bearing Unit	m2	2,800		-	1,360	-	-	-	1,520	3,040	-	3,808	-	-	-	4,256	8,512
Over Bridge on 4-lane Motorway	each	13,000,000		0.50	0.50	0.25	0.20	-	-	-	6,500	6,500	3,250	2,600	-	-	-
" " on 6-lane Motorway	each	14,700,000		-	-	-	-	0.50	0.50	0.50	-	-	-	-	7,350	7,350	7,350
TOTAL											46,034	65,712	32,785	39,300	57,409	78,957	172,633

Appendix 10.4 ECOMOMIC CONSTRUCTION COSTS FOR EACH LINK

ROUTE TM-1 (BANGKOK - CHIANG RAI)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
BANG PA-IN J.C. -	AYUTTHAYA	13.0	1194.5	119.4	131.4	130.0	1575.3	121.2	1430.8
AYUTTHAYA -	ANG THONG	30.5	2006.8	200.7	220.7	305.0	2733.2	89.6	2490.4
ANG THONG -	SING BURI J.C.	24.5	2382.9	238.3	262.1	122.5	3005.8	122.7	2717.5
SING BURI J.C. -	SING BURI	10.0	721.8	72.2	79.4	50.0	923.4	92.3	836.1
SING BURI -	IN BURI	24.5	1579.9	158.0	173.8	122.5	2034.2	83.0	1843.0
IN BURI -	CHAI NAT	24.2	1325.2	132.5	145.8	121.0	1724.5	71.3	1564.2
CHAI NAT -	UTHAI THANI	23.2	1239.6	124.0	136.4	116.0	1615.9	69.7	1465.9
UTHAI THANI -	NAKON SAWAN	25.6	1368.5	136.8	150.5	128.0	1783.9	69.7	1618.3
NAKON SAWAN -	PHO THALE	50.5	2610.0	261.0	287.1	252.5	3410.6	67.5	3094.7
PHO THALE -	SAM NGAM	41.0	2127.0	212.7	234.0	123.0	2696.7	65.8	2439.4
SAM NGAM -	PHITSANULOK	50.0	2570.4	257.0	282.7	150.0	3260.1	65.2	2949.1
PHITSANULOK -	SAWANKHALOK	55.0	2831.6	283.2	311.5	165.0	3591.3	65.3	3248.6
SAWANKHALOK -	SI SATCHANALAI	23.4	1249.4	124.9	137.4	70.2	1582.0	67.6	1430.8
SI SATCHANALAI -	LONG	64.1	2755.3	275.5	303.1	192.3	3526.2	55.0	3192.8
LONG -	LAMPANG	39.5	2964.6	296.5	326.1	39.5	3626.7	91.8	3268.0
LAMPANG -	LAMPHUN	65.8	4538.1	453.8	499.2	65.8	5556.9	84.5	5007.7
LAMPHUN -	CHAIANG MAI	24.9	1441.0	144.1	158.5	186.8	1930.4	77.5	1756.0
CHAIANG MAI -	DOI SAKET	14.6	826.7	82.7	90.9	109.5	1109.8	76.0	1009.8
DOI SAKET -	MAE CHEDI	58.5	2615.7	261.6	287.7	87.8	3252.8	55.6	2936.3
MAE CHEDI -	WIANG PA PAO	20.2	1091.8	109.2	120.1	30.3	1351.4	66.9	1219.3
WIANG PA PAO -	MAE SUAI	50.3	1993.2	199.3	219.3	75.4	2487.2	49.4	2246.0
MAE SUAI -	CHIANG RAI	22.3	1119.8	112.0	123.2	33.4	1388.4	62.3	1252.9
TOTAL		755.6	42553.8	4255.4	4680.9	2676.5	54166.6	72.6	49017.6

ROUTE TM-2 (O.R.R. - NONH KHAI)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
BANG PA-IN J.C. -	NONG KHAE	36.2	2667.2	266.7	293.4	362.0	3589.3	99.2	3266.6
NONG KHAE -	SARABURI	13.1	837.9	83.8	92.2	131.0	1144.8	87.4	1043.4
SARABURI -	SARABURI J.C.	8.7	1306.5	130.6	143.7	87.0	1667.8	191.7	1509.7
SARABURI J.C. -	PAK CHONG	49.6	2323.8	232.4	255.6	99.2	2911.0	58.7	2629.8
PAK CHONG -	SIKHIU	44.4	2230.2	223.0	245.3	88.8	2787.4	62.8	2517.5
SIKHIU -	S. NAKHON RATCHASIM	35.3	1921.2	192.1	211.3	70.6	2395.2	67.9	2162.8
S. NAKHON RATCHASIM -	NAKHON RATCHASIMA	7.7	571.9	57.2	62.9	23.1	715.1	92.9	645.9
NAKHON RATCHASIMA -	N. NAKHON RATCHASIM	11.0	724.3	72.4	79.7	33.0	909.3	82.7	821.7
N. NAKHON RATCHASIM -	KHONG	44.5	2314.4	231.4	254.6	133.5	2934.0	65.9	2653.9
KHONG -	BUA YAI	21.4	1161.6	116.2	127.8	64.2	1469.8	68.7	1329.2
BUA YAI -	PHON	28.9	1520.3	152.0	167.2	86.7	1926.3	66.7	1742.4
PHON -	BAN PHAI	31.0	1634.5	163.4	179.8	93.0	2070.7	66.8	1873.0
BAN PHAI -	KHON KEAN	43.6	2280.8	228.1	250.9	130.8	2890.6	66.3	2614.6
KHON KEAN -	UBOL RATTANA	25.1	1333.2	133.3	146.6	75.3	1688.4	67.3	1527.1
UBOL RATTANA -	NONG SEANG	51.3	2623.7	262.4	288.6	153.9	3328.6	64.9	3011.1
NONG SEANG -	UDON THANI	29.0	1551.0	155.1	170.6	87.0	1963.6	67.7	1776.0
UDON THANI -	THA BO	43.2	2224.7	222.5	244.7	129.6	2821.5	65.3	2552.3
THA BO -	NONG KAI	11.5	641.3	64.1	70.5	34.5	810.5	70.5	732.9
TOTAL		535.5	29868.4	2986.8	3285.5	1883.2	38024.0	71.0	34409.9

Appendix 10.4 ECOMOMIC CONSTRUCTION COSTS FOR EACH LINK

ROUTE TM-3

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
PHRA KHANONG -	LAT KRABANG	8.0	911.3	91.1	100.2	200.0	1302.6	162.8	1192.4
LAT KRABANG -	BANG PAKONG J.C.	29.5	2700.4	270.0	297.0	737.5	4005.0	135.8	3678.2
BANG PAKONG J.C. -	BANG PAKONG	1.5	212.3	21.2	23.4	37.5	294.4	196.3	268.7
BANG PAKONG -	NORTTH CHONBURI	20.5	1817.5	181.8	199.9	512.5	2711.7	132.3	2491.8
NORTTH CHONBURI -	CHONBURI J.C.	3.5	370.6	37.1	40.8	87.5	535.9	153.1	491.1
CHONBURI J.C. -	SOUTH CHONBURI	3.7	489.1	48.9	53.8	92.5	684.3	184.9	625.1
SOUTH CHONBURI -	LAEM CHABANG	28.5	1825.6	182.6	200.8	712.5	2921.5	102.5	2700.6
LAEM CHABANG -	PHATTAYA J.C.,I.C.	16.5	1088.5	108.8	119.7	412.5	1729.5	104.8	1597.8
PHATTAYA J.C.,I.C. -	BANG LAMUNG	16.1	867.9	86.8	95.5	402.5	1452.7	90.2	1347.7
BANG LAMUNG -	BAN CHANG J.C.	9.7	600.3	60.0	66.0	242.5	968.9	99.9	896.2
BAN CHANG J.C. -	MAP TA PHUT	12.0	676.7	67.7	74.4	300.0	1118.8	93.2	1036.9
MAP TA PHUT -	RAYONG	14.0	882.2	88.2	97.0	350.0	1417.4	101.2	1310.7
RAYONG -	KLAENG	41.8	2166.5	216.6	238.3	1045.0	3666.4	87.7	3404.3
KLAENG -	CHANTABURI	52.8	2622.1	262.2	288.4	396.0	3568.8	67.6	3251.5
LAEM CHABANG JC. -	LAEM CHABANG	7.7	291.5	29.2	32.1	192.5	545.2	70.8	510.0
BANG CHANG JC. -	U TAPHAO	6.8	581.0	58.1	63.9	170.0	873.1	128.4	802.8
U TAPHAO -	SATTAHIP	10.5	538.6	53.9	59.2	262.5	914.2	87.1	849.0
TOTAL		291.9	18972.2	1897.2	2086.7	6373.5	29329.8	100.5	27034.3

ROUTE TM-4 (O.R.M - HAT YAI)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
PHASI CHAREON J.C. -	SAMUT SAKHON	15.2	1680.1	168.0	184.8	152.0	2184.9	143.7	1981.6
SAMUT SAKHON -	DAMNOEN SADUAK	37.0	4120.7	412.1	453.3	370.0	5356.0	144.8	4857.4
DAMNOEN SADUAK -	WAT PHLENG J.C.	15.1	1342.6	134.3	147.7	151.0	1775.5	117.6	1613.1
WAT PHLENG J.C. -	PAK THO	4.8	487.5	48.7	53.6	48.0	637.8	132.9	578.8
PAK THO -	PETCHABURI	35.4	1851.2	185.1	203.6	354.0	2594.0	73.3	2370.0
PETCHABURI -	CHA-AM	38.7	1827.4	182.7	201.0	290.2	2501.4	64.6	2280.3
CHA-AM -	HUA HIN	25.7	1009.1	100.9	111.0	192.7	1413.7	55.0	1291.6
HUA HIN -	PRAN BURI	20.3	889.1	88.9	97.8	152.3	1228.1	60.5	1120.5
PRAN BURI -	JUI BURI	34.8	1811.0	181.1	199.2	52.2	2243.5	64.5	2024.3
JUI BURI -	PRACHUAP KHIRI KHAN	30.7	1645.4	164.5	181.0	46.1	2037.0	66.4	1837.9
PRACHUAP KHIRI KHAN -	THAP SAKAE	49.5	2209.0	220.9	243.0	74.3	2747.1	55.5	2479.8
THAP SAKAE -	BANG SAPHAN	23.1	1163.8	116.4	128.0	34.6	1442.8	62.5	1302.0
BANG SAPHAN -	PATHIU	62.3	2814.1	281.4	309.6	93.5	3498.5	56.2	3158.0
PATHIU -	CHUMPHON	29.9	1351.3	135.1	148.6	44.8	1679.9	56.2	1516.4
CHUMPHON -	LANG SUAN	64.0	3274.9	327.5	360.2	96.0	4058.7	63.4	3662.4
LANG SUAN -	THA CHANA	42.9	2209.9	221.0	243.1	64.4	2738.4	63.8	2471.0
THA CHANA -	SURAT THANI	51.5	2570.7	257.1	282.8	77.3	3187.8	61.9	2876.7
SURAT THANI -	BAN NA SAN J.C.	40.2	2076.9	207.7	228.5	60.3	2573.4	64.0	2322.1
BAN NA SAN J.C. -	BAN NA SAN	1.9	179.2	17.9	19.7	9.5	226.3	119.1	204.6
BAN NA SAN -	WIANG SA	18.6	1013.0	101.3	111.4	93.0	1318.7	70.9	1196.2
WIANG SA -	CHAWANG	34.7	1831.7	183.2	201.5	173.5	2389.9	68.9	2168.2
CHAWANG -	THUNG SONG	30.9	1618.9	161.9	178.1	154.5	2113.3	68.4	1917.4
THUNG SONG -	RON PHIBUN J.C.	16.4	839.5	83.9	92.3	82.0	1097.8	66.9	996.2
RON PHIBUN J.C. -	KHAN KHANUN	35.4	1866.2	186.6	205.3	177.0	2435.1	68.8	2209.3
KHAN KHANUN -	PHATTHALUNG	30.0	1585.2	158.5	174.4	150.0	2068.1	68.9	1876.3
PHATTHALUNG -	RATTAPHUM	54.9	2801.0	280.1	308.1	274.5	3663.7	66.7	3324.8
RATTAPHUM -	HAT YAI J.C.	23.1	1271.0	127.1	139.8	115.5	1653.5	71.6	1499.7
HAT YAI J.C. -	HAT YAI	2.0	291.1	29.1	32.0	10.0	362.2	181.1	327.0
HAT YAI -	SADAO	41.1	2099.3	209.9	230.9	205.5	2745.7	66.8	2491.7
SADAO -	MALAYSIA BORDER	13.3	676.5	67.7	74.4	66.5	885.1	66.5	803.2
HAT YAI JC. -	NORTH HATYAI	3.8	433.3	43.3	47.7	19.0	543.3	143.0	490.8
NORTH HATYAI -	SONGKHLA	24.2	1213.4	121.3	133.5	121.0	1589.2	65.7	1442.4
TOTAL		951.4	52054.0	5205.2	5725.9	4005.2	66990.4	70.4	60691.7

Appendix 10.4 ECOMOMIC CONSTRUCTION COSTS FOR EACH LINK

ROUTE TM-21 (NAKHON RATCHSIMA - UBON RATCHATHANI)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANSIAL COST	FINANCIAL COST/km	ECONOMIC COST
NAKHON RATCHASIMA -	CHAKKARAT	31.3	1824.8	182.5	200.7	93.9	2301.9	73.5	2081.1
CHAKKARAT -	LAM PLAI MAT	46.6	2392.2	239.2	263.1	139.8	3034.4	65.1	2744.9
LAM PLAI MAT -	BURI RAM	32.9	1728.1	172.8	190.1	98.7	2189.6	66.1	1980.5
BURI RAM -	SURIN	43.1	2256.2	225.6	248.2	129.3	2859.3	66.3	2586.3
SURIN -	SAMRONG THAP	47.1	2416.8	241.7	265.8	141.3	3065.6	65.1	2773.2
SAMRONG THAP -	SI SA KET	44.5	2325.1	232.5	255.8	133.5	2946.9	66.2	2665.5
SI SA KET -	KANTHARAROM	27.5	1451.3	145.1	159.6	82.5	1838.6	66.9	1663.0
KANTHARAROM -	UBON RATCHATHAN	28.1	1405.6	140.6	154.6	84.3	1785.0	63.5	1614.9
TOTAL		301.1	15800.0	1580.1	1738.0	903.3	20021.4	66.5	18109.6

ROUTE TM-31 (O.R.M)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
BANG PA-IN JC. -	KHLONG LIANG	15.8	2993.4	299.3	329.3	0.0	3622.1	229.2	3259.8
KHLONG LIANG -	THANYABURI	6.0	1183.2	118.3	130.2	0.0	1431.7	238.6	1288.5
THANYABURI -	LAM LUK KA	8.7	1681.9	168.2	185.0	0.0	2035.1	233.9	1831.6
LAM LUK KA -	MIN BURI	11.8	2297.4	229.7	252.7	0.0	2779.8	235.6	2501.8
MIN BURI -	BANG KAPI	3.7	758.4	75.8	83.4	0.0	917.6	248.0	825.8
BANG KAPI -	PHRA KHAONG	7.1	1386.4	138.6	152.5	0.0	1677.5	236.3	1509.8
PHRA KHAONG -	BANG PHLI	9.8	1885.1	188.5	207.4	0.0	2281.0	232.8	2052.9
BANG PHLI -	SAMUT PRAKAN	9.2	1774.3	177.4	195.2	0.0	2146.9	233.4	1932.2
SAMUT PRAKAN -	SAMUT PRAKAN	3.8	776.8	77.7	85.5	0.0	940.0	247.4	846.0
SAMUT PRAKAN -	PHRA PANDEANG	6.6	1963.4	196.3	216.0	0.0	2375.7	360.0	2138.2
PHRA PANDEANG -	BANG KHUN THIEN	14.0	2660.9	266.1	292.7	0.0	3219.7	230.0	2897.8
BANG KHUN THIEN -	PHSI CHANOEN	5.7	1127.8	112.8	124.1	0.0	1364.6	239.4	1228.2
PHSI CHANOEN -	PHSI CHANOEN	2.1	462.8	46.3	50.9	0.0	560.0	266.7	504.0
PHSI CHANOEN -	TALING CHAN	8.2	1589.6	159.0	174.9	0.0	1923.4	234.6	1731.1
TALING CHAN -	BANG YAI	9.9	1946.4	194.6	214.1	0.0	2355.1	237.9	2119.6
BANG YAI -	BANG BUA THONG	7.5	1460.3	146.0	160.6	0.0	1766.9	235.6	1590.2
BANG BUA THONG -	LAT LUM KAEO	12.8	2439.3	243.9	268.3	0.0	2951.5	230.6	2656.4
LAT LUM KAEO -	SAM KHOK	6.8	1800.9	180.1	198.1	0.0	2179.1	320.5	1961.2
SAM KHOK -	BANG PA-IN	10.5	2014.4	201.4	221.6	0.0	2437.5	232.1	2193.7
BANG PA-IN -	BANG PA-IN JC.	7.7	1497.2	149.7	164.7	0.0	1811.6	235.3	1630.5
TOTAL		167.7	33700.0	3370.0	3707.0	0.0	40777.0	243.2	36699.3

ROUTE TM-32 (O.R.R. - KANCHANABURI)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
BANG YAI -	NAKHON PATHOM	41.0	3271.7	327.2	359.9	410.0	4368.8	106.6	3972.9
NAKHON PATHOM -	BANG PHONG J.C.	12.0	1593.1	159.3	175.2	120.0	2047.7	170.6	1854.9
BANG PHONG J.C. -	THA MAKA	22.3	1313.0	131.3	144.4	223.0	1811.7	81.2	1652.8
THA MAKA -	KANCHANABURI	24.7	1238.0	123.8	136.2	247.0	1745.0	70.6	1595.2
TOTAL		100.0	7415.8	741.6	815.7	1000.0	9973.1	99.7	9075.8

Appendix 10.4 ECOMOMIC CONSTRUCTION COSTS FOR EACH LINK

ROUTE TM-33 (O.R.R. - SUPHAN BURI)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
BANG BUA THONG -	LAT LUM KAEO	14.0	935.7	93.6	102.9	140.0	1272.2	90.9	1159.0
LAT LUM KAEO -	LAT BUA LUANG	14.0	786.4	78.6	86.5	140.0	1091.6	78.0	996.4
LAT BUA LUANG -	SUPHAN BURI	34.0	1835.2	183.5	201.9	340.0	2560.6	75.3	2338.6
TOTAL		62.0	3557.3	355.7	391.3	620.0	4924.4	79.4	4493.9

ROUTE TM-34 (O.R.R. - ARANYAPRATHET)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
THANYABURI -	OONGKHARAK	36.9	2512.8	251.3	276.4	369.0	3409.5	92.4	3105.4
OONGKHARAK -	NAKHON NAYOK	22.1	2261.2	226.1	248.7	221.0	2957.0	133.8	2683.4
NAKHON NAYOK -	PRACHIN BURI	19.7	1163.0	116.3	127.9	197.0	1604.2	81.4	1463.5
PRACHIN BURI -	KABIN BURI	43.1	2337.5	233.7	257.1	431.0	3259.4	75.6	2976.5
KABIN BURI -	KABIN BURI	3.2	1013.6	101.4	111.5	16.0	1242.5	388.3	1119.8
KABIN BURI -	SA KAEN	39.7	2148.1	214.8	236.3	198.5	2797.7	70.5	2537.8
SA KAEN -	WATTHANA NAKHJON	25.3	1438.8	143.9	158.3	126.5	1867.4	73.8	1693.3
WATTHANA NAKHJON -	ARRANYAPRATHET	21.7	1090.3	109.0	119.9	108.5	1427.7	65.8	1295.8
TOTAL		211.7	13965.1	1396.5	1536.2	1667.5	18565.3	87.7	16875.5

ROUTE TM-35 (CHON BURI - NAKHON RATCHASIMA)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
CHON BURI -	PHANAT NIKHON	16.2	1241.2	124.1	136.5	81.0	1582.9	97.7	1432.7
PHANAT NIKHON -	PLANG TAO	24.3	1589.5	159.0	174.8	121.5	2044.8	84.1	1852.5
PLANG TAO -	KABIN BURI	63.5	4778.6	477.9	525.6	317.5	6099.6	96.1	5521.4
KABIN BURI -	PAK THONG CHAI	104.7	6554.0	655.4	720.9	523.5	8453.8	80.7	7660.8
PAK THONG CHAI -	NAKHON RATCHASIMA	30.4	2049.8	205.0	225.5	60.8	2541.1	83.6	2293.1
TOTAL		239.1	16213.2	1621.3	1783.4	1104.3	20722.2	86.7	18760.4

Appendix 10.4 ECOMOMIC CONSTRUCTION COSTS FOR EACH LINK

ROUTE TM-36 (RATCHABURI - CHACHOENGSAO)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
WAT PHLENG -	BANG PANG	41.3	2231.7	223.2	245.5	413.0	3113.4	75.4	2843.3
BANG PANG -	KANPHAENG SAEN	23.7	1360.0	136.0	149.6	237.0	1882.6	79.4	1718.0
KANPHAENG SAEN -	SANG PHI NONG	16.4	882.7	88.3	97.1	164.0	1232.1	75.1	1125.3
SANG PHI NONG -	SUPHAN BURI	32.4	1692.7	169.3	186.2	324.0	2372.2	73.2	2167.4
SUPHAN BURI -	SUPHAN BURI	6.0	713.3	71.3	78.5	60.0	923.1	153.8	836.7
SUPHAN BURI -	PHNOM BURI	48.1	2491.7	249.2	274.1	481.0	3496.0	72.7	3194.5
PHNOM BURI -	THA WANG	7.1	734.2	73.4	80.8	71.0	959.3	135.1	870.5
THA WANG -	LOP BURI	16.4	1000.4	100.0	110.0	164.0	1374.5	83.8	1253.4
LOP BURI -	N. SARABURI	31.6	1664.0	166.4	183.0	316.0	2329.5	73.7	2128.1
N. SARABURI -	SARBURI	22.5	1183.2	118.3	130.1	225.0	1656.6	73.6	1513.5
SARBURI -	NAKHON NAYOK	45.9	2394.1	239.4	263.3	459.0	3355.8	73.1	3066.2
NAKHON NAYOK -	NAKHON NAYOK	9.4	537.9	53.8	59.2	94.0	744.9	79.2	679.8
NAKHON NAYOK -	CHACHONGSAO	48.2	2588.7	258.9	284.8	482.0	3614.3	75.0	3301.1
CHACHONGSAO -	BANG PAKONG	16.8	902.4	90.2	99.3	168.0	1259.9	75:0	1150.7
TOTAL		365.8	20377.0	2037.7	2241.5	3658.0	28314.2	77.4	25848.6

ROUTE TM-41 (KRABI - KHNONM)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
KLONG SAI -	KRABI	18.8	1193.5	119.4	131.3	94.0	1538.2	81.8	1393.7
KRABI -	PRA SAENG	55.2	2260.2	226.0	248.6	276.0	3010.9	54.5	2737.4
PRA SAENG -	PRA SAENG	2.0	230.7	23.1	25.4	10.0	289.1	144.5	261.2
PRA SAENG -	BAN NA SAN	37.5	1610.1	161.0	177.1	187.5	2135.8	57.0	1940.9
BAN NA SAN -	KANCHANADIT	47.0	2389.9	239.0	262.9	235.0	3126.8	66.5	2837.7
KANCHANADIT -	KHANON	30.2	1556.6	155.7	171.2	151.0	2034.4	67.4	1846.1
TOTAL		190.7	9241.1	924.1	1016.5	953.5	12135.2	63.6	11017.0

ROUTE TM-42 (PHRASAENG - PHUKET)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
PHRA SAENG -	AO LUK	47.4	2356.9	235.7	259.3	237.0	3088.9	65.2	2803.7
AO LUK -	PHANGNGA	25.6	1323.9	132.4	145.6	128.0	1729.9	67.6	1569.7
PHANGNGA -	THAKUA THUNG	24.0	1289.7	129.0	141.9	120.0	1680.5	70.0	1524.5
THAKUA THUNG -	PHUKET AIRPORT	19.7	1103.6	110.4	121.4	98.5	1433.8	72.8	1300.3
PHUKET AIRPORT -	PHUKET	19.3	972.0	97.2	106.9	96.5	1272.7	65.9	1155.1
TOTAL		136.0	7046.1	704.6	775.1	680.0	9205.8	67.7	8353.2

ROUTE TM-43 (RON PHIBUN - NAKHON SI THARMARAT)

(UNIT:MILLION BAHT)

SECTION		LENGTH (km)	DIRECT CONSTRUCTION COST	PHYSICAL CONTINGENCIES	ENGINEERING & SUPERVISION	LAND ACQUISITION	FINANCIAL COST	FINANCIAL COST/km	ECONOMIC COST
RON PHIBUN -	NAKHON SI THAMARAT	36.9	2063.7	206.4	227.0	184.5	2681.5	72.7	2431.8
TOTAL		36.9	2063.7	206.4	227.0	184.5	2681.5	72.7	2431.8

Appendix 10.5 ECONOMIC VALUES FOR ESTIMATING VOC

COST OF VEHICLES

(Baht)

Vehicle Type	Cost of Customs & Duties (Incl.Tires)					Selling Price(Financial)	Business & Municipal Tax	Total Tax	Economic Cost(Incl. Tires)	Financial Cost(Excl. Tires)	Economic Cost(Excl Tires)
	Imported Parts	Import Duty	Business Tax	Municipal Tax	Sub-total of Tax						
P/C	92,928	104,079	3,215	322	107,616	526,000	173,580	281,196	244,804	522,488	241,852
L/B	119,850	35,955	2,542	254	38,751	313,000	30,987	69,738	243,262	308,768	239,726
M/B	225,360	22,536	4,045	405	26,986	532,600	52,727	79,713	452,887	517,030	439,855
H/B	592,386	59,239	10,663	1,063	70,935	1,400,000	138,600	209,535	1,190,465	1,367,690	1,163,441
P/P	118,318	35,495	2,510	251	38,256	309,000	30,591	68,847	240,153	304,768	236,617
L/T	76,265	22,880	1,618	162	24,660	295,800	29,284	53,944	241,856	291,568	238,320
M/T	215,798	21,580	3,874	387	25,841	510,000	50,490	76,331	433,669	494,430	420,637
H/T	452,752	45,275	8,127	813	54,215	1,070,000	105,930	160,145	909,855	1,031,220	877,425

SALVAGE VALUES
(Percent of Vehicle Price)

Road Type	PC	LB	MB	HB	PP	LT	MT	HT
Paved (Good)	25	20	15	15	20	20	15	15
Laterite (Good)	15	12	10	10	12	12	10	10
Laterite (Poor)	5	5	5	5	5	5	5	5

Appendix 10.5 ECONOMIC VALUES FOR ESTIMATING VOC

VARIATION IN VEHICLE LIFE AT DIFFERENT SPEEDS
(Year)

Speed	PC	LB	MB	HB	PP	LT	MT	HT
Paved Road (Good Condition)								
20	13.94	11.16	13.13	13.26	11.16	11.21	13.13	13.45
30	13.41	10.80	12.79	12.88	10.80	10.83	12.79	13.00
40	12.97	10.50	12.49	12.55	10.50	10.51	12.49	12.62
50	12.60	10.23	12.23	12.26	10.23	10.24	12.23	12.29
60	12.28	10.00	12.00	12.00	10.00	10.00	12.00	12.00
70	12.00	9.80	11.79	11.77	9.80	9.79	11.79	11.75
80	11.76	9.62	11.60	11.57	9.62	9.61	11.60	11.53
90	11.54	9.46	11.43	11.40	9.46	9.44	11.43	11.34
100	11.35	9.31	11.28	11.26	9.31	9.30	11.28	11.17
110	11.18	9.17	11.15	11.15	9.17	9.19	11.15	11.02
120	11.03	9.04	11.04	10.35	9.04	8.39	11.04	10.89
Laterite Road (Good Condition)								
20	9.87	8.70	9.53	9.71	8.70	8.73	9.53	9.68
30	9.53	8.43	9.30	9.44	8.43	8.44	9.30	9.38
40	9.24	8.20	9.09	9.20	8.20	8.21	9.09	9.12
50	9.00	8.00	8.91	9.00	8.00	8.00	8.91	8.89
60	8.79	7.83	8.75	8.82	7.83	7.82	8.75	8.70
70	8.61	7.68	8.61	8.66	7.68	7.67	8.61	8.53
80	8.45	7.54	8.48	8.52	7.54	7.53	8.48	8.38
Laterite Road (Poor Condition)								
20	6.10	5.15	6.14	6.16	5.15	5.15	6.14	6.18
30	5.91	5.00	6.00	6.00	5.00	5.00	6.00	6.00
40	5.76	4.88	5.88	5.86	4.88	4.87	5.88	5.85
50	5.63	4.77	5.77	5.74	4.77	4.76	5.77	5.78

ANNUAL KILOMETRAGE

Speed	PC	LB	MB	HB	PP	LT	MT	HT
20	15,500	25,200	31,200	76,000	25,200	22,000	31,200	55,000
30	17,000	27,400	33,400	82,000	27,400	24,000	33,400	60,000
40	18,500	29,600	35,600	88,000	29,600	26,000	35,600	65,000
50	20,000	31,800	37,800	94,000	31,800	28,000	37,800	70,000
60	21,500	34,000	40,000	100,000	34,000	30,000	40,000	75,000
70	23,000	36,200	42,200	106,000	36,200	32,000	42,200	80,000
80	24,500	38,400	44,400	112,000	38,400	34,000	44,400	85,000
90	26,000	40,600	46,600	118,000	40,600	36,000	46,600	90,000
100	27,500	42,800	48,800	124,000	42,800	38,000	48,800	95,000
110	29,000	45,000	51,000	130,000	45,000	40,000	51,000	100,000
120	30,500	47,200	53,200	136,000	47,200	42,000	53,200	105,000

Appendix 10.5 ECONOMIC VALUES FOR ESTIMATING VOC

VARIATION IN ANNUAL ECONOMIC CAPITAL COST
(Baht/Year)

Speed	P/C	L/B	M/B	H/B	P/P	L/T	M/T	H/T
Paved Road (Good Condition)								
20	34,670	37,820	65,869	173,577	37,329	37,527	62,992	130,208
30	35,118	38,354	66,541	175,524	37,856	38,083	63,634	131,899
40	35,522	38,830	67,170	177,328	38,327	38,586	64,235	133,439
50	35,888	39,286	67,743	179,006	38,776	39,038	64,784	134,866
60	36,226	39,696	68,275	180,591	39,181	39,463	65,292	136,195
70	36,538	40,069	68,781	182,060	39,549	39,853	65,776	137,402
80	36,820	40,420	69,257	183,392	39,896	40,203	66,231	138,513
90	37,090	40,744	69,698	184,566	40,216	40,546	66,653	139,513
100	37,332	41,059	70,100	185,564	40,527	40,840	67,038	140,440
110	37,557	41,363	70,459	186,367	40,827	41,077	67,380	141,285
120	37,762	41,655	70,769	192,792	41,115	43,007	67,677	142,039
Laterite Road (Good Condition)								
20	40,995	43,832	77,210	202,269	43,264	43,494	73,836	152,785
30	41,707	44,593	78,200	205,232	44,015	44,302	74,783	155,294
40	42,360	45,284	79,152	208,026	44,696	44,987	75,694	157,615
50	42,935	45,919	80,007	210,479	45,323	45,649	76,511	159,792
60	43,467	46,486	80,799	212,790	45,883	46,247	77,268	161,684
70	43,944	47,009	81,518	214,932	46,399	46,768	77,956	163,454
80	44,387	47,516	82,208	216,877	46,900	47,274	78,617	165,081
Laterite Road (Poor Condition)								
20	56,695	63,249	102,657	270,940	62,429	62,878	98,172	203,888
30	57,929	64,616	104,274	275,810	63,778	64,237	99,718	208,006
40	58,963	65,771	105,723	280,299	64,918	65,484	101,104	211,640
50	59,905	66,883	107,107	284,327	66,015	66,593	102,427	213,402

Appendix 10.6 CREW SALARIES AND ALLOWANCES

Appendix 10.6 CREW SALARIES AND ALLOWANCES

CREW SALARIES AND ALLOWANCES
(Baht/year)

	L/B	M/B	H/B	P/P	L/T	M/T	H/T
Financial							
Driver salary	49,200	49,200	61,200	49,200	49,200	44,400	55,200
Driver allowance	–	27,600	34,800	–	–	18,000	28,600
Assistant salary	–	31,200	79,200	–	–	31,200	62,400
Total	49,200	108,000	175,200	49,200	49,200	93,600	146,200
Economic							
Driver salary	34,400	34,400	55,080	34,400	34,400	35,500	44,200
Driver allowance	–	27,600	34,800	–	–	18,000	28,600
Assistant salary	–	18,700	47,500	–	–	18,700	37,400
Total	34,400	80,700	137,400	34,400	34,400	72,200	110,200

Appendix 10.7 COST BENEFIT CASH FLOW (CASE 1 — CASE 5)

COST BENEFIT CASH FLOW (Case 1)

(Million Baht / year)

No.	YEAR	COST				BENEFIT
		CONSTRUC-TION	MAINTE-NANCE	OPERATION	TOTAL COST	
1	1991	16,166			16,166	
2	1992	16,166	63	79	16,308	3,812
3	1993	16,166	126	157	16,449	5,756
4	1994	16,166	189	236	16,591	8,692
5	1995	16,166	252	315	16,733	13,125
6	1996	16,996	315	393	17,704	19,819
7	1997	16,996	393	491	17,880	30,589
8	1998	16,996	471	589	18,057	41,360
9	1999	16,996	550	687	18,233	52,130
10	2000	16,996	628	785	18,409	62,901
11	2001	15,701	706	883	17,291	73,671
12	2002	15,701	793	992	17,487	71,834
13	2003	15,701	881	1,101	17,683	69,997
14	2004	15,701	968	1,210	17,879	68,161
15	2005	15,701	1,055	1,319	18,075	66,324
16	2006	15,701	1,142	1,428	18,271	64,487
17	2007	15,701	1,229	1,537	18,467	62,650
18	2008	15,701	1,316	1,646	18,663	60,813
19	2009	15,701	1,403	1,755	18,859	58,977
20	2010	15,701	1,490	1,864	19,055	57,140
21	2011		1,577	1,973	3,550	55,303
22	2012		1,577	1,973	3,550	55,303
23	2013		1,577	1,973	3,550	55,303
24	2014		1,577	1,973	3,550	55,303
25	2015		1,577	1,973	3,550	55,303
26	2016		1,577	1,973	3,550	55,303
27	2017		1,577	1,973	3,550	55,303
28	2018		1,577	1,973	3,550	55,303
29	2019		1,577	1,973	3,550	55,303
30	2020		1,577	1,973	3,550	55,303
31	2021		1,577	1,973	3,550	55,303
32	2022		1,577	1,973	3,550	55,303
33	2023		1,577	1,973	3,550	55,303
34	2024		1,577	1,973	3,550	55,303
35	2025		1,577	1,973	3,550	55,303
36	2026		1,577	1,973	3,550	55,303
37	2027		1,577	1,973	3,550	55,303
38	2028		1,577	1,973	3,550	55,303
39	2029		1,577	1,973	3,550	55,303
40	2030		1,577	1,973	3,550	55,303

EIRR 27.78 (%)
NPV* 133,094 (Million Baht)
B/C* 2.01

Note: * Discount Rate = 12%

COST BENEFIT CASH FLOW (Case 2)

(Million Baht / year)

No.	YEAR	COST				BENEFIT
		CONSTRUC-TION	MAINTE-NANCE	OPERATION	TOTAL COST	
1	1991	16,166			16,166	
2	1992	16,166	63	79	16,308	3,812
3	1993	16,166	126	157	16,449	5,756
4	1994	16,166	189	236	16,591	8,692
5	1995	16,166	252	315	16,733	13,125
6	1996	16,788	315	393	17,496	19,819
7	1997	16,788	393	492	17,673	26,128
8	1998	16,788	472	590	17,850	32,438
9	1999	16,788	551	689	18,027	38,747
10	2000	16,788	629	787	18,204	45,057
11	2001	15,805	708	885	17,398	51,366
12	2002	15,805	795	994	17,593	51,760
13	2003	15,805	882	1,103	17,789	52,153
14	2004	15,805	969	1,211	17,985	52,547
15	2005	15,805	1,056	1,320	18,181	52,941
16	2006	15,805	1,143	1,429	18,376	53,335
17	2007	15,805	1,230	1,538	18,572	53,728
18	2008	15,805	1,316	1,647	18,768	54,122
19	2009	15,805	1,403	1,755	18,963	54,516
20	2010	15,805	1,490	1,864	19,159	54,909
21	2011		1,577	1,973	3,550	55,303
22	2012		1,577	1,973	3,550	55,303
23	2013		1,577	1,973	3,550	55,303
24	2014		1,577	1,973	3,550	55,303
25	2015		1,577	1,973	3,550	55,303
26	2016		1,577	1,973	3,550	55,303
27	2017		1,577	1,973	3,550	55,303
28	2018		1,577	1,973	3,550	55,303
29	2019		1,577	1,973	3,550	55,303
30	2020		1,577	1,973	3,550	55,303
31	2021		1,577	1,973	3,550	55,303
32	2022		1,577	1,973	3,550	55,303
33	2023		1,577	1,973	3,550	55,303
34	2024		1,577	1,973	3,550	55,303
35	2025		1,577	1,973	3,550	55,303
36	2026		1,577	1,973	3,550	55,303
37	2027		1,577	1,973	3,550	55,303
38	2028		1,577	1,973	3,550	55,303
39	2029		1,577	1,973	3,550	55,303
40	2030		1,577	1,973	3,550	55,303

EIRR 23.09 (%)
NPV* 91,098 (Million Baht)
B/C* 1.69

Note: * Discount Rate = 12%

Appendix 10.7 COST BENEFIT CASH FLOW (CASE 1 – CASE 5)

COST BENEFIT CASH FLOW (Case 3)

(Million Baht / year)

No.	YEAR	COST				BENEFIT
		CONSTRUC-TION	MAINTE-NANCE	OPERATION	TOTAL COST	
1	1991	22,741			22,741	
2	1992	22,741	75	93	22,909	5,432
3	1993	22,741	149	187	23,077	8,203
4	1994	22,741	224	280	23,245	12,386
5	1995	22,741	299	374	23,413	18,703
6	1996	11,888	374	467	12,729	28,242
7	1997	11,888	446	558	12,892	38,826
8	1998	11,888	519	649	13,056	49,410
9	1999	11,888	591	740	13,219	59,995
10	2000	11,888	664	830	13,382	70,579
11	2001	14,967	737	921	16,625	81,163
12	2002	14,967	821	1,026	16,814	78,577
13	2003	14,967	905	1,131	17,004	75,991
14	2004	14,967	989	1,237	17,193	73,405
15	2005	14,967	1,073	1,342	17,382	70,819
16	2006	14,967	1,157	1,447	17,571	68,233
17	2007	14,967	1,241	1,552	17,761	65,647
18	2008	14,967	1,325	1,657	17,950	63,061
19	2009	14,967	1,409	1,762	18,139	60,475
20	2010	14,967	1,493	1,868	18,328	57,889
21	2011		1,577	1,973	3,550	55,303
22	2012		1,577	1,973	3,550	55,303
23	2013		1,577	1,973	3,550	55,303
24	2014		1,577	1,973	3,550	55,303
25	2015		1,577	1,973	3,550	55,303
26	2016		1,577	1,973	3,550	55,303
27	2017		1,577	1,973	3,550	55,303
28	2018		1,577	1,973	3,550	55,303
29	2019		1,577	1,973	3,550	55,303
30	2020		1,577	1,973	3,550	55,303
31	2021		1,577	1,973	3,550	55,303
32	2022		1,577	1,973	3,550	55,303
33	2023		1,577	1,973	3,550	55,303
34	2024		1,577	1,973	3,550	55,303
35	2025		1,577	1,973	3,550	55,303
36	2026		1,577	1,973	3,550	55,303
37	2027		1,577	1,973	3,550	55,303
38	2028		1,577	1,973	3,550	55,303
39	2029		1,577	1,973	3,550	55,303
40	2030		1,577	1,973	3,550	55,303

EIRR 27.75 (%)
NPV* 154,544 (Million Baht)
B/C* 2.07

Note: * Discount Rate = 12%

COST BENEFIT CASH FLOW (Case 4)

(Million Baht / year)

No.	YEAR	COST				BENEFIT
		CONSTRUC-TION	MAINTE-NANCE	OPERATION	TOTAL COST	
1	1991	10,898			10,898	
2	1992	10,898	52	65	11,015	3,881
3	1993	10,898	104	130	11,132	5,860
4	1994	10,898	156	196	11,250	8,849
5	1995	10,898	208	261	11,367	13,362
6	1996	12,266	261	326	12,852	20,177
7	1997	12,266	332	415	13,012	26,983
8	1998	12,266	403	504	13,173	33,789
9	1999	12,266	474	593	13,333	40,596
10	2000	12,266	545	682	13,493	47,402
11	2001	20,700	616	771	22,087	54,208
12	2002	20,700	712	891	22,303	54,318
13	2003	20,700	808	1,011	22,520	54,427
14	2004	20,700	905	1,131	22,736	54,537
15	2005	20,700	1,001	1,252	22,952	54,646
16	2006	20,700	1,097	1,372	23,169	54,756
17	2007	20,700	1,193	1,492	23,385	54,865
18	2008	20,700	1,289	1,612	23,601	54,975
19	2009	20,700	1,385	1,732	23,818	55,084
20	2010	20,700	1,481	1,853	24,034	55,194
21	2011		1,577	1,973	3,550	55,303
22	2012		1,577	1,973	3,550	55,303
23	2013		1,577	1,973	3,550	55,303
24	2014		1,577	1,973	3,550	55,303
25	2015		1,577	1,973	3,550	55,303
26	2016		1,577	1,973	3,550	55,303
27	2017		1,577	1,973	3,550	55,303
28	2018		1,577	1,973	3,550	55,303
29	2019		1,577	1,973	3,550	55,303
30	2020		1,577	1,973	3,550	55,303
31	2021		1,577	1,973	3,550	55,303
32	2022		1,577	1,973	3,550	55,303
33	2023		1,577	1,973	3,550	55,303
34	2024		1,577	1,973	3,550	55,303
35	2025		1,577	1,973	3,550	55,303
36	2026		1,577	1,973	3,550	55,303
37	2027		1,577	1,973	3,550	55,303
38	2028		1,577	1,973	3,550	55,303
39	2029		1,577	1,973	3,550	55,303
40	2030		1,577	1,973	3,550	55,303

EIRR 33.40 (%)
NPV* 117,356 (Million Baht)
B/C* 2.05

Note: * Discount Rate = 12%

Appendix 10.7 COST BENEFIT CASH FLOW (CASE 1 — CASE 5)

COST BENEFIT CASH FLOW (Case 5)

(Million Baht / year)

No.	YEAR	COST				BENEFIT
		CONSTRUC-TION	MAINTE-NANCE	OPERATION	TOTAL COST	
1	1991	10,898			10,898	
2	1992	10,898	52	65	11,015	3,881
3	1993	10,898	104	130	11,132	5,860
4	1994	10,898	156	196	11,250	8,849
5	1995	10,898	208	261	11,367	13,362
6	1996	12,952	261	326	13,538	20,177
7	1997	12,952	333	417	13,701	28,738
8	1998	12,952	406	507	13,865	37,299
9	1999	12,952	478	598	14,028	45,861
10	2000	12,952	551	689	14,191	54,422
11	2001	20,357	623	779	21,759	62,983
12	2002	20,357	718	899	21,974	62,215
13	2003	20,357	814	1,018	22,189	61,447
14	2004	20,357	909	1,137	22,404	60,679
15	2005	20,357	1,005	1,257	22,619	59,911
16	2006	20,357	1,100	1,376	22,833	59,143
17	2007	20,357	1,196	1,495	23,048	58,375
18	2008	20,357	1,291	1,615	23,263	57,607
19	2009	20,357	1,387	1,734	23,478	56,839
20	2010	20,357	1,482	1,853	23,693	56,071
21	2011		1,577	1,973	3,550	55,303
22	2012		1,577	1,973	3,550	55,303
23	2013		1,577	1,973	3,550	55,303
24	2014		1,577	1,973	3,550	55,303
25	2015		1,577	1,973	3,550	55,303
26	2016		1,577	1,973	3,550	55,303
27	2017		1,577	1,973	3,550	55,303
28	2018		1,577	1,973	3,550	55,303
29	2019		1,577	1,973	3,550	55,303
30	2020		1,577	1,973	3,550	55,303
31	2021		1,577	1,973	3,550	55,303
32	2022		1,577	1,973	3,550	55,303
33	2023		1,577	1,973	3,550	55,303
34	2024		1,577	1,973	3,550	55,303
35	2025		1,577	1,973	3,550	55,303
36	2026		1,577	1,973	3,550	55,303
37	2027		1,577	1,973	3,550	55,303
38	2028		1,577	1,973	3,550	55,303
39	2029		1,577	1,973	3,550	55,303
40	2030		1,577	1,973	3,550	55,303

EIRR 35.44 (%)
NPV* 133,160 (Million Baht)
B/C* 2.19

Note: * Discount Rate = 12%

Appendix 11.1 FINANCIAL CASH FLOW (CASE 1 – CASE 5)

FINANCIAL CASH FLOW (Case 1)

(Million Baht)

NO.	YEAR	COSTS				TOLL REVENUE
		CONSTRUC-TION	MAINTE-NANCE	OPERATION	TOTAL COST	
1	1991	18,650			18,650	
2	1992	19,582	76	96	19,754	707
3	1993	20,561	161	201	20,922	1,068
4	1994	21,589	253	316	22,158	1,612
5	1995	22,669	354	442	23,465	2,435
6	1996	25,202	465	581	26,247	3,676
7	1997	26,462	609	762	27,833	7,211
8	1998	27,785	767	959	29,512	10,160
9	1999	29,175	940	1,174	31,289	13,109
10	2000	30,633	1,127	1,409	33,169	16,058
11	2001	29,588	1,331	1,664	32,583	19,007
12	2002	31,067	1,570	1,963	34,600	27,622
13	2003	32,620	1,830	2,287	36,737	33,208
14	2004	34,251	2,111	2,639	39,001	38,794
15	2005	35,964	2,416	3,020	41,400	44,380
16	2006	37,762	2,747	3,433	43,942	49,966
17	2007	39,650	3,104	3,880	46,634	64,395
18	2008	41,633	3,490	4,363	49,485	70,870
19	2009	43,714	3,907	4,884	52,505	77,345
20	2010	45,900	4,357	5,446	55,704	83,820
21	2011		4,842	6,053	10,896	90,296
22	2012		5,085	6,356	11,440	111,705
23	2013		5,339	6,673	12,012	119,222
24	2014		5,606	7,007	12,613	127,245
25	2015		5,886	7,358	13,244	135,808
26	2016		6,180	7,725	13,906	144,947
27	2017		6,489	8,112	14,601	179,328
28	2018		6,814	8,517	15,331	191,395
29	2019		7,155	8,943	16,098	204,275
30	2020		7,512	9,390	16,903	218,021
31	2021		7,888	9,860	17,748	232,693
32	2022		8,282	10,353	18,635	278,859
33	2023		8,696	10,870	19,567	288,241
34	2024		9,131	11,414	20,545	297,940
35	2025		9,588	11,985	21,572	307,965
36	2026		10,067	12,584	22,651	318,327
37	2027		10,570	13,213	23,784	381,428
38	2028		11,099	13,874	24,973	394,262
39	2029		11,654	14,567	26,221	407,527
40	2030		12,237	15,296	27,532	421,239

FIRR 12.88 (%)

FINANCIAL CASH FLOW (Case 2)

(Million Baht)

NO.	YEAR	COSTS				TOLL REVENUE
		CONSTRUC-TION	MAINTE-NANCE	OPERATION	TOTAL COST	
1	1991	18,650			18,650	
2	1992	19,582	76	96	19,754	707
3	1993	20,561	161	201	20,922	1,068
4	1994	21,589	253	316	22,158	1,612
5	1995	22,669	354	442	23,465	2,435
6	1996	24,911	465	581	25,957	3,676
7	1997	26,157	610	762	27,529	6,232
8	1998	27,465	768	960	29,193	8,203
9	1999	28,838	941	1,176	30,955	10,173
10	2000	30,280	1,129	1,412	32,821	12,144
11	2001	29,773	1,334	1,667	32,774	14,114
12	2002	31,262	1,573	1,966	34,800	22,517
13	2003	32,825	1,832	2,290	36,947	28,670
14	2004	34,466	2,113	2,642	39,221	34,823
15	2005	36,189	2,418	3,023	41,630	40,976
16	2006	37,999	2,748	3,435	44,183	47,130
17	2007	39,899	3,105	3,882	46,886	61,765
18	2008	41,894	3,491	4,364	49,749	68,897
19	2009	43,988	3,908	4,885	52,781	76,030
20	2010	46,188	4,358	5,447	55,992	83,163
21	2011		4,842	6,053	10,896	90,296
22	2012		5,085	6,356	11,440	113,499
23	2013		5,339	6,673	12,012	123,082
24	2014		5,606	7,007	12,613	133,474
25	2015		5,886	7,358	13,244	144,744
26	2016		6,180	7,725	13,906	156,965
27	2017		6,489	8,112	14,601	197,314
28	2018		6,814	8,517	15,331	213,973
29	2019		7,155	8,943	16,098	232,040
30	2020		7,512	9,390	16,903	251,631
31	2021		7,888	9,860	17,748	272,877
32	2022		8,282	10,353	18,635	329,726
33	2023		8,696	10,870	19,567	343,646
34	2024		9,131	11,414	20,545	358,153
35	2025		9,588	11,985	21,572	373,273
36	2026		10,067	12,584	22,651	389,031
37	2027		10,570	13,213	23,784	470,012
38	2028		11,099	13,874	24,973	489,854
39	2029		11,654	14,567	26,221	510,534
40	2030		12,237	15,296	27,532	532,087

FIRR 13.09 (%)

ndix 11.1 FINANCIAL CASH FLOW (CASE 1 – CASE 5)

FINANCIAL CASH FLOW (Case 3)

(Million Baht)

NO.	YEAR	COSTS				TOLL REVENUE
		CONSTRUC-TION	MAINTE-NANCE	OPERATI-ON	TOTAL COST	
1	1991	26,288			26,288	
2	1992	27,602	91	113	27,807	959
3	1993	28,982	191	238	29,411	1,448
4	1994	30,432	300	375	31,107	2,187
5	1995	31,953	420	525	32,899	3,302
6	1996	17,597	552	689	18,838	4,987
7	1997	18,477	692	865	20,033	8,591
8	1998	19,401	845	1,056	21,301	11,400
9	1999	20,371	1,011	1,264	22,645	14,210
10	2000	21,389	1,192	1,490	24,071	17,019
11	2001	28,220	1,388	1,735	31,343	19,829
12	2002	29,631	1,624	2,030	33,284	28,479
13	2003	31,112	1,880	2,350	35,342	33,970
14	2004	32,668	2,157	2,697	37,522	39,461
15	2005	34,301	2,458	3,072	39,831	44,951
16	2006	36,016	2,783	3,479	42,278	50,442
17	2007	37,817	3,134	3,918	44,869	64,837
18	2008	39,708	3,514	4,393	47,615	71,201
19	2009	41,693	3,924	4,905	50,522	77,566
20	2010	43,778	4,366	5,458	53,601	83,931
21	2011		4,842	6,053	10,896	90,296
22	2012		5,085	6,356	11,440	111,455
23	2013		5,339	6,673	12,012	118,688
24	2014		5,606	7,007	12,613	126,390
25	2015		5,886	7,358	13,244	134,593
26	2016		6,180	7,725	13,906	143,328
27	2017		6,489	8,112	14,601	176,926
28	2018		6,814	8,517	15,331	188,408
29	2019		7,155	8,943	16,098	200,635
30	2020		7,512	9,390	16,903	213,656
31	2021		7,888	9,860	17,748	227,522
32	2022		8,282	10,353	18,635	272,346
33	2023		8,696	10,870	19,567	281,183
34	2024		9,131	11,414	20,545	290,308
35	2025		9,588	11,985	21,572	299,728
36	2026		10,067	12,584	22,651	309,454
37	2027		10,570	13,213	23,784	370,366
38	2028		11,099	13,874	24,973	382,384
39	2029		11,654	14,567	26,221	394,792
40	2030		12,237	15,296	27,532	407,603

FIRR 12.54 (%)

FINANCIAL CASH FLOW (Case 4)

(Million Baht)

NO.	YEAR	COSTS				TOLL REVENUE
		CONSTRUC-TION	MAINTE-NANCE	OPERATI-ON	TOTAL COST	
1	1991	12,585			12,585	
2	1992	13,214	63	79	13,356	798
3	1993	13,875	133	166	14,174	1,204
4	1994	14,568	209	262	15,039	1,819
5	1995	15,297	293	366	15,956	2,746
6	1996	18,140	385	481	19,006	4,146
7	1997	19,047	514	643	20,205	6,649
8	1998	20,000	656	820	21,475	8,491
9	1999	21,000	810	1,013	22,823	10,334
10	2000	22,050	978	1,223	24,251	12,176
11	2001	39,034	1,161	1,452	41,647	14,018
12	2002	40,985	1,410	1,762	44,157	22,416
13	2003	43,035	1,680	2,100	46,814	28,581
14	2004	45,186	1,974	2,467	49,627	34,745
15	2005	47,446	2,292	2,866	52,603	40,910
16	2006	49,818	2,638	3,298	55,754	47,074
17	2007	52,309	3,013	3,766	59,088	61,713
18	2008	54,924	3,418	4,273	62,616	68,859
19	2009	57,670	3,857	4,821	66,349	76,004
20	2010	60,554	4,331	5,414	70,298	83,150
21	2011		4,842	6,053	10,896	90,296
22	2012		5,085	6,356	11,440	113,541
23	2013		5,339	6,673	12,012	123,173
24	2014		5,606	7,007	12,613	133,621
25	2015		5,886	7,358	13,244	144,957
26	2016		6,180	7,725	13,906	157,253
27	2017		6,489	8,112	14,601	197,749
28	2018		6,814	8,517	15,331	214,525
29	2019		7,155	8,943	16,098	232,723
30	2020		7,512	9,390	16,903	252,465
31	2021		7,888	9,860	17,748	273,882
32	2022		8,282	10,353	18,635	331,004
33	2023		8,696	10,870	19,567	345,043
34	2024		9,131	11,414	20,545	359,679
35	2025		9,588	11,985	21,572	374,935
36	2026		10,067	12,584	22,651	390,838
37	2027		10,570	13,213	23,784	472,285
38	2028		11,099	13,874	24,973	492,317
39	2029		11,654	14,567	26,221	513,199
40	2030		12,237	15,296	27,532	534,967

FIRR 14.16 (%)

Appendix 11.1 FINANCIAL CASH FLOW (CASE 1 – CASE 5)

FINANCIAL CASH FLOW (Case 5)

(Million Baht)

NO.	YEAR	COSTS				TOLL REVENUE
		CONSTRUC-TION	MAINTE-NANCE	OPERATI-ON	TOTAL COST	
1	1991	12,585			12,585	
2	1992	13,214	63	79	13,356	798
3	1993	13,875	133	166	14,174	1,204
4	1994	14,568	209	262	15,039	1,819
5	1995	15,297	293	366	15,956	2,746
6	1996	19,173	385	481	20,039	4,146
7	1997	20,132	516	646	21,294	7,017
8	1998	21,138	660	825	22,624	9,227
9	1999	22,195	817	1,022	24,034	11,437
10	2000	23,305	988	1,235	25,528	13,647
11	2001	38,375	1,174	1,468	41,016	15,857
12	2002	40,293	1,422	1,777	43,492	24,335
13	2003	42,308	1,691	2,114	46,113	30,286
14	2004	44,423	1,984	2,480	48,887	36,238
15	2005	46,645	2,302	2,877	51,823	42,189
16	2006	48,977	2,646	3,308	54,931	48,140
17	2007	51,426	3,020	3,775	58,220	62,702
18	2008	53,997	3,424	4,280	61,700	69,600
19	2009	56,697	3,861	4,826	65,383	76,499
20	2010	59,532	4,333	5,416	69,280	83,397
21	2011		4,842	6,053	10,896	90,296
22	2012		5,085	6,356	11,440	112,791
23	2013		5,339	6,673	12,012	121,551
24	2014		5,606	7,007	12,613	130,992
25	2015		5,886	7,358	13,244	141,165
26	2016		6,180	7,725	13,906	152,129
27	2017		6,489	8,112	14,601	190,042
28	2018		6,814	8,517	15,331	204,802
29	2019		7,155	8,943	16,098	220,708
30	2020		7,512	9,390	16,903	237,850
31	2021		7,888	9,860	17,748	256,323
32	2022		8,282	10,353	18,635	308,718
33	2023		8,696	10,870	19,567	320,707
34	2024		9,131	11,414	20,545	333,161
35	2025		9,588	11,985	21,572	346,099
36	2026		10,067	12,584	22,651	359,539
37	2027		10,570	13,213	23,784	432,971
38	2028		11,099	13,874	24,973	449,785
39	2029		11,654	14,567	26,221	467,251
40	2030		12,237	15,296	27,532	485,396

FIRR 14.03 (%)

Appendix 11.2 FINANCIAL REPAYMENT SCHEDULE (CASE 1)

FINANCIAL REPAYMENT SCHEDULE
(Case 1:Programme-1)

(Million Baht)

No.	Year	(1) INVT (A)	(2) INVT (B)	(3) ACCUM(A)	(4) ACCUM(B)	(5) REPAY(A)	(6) REPAY(B)	(7) NOREPY(A)	(8) NOREPY(B)	(9) INTRST(A)	(10) INTRST(B)	(11) RPY&IT(A)	(12) RPY&IT(B)
1	1991	7,460	11,190	7,460	11,190	0	0	7,460	11,190				
2	1992	7,833	11,749	15,293	22,939	0	0	15,293	22,939	224	1,678	224	1,678
3	1993	8,224	12,337	23,517	35,276	0	0	23,517	35,276	459	3,441	459	3,441
4	1994	8,636	12,954	32,153	48,229	0	0	32,153	48,229	706	5,291	706	5,291
5	1995	9,068	13,601	41,220	61,831	0	0	41,220	61,831	965	7,234	965	7,234
6	1996	10,081	15,121	51,301	76,952	0	4,122	51,301	72,830	1,237	9,275	1,237	13,397
7	1997	10,585	15,877	61,886	92,829	0	4,122	61,886	84,585	1,539	10,924	1,539	15,047
8	1998	11,114	16,671	73,000	109,500	0	4,122	73,000	97,134	1,857	12,688	1,857	16,810
9	1999	11,670	17,505	84,670	127,005	0	4,122	84,670	110,517	2,190	14,570	2,190	18,692
10	2000	12,253	18,380	96,923	145,385	0	4,122	96,923	124,775	2,540	16,578	2,540	20,700
11	2001	11,835	17,753	108,758	163,137	4,846	9,692	103,912	132,835	2,908	18,716	7,754	28,409
12	2002	12,427	18,640	121,185	181,778	4,846	9,692	111,493	141,783	3,117	19,925	7,964	29,618
13	2003	13,048	19,572	134,233	201,350	4,846	9,692	119,695	151,663	3,345	21,267	8,191	30,960
14	2004	13,701	20,551	147,934	221,901	4,846	9,692	128,549	162,521	3,591	22,749	8,437	32,442
15	2005	14,386	21,578	162,319	243,479	4,846	9,692	138,088	174,407	3,856	24,378	8,703	34,070
16	2006	15,105	22,657	177,424	266,136	4,846	16,232	148,347	180,832	4,143	26,161	8,989	42,393
17	2007	15,860	23,790	193,284	289,926	4,846	16,232	159,361	188,390	4,450	27,125	9,297	43,357
18	2008	16,653	24,980	209,937	314,906	4,846	16,232	171,168	197,138	4,781	28,259	9,627	44,490
19	2009	17,486	26,229	227,423	341,134	4,846	16,232	183,807	207,135	5,135	29,571	9,981	45,803
20	2010	18,360	27,540	245,783	368,674	4,846	16,232	197,321	218,443	5,514	31,070	10,360	47,302
21	2011					12,289	20,456	185,032	197,987	5,920	32,766	18,209	53,223
22	2012					12,289	20,456	172,743	177,530	5,551	29,698	17,840	50,154
23	2013					12,289	20,456	160,454	157,074	5,182	26,630	17,471	47,086
24	2014					12,289	20,456	148,165	136,618	4,814	23,561	17,103	44,017
25	2015					12,289	20,456	135,875	116,162	4,445	20,493	16,734	40,949
26	2016					12,289	14,886	123,586	101,276	4,076	17,424	16,365	32,310
27	2017					12,289	14,886	111,297	86,390	3,708	15,191	15,997	30,077
28	2018					12,289	14,886	99,008	71,504	3,339	12,958	15,628	27,844
29	2019					12,289	14,886	86,719	56,618	2,970	10,726	15,259	25,612
30	2020					12,289	14,886	74,430	41,732	2,602	8,493	14,891	23,379
31	2021					7,443	8,346	66,987	33,385	2,233	6,260	9,676	14,606
32	2022					7,443	8,346	59,544	25,039	2,010	5,008	9,453	13,354
33	2023					7,443	8,346	52,101	16,693	1,786	3,756	9,229	12,102
34	2024					7,443	8,346	44,658	8,346	1,563	2,504	9,006	10,850
35	2025					7,443	8,346	37,215		1,340	1,252	8,783	9,598
36	2026					7,443		29,772		1,116	0	8,559	0
37	2027					7,443		22,329		893	0	8,336	0
38	2028					7,443		14,886		670	0	8,113	0
39	2029					7,443		7,443		447	0	7,890	0
40	2030					7,443				223	0	7,666	0

(1): Investment by loan,(A)
(2): Investment by loan,(B)
(3): Accumulated loan ,(A)
(4): Accumulated loan ,(B)
(5): Repayment, (A)
(6): Repayment, (B)
(7): Loan (A) not paid back
(8): Loan (B) not paid back
(9): Interest on loan (A), 3.0% p.a.
(10): Interest on loan (B), 15.0% p.a.
(11): Repayment (A) plus interest
(12): Repayment (B) plus interest
(13): = (11)+(12)
(14): Toll revenues
(15): Maintenance & Operation costs
(16): Surplus per year (14)-(15)-(13)
(17): Accumulated surplus
(18): Short loan to cover (-) surplus
(19): Interest on short loan, 15.0% p.a.
(20): Repayment of short loan
with its interest charge
(21): Accumulated net surplus

Appendix 11.2 FINANCIAL REPAYMENT SCHEDULE (CASE 1)

FINANCIAL REPAYMENT SCHEDULE
(Case 1:Programme-1,Cont'd)

(Million Baht)

Year	(13) (11)+(12)	(14) REVENUE	(15) M & O	(16) SURPLUS	(17) ACCUMSPL	(18) SHORTLOAN	(19) INTRST*18	(20) RPY&R%18	(21) ACMNETSPL	Year
1991										1991
1992	1,902	707	172	-1,367	-1,367	1,367			0	1992
1993	3,900	1,068	361	-3,193	-4,560	3,193	205	1,572	-2,939	1993
1994	5,997	1,612	569	-4,953	-9,514	4,953	479	3,672	-8,232	1994
1995	8,199	2,435	796	-6,561	-16,074	6,561	743	5,696	-15,210	1995
1996	14,633	3,676	1,045	-12,002	-28,076	12,002	984	7,545	-23,619	1996
1997	16,586	7,211	1,371	-10,745	-38,822	10,745	1,800	13,803	-41,879	1997
1998	18,666	10,160	1,726	-10,233	-49,055	10,233	1,612	12,357	-51,179	1998
1999	20,882	13,109	2,114	-9,887	-58,942	9,887	1,535	11,768	-60,822	1999
2000	23,240	16,058	2,536	-9,718	-68,659	9,718	1,483	11,370	-70,312	2000
2001	36,162	19,007	2,995	-20,150	-88,809	20,150	1,458	11,175	-79,834	2001
2002	37,581	27,622	3,533	-13,492	-102,301	13,492	3,023	23,173	-111,982	2002
2003	39,151	33,208	4,117	-10,059	-112,361	10,059	2,024	15,516	-117,817	2003
2004	40,879	38,794	4,750	-6,835	-119,195	6,835	1,509	11,568	-123,929	2004
2005	42,773	44,380	5,436	-3,830	-123,025	3,830	1,025	7,860	-127,055	2005
2006	51,382	49,966	6,180	-7,596	-130,621	7,596	574	4,404	-127,429	2006
2007	52,653	64,395	6,984	4,758	-125,863		1,139	8,735	-134,598	2007
2008	54,117	70,870	7,853	8,900	-116,963				-116,963	2008
2009	55,784	77,345	8,791	12,770	-104,192				-104,192	2009
2010	57,663	83,820	9,804	16,354	-87,838				-87,838	2010
2011	71,431	90,296	10,896	7,969	-79,869				-79,869	2011
2012	67,994	111,705	11,440	32,271	-47,599				-47,599	2012
2013	64,557	119,222	12,012	42,653	-4,946				-4,946	2013
2014	61,120	127,245	12,613	53,512	48,567				48,567	2014
2015	57,683	135,808	13,244	64,882	113,448				113,448	2015
2016	48,676	144,947	13,906	82,366	195,814				195,814	2016
2017	46,074	179,328	14,601	118,652	314,466				314,466	2017
2018	43,472	191,395	15,331	132,592	447,058				447,058	2018
2019	40,871	204,275	16,098	147,306	594,364				594,364	2019
2020	38,269	218,021	16,903	162,850	757,214				757,214	2020
2021	24,282	232,693	17,748	190,663	947,877				947,877	2021
2022	22,807	278,859	18,635	237,417	1,185,294				1,185,294	2022
2023	21,332	288,241	19,567	247,343	1,432,637				1,432,637	2023
2024	19,856	297,940	20,545	257,538	1,690,175				1,690,175	2024
2025	18,381	307,965	21,572	268,011	1,958,187				1,958,187	2025
2026	8,559	318,327	22,651	287,116	2,245,303				2,245,303	2026
2027	8,336	381,428	23,784	349,308	2,594,611				2,594,611	2027
2028	8,113	394,262	24,973	361,176	2,955,787				2,955,787	2028
2029	7,890	407,527	26,221	373,416	3,329,203				3,329,203	2029
2030	7,666	421,239	27,532	386,041	3,715,244				3,715,244	2030

(1): Investment by loan,(A)
(2): Investment by loan,(B)
(3): Accumulated loan ,(A)
(4): Accumulated loan ,(B)
(5): Repayment, (A)
(6): Repayment, (B)
(7): Loan (A) not paid back
(8): Loan (B) not paid back
(9): Interest on loan (A), 3.0% p.a.
(10): Interest on loan (B), 15.0% p.a.
(11): Repayment (A) plus interest
(12): Repayment (B) plus interest
(13): = (11)+(12)
(14): Toll revenues
(15): Maintenance & Operation costs
(16): Surplus per year (14)-(15)-(13)
(17): Accumulated surplus
(18): Short loan to cover (-) surplus
(19): Interest on short loan, 15.0% p.a.
(20): Repayment of short loan with its interest charge
(21): Accumulated net surplus

Appendix 11.3 FINANCIAL REPAYMENT SCHEDULE (CASE 1)

FINANCIAL REPAYMENT SCHEDULE
(Case 1:Programme-2)

(Million Baht)

No.	Year	(1) INVT (A)	(2) INVT (B)	(3) ACCUM(A)	(4) ACCUM(B)	(5) REPAY(A)	(6) REPAY(B)	(7) NOREPY(A)	(8) NOREPY(B)	(9) INTRST(A)	(10) INTRST(B)	(11) RPY&IT(A)	(12) RPY&IT(B)
1	1991	7,460	11,190	7,460	11,190	0	0	7,460	11,190				
2	1992	7,833	11,749	15,293	22,939	0	0	15,293	22,939	671	1,678	671	1,678
3	1993	8,224	12,337	23,517	35,276	0	0	23,517	35,276	1,376	3,441	1,376	3,441
4	1994	8,636	12,954	32,153	48,229	0	0	32,153	48,229	2,117	5,291	2,117	5,291
5	1995	9,068	13,601	41,220	61,831	0	0	41,220	61,831	2,894	7,234	2,894	7,234
6	1996	10,081	15,121	51,301	76,952	2,748	4,122	48,553	72,830	3,710	9,275	6,458	13,397
7	1997	10,585	15,877	61,886	92,829	2,748	4,122	56,390	84,585	4,370	10,924	7,118	15,047
8	1998	11,114	16,671	73,000	109,500	2,748	4,122	64,756	97,134	5,075	12,688	7,823	16,810
9	1999	11,670	17,505	84,670	127,005	2,748	4,122	73,678	110,517	5,828	14,570	8,576	18,692
10	2000	12,253	18,380	96,923	145,385	2,748	4,122	83,183	124,775	6,631	16,578	9,379	20,700
11	2001	11,835	17,753	108,758	163,137	6,462	9,692	88,557	132,835	7,486	18,716	13,948	28,409
12	2002	12,427	18,640	121,185	181,778	6,462	9,692	94,522	141,783	7,970	19,925	14,432	29,618
13	2003	13,048	19,572	134,233	201,350	6,462	9,692	101,108	151,663	8,507	21,267	14,969	30,960
14	2004	13,701	20,551	147,934	221,901	6,462	9,692	108,347	162,521	9,100	22,749	15,561	32,442
15	2005	14,386	21,578	162,319	243,479	6,462	9,692	116,271	174,407	9,751	24,378	16,213	34,070
16	2006	15,105	22,657	177,424	266,136	10,821	16,232	120,555	180,832	10,464	26,161	21,286	42,393
17	2007	15,860	23,790	193,284	289,926	10,821	16,232	125,594	188,390	10,850	27,125	21,671	43,357
18	2008	16,653	24,980	209,937	314,906	10,821	16,232	131,425	197,138	11,303	28,259	22,125	44,490
19	2009	17,486	26,229	227,423	341,134	10,821	16,232	138,090	207,135	11,828	29,571	22,650	45,803
20	2010	18,360	27,540	245,783	368,674	10,821	16,232	145,629	218,443	12,428	31,070	23,249	47,302
21	2011					13,637	20,456	131,991	197,987	13,107	32,766	26,744	53,223
22	2012					13,637	20,456	118,354	177,530	11,879	29,698	25,517	50,154
23	2013					13,637	20,456	104,716	157,074	10,652	26,630	24,289	47,086
24	2014					13,637	20,456	91,079	136,618	9,424	23,561	23,062	44,017
25	2015					13,637	20,456	77,441	116,162	8,197	20,493	21,835	40,949
26	2016					9,924	14,886	67,517	101,276	6,970	17,424	16,894	32,310
27	2017					9,924	14,886	57,593	86,390	6,077	15,191	16,001	30,077
28	2018					9,924	14,886	47,669	71,504	5,183	12,958	15,107	27,844
29	2019					9,924	14,886	37,745	56,618	4,290	10,726	14,214	25,612
30	2020					9,924	14,886	27,821	41,732	3,397	8,493	13,321	23,379
31	2021					5,564	8,346	22,257	33,385	2,504	6,260	8,068	14,606
32	2022					5,564	8,346	16,693	25,039	2,003	5,008	7,567	13,354
33	2023					5,564	8,346	11,128	16,693	1,502	3,756	7,067	12,102
34	2024					5,564	8,346	5,564	8,346	1,002	2,504	6,566	10,850
35	2025					5,564	8,346			501	1,252	6,065	9,598
36	2026									0	0	0	0
37	2027									0	0	0	0
38	2028									0	0	0	0
39	2029									0	0	0	0
40	2030									0	0	0	0

(1): Investment by loan,(A)
(2): Investment by loan,(B)
(3): Accumulated loan ,(A)
(4): Accumulated loan ,(B)
(5): Repayment, (A)
(6): Repayment, (B)
(7): Loan (A) not paid back
(8): Loan (B) not paid back
(9): Interest on loan (A), 9.0% p.a.
(10): Interest on loan (B), 15.0% p.a.
(11): Repayment (A) plus interest
(12): Repayment (B) plus interest
(13): = (11)+(12)
(14): Toll revenues
(15): Maintenance & Operation costs
(16): Surplus per year (14)-(15)-(13)
(17): Accumulated surplus
(18): Short loan to cover (-) surplus
(19): Interest on short loan, 15.0% p.a.
(20): Repayment of short loan
with its interest charge
(21): Accumulated net surplus

Appendix 11.3 FINANCIAL REPAYMENT SCHEDULE (CASE 1)

FINANCIAL REPAYMENT SCHEDULE
(Case 1:Programme-2,Cont'd)

(Million Baht)

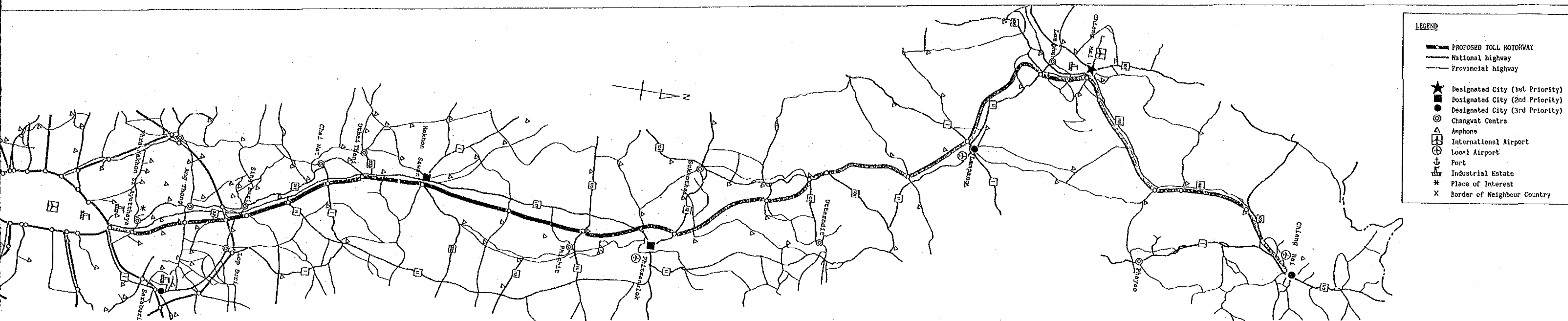
Year	(13) (11)+(12)	(14) REVENUE	(15) M & O	(16) SURPLUS	(17) ACCUMSPL	(18) SHORTLOAN	(19) INTRST*18	(20) RPY&R%18	(21) ACMNETSPL	Year
1991										1991
1992	2,350	707	172	-1,815	-1,815	1,815			0	1992
1993	4,817	1,068	361	-4,111	-5,925	4,111	272	2,087	-3,902	1993
1994	7,408	1,612	569	-6,364	-12,290	6,364	617	4,727	-10,652	1994
1995	10,128	2,435	796	-8,490	-20,780	8,490	955	7,319	-19,609	1995
1996	19,854	3,676	1,045	-17,223	-38,003	17,223	1,273	9,763	-30,543	1996
1997	22,164	7,211	1,371	-16,324	-54,327	16,324	2,584	19,807	-57,810	1997
1998	24,633	10,160	1,726	-16,199	-70,527	16,199	2,449	18,773	-73,100	1998
1999	27,268	13,109	2,114	-16,273	-86,800	16,273	2,430	18,629	-89,156	1999
2000	30,079	16,058	2,536	-16,557	-103,356	16,557	2,441	18,714	-105,514	2000
2001	42,357	19,007	2,995	-26,344	-129,701	26,344	2,483	19,040	-122,396	2001
2002	44,049	27,622	3,533	-19,960	-149,660	19,960	3,952	30,296	-159,997	2002
2003	45,928	33,208	4,117	-16,837	-166,497	16,837	2,994	22,954	-172,614	2003
2004	48,003	38,794	4,750	-13,959	-180,456	13,959	2,526	19,362	-185,860	2004
2005	50,283	44,380	5,436	-11,340	-191,796	11,340	2,094	16,053	-196,509	2005
2006	63,679	49,966	6,180	-19,893	-211,689	19,893	1,701	13,041	-204,837	2006
2007	65,028	64,395	6,984	-7,617	-219,306	7,617	2,984	22,876	-234,565	2007
2008	66,615	70,870	7,853	-3,598	-222,903	3,598	1,143	8,759	-228,065	2008
2009	68,452	77,345	8,791	102	-222,801		540	4,137	-226,939	2009
2010	70,552	83,820	9,804	3,465	-219,336				-219,336	2010
2011	79,967	90,296	10,896	-567	-219,902	567			-219,336	2011
2012	75,671	111,705	11,440	24,594	-195,308		85	652	-195,960	2012
2013	71,375	119,222	12,012	35,835	-159,473				-159,473	2013
2014	67,079	127,245	12,613	47,553	-111,920				-111,920	2014
2015	62,783	135,808	13,244	59,781	-52,139				-52,139	2015
2016	49,204	144,947	13,906	81,838	29,698				29,698	2016
2017	46,078	179,328	14,601	118,649	148,347				148,347	2017
2018	42,952	191,395	15,331	133,112	281,459				281,459	2018
2019	39,826	204,275	16,098	148,352	429,811				429,811	2019
2020	36,700	218,021	16,903	164,419	594,230				594,230	2020
2021	22,674	232,693	17,748	192,271	786,501				786,501	2021
2022	20,922	278,859	18,635	239,302	1,025,803				1,025,803	2022
2023	19,169	288,241	19,567	249,506	1,275,309				1,275,309	2023
2024	17,416	297,940	20,545	259,979	1,535,287				1,535,287	2024
2025	15,663	307,965	21,572	270,729	1,806,016				1,806,016	2025
2026	0	318,327	22,651	295,676	2,101,692				2,101,692	2026
2027	0	381,428	23,784	357,644	2,459,336				2,459,336	2027
2028	0	394,262	24,973	369,289	2,828,625				2,828,625	2028
2029	0	407,527	26,221	381,306	3,209,931				3,209,931	2029
2030	0	421,239	27,532	393,707	3,603,638				3,603,638	2030

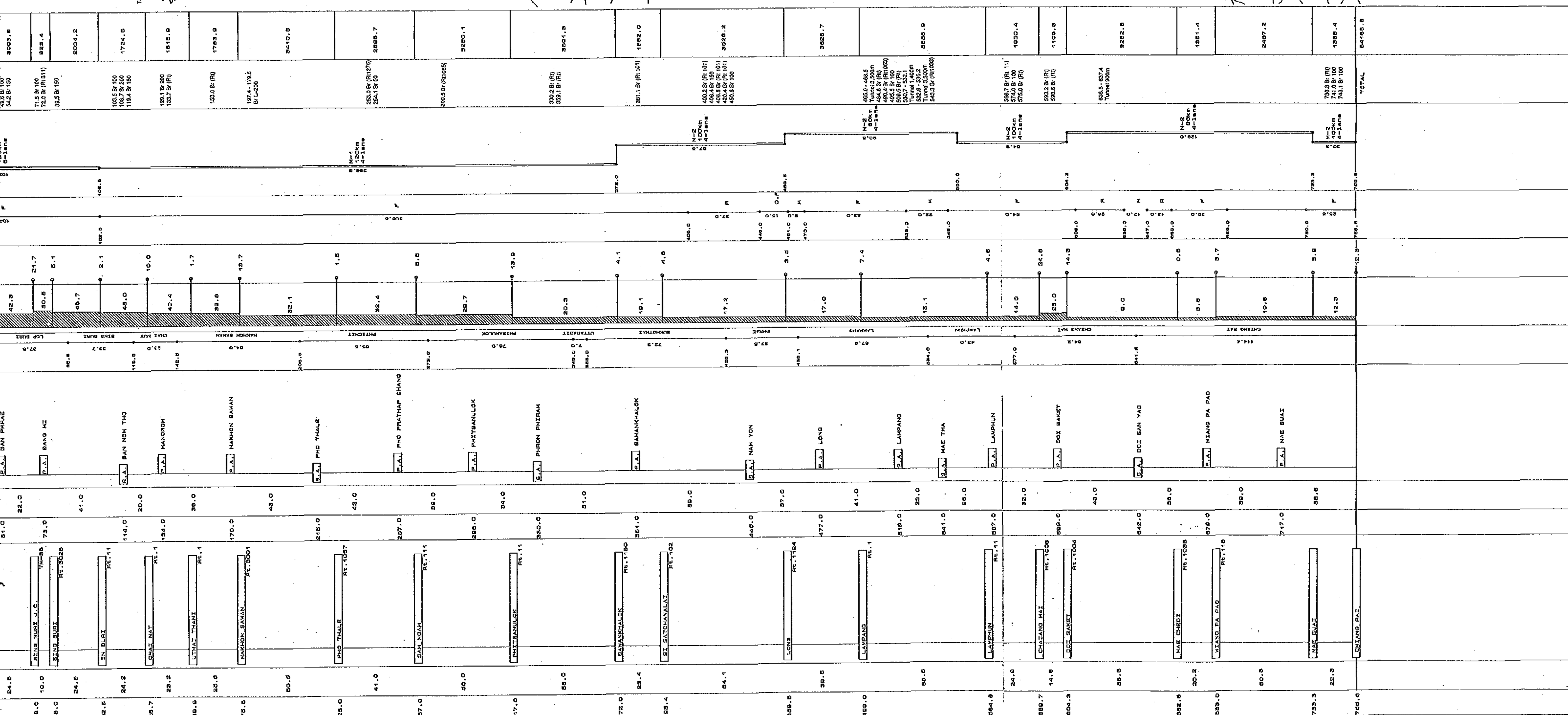
(1): Investment by loan,(A)
(2): Investment by loan,(B)
(3): Accumulated loan ,(A)
(4): Accumulated loan ,(B)
(5): Repayment, (A)
(6): Repayment, (B)
(7): Loan (A) not paid back
(8): Loan (B) not paid back
(9): Interest on loan (A), 9.0% p.a.
(10): Interest on loan (B), 15.0% p.a.
(11): Repayment (A) plus interest
(12): Repayment (B) plus interest
(13): = (11)+(12)
(14): Toll revenues
(15): Maintenance & Operation costs
(16): Surplus per year (14)-(15)-(13)
(17): Accumulated surplus
(18): Short loan to cover (-) surplus
(19): Interest on short loan, 15.0% p.a.
(20): Repayment of short loan with its interest charge
(21): Accumulated net surplus

ROUTE TH-1 (BANGKOK - CHIANG RAI) TOTAL LENGTH = 755.6 KM

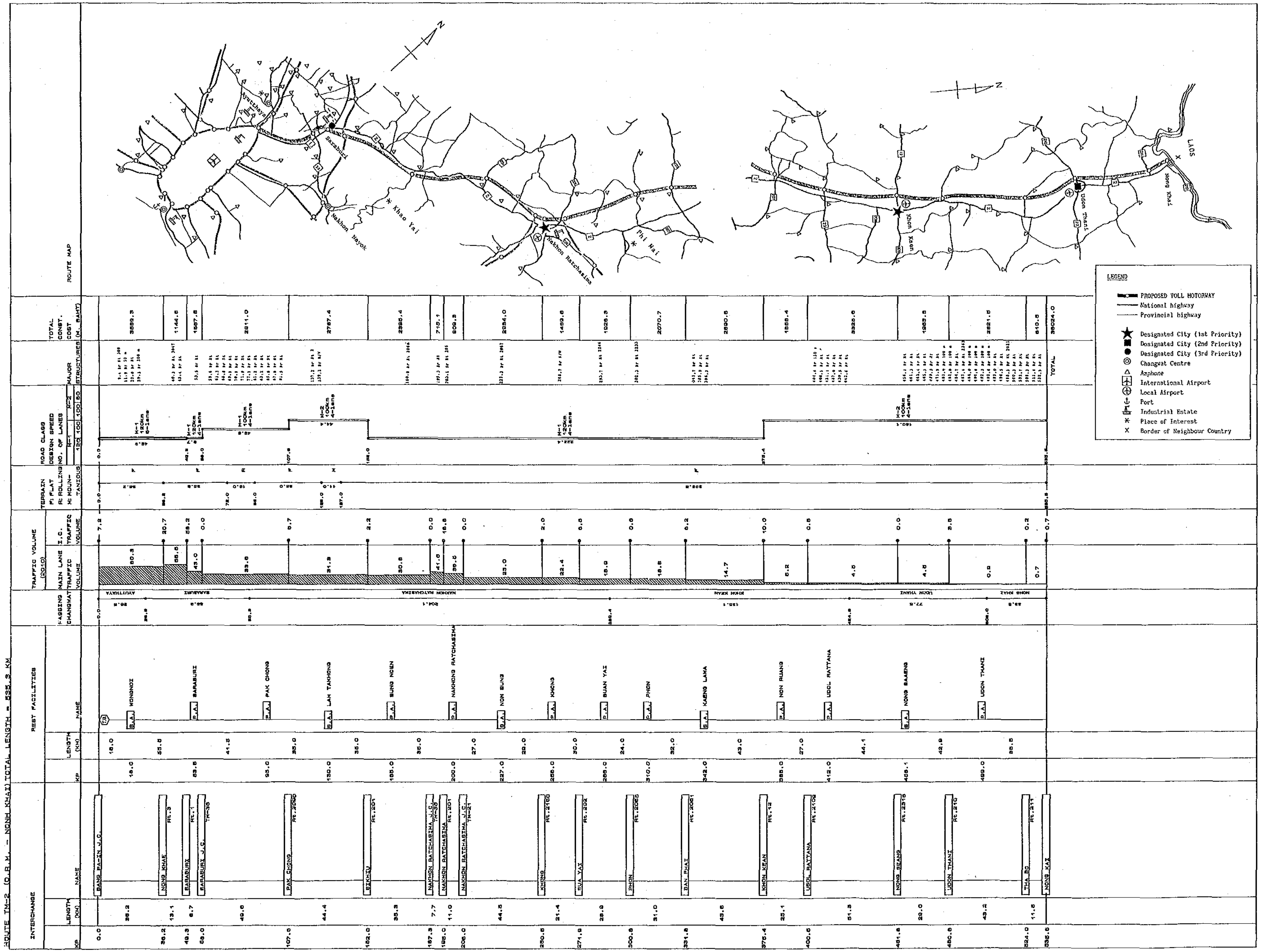
INTERCHANGE			REST FACILITIES			PASSING/ CHANGING LANE	TRAFFIC VOLUME (2516)				ROAD CLASS / DESIGN SPEED / NO. OF LANES				MAJOR STRUCTURES	TOTAL CONST. COST (M. BAHT)	ROUTE MAP
KP	LENGTH (KM)	NAME	KP	LENGTH (KM)	NAME		TERRAIN: PL FLAT, RL ROLLING, MT MOUN.	T.C. TRAFFIC VOLUME	MAIN LANE TRAFFIC VOLUME								
0.0	13.0	BANG PA-IN J.C. TH-31	0.0	29.0	NAKHON LUANG P.A.	0.0	7.2	82.5							17.2 Br 100 92.8 Br 99	1673.9	
13.0	30.5	AYUTTHAYA RT.309	30.0	21.0	BAN PHRAE P.A.	46.0	20.5	49.1							16.8 Br 100 17.2 Br 99 20.2 Br 100 21.8 Br (Railway) 23.2 Br 100 23.4 Br 100 25.9 Br 100 34.3 Br 100 42.2 Br 99	2739.2	
43.5	24.5	ANG THONG RT.3267	51.0	22.0	BANG MI P.A.	67.5	9.1	42.3							49.8 Br 100 54.2 Br 150	3008.8	
68.0	10.0	SENG BURI J.C. TH-35	73.0	41.0		78.0	21.7	50.5							71.5 Br 100 72.0 Br (RL311) 89.5 Br 150	923.4	
78.0	24.5	SENG BURI RT.3028	114.0	20.0	BAN NOM THO P.A.	98.5	5.1	48.7								2094.2	
102.5	24.2	CN. BURI RT.11	134.0	35.0	NAKHON P.A.	118.0	2.1	48.0							100.3 Br 100 109.7 Br 200 110.4 Br 150	1724.5	
126.7	23.2	CHAI NAT RT.1	170.0	43.0	NAKHON SAWAN P.A.	143.0	10.0	40.4							129.1 Br 200 130.0 Br (RI)	1515.8	
149.9	20.6	UTHAI THANI RT.1	213.0	42.0	PHO THALE P.A.	148.5	1.7	39.8							152.0 Br (RI)	1753.9	
175.5	50.5	NAKHON SAWAN RT.3001	255.0	38.0	PHO PRATHAP CHANG P.A.	206.0	13.7	32.1							197.4 - 179.6 Br L=200	2410.5	
226.0	41.0	PHO THALE RT.1087	297.0	38.0	PHITSANULOK P.A.	208.0	1.5	32.4							252.0 Br (RI1278) 254.1 Br 50	2698.7	
267.0	50.0	BAN NIAM RT.111	335.0	54.0	PHROM PHIRAM P.A.	268.0	5.5	29.7							300.6 Br (RI1065)	3280.1	
317.0	55.0	PHITSANULOK RT.11	389.0	59.0	SAWANKHALOK P.A.	273.0	13.0	20.3							330.2 Br (RI) 359.1 Br (RI)	3691.8	
372.0	23.4	SAWANKHALOK RT.1180	412.4	28.0		286.0	4.1	10.1							381.1 Br (RL101)	1592.0	
395.4	54.1	RE SATCHANALAI RT.102	440.0	37.0	MAN YON P.A.	345.0	4.8	17.2							400.2 Br (RL101) 406.4 Br 150 429.4 Br (RL101) 430.4 Br (RL161) 450.8 Br 100	3526.2	
449.5	32.5	LONG RT.1124	477.0	41.0	LONG P.A.	388.0	3.8	17.0								3625.7	
481.9	55.8	LAMPANG RT.1	518.0	23.0	LAMPANG P.A.	428.3	7.4	13.1							465.0 - 468.5 Tunnel 3,500m 484.4 Br (RI1065) 490.4 Br (RI1065) 495.8 Br 100 503.7 Br (RI) 509.7 - 552.1 Tunnel 1,400m 552.8 - 557.4 Tunnel 3,500m 562.3 Br (RL1033)	8585.9	
537.7	14.3	CHIANG MAI RT.1006	541.0	25.0	MAE THA P.A.	477.0	4.0	14.0							536.7 Br (RI 11) 574.0 Br 100 577.0 Br (RI)	1930.4	
552.0	20.2	DOI SAKET RT.1064	557.0	32.0	LAMPHUN P.A.	491.0	24.6	23.0							593.8 Br (RI) 595.6 Br (RI)	1100.8	
572.2	50.3	MAE CHEDI RT.1039	589.0	43.0	DOI SAN YAO P.A.	515.6	14.3	9.0							626.5 - 627.4 Tunnel 900m	3322.8	
622.5	22.3	PRANG PA PAO RT.116	632.0	38.0	MYANG PA PAO P.A.	539.9	0.8	6.8								1351.4	
644.8		MAE SUAK	670.0	33.0	MAE SUAK P.A.	546.7	3.7	10.8								2457.2	
755.6		CHIANG RAI	717.0	38.6		560.5	3.0	12.3							726.9 Br (RI) 741.0 Br 100 748.1 Br 100	1358.4	
						573.5	12.2								TOTAL	54155.6	

LEG


LEGEND
PROPOSED TOLL MOTORWAY
National highway
Provincial highway
Designated City (1st Priority)
Designated City (2nd Priority)
Designated City (3rd Priority)
Changwat Centre
Amphone
International Airport
Local Airport
Port
Industrial Estate
Place of Interest
Border of Neighbour Country



ROUTE TM-2 (O.R.M. - NONH KHAI) TOTAL LENGTH = 535.3 KM



ROUTE TM-3 TOTAL LENGTH = 291.9 KM (O.R.R – CHANTABURI)

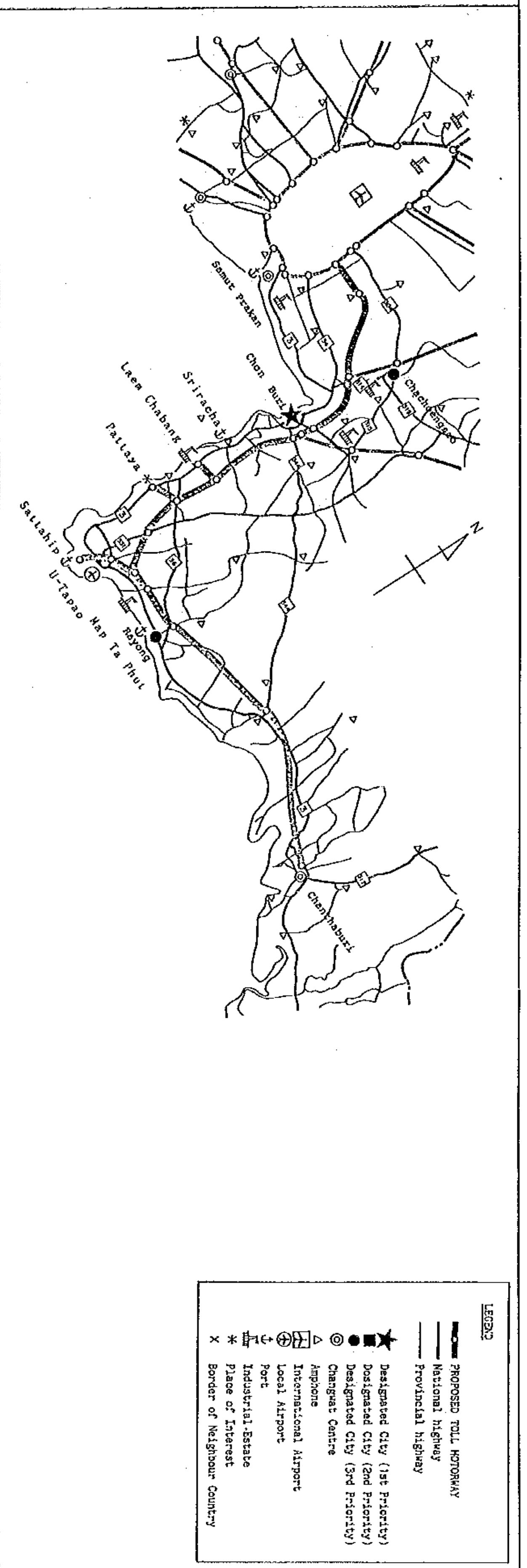
Interchange KP	Interchange Length (KM)	Interchange Name	Rest Facilities KP	Rest Facilities Length (KM)	Rest Facilities Name	Traffic Volume (2010) Main Lane Traffic Volume	Traffic Volume (2010) I.C. Traffic Volume	Major Structures	Total Const. Cost (M. BAHT)
0.0		PHRA KHANONG (TM-31)			T.G.		17.8		
	6.0					64.7		[illegible]	1302.8
6.0		LAT KRABANG					32.2		
	29.5		32.0		S.A. KHLONG PHRAYA SAMUT	84.7		[illegible]	4005.0
37.5		BANG PAKONG J.C. (TM-35)					34.1		
	1.5					85.?			394.4
39.0		BANG PAKONG (Rt.314)					11.5		
	20.5					75.5		[illegible]	2711.7
59.5		NORTH CHONBURI					40.5		
	3.5					82.1			535.9
63.0		CHONBURI J.C. (Rt.315)					45.9		
	3.7					78.5			684.3
66.7		SOUTH CHONBURI (TM-35, Rt.334)					27.9		
	28.5			100.0		85.0		[illegible]	2921.5
95.2		LAEM CHABANG (TM-31)					27.7		
	16.5					62.4		[illegible]	1729.5
111.7		PHATTAYA J.C., I.C. (Rt.35)					21.9		
	16.1					46.5		[illegible]	1452.7
127.8		BANG LAMUNG (Rt.331)					21.0		
	9.7		132.0		S.A. BAN CHANG	48.5		[illegible]	858.9
137.5		BAN CHANG J.C.					11.0		
	12.0					40.9		[illegible]	1118.9
149.5		MAP TA PHUT (Rt.3191)					5.3		
	14.0			84.0		35.3		[illegible]	1417.4
163.5		RAYONG (Rt.3198)					21.1		
	41.8		186.0		P.A.	28.4		[illegible]	3568.4
205.3		KLAENG (Rt.344)					11.3		
	52.8					13.9		[illegible]	3558.8
258.1		CHANTABURI (Rt.344)					13.9		
0.0		LAEM CHABANG JC. (TM-3)					16.5		
	7.7					16.5		[illegible]	845.2
7.7		LAEM CHABANG (Rt.3)					16.5		
0.0		PHATTHAYA JC (TM-3)					6.9		
	6.8					6.9		[illegible]	819.4
6.8		PHATTAYA (Rt.3)					6.9		
0.0		BANG CHANG JC. (0)					15.7		
	6.8					15.7		[illegible]	673.1
6.8		U TAPHAO (3)					19.7		
	10.5					2.0		[illegible]	914.2
17.3		SATTAHIP (3)					2.0		
								TOTAL	29329.8

Passing Changwat: 0.0 – 18.0 – 32.0 – 41.5 – 135.0 (RAYONG 93.5; CHANTABURI 123.1); Chon Buri 7.7; Chon Buri 6.8; Chon Buri / Rayong 6.5, 10.5.

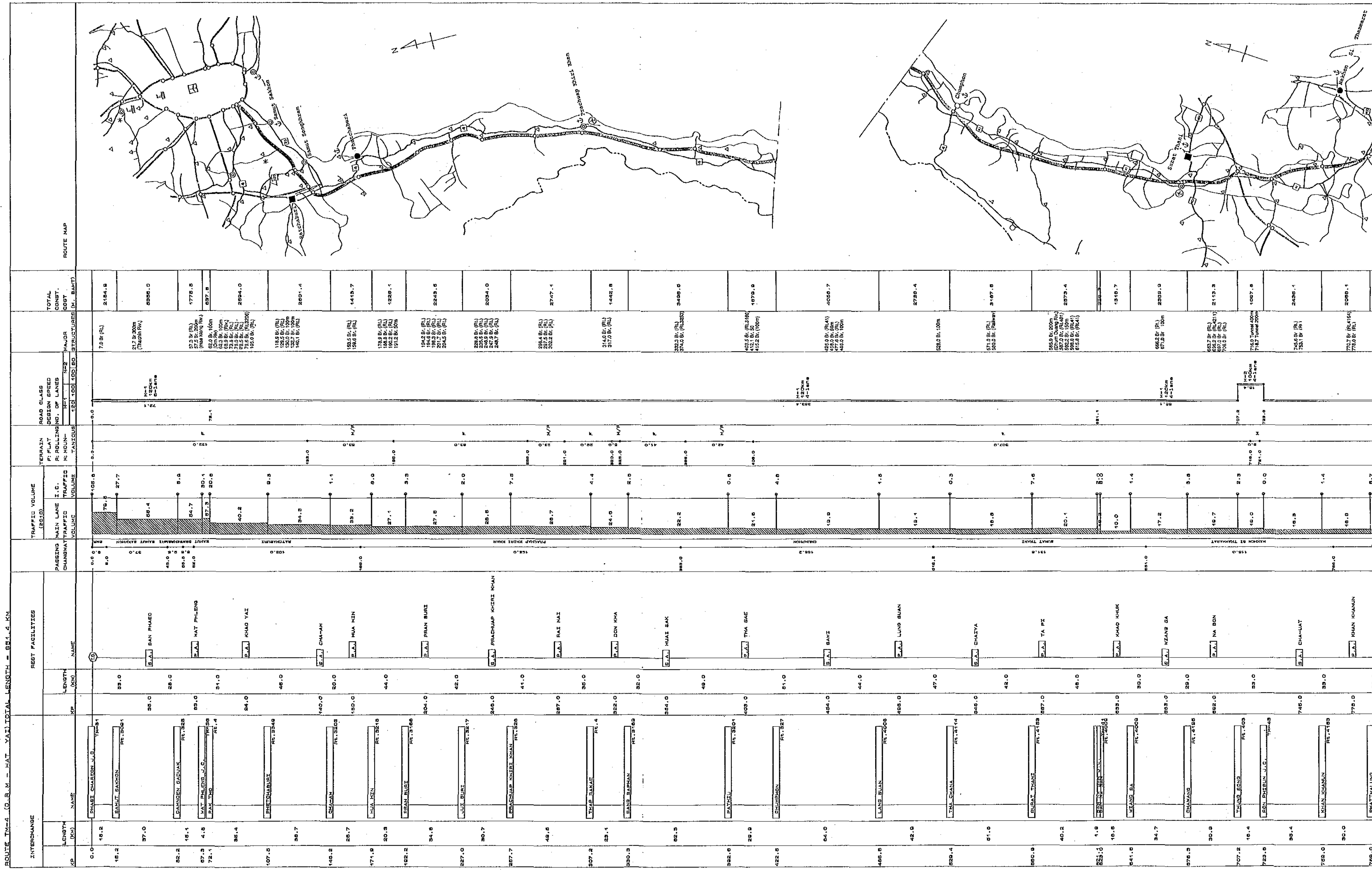
Terrain (F: Flat, R: Rolling, M: Mountainous): 0.0 – 56.0 F; 56.0 – 258.1 R (202.1); 0.0 – 7.7 R/M; 0.0 – 6.8 M/F; 0.0 – 17.3 F.

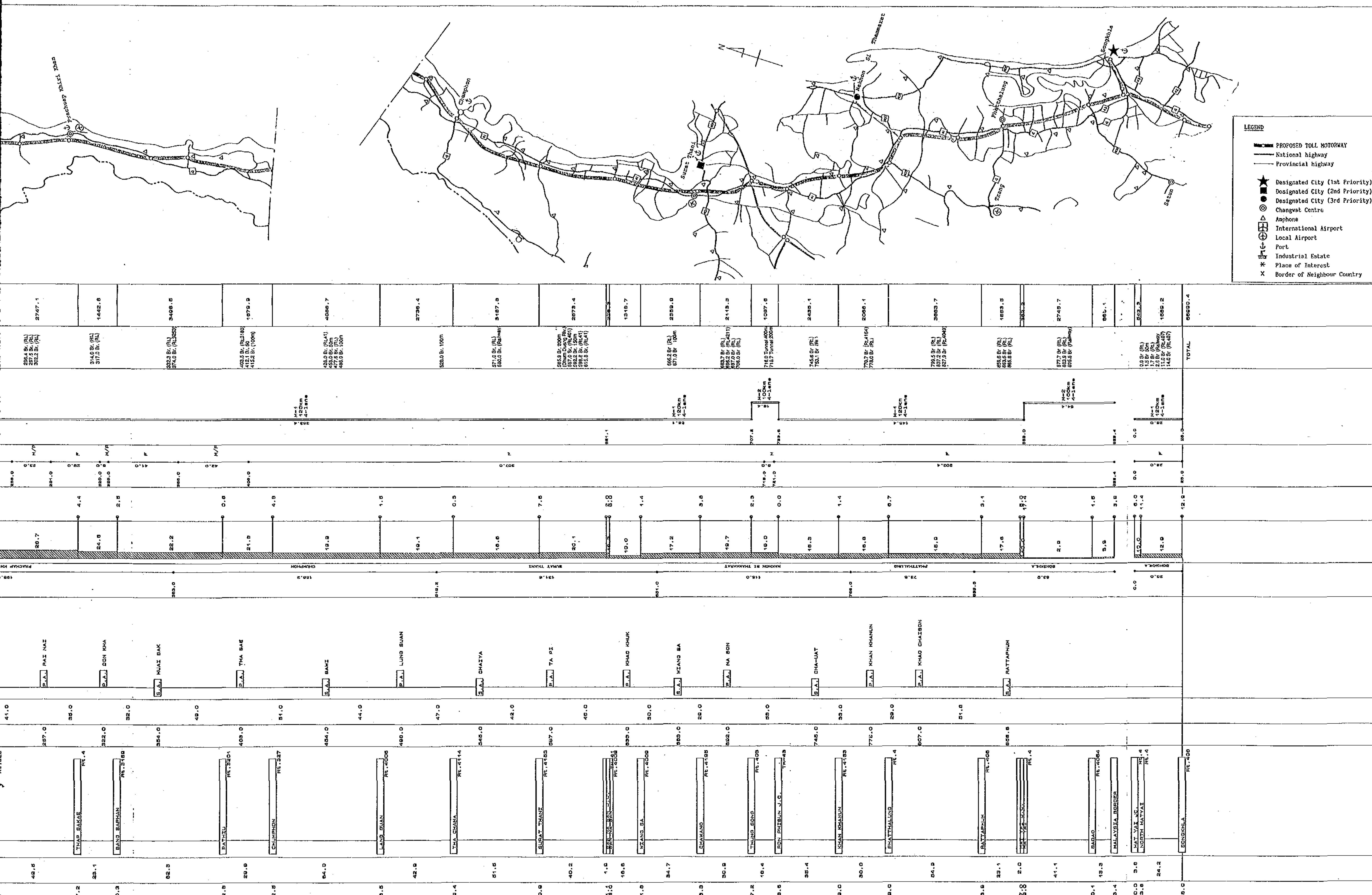
Road Class / Design Speed / No. of Lanes: 0.0 – 111.7 (111.7) M-1 120km 6-lane; 111.7 – 205.3 (93.6) M-2 120km 4-lane; 205.3 – 258.1 (52.8) M-2 100km 4-lane; 0.0 – 7.7 M-2 100km 4-lane; 0.0 – 6.8 M-2 100km 4-lane; 0.0 – 17.3 M-2 100km 4-lane.

ROUTE MAP



ROUTE TM-4 (O.B.M. - HAT YAI) TOTAL LENGTH = 851.4 KM




Prachuap Khiri Khan
Chumphon
Surat Thani
Nakhon Si Thammarat
Phatthalung
Trang
Songkhla
Satun
LEGEND
PROPOSED TOLL MOTORWAY
National highway
Provincial highway
Designated City (1st Priority)
Designated City (2nd Priority)
Designated City (3rd Priority)
Changwat Centre
Amphone
International Airport
Local Airport
Port
Industrial Estate
Place of Interest
Border of Neighbour Country
TOTAL

ROUTETM-21 (NAKHON RATCHASIMA – UBON RATCHATHNI) TOTAL LENGTH = 301.1 KM

INTERCHANGE

KP	LENGTH (KM)	NAME	Route
0.0		NAKHON RATCHASIMA	TH-2
	31.3		
31.3		CHAKKRAT	Rt.2162
	46.6		
77.9		LAM PLAI MAT	Rt.2226
	32.9		
110.8		BURI RAM	Rt.219
	43.1		
153.9		SURIN	Rt.214
	47.1		
201.0		SAHRANG THAP	Rt.2282
	44.5		
245.5		SI SA KET	Rt.221
	28.0		
273.5		KANTHARAROM	Rt.2085
	27.6		
301.1		UBON RATCHASIMA	Rt.24

REST FACILITIES

KP	LENGTH (KM)	NAME
28.0		S.A. CHAKKAHAT
	31.0	
54.0		P.A. HUAI THALANG
	40.0	
94.0		P.A. LAI PLAI MAT
	35.0	
130.0		S.A. KTABANG
	45.0	
176.0		P.A. SIKHORAPUM
	48.0	
224.0		S.A. UTHUMPHON
	42.0	
266.0		S.A. KANTHNAROM

PASSING CHANGWAT

KP	Length	Changwat
0.0 – 66.0	66.0	NAKHON RATCHASIMA
66.0 – 149.5	80.5	BURI RAM
149.5 – 215.0	65.5	SURIN
215.0 – 296.2	71.2	SI SAKET
296.2 – 301.1	14.9	UBON RATCHATHANI

TRAFFIC VOLUME (2010), TOTAL CONST. COST

Section (KP)	MAIN LANE TRAFFIC VOLUME	I.C. TRAFFIC VOLUME (at start KP)	MAJOR STRUCTURES	TOTAL CONST. COST (M. BAHT)
0.0 – 31.3	19.7	19.7	8.0 Br 50 m 18.0 Br 50 m 29.1 Br 100 m	2301.9
31.3 – 77.9	17.6	2.8	38.0 Br 100 m 47.4 Br 50 m 55.2 Br 100 m 55.6 Br (Rt 3351) 59.9 Br (Rt) 61.0 Br (Rt 3318)	3084.4
77.9 – 110.8	17.7	1.6		2169.6
110.8 – 153.9	12.0	10.2		2650.3
153.9 – 201.0	9.9	7.4		3066.6
201.0 – 245.5	9.5	1.2		2984.9
245.5 – 273.5	11.9	7.8		1838.6
273.5 – 301.1	10.3	2.7		1785.0
301.1		10.5	TOTAL	20021.4

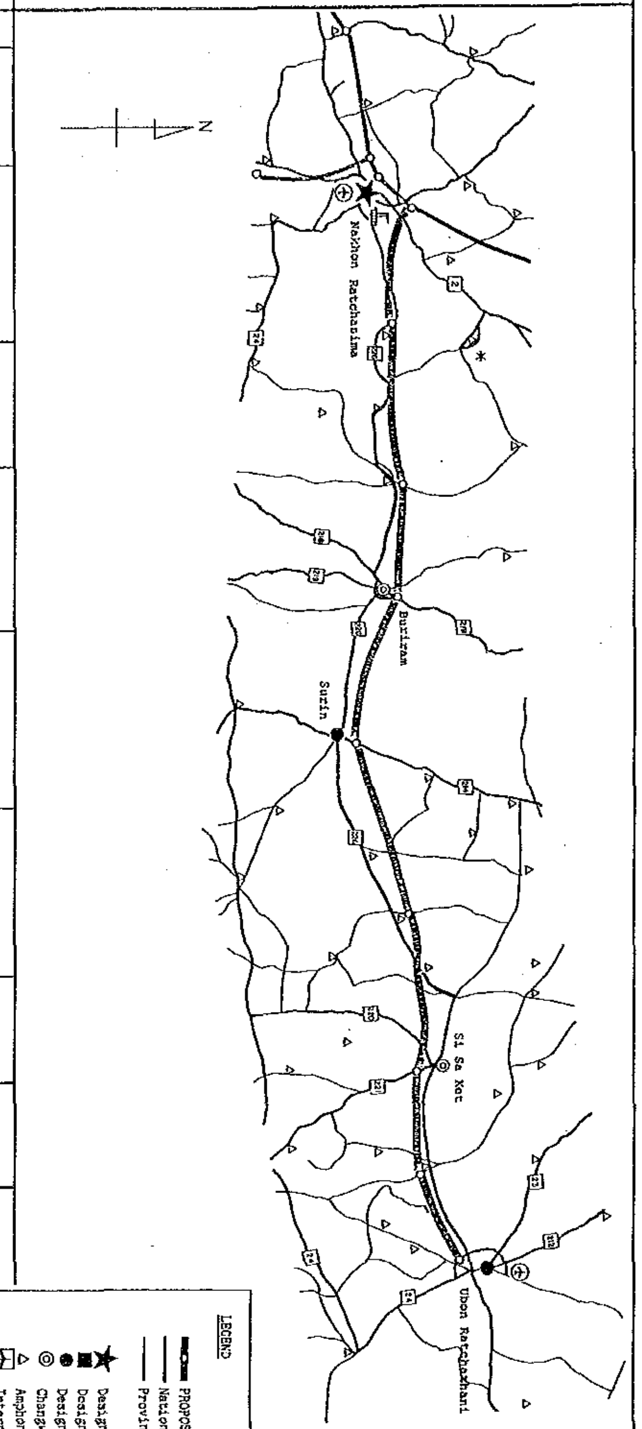
TERRAIN (F: FLAT, R: ROLLING, M: MOUNTAINOUS)

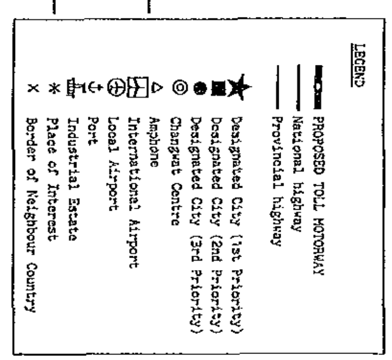
KP	Length	Terrain
0.0 – 7.0	7.0	F
7.0 – 78.0	[illegible]	F
78.0 – 301.1	[illegible]	F

ROAD CLASS, DESIGN SPEED, NO. OF LANES (M-1: 120, 100; M-2: 100, 80)

KP	Length	Class
0.0 – 110.8	110.8	M-1 120km 4-lane
110.8 – 301.1	190.3	M-2 100km 4-lane

ROUTE MAP

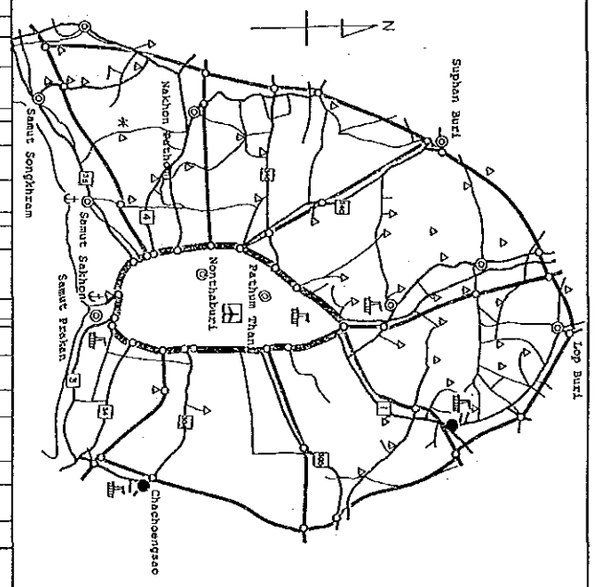




ROUTE TM-31 (O.B.R.R.) TOTAL LENGTH = 167.7 KM

KP	LENGTH (KM)	INTERCHANGE NAME	REST FACILITIES KP	REST FACILITIES LENGTH (KM)	REST FACILITIES NAME	PASSING CHANGWAT	TRAFFIC VOLUME (2010) MAIN LANE TRAFFIC VOLUME	TRAFFIC VOLUME (2010) I.C. TRAFFIC VOLUME	TERRAIN F: FLAT R: ROLLING M: MOUNTAINOUS	ROAD CLASS DESIGN SPEED NO. OF LANES M-1 120	M-1 100	M-2 100	M-2 80	MAJOR STRUCTURES	TOTAL CONST. COST (M. BAHT)
0.0		BANG PA-IN J.C. TM-1, TM-2				0.0 PATHUM THANI 4.5	73.4	7.2	0.0	0.0				1.1 Br (Rt.1 1.5 Br 50m 4.8 Br 150m 7.0 Br 50m	3822.1
15.8	15.8														
15.8	6.0	KHLONG LUANG Rt.9214				27.0	73.4	0.0							1431.7
21.8	6.7	THANYABURI J.C. Rt.305					73.4	3.9							2035.1
30.5	11.8	LAM LUK KA Rt.3312				31.5	63.9	0.0							2779.8
42.3	3.7	MIN BURI					63.9	0.0							917.6
46.0	7.1	BANG KAPI Rt.304 Rt.3278				32.0 BANGKOK	63.3	0.0							1677.5
53.1	9.8	PHRA KHANONG J.C. TM-3					63.3	17.8						46.6 Br 100m 53.3 Br (Railway) 54.0 Br 100m 67.7 Br (Rt.)	2251.0
62.9	9.2	BANG PHLI Rt.34				53.5	59.5	0.0							2146.9
72.1	3.8	SAMUT PRAKAN					58.7	53.6							940.0
75.9	9.8	SAMUT PRAKAN Rt.3344 ETA. Rt.3				19.0 SAMUT PRAKAN	58.7	108.0							2575.7
82.5	14.0	PHRA PHADENNG Rt.309				81.5	75.0	27.8						81.5 Br (Rt.3202) 92.6 Br 500m	3219.7
96.5	5.7	BANG KHUN THIEN Rt.35					88.0	105.5						97.5 Br 100m	1364.5
102.2	2.1	PHASI CHAROEN J.C. TM-4				53.0 NONTHABURI	89.0	19.8						99.0 Br (Rt.)	550.0
104.3	8.2	PHASI CHAROEN Rt.4					178.0	33.2						103.9 Br (Railway)	1923.4
112.5	9.9	TALING CHAN Rt.338					84.0	48.8						106.0 Br 100m 114.2 Br 100m 119.2 Br 100m	2355.1
122.4	7.5	BANG YAI J.C. TM-32				114.5 PATHUM THANI 11.0	73.6	47.4						127.3 Br 100m 134.7 Br 100m	1765.9
129.9	12.8	BANG BUA THONG J.C. TM-33				125.5	80.6	29.6							2951.6
142.7	6.8	LAT LUM KAEO Rt.345				42.2 AYUTTHAYA	51.2	0.0							2178.1
149.5	10.5	SAM KHOK Rt.3111					51.2	0.0						153.5 Br 100m 160.5 Br (Railway) 164.8 Br (Rt.306) 165.0 Br (Rt.32)	2437.8
160.0	7.7	BANG PA-IN New Road					51.2	0.0							1811.8
167.7		NANG PA-IN J.C. TM-1, TM-2					51.2	52.1	167.7	167.7				TOTAL	40777.0

ROUTE MAP



LEGEND

- PROPOSED TOLL MOTORWAY
- National highway
- Provincial highway
- Designated City (1st Priority)
- Designated City (2nd Priority)
- Designated City (3rd Priority)
- Changwat Centre
- Amphone
- International Airport
- Local Airport
- Port
- Industrial Estate
- Place of Interest
- Border of Neighbour Country

ROUTE TM-32 (O.R.R. - KANCHANABURI) TOTAL LENGTH = 100.0 KM

INTERCHANGE

KP	LENGTH (KM)	NAME	
0.0		BANG YAI	Rt.340
	41.0		
41.0		NAKHON PATHOM	Rt.321
	12.0		
53.0		BANG PHONG J.C.	TM-35
	22.8		
75.8		THA MAKA	Rt.3081
	24.7		
100.0		KANCHANABURI	Rt.324

REST FACILITIES

KP	LENGTH (KM)	NAME
		T.B.
22.0		S.A. NAKHON CHAISI
	41.0	
63.0		P.A. THA MAKA

PASSING CHANGWAT

KP	LENGTH (KM)	CHANGWAT
0.0–11.5	11.5	NONTHABURI
11.5–55.0	43.5	NAKHON PATHOM
55.0–62.5	7.5	RATCHABURI
62.5–100.0	37.5	KANCHANABURI

TRAFFIC VOLUME (2010)

KP	MAIN LANE TRAFFIC VOLUME	I.C. TRAFFIC VOLUME
0.0		48.5
0.0–41.0	51.6	
41.0		57.2
41.0–53.0	62.4	
53.0		24.6
53.0–75.8	29.3	
75.8		15.7
75.8–100.0	11.8	
100.0		11.8

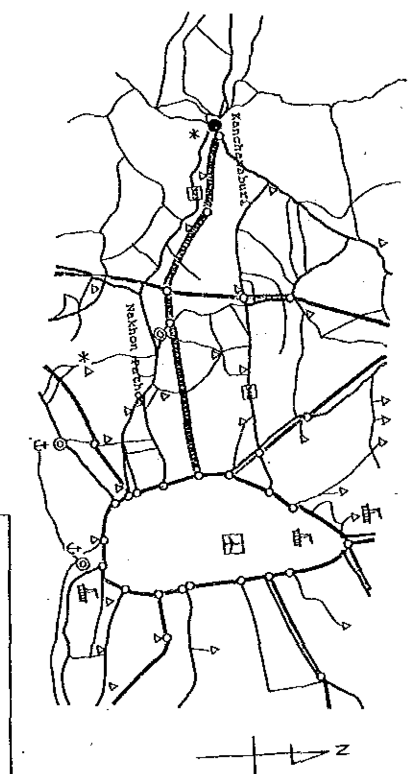
TERRAIN (F: FLAT, R: ROLLING, M: MOUNTANIOUS)

KP	LENGTH	TERRAIN
0.0–100.0	100.0	F

ROAD CLASS / DESIGN SPEED / NO. OF LANES (M-1: 120, 100; M-2: 100, 80), MAJOR STRUCTURES, TOTAL CONST. COST (M. BAHT)

KP	LENGTH	ROAD CLASS	MAJOR STRUCTURES	TOTAL CONST. COST (M. BAHT)
0.0–53.0	53.0	M-1 120Km 6-lane	11.9 Br 50 m 20.1 Br 150 m 22.2 Br (Rt 3233) 29.2 Br (Rt) 35.0 Br (Rt) 37.0 Br (Rt 3036) 39.1 Br (Rt)	4558.8
			42.7 Br (Rt)	2047.7
53.0–75.8	22.8	M-1 120Km 4-lane	54.3 Br (RAILWAY) 61.2 Br (Rt) 62.8 Br (Rt 3394) 72.7 Br (Rt)	1511.7
75.8–100.0	24.7	M-2 100Km 4-lane	87.0 Br (Rt) 88.2 Br (Rt 3084)	1745.0
			TOTAL	9873.1

ROUTE MAP



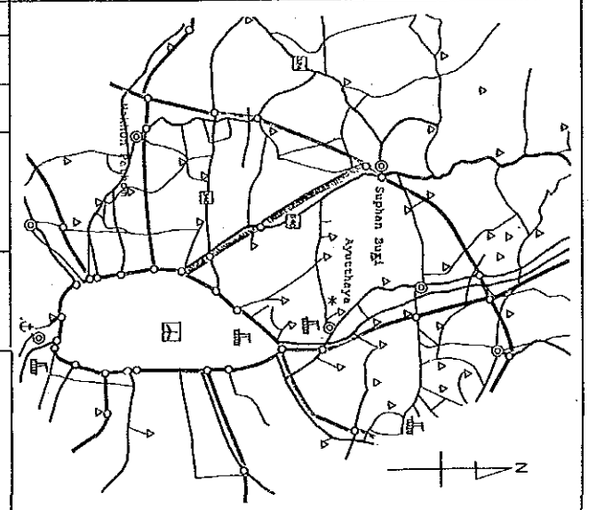
LEGEND

- PROPOSED TOLL MOTORWAY
- National highway
- Provincial highway
- ★ Designated City (1st Priority)
- ■ Designated City (2nd Priority)
- ● Designated City (3rd Priority)
- ◎ Changwat Centre
- △ Amphone
- International Airport
- Local Airport
- Port
- Industrial Estate
- * Place of Interest
- × Border of Neighbour Country

ROUTE TM-33 (O.R.R. - SUPHAN BURI) TOTAL LENGTH = 62.0 KM

INTERCHANGE KP	LENGTH (KM)	NAME	REST FACILITIES KP	LENGTH (KM)	NAME	PASSING CHANGWAT	TRAFFIC VOLUME (2010) MAIN LANE TRAFFIC VOLUME	I.C. TRAFFIC VOLUME	TERRAIN F: FLAT R: ROLLING M: MOUNTAINOUS	ROAD CLASS DESIGN SPEED NO. OF LANES N-1 120 100 N-2 100 80	MAJOR STRUCTURES	TOTAL CONST. COST (M. BAHT)
0.0	14.0	BANG BUA THONG Rt.340					32.8	47.4	0.0	0.0	8.0 Br 50 m	1272.2
14.0	14.0	LAT LUM KAEO Rt.346					21.0	12.8			18.0 Br 50 m	1091.8
28.0	34.0	LAT BUA LUANG Rt.340	28.0		P.A. LAT BUA LUANG		18.4	9.1	28.0 F	28.0 N-1 120km 4-lane	29.1 Br 100 m 33.0 Br 100 m 47.4 Br 50 m 55.2 Br 100 m 55.6 Br (Rt 3351) 59.9 Br (Rt) 61.0 Br (Rt 3318)	2560.8
62.0		SUPHAN BURI J.C.						18.4	62.0	62.0	TOTAL	4924.2

ROUTE MAP



LEGEND

- PROPOSED TOLL MOTORWAY
- National highway
- Provincial highway
- Designated City (1st Priority)
- Designated City (2nd Priority)
- Designated City (3rd Priority)
- Changwat Centre
- Amphone
- International Airport
- Local Airport
- Port
- Industrial Estate
- Place of Interest
- Border or Neighbour Country

ROUTE TM-34 (O.R.R. - ARANYAPRATHET) TOTAL LENGTH = 211.7 KM

INTERCHANGE

KP	LENGTH (KM)	NAME	
0.0		THANYABURI	Rt.304
	36.9		
36.9		ONGKHARAK	Rt.305
	22.1		
59.0		NAKHON NAYOK	TM-35
	19.7		
78.7		PRACHIN BURI	Rt.320
	43.1		
121.8	3.2	KABIN BURI	
125.0		KABIN BURI	Rt.340 TM-35
	39.7		
164.7		SA KAEN	Rt.317
	25.3		
190.0		WATTHANA NAKHJON	Rt.3395
	21.7		
211.7		ARRANYAPRATHET	Rt.3067

REST FACILITIES

KP	LENGTH (KM)	NAME
		T.B.
51.0		S.A. NAKOHON AYOK
	45.0	
96.0		P.A. PRACHANTAKHON

PASSING CHANGWAT

KP	LENGTH	CHANGWAT
0.0 – 27.9	27.9	PATHUM THANI
27.9 – 71.9	43.7	NAKHON NAYOK
71.9 – 211.7	140.2	PRACHIN BURI

TRAFFIC VOLUME (2010)

MAIN LANE TRAFFIC VOLUME	I.C. TRAFFIC VOLUME
	3.9
87.8	
	6.2
85.7	
	22.0
41.0	
	32.8
30.8	
	19.9
30.0	
	12.0
21.2	
	25.7
19.0	
	15.0
7.2	
	2.7

TERRAIN (F: FLAT, R: ROLLING, M: MOUNTANIOUS): 0.0 – 211.7, 211.7 F

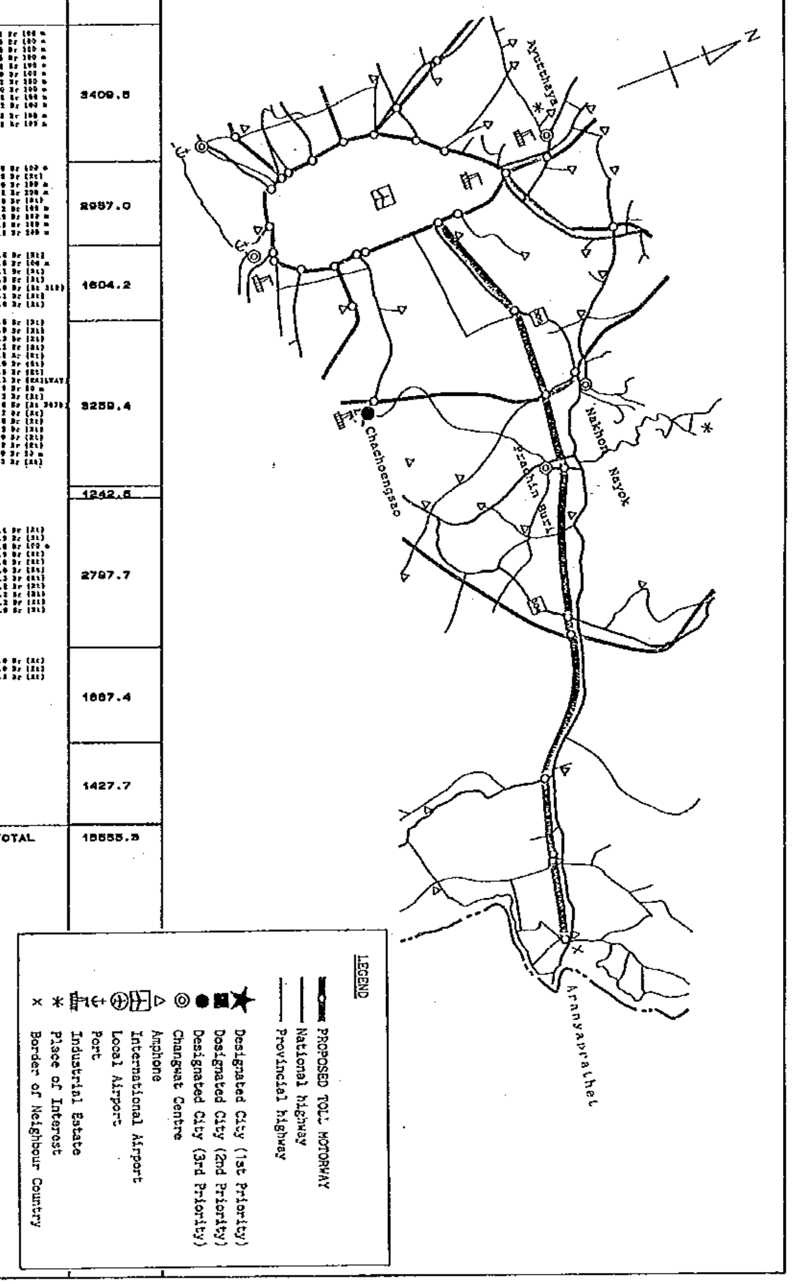
ROAD CLASS / DESIGN SPEED / NO. OF LANES (M-1: 120, 100; M-2: 100, 80)

KP	LENGTH	CLASS
0.0 – 59.0	59.0	M-1 120km 6-lane
59.0 – 190.0	131.0	M-1 120km 4-lane
190.0 – 211.7	21.7	M-2 100km 4-lane

MAJOR STRUCTURES / TOTAL CONST. COST (M. BAHT)

SECTION	TOTAL CONST. COST (M. BAHT)
THANYABURI – ONGKHARAK	3409.8
ONGKHARAK – NAKHON NAYOK	2957.0
NAKHON NAYOK – PRACHIN BURI	1604.2
PRACHIN BURI – KABIN BURI	3259.4
KABIN BURI – KABIN BURI	1242.6
KABIN BURI – SA KAEN	2797.7
SA KAEN – WATTHANA NAKHJON	1867.4
WATTHANA NAKHJON – ARRANYAPRATHET	1427.7
TOTAL	18585.8

ROUTE MAP



ROUTE TM-35 (CHON BURI ~ NAKHON RATCHASIMA) TOTAL LENGTH = 239.1 KM

INTERCHANGE

KP	LENGTH (KM)	NAME	
0.0		CHON BURI	TM-3
	15.2		
15.2		PHANAT NIKHON	Rt.315
	24.3		
40.5		PLANG TAO	Rt.331
	63.5		
104.0		KABIN BURI	TM-34
	104.7		
206.7		PAK THONG CHAI	Rt.2072
	30.4		
239.1		NAKHON RATCHASIMA	TM-2

REST FACILITIES

KP	LENGTH (KM)	NAME
30.0		P.A. PHANAT NIKHON
	25.0	
55.0		P.A. PHANOM SARAKAN
	85.0	
140.0		S.A. NA DI
	73.0	
213.0		P.A. PAK THONGCHAI

PASSING CHANGWAT

KP	Length	Changwat
0.0 – 31.9	31.9	CHON BURI
31.9 – 72.7	40.8	CHACHOENGSAO
72.7 – [illegible]	82.3	PRACHIN BURI
[illegible] – 239.1	84.1	NAKHON RATCHASIMA

TRAFFIC VOLUME (2010)

KP	MAIN LANE TRAFFIC VOLUME	I.C. TRAFFIC VOLUME
0.0		19.8
0.0 – 15.2	19.5	
15.2		14.8
15.2 – 40.5	5.5	
40.5		3.1
40.5 – 104.0	4.2	
104.0		27.9
104.0 – 206.7	11.4	
206.7		1.4
206.7 – 239.1	10.8	
239.1		10.8

TERRAIN (F: FLAT, R: ROLLING, M: MOUNTANIOUS)

KP	Length	Terrain
0.0 – 127.0	127.0	F
127.0 – 132.0	5.0	R
132.0 – 144.0	[illegible]	F
144.0 – 185.0	41.0	M
185.0 – [illegible]	54.1	F

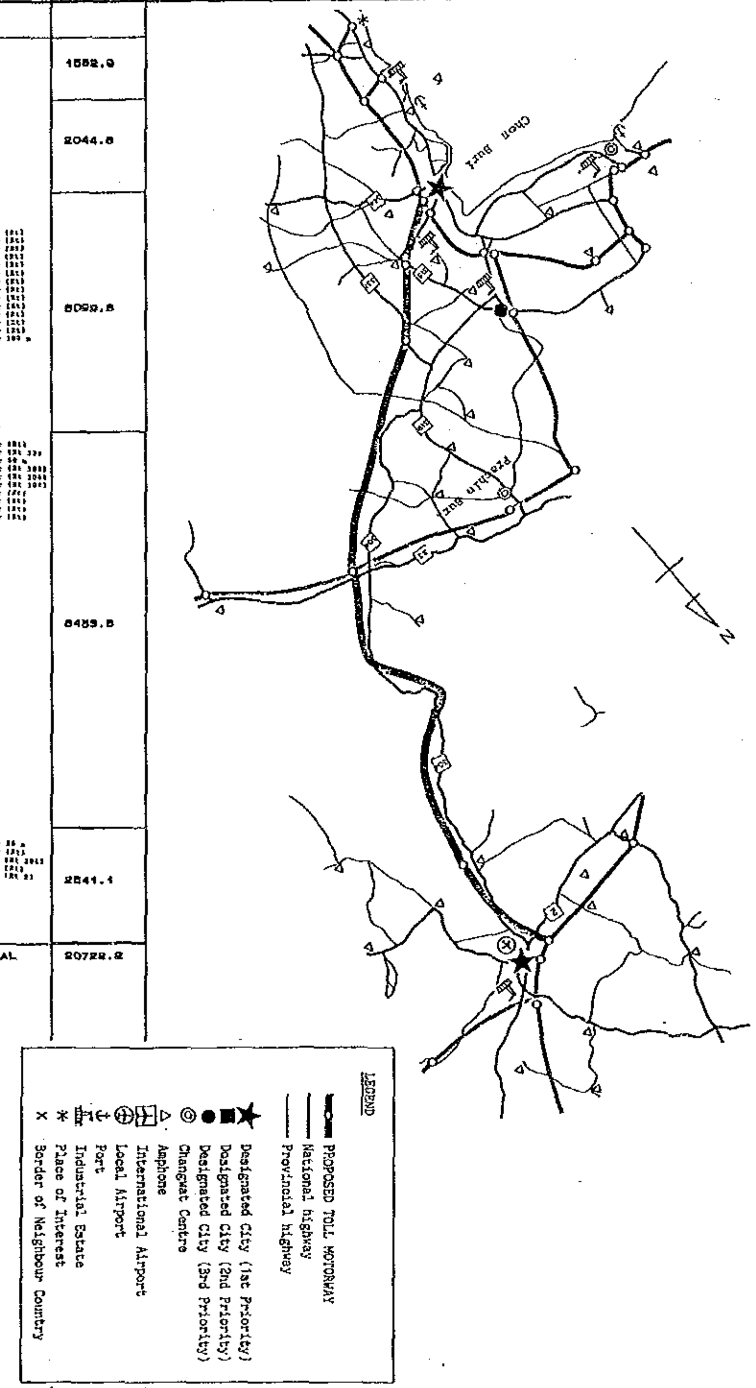
ROAD CLASS / DESIGN SPEED / NO. OF LANES (M-1: 120, 100; M-2: 100, 80)

KP	Length	Class
0.0 – 15.2	15.2	M-1 120km 4-lane
15.2 – 140.0	[illegible]	M-2 100km 4-lane
140.0 – 190.0	50.0	M-2 080km 4-lane
190.0 – [illegible]	49.1	M-2 100km 4-lane

MAJOR STRUCTURES / TOTAL CONST. COST (M. BAHT)

Section	MAJOR STRUCTURES	TOTAL CONST. COST (M. BAHT)
CHON BURI – PHANAT NIKHON		1582.9
PHANAT NIKHON – PLANG TAO		2044.6
PLANG TAO – KABIN BURI	[illegible]	6099.6
KABIN BURI – PAK THONG CHAI	[illegible]	6453.5
PAK THONG CHAI – NAKHON RATCHASIMA	[illegible]	2541.1
	TOTAL	20722.2

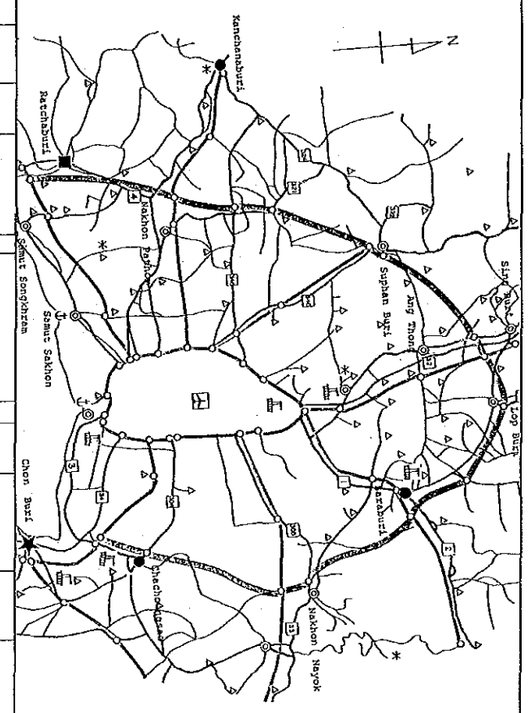
ROUTE MAP



ROUTE TH-96 (RATCHABURI – CHACHOENGSAO) TOTAL LENGTH = 365.8 KM

INTERCHANGE KP	LENGTH (KM)	NAME	REST FACILITIES KP	LENGTH (KM)	NAME	PASSING CHANGWAT	TRAFFIC VOLUME (2010) MAIN LANE TRAFFIC VOLUME	I.C. TRAFFIC VOLUME	TERRAIN F: FLAT R: ROLLING M: MOUNTAINOUS	ROAD CLASS DESIGN SPEED NO. OF LANES M-1 120 100	M-2 100 80	MAJOR STRUCTURES	TOTAL CONST. COST (M. BAHT)
0.0		HAT PHLENG J.C. TH-4				0.0 RATCHABURI		16.9	0.0	0.0			
	48.3		50.0		P.A. PHOTHARAM	48.0	16.9			M-1 120Km 4-1ane			3115.4
48.3		BANG PANG J.C. TH-92						31.7					
	18.7					53.0 NAKHON PATHOM	48.1						1552.6
66.0		KANPHAENG SAEN Rt.346	76.0					33.8		53.0			
	13.4						11.1						1232.1
81.4		BONG PHI NONG Rt.321				78.0		4.6					
	32.4						10.1						2372.2
			106.0		P.A. BANG PLA MA			7.3					
113.8	5.0	SUPHAN BURI J.C. TH-32					27.4	18.4					923.1
118.8		SUPHAN BURI Rt.3097				93.0 SUPHAN BURI							
	43.1		156.0	50.0			11.2				M-2 100Km 4-1ane		3428.0
					P.A. PHO THONG			0.9					
157.9	7.1	PHNOM BURI Rt.309				172.0	12.4	25.6					859.3
175.0		THA NANG J.C. TH-1		55.0			17.8						1374.6
	16.4					206.0 LOP BURI		16.8					
191.4		LOP BURI Rt.1					12.8						2329.5
	31.6		211.0		P.A. PHRA PHUTTHABAT	208.0		9.0			229.0		
223.0		N. SARABURI Rt.21					18.6						1858.6
	22.5			53.0		79.0 SARABURI		30.1					
245.5		SARBURI J.C. TH-2					20.8						3356.8
	45.9		274.0		P.A. BAN NA								
291.4		NAKHON NAYOK Rt.305				287.0		10.0					
	9.4			59.0		28.0	27.5	279.2			K-1 120Km 4-1ane		744.9
300.8		NAKHON NAYOK J.C. TH-34				318.0 4.0 312.0							
	48.2						18.5						3814.3
			333.0		P.A. NABO NA PAZEO	49.5 CHACHOENGSAO		25.3					
349.0		CHACHONGSAO Rt.314					17.5						1259.9
	16.6							17.5	365.8	365.8			
365.8		BANG PAKONG J.C. TH-3										TOTAL	28314.2

ROUTE MAP



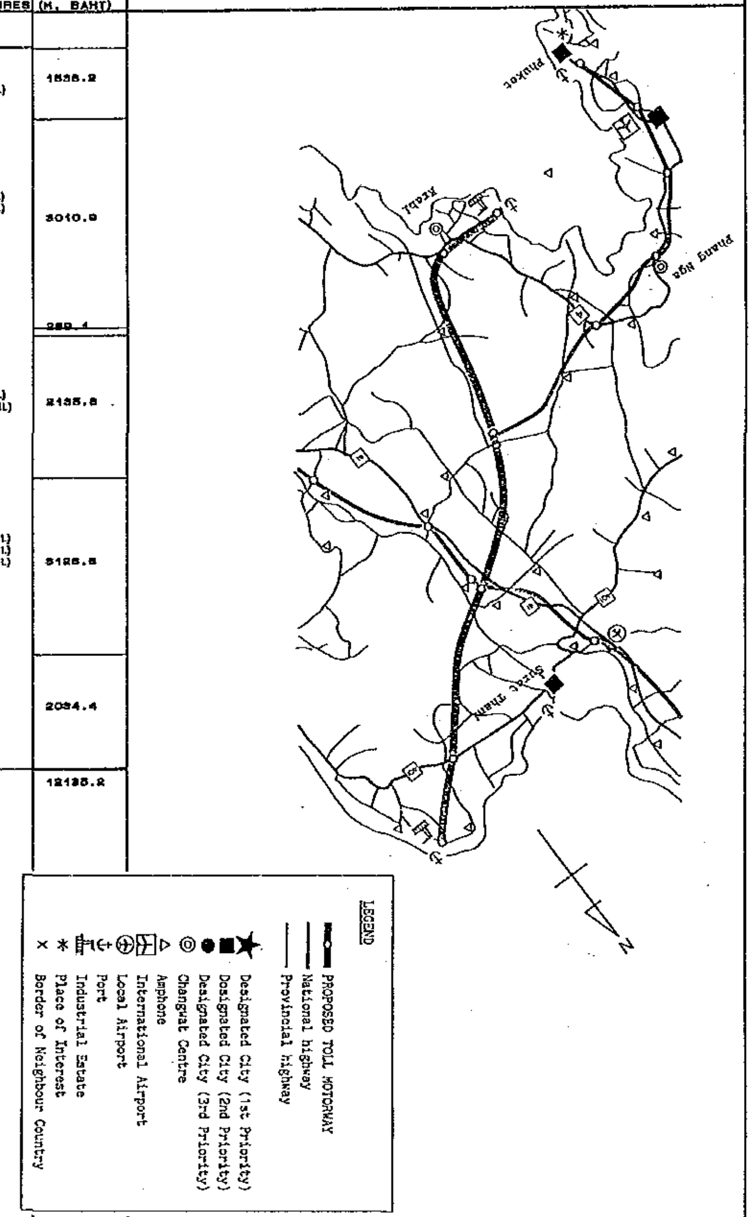
LEGEND

- PROPOSED TOLL MOTORWAY
- National highway
- Provincial highway
- Designated City (1st Priority)
- Designated City (2nd Priority)
- Designated City (3rd Priority)
- Changwat Centre
- Amphore
- International Airport
- Local Airport
- Port
- Industrial Estate
- Place of Interest
- Border of Neighbour Country

ROUTE TM-41 (KRABI - KHNONM) TOTAL LENGTH = 190.7 KM

INTERCHANGE KP	INTERCHANGE LENGTH (KM)	INTERCHANGE NAME	REST FACILITIES KP	REST FACILITIES LENGTH (KM)	REST FACILITIES NAME	PASSING CHANGWAT	TRAFFIC VOLUME (2010) MAIN LANE TRAFFIC VOLUME	TRAFFIC VOLUME (2010) I.C. TRAFFIC VOLUME	TERRAIN F: FLAT R: ROLLING M: MOUNTANIOUS	ROAD CLASS DESIGN SPEED NO. OF LANES (M-1: 120, 100; M-2: 100, 80)	MAJOR STRUCTURES	TOTAL CONST. COST (M. BAHT)
0.0		KLONG SAI				0.0		17.1	0.0	0.0		
	18.8					KRABI 82.0	17.1		33.0 R		5.4 Br. (RL) 13.3 Br. (RL)	1838.2
18.8		KRABI Rt.4						4.1	33.0			
	55.2		45.0		S.A. KHAO PHANON	82.0	21.1		63.0 F		44.8 Br. (RL) 74.5 Br. (RL)	3010.9
74.0 76.0	2.0	PRA SAENG UC PRA SAENG IC TM-42 Rt.4035					23.8	5.0 2.4				280.4
	37.5			123.0			26.0		96.0	M-1 120km 4-lane 190.7	99.7 Br. (RL) 111.5 Br. (RL)	2155.8
113.5		BAN NA SAN TM-4				SURAT THANI 126.0		2.0				
	47.0						20.5		92.7 F		115.2 Br. (RL) 117.1 Br. (RL) 163.1 Br. (RL)	5126.5
160.5		KANCHANADIT Rt.401						4.1				
	30.2		168.0		S.A. DAN SAK	180.0	17.0					2034.4
190.7		KHANON				NAKHON SI THAMMARAT 10.7		17.0	190.7	190.7	TOTAL	12135.2

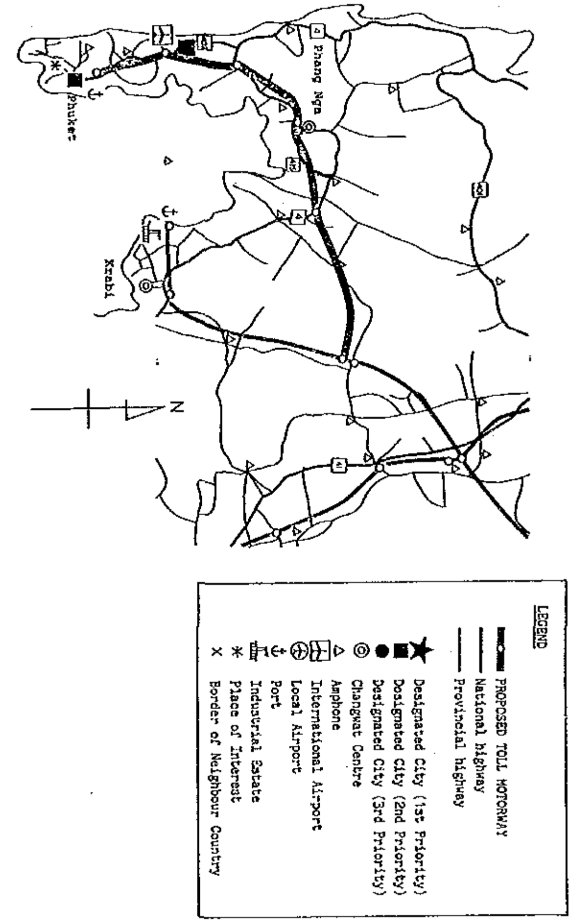
ROUTE MAP



ROUTE TM-42 (PHRASAENG - PHUKET) TOTAL LENGT = 138.0 KM

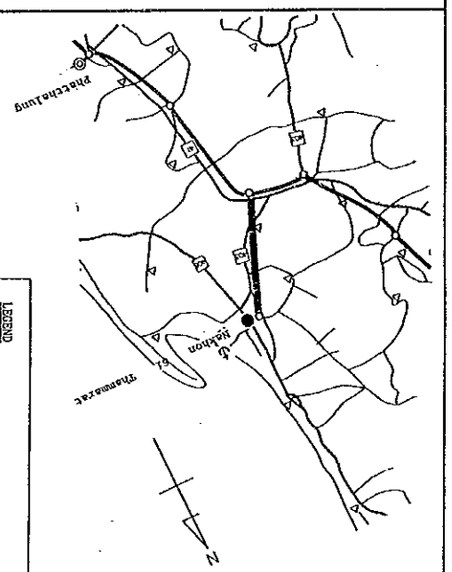
INTERCHANGE KP	INTERCHANGE LENGTH (KM)	INTERCHANGE NAME	REST FACILITIES KP	REST FACILITIES LENGTH (KM)	REST FACILITIES NAME	PASSING CHANGWAT	TRAFFIC VOLUME (2010) MAIN LANE TRAFFIC VOLUME	TRAFFIC VOLUME (2010) I.C. TRAFFIC VOLUME	TERRAIN F: FLAT R: ROLLING M: MOUNTANIOUS	ROAD CLASS DESIGN SPEED NO. OF LANES (M-1: 120, 100; M-2: 100, 80)	MAJOR STRUCTURES	TOTAL CONST. COST (M. BAHT)
0.0		PHRA SAENG (TM-41)				0.0		6.7	0.0	0.0		
	47.4		28.0		S.A. AO LUK	SURAT THANI 21.0 (0.0–21.0); KRABI 40.5 (21.0–61.5)	6.7		28.0 F; 28.0 (R)		21.0 Br. 100m	3068.9
47.4		AO LUK (Rt.4)		27.0				2.4	45.0			
	25.6					61.5	5.8		29.0 F	M-2 100km 4-lane (138.0)	55.5 Br. (Rt.4040) 68.2 Br. 150m 71.9 Br. 100m	1729.9
73.0		PHANGNGA (Rt.4)						6.7	74.0		75.5 Br. (Rt)	
	24.0		55.0		P.A. TAKUA THUNG	PHANGNGA 47.5 (61.5–109.0)	8.8					1580.5
97.0		THAKUA THUNG (Rt.4)		56.0				5.8				
	19.7		111.0		S.A. THA NAN	109.0	11.0		64.0 F		103.3 Br. (Rt) 108.5 Br. 900m 117.7 Br. (Rt.402)	1435.5
116.7		PHUKET AIRPORT (Rt.4026)						0.9				
	19.3					PHUKET 29.0 (109.0–138.0)	15.9				121.9 Br. (Rt.402) 131.3 Br. (Rt.4027) 133.2 Br. (Rt.402)	1272.7
138.0		PHUKET (Rt.402)				138.0		15.9	138.0	138.0	TOTAL	9250.8

ROUTE MAP



ROUTE TH-43 (RON PHIBUN – NAKHON SI THAMARAT) TOTAL LENGTH = 38.9 KM

INTERCHANGE			REST FACILITIES			PASSING CHANGWAT	TRAFFIC VOLUME (2010)		TERRAIN F: FLAT R: ROLLING M: MOUN-TAINOUS	ROAD CLASS DESIGN SPEED NO. OF LANES				MAJOR STRUCTURES	TOTAL CONST. COST (M. BAHT)
							MAIN LANE TRAFFIC VOLUME	I.C. TRAFFIC VOLUME		M-1 120	M-1 100	M-2 100	M-2 80		
KP	LENGTH (KM)	NAME	KP	LENGTH (KM)	NAME										
0.0		RON PHIBUN J.O. TH-4				0.0		12.7	0.0	0.0				2.0 Br. (RL41) 2.7 Br. (RL41) 2.7 Br. (Railway) 24.0 Br. (RL)	2581.5
	38.9					38.9 NAKHON SI THAMARAT	12.7		38.9 F	38.9 M-1 120Km 4-lane					
38.9		NAKHON SI THAMARAT Rt.401						12.7	38.9	38.9				TOTAL	2581.5



LEGEND

- PROPOSED TOLL MOTORWAY
- National Highway
- Provincial Highway
- Designated City (1st Priority)
- Designated City (2nd Priority)
- Designated City (3rd Priority)
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