

6) CONSTRUCTION QUANTITIES AND COSTS

CONSTRUCTION QUANTITIES AND COSTS  
(Project WD 7-6 Length = 64.000 Km)  
(Improved Length 64.000 Km)

ITEM	Unit	Financial		Financial		Economic cost		Residual Value	
		Unit Cost	Quantity	Total cost	%	1000 Baht	%	1000 Baht	
		Baht		1000 Baht					
EARTH WORK									
Clearing & Grubbing	SQ.M	1	128,000	128			83		90
Roadway Excavation(Unclassified)	CU.M	30	0	0					
Embankment(Borrowed Material)	CU.M	100	115,200	11,520					
Slope Protection(Stripe Sodding)	SQ.M	6	214,656	1,288					
Sand Mat (t=0.5m)	SQ.M	50	0	0					
Excavate Existing Surface	SQ.M	2	0	0					
Thickness Over 10cm (2 Lay)	SQ.M	14	166,400	2,330					
SUB TOTAL				15,266			12,670		11,403
SUBBASE AND BASE									
Subbase(Selected Material)	CU.M	190	49,920	9,485			83		50
Subbase(Soil Aggregate)	CU.M	190	66,560	12,646					
Base Coarses(Crush Stone)	CU.M	280	23,040	6,451					
Shoulder(Soil Aggregate)	CU.M	190	28,160	5,350					
SUB TOTAL				33,933			28,164		14,082
SURFACE									
Asphaltic Prime coat	SQ.M	13	96,000	1,248			83		50
Asphaltic Tack coat	SQ.M	7	352,000	2,464					
Asphalt concrete Surfacing	CU.M	1,900	22,400	42,560					
SUB TOTAL				46,272			38,406		19,203
STRUCTURES(Equivalent)									
RC Pipe Culvert( D= 600 m)	M	1,380	66	91			83		50
( D= 800 m)	M	1,950	0	0					
( D=1000 m)	M	2,640	100	264					
RC Box Culvert(3-2.40*2.40 m)	M	17,100	0	0					
RC Bridge (W=15.0 m)	M	96,000	0	0					
RC Bridge Wideing	SQ.M	9,600	2,126	20,410					
PC Bridge Wideing	SQ.M	15,000	778	11,670					
SUB TOTAL				32,435			26,921		13,460
TOTAL (a)				127,905			106,161		58,149
Miscellaneous Works [(a)*7%]	Ls	1		8,953			7,431		4,070
CONTRACT AMOUNT (b)				136,858			113,592		62,219
PHYSICAL CONTINGENCIES [(b)*10%] (c)	Ls	1		13,686			11,359		6,222
ENGINEERING & SUPERVISION [(b)+(c)*10%] (d)	Ls	1		15,054	85	12,796	0	0	0
LAND ACQUISITION(Average) (e)	SQ.M	50	0	0	100	0	100	0	0
PROJECT COST [(b)+(c)+(d)+(e)]				165,599			137,748		68,441
AVERAGE COST PER KM				2,587					

MAINTENANCE BUDGET CALCULATION

Project Road No, WD 7-6 Na= 9,300 Baht/Km/year  
(Existing Road) Km= 1.16  
Length = 64.000 Km

Laterite Surface

ITEMS	Existing Road		
	Condition		Factor
1. A.D.T	A1	1,800	0.95
2. Width Of Embankment (Surface & Shoulder)	A3	10m	0.67
3. R-O-W Width (m)	B1	60 m	0.31
4. Traffic Service Operation Topography	B2	0 - 3 %	0.05
5. Drainage Topography	B3	0 - 3 %	0.00
6. Bridge Quantity (m/Km)	B4	7	0.02
7. NO. Of Lanes		2	

Ks(Existing) = 1+0.7(A1+A3)+0.3(B1+B2+B3+B4) = 2.25  
Maintenance cost + Overhead= Ks \* Km \* Na \*1.28 = 31,095 Baht/Km/year  
Total Cost(Existing) =Length \*(Baht/Km/year)= 1,990,102 Baht/year  
Financial Cost = 1,990,000 Baht/year  
Economic Cost = 1,652,000 Baht/year  
( 1,651,700 )Baht/year

Project Road No, WD 7-6 Na= 8,200 Baht/Km/year  
(Proposed Road) Km= 1.00  
Length = 64.000 Km

Asphalt Pavement

ITEMS	Proposed Road		
	Condition		Factor
1. Surface /Base Type	X1	AC	0.00
2. Subgrade CBR	X2	4 %	0.50
3. A.D.T	X3	2,500	0.86
4. Service Life (year)	X4	10	1.40
5. Pavement Width (m)	X5	7 m	0.19
6. R-O-W Width (m)	Y1	60 m	0.10
7. Shoulder, Access, Median Width (m)	Y2	2.5 m	0.05
8. Traffic Service Operation Topography	Y3	0 - 3 %	0.00
9. Drainage Topography	Y4	0 - 3 %	0.00
10. Bridge Quantity (m/Km)	Y5	7	0.00
11. NO. Of Lanes		2	

Ka = 1+0.5(X1+X2+X3+X4+X5+Y1+Y2+Y3+Y4+Y5)= 2.55  
Maintenance cost + Overhead= Ka \* Km \* Na \*1.28 = 26,792 Baht/Km/year  
Total Cost =Length \*(Baht/Km/year)= 1,714,660 Baht/year  
Financial Cost = 1,715,000 Baht/year  
Economic Cost = 1,423,000 Baht/year  
( 1,423,450 )Baht/year

7) Construction Schedule

Project WD7-6 Route No. 401 from Phun Phin to 416

year and Month	First Year												Second Year												Third Year											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Work Items	=====																																			
Lend Acquisition																																				
Preparatory Works	=====																																			
Earth Works	=====																																			
Pavement Works													=====																							
Bridge Works	=====																																			
Miscellaneous Works													=====												=====											
Clearing -Up																									=====											
Percentage Of Disbursement (%)	23 %												47 %												30 %											

8) Economic Evaluation

Project WD7-6 Route No. 401 from Phun Phin to 416

(unit ; 1000 Baht)

Year	Conct- ruction Cost	Mainte- nance Cost	Total Cost	VOC Saving	Time Saving	Balance	Sensi. Analysis
						Benefit= Cost=	0.8 1.2
1990	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0
1993	29,923	0	29,923	0	0	(29,923)	(35,907)
1994	66,241	0	66,241	0	0	(66,241)	(79,490)
1995	41,583	0	41,583	0	0	(41,583)	(49,900)
1996	0	(508)	(508)	256	1,242	2,006	1,808
1997	0	(508)	(508)	761	5,694	6,964	5,774
1998	0	(508)	(508)	1,266	10,147	11,921	9,740
1999	0	(508)	(508)	1,772	14,599	16,879	13,706
2000	0	(508)	(508)	2,277	19,052	21,836	17,672
2001	0	(508)	(508)	2,782	23,504	26,794	21,638
2002	0	(508)	(508)	2,855	24,892	28,255	22,807
2003	0	(508)	(508)	2,927	26,280	29,715	23,975
2004	0	(508)	(508)	3,000	27,668	31,176	25,144
2005	0	(508)	(508)	3,072	29,056	32,636	26,312
2006	0	(508)	(508)	3,145	30,444	34,097	27,481
2007	0	(508)	(508)	3,145	30,444	34,097	27,481
2008	0	(508)	(508)	3,145	30,444	34,097	27,481
2009	0	(508)	(508)	3,145	30,444	34,097	27,481
2010	0	(508)	(508)	3,145	30,444	34,097	27,481
Total	137,747	(7,620)	130,127	36,693	334,354	240,920	140,685
						IRR =	10.77%
						NPV (i;12)	(7,438)
						B/C (i;12)	0.90

PROJECT WD6-1

**RT. 4137 / 417 PALIAN - KHUAN KALONG**

**CHANGWAT: SATUN, TRANG**

2) ROUTE MAP

3.17 Route No. 417 Palian - Khuan Kalong (WD6-1)

1) Summary

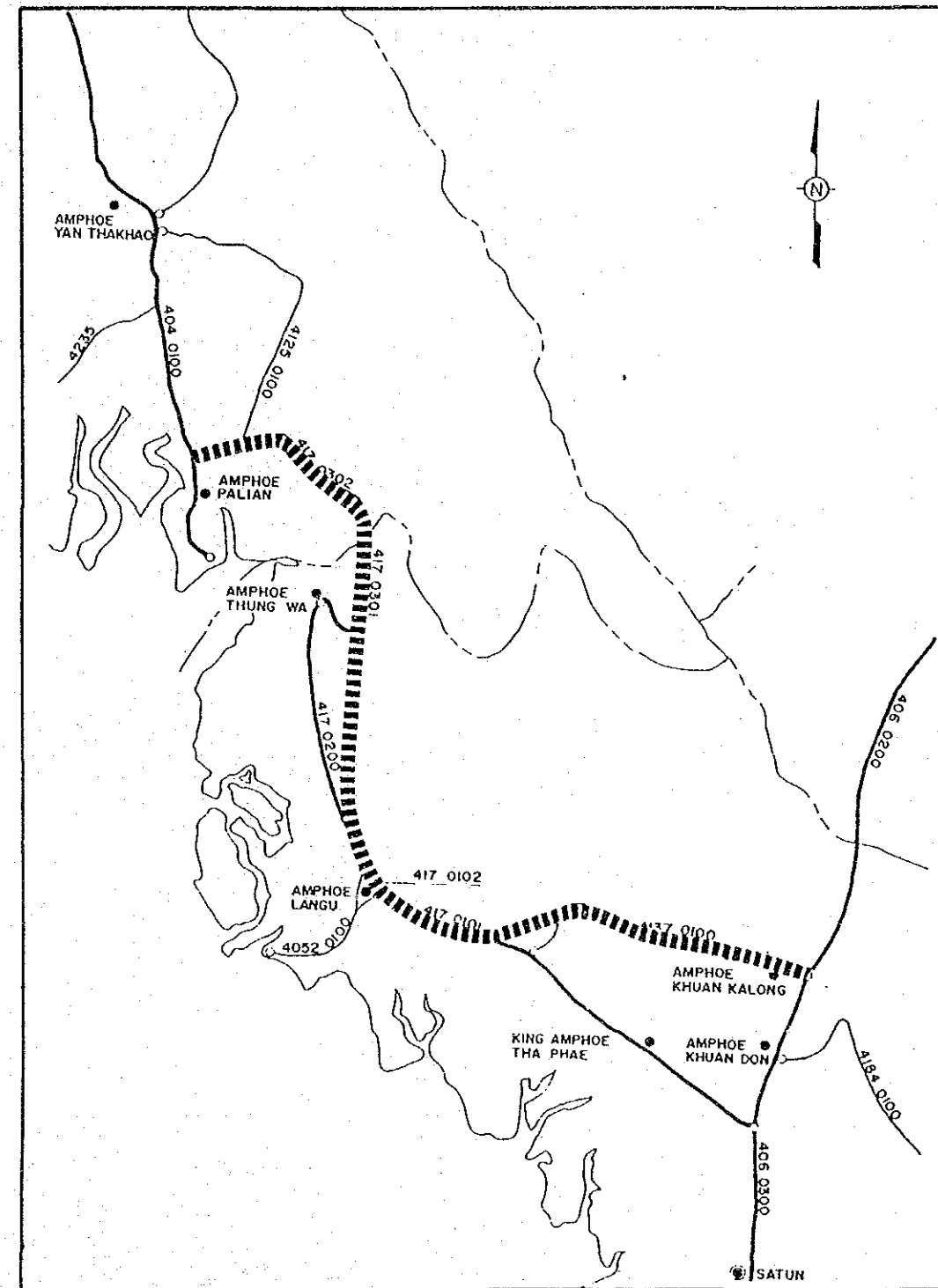
The project forms a part of the highway network development along the west coast, together with the project of WD7-3. The aim of the project is to improve the highway link between Route 404 from Trang and Route 406 to Satun and Hat Yai. Future extension of the highway to the further south will complete the highway network on the west coast.

The existing highway is of "F4" standard with paved carriageway width of 5.0 meters and soil aggregate shoulders of about 1 meter. Surface condition is good to fair. The width of the existing right of way is 15 meters from the center line. The proposed highway is of "S3" standard with carriageway width of 6.0 meters and soil aggregate shoulders of 2.0 meters. Land acquisition is not required.

The project starts from the intersection with Route 406 in Amphoe Khuan Kalong and ends at the intersection with Route 404 in Amphoe Palian. The total length is 98.2 kilometers along the existing route. The project include improvement of horizontal alignment in two sections: one for bypassing amphoe Thung Wa with substantial distance saving; and another for short cut connection between Route 417 and 4137. The total saving of distance amounts to 19 kilometers in comparison with the existing highway. The project length amounts to 79.2 kilometers.

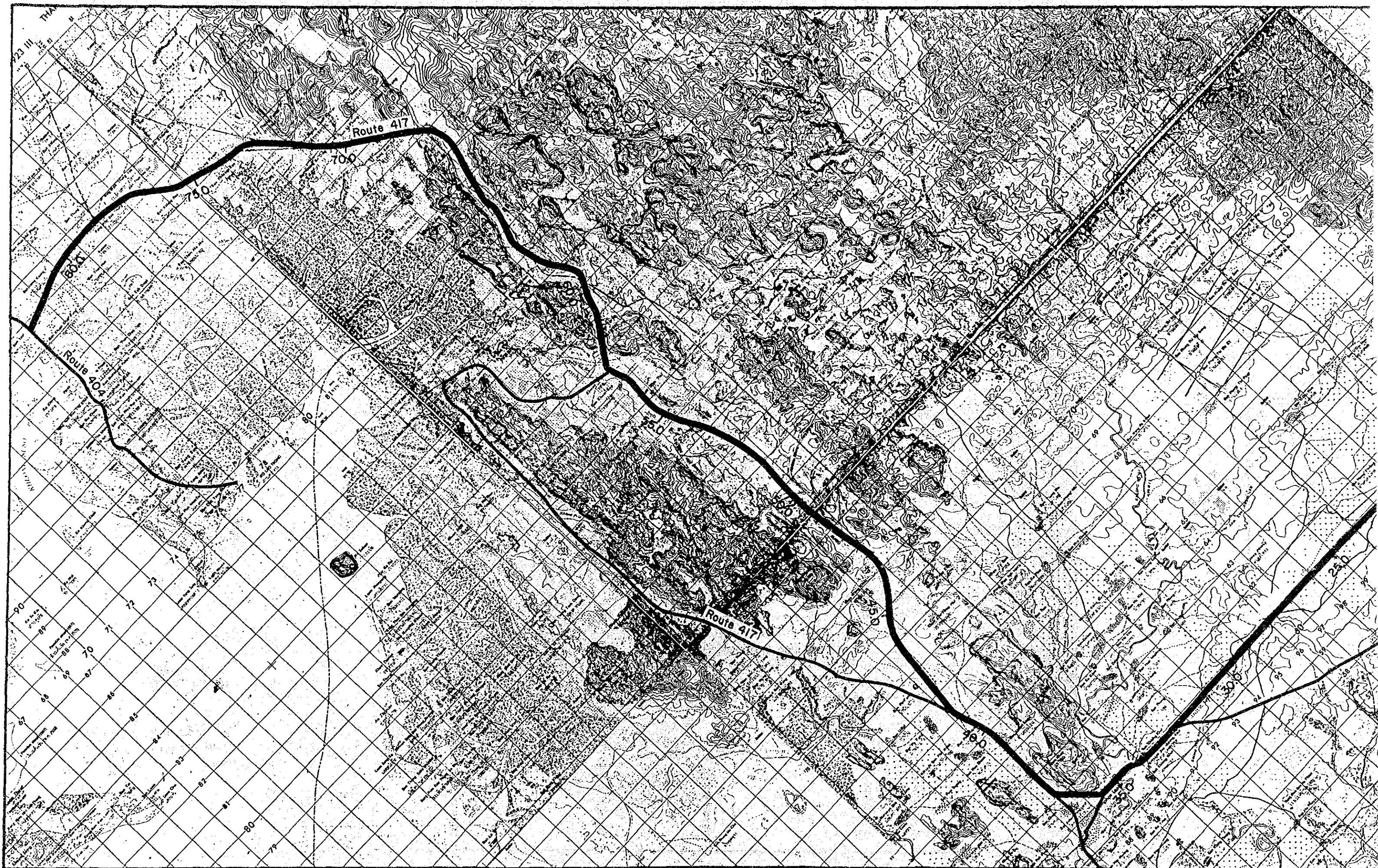
WD6-1	Description
Changwat	: Satun and Trang
Name or Location	: Rt.4137/417 Khuan Kalong - Palian
Road Class	: S3 (F4)
Cross Section (m)	: 2.00+6.00+2.00 (1.50+5.00+1.50)
Surface Type	: SA /ASC / SA ( SA /DBST/ SA )
Surface Condition	: ( F and G/F )
Length: Total	: 79.2 km
DOH Road	: 59.8 km +19.4 km:New
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AADT<'96/'01/'06>	: 900 / 1,400 / 3,200
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Financial Cost	: 251.2 million baht
NPV	: 117 million baht (12% discount rate)
B/C	: 1.9 (12% discount rate)
EIRR	: 22.4 %

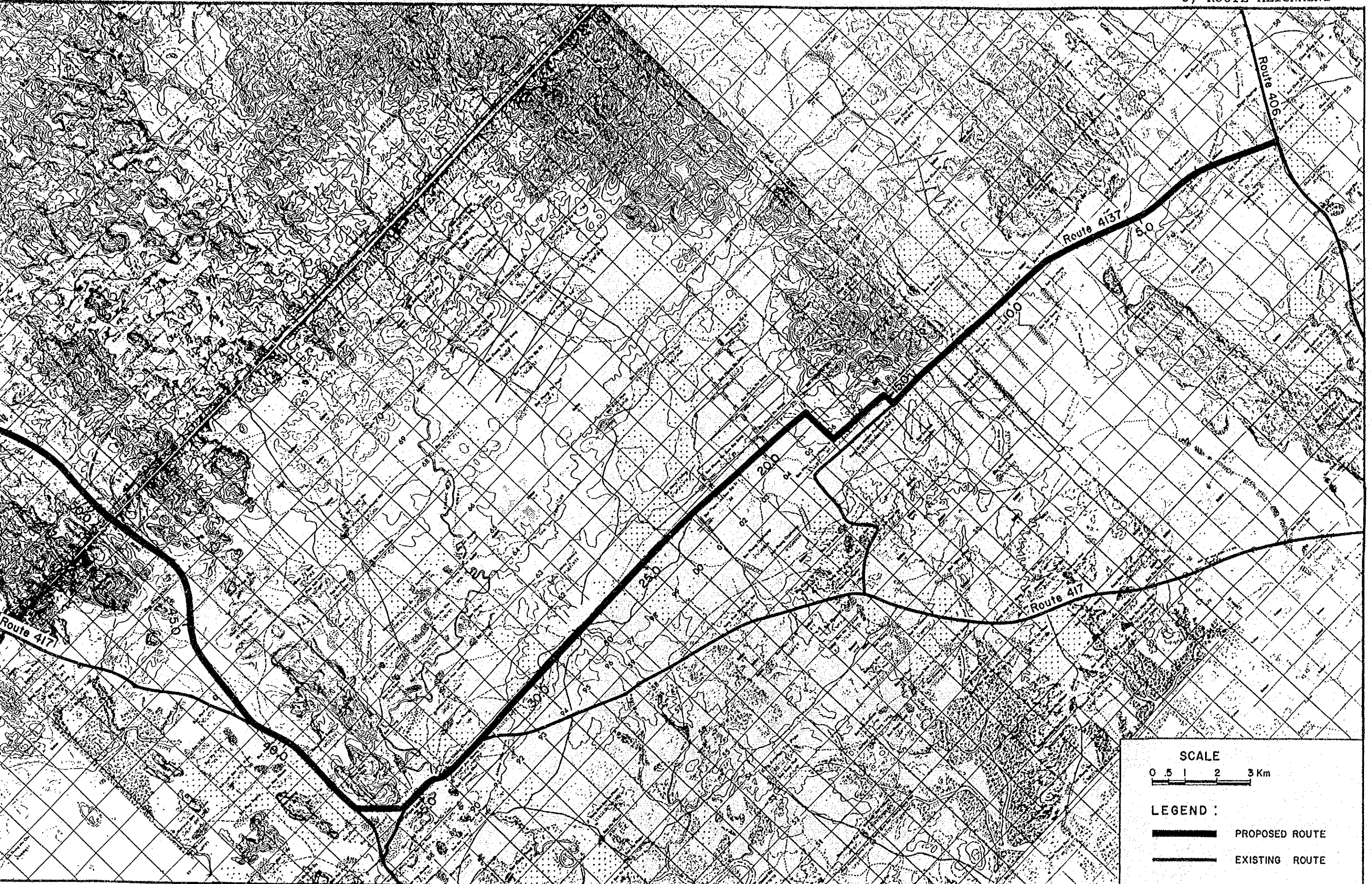
( ): Existing Condition or Value



LEGEND :

	PROJECT ROUTE		PROVINCIAL HIGHWAYS
	DIVIDED HIGHWAYS		CHANGWAT, AMPHOE
	NATIONAL HIGHWAYS		





### 4) PROFILE OF PROJECT

PROJECT NO. WD 6-1      ROUTE NO. 417      PALIAN - KHUAN KALONG

(1/4)

STATION (Km)		0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30			
VILLAGE ROAD INTERSECTION		J. Rt. 406 B. THUNG TUM SAO			B. HUAINUM DUM		B. NICOM SOI 10							B. NICOM - PHANG 35	B. SUAN THET	J. Rt. 417 B. CHALUNG				
LAND USE		RICE, RUBBER, 50% DEVELOPED																		
TERRAIN		FLAT 12.2 KM ROLLING 14.6 KM																		
FLOODING LENGTH		SLIGHT FLOODING REPORTED																		
EXISTING CONDITIONS	RIGHT OF WAY	30.00 M (15.00+15.00)																		
	ALIGNMENT	HOR.	NUMBER OF HORIZONTAL CURVES 14																	
		VER.	NUMBER OF VERTICAL CURVES 26																	
	CROSS SECTION	F4 1.00+5.00+1.00 = 7.00 M																		
	SURFACE	SA+DBST (FAIR)+SA																		
	BRIDGES AND (Type - Width - Length (m))		2+054		5+156		5+926		8+181		9+926		13+122		18+238		19+647		19+942	
BOX CULVERTS (Width - Height - Length (m))		RC 8.0x3x10.0		RC 8.0x1x10.0		BX2-1.5x1.2x10.0		BX2-3.4x2.5x10.0		RC 8.0x3x6.7		RC 8.0x3x8.7		RC 8.0x3x6.7		RC 8.0x1x10.0 RC 8.0x1x10.0		BX2-2.1x1.8x12.0		RC 7.0x3x5.7
PROPOSED CONDITIONS	CROSS SECTION	S3 2.00+6.00+2.00 = 10.00 M																		
	TYPE OF IMPROVEMENT		WD (1) 22,780 M															RA (1) 9,670 M		
	BRIDGES (Type - Width - Length (m))	0+000	RC 10.0x3x10.0		RC 10.0x1x10.0		RC 10.0x3x6.7		RC 10.0x3x8.7		RC 10.0x3x6.7		RC 10.0x1x10.0 RC 10.0x1x10.0		22+780				RC 10.0x18.0	

PROJECT NO. WD 6-1 ROUTE NO. 417 PALIAN - KHUAN KALONG

(2/4)

STATION (Km)		30	32	34	36	38	39+600	40	41+055	42	43+159	44	45+858	46	48+359	50	52	54	56	58	60																		
VILLAGE ROAD INTERSECTION																																							
LAND USE		RICE, RUBBER, 90% DEVELOPED										RICE, RUBBER, FRUIT, 90% DEVELOPED																											
TERRAIN		FLAT 7.4 KM ROLLING 5.4 KM										FLAT 10.8 KM ROLLING 15.0 KM																											
FLOODING LENGTH		NO FLOODING REPORTED										NO FLOODING REPORTED																											
EXISTING CONDITIONS	RIGHT OF WAY	30.00 M (15.00+15.00)										30.00 M		30.00 M (15.00+15.00)																									
	ALIGNMENT	HOR.	NUMBER OF HORIZONTAL CURVES 17										NUMBER OF HORIZONTAL CURVES 51																										
		VER.	NUMBER OF VERTICAL CURVES 55										NUMBER OF VERTICAL CURVES 107																										
	CROSS SECTION	F4 1.50+5.00+1.50 = 8.00 M										F4 8.00M		F4 1.50+5.00+1.50 = 8.00 M																									
	SURFACE	SA+DBST (GOOD/FAIR)+ SA										DBST		SA+DBST (GOOD/FAIR)+ SA																									
BRIDGES AND (Type - Width - Length (m))	BOX CULVERTS (Width - Height - Length (m))	RC 7.0x4x7.0		BX 3-2.4x2.4x13.0		BX 2-2.7x2.7x12.0		RC 8.0 x 6 x 13.30		BX 4-1.5 x 1.5 x 10.0		RC 8.0 x 1 x 10.0		BX 2-2.4 x 2.4 x 11.0		RC 8.0 x 3 x 9.0		BX 3-2.1 x 1.8 x 11.0		RC 8.0 x 3 x 8.3		BX 2-3.0x2.7x18.0		RC 8.0 x 4 x 8.0		BX 4-2.7x2.7x15.0													
		33+523		34+985		35+952		39+179		39+878		42+588		44+495		47+124		49+788		50+190		50+958		51+319		54+584													
PROPOSED CONDITIONS	CROSS SECTION	S3 2.00+6.00+2.00 = 10.00 M																																					
	TYPE OF IMPROVEMENT	RA(1)										WD (2) 8,890 M										RA (2) 16,410 M																	
	BRIDGES (Type - Width - Length (m))	RC 10.0x4x7.0		36+490 32+450		RC 10.0 x 6 x 13.3		RC 10.0 x 3 x 5.0		RC 10.0 x 1 x 10.0		45+380 41+340		RC 10.0 x 27.0		RC 10.0 x 25.0		RC 10.0 x 32.0																					



PROJECT NO. WD 6-1 ROUTE NO. 417 PALIAN - KHUAN KALONG

(3/4)

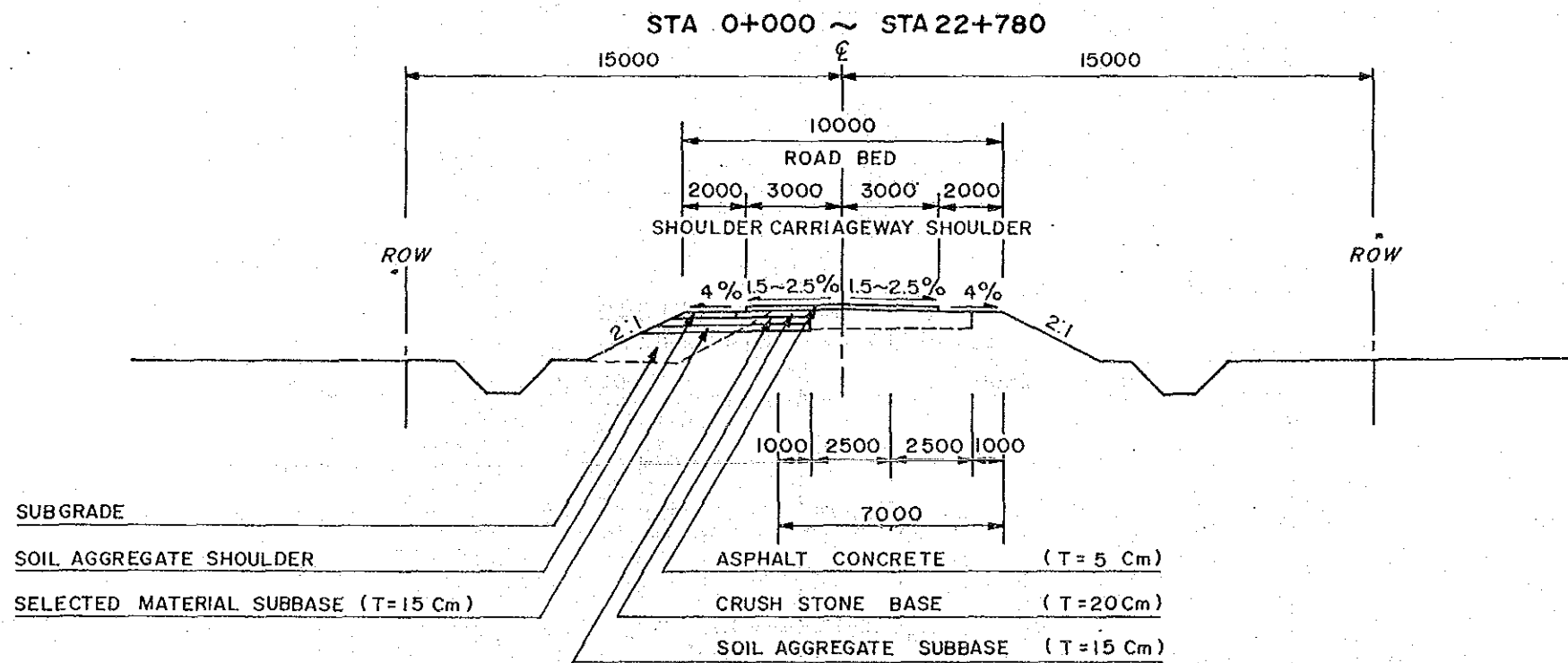
STATION (Km)		60	62	64	65+159	66	68	70	72	74	76	78	79+859	81+359	82	84+259	86	87+209	88	90																												
VILLAGE ROAD INTERSECTION						TUNG WA								SATUN TRANG	BAN NAI KHAO	BAN LI PHANG		BAN THUNG LOMCHIAK																														
LAND USE		RICE, RUBBER, FRUIT				RICE, RUBBER, FRUIT, 60% DEVELOPED							RUBBER 100% DEVELOPED																																			
TERRAIN						FLAT 4.7 KM, ROLLING 6.0 KM, MOUNTAINOUS 4.0 KM							FLAT 16.2 KM ROLLING 0.4 KM																																			
FLOODING LENGTH		NO FLOODING REPORTED				NO FLOODING REPORTED							NO FLOODING REPORTED																																			
EXISTING CONDITIONS	RIGHT OF WAY	30.00 M (15.00+15.00)				40.00 M (20.00+20.00)							40.00 M (20.00+20.00)																																			
	ALIGNMENT	HOR.				NUMBER OF HORIZONTAL CURVES 34							NUMBER OF CURVES 23																																			
		VER.				NUMBER OF VERTICAL CURVES 58							NUMBER OF CURVES 45																																			
	CROSS SECTION	F 4 1.50 + 5.00 + 1.50 = 8.00 M				F 4 1.50 + 5.00 + 1.50 = 8.00 M							F 4 1.50 + 5.00 + 1.50 = 8.00 M																																			
	SURFACE	SA + DBST (GOOD/FAIR) + SA				SA + DBST (FAIR) + SA							SA + DBST (GOOD/FAIR) + SA																																			
BRIDGES AND (Type - Width - Length (m))	BX2-3.3 x 3.3 x 180 59+746				RC 8.0 x 1 x 10.0 61+494				BX 1-1.5 x 1.2 x 13.0 64+164				BX 1-2.7 x 2.4 x 12.0 66+144				BX 2-2.4 x 2.1 x 13.0 68+789				BX2-3.0 x 3.0 x 14.0 69+398				RC 8.0 x 3 x 7.0 69+647				RC 8.0 x 4 x 10.0 70+857				RC 9.2 x 3 x 8.3 71+155				RC 8.0 x 3 x 5.0 74+550				BX 2-3.0 x 3.0 x 10.0 74+660				BX 2-3.3 x 3.0 x 12.0 74+699			
BOX CULVERTS (Width - Height - Length (m))																	RC 8.0 x 4 x 10.0 81+581				BX2-2.4 x 2.4 x 16.0 82+495				RC 8.0 x 3 x 7.0 83+124				RC 8.0 x 3 x 10.0 84+353				RC 8.0 x 3 x 6.0 84+911				BX2-2.4 x 2.4 x 11.0 85+569				BX 2-2.7 x 2.4 x 12.0 86+872				RC 8.0 x 3 x 8.0 87+527			
PROPOSED CONDITIONS	CROSS SECTION	S 3 2.00 + 6.00 + 2.00 = 10.00 M																																														
	TYPE OF IMPROVEMENT	RA (2)									WD (3) 24,835																																					
	BRIDGES (Type - Width - Length (m))	RC 10.0 x 10.0								RC 10.0 x 21.0				RC 10.0 x 40.0				RC 10.0 x 25.0				RC 10.0 x 3 x 5.0				RC 10.0 x 4 x 10.0				RC 10.0 x 3 x 7.0				RC 10.0 x 3 x 10.0				RC 10.0 x 3 x 6.0				RC 10.0 x 3 x 8.0						

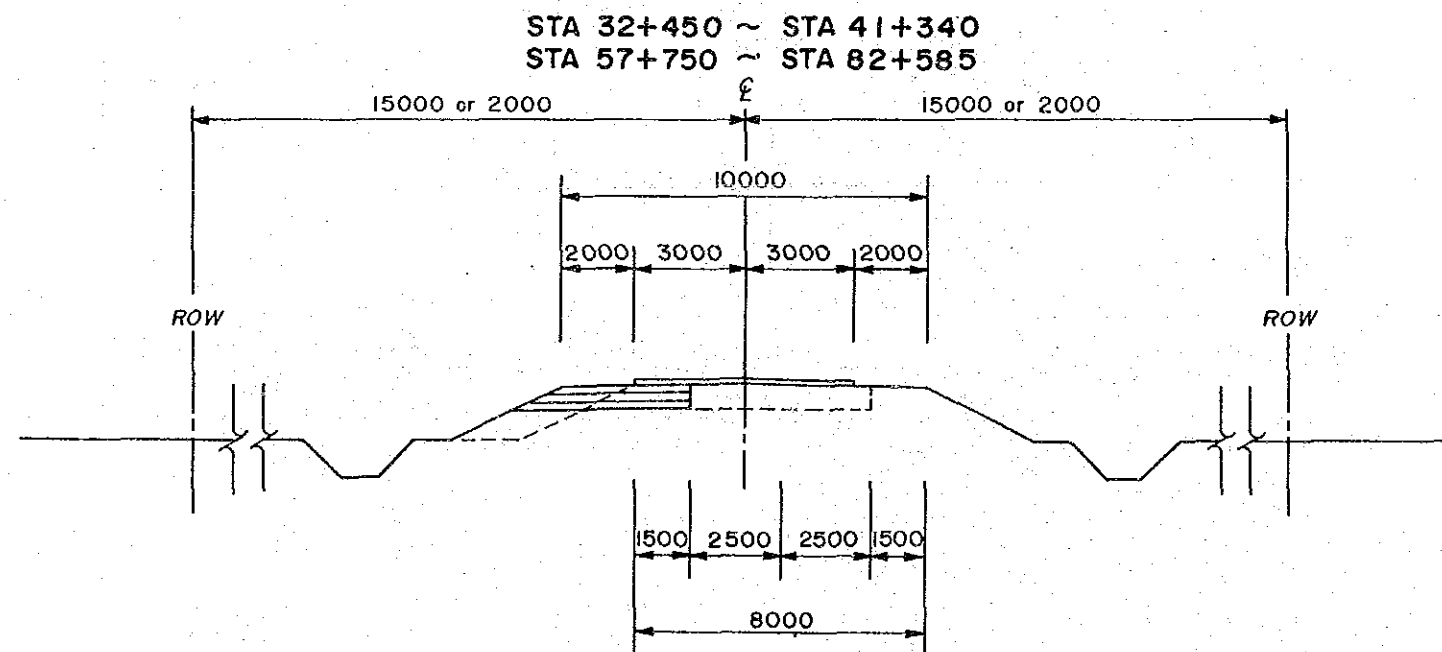
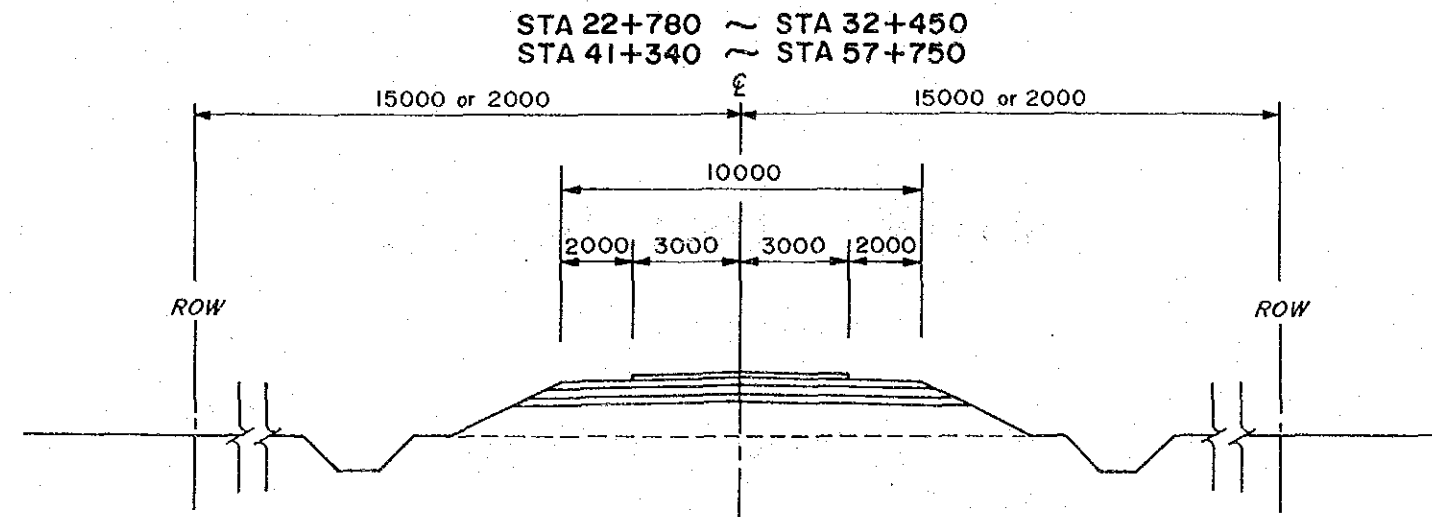
PROJECT NO. WD 6-1 ROUTE NO. 417 PALIAN - KHUAN KALONG

(4/4)

STATION (Km)		90	92	94	96	98	100	102	
VILLAGE ROAD INTERSECTION			TAM BON THUNG YAO J.RT. 4125 92+459 92+564	BAN SAM YAK 94+459	PALIAN J.RT. 404 96+534				
LAND USE									
TERRAIN									
FLOODING LENGTH									
EXISTING CONDITIONS	RIGHT OF WAY	40.00 M (20.00+20.00)							
	ALIGNMENT	HOR.							
		VER.							
	CROSS SECTION	F 4 1.50 + 5.00 + 1.50 = 8.00 M							
	SURFACE	SA + DBST (GOOD/FAIR) + SA							
BRIDGES AND (Type - Width - Length (m))		90+020		93+724					
	BOX CULVERTS (Width - Height - Length (m))	RC 8.0 x 7 x 10.0		RC 8.0 x 6 x 9.3					
PROPOSED CONDITIONS	CROSS SECTION	S 3 2.00 + 6.00 + 2.00 = 10.00 M							
	TYPE OF IMPROVEMENT	WD (3)							
	BRIDGES (Type - Width - Length (m))	RC 10.0 x 7 x 10.0		RC 10.0 x 6 x 9.3		96+534 (82+585)			

### 5) TYPICAL CROSS SECTION





6) CONSTRUCTION QUANTITIES AND COSTS

CONSTRUCTION QUANTITIES AND COSTS  
(Project WD -6-1 Length = 98.234 Km)  
(Improved Length 79.184 Km)

ITEM	Unit	Financial Unit Cost Baht	Quantity	Financial Total cost 1000 Baht	Economic cost % 1000 Baht	Residual Value % 1000 Baht
<b>EARTH WORK</b>						
Clearing & Grubbing	SQ.M	1	451,648	452	83	90
Roadway Excavation(Unclassified)	CU.M	30	0	0		
Embankment(Borrowed Material)	CU.M	100	394,049	39,405		
Slope Protection(Stripe Sodding)	SQ.M	6	330,651	1,984		
Sand Mat (t=0.5m)	SQ.M	50	0	0		
Excavate Existing Surface	SQ.M	2	0	0		
Thickness Over 10cm (2 Lay)	SQ.M	14	144,596	2,024		
SUB TOTAL				43,865	36,408	32,767
<b>SUBBASE AND BASE</b>						
Subbase(Selected Material)	CU.M	190	78,379	14,892	83	50
Subbase(Soil Aggregate)	CU.M	190	78,379	14,892		
Base Coarses(Crush Stone)	CU.M	280	49,298	13,804		
Shoulder(Soil Aggregate)	CU.M	190	33,519	6,369		
SUB TOTAL				49,956	41,464	20,732
<b>SURFACE</b>						
Asphaltic Prime coat	SQ.M	13	216,916	2,820	83	50
Asphaltic Tack coat	SQ.M	7	258,188	1,807		
Asphalt concrete Surfacing	CU.M	1,900	23,755	45,135		
SUB TOTAL				49,762	41,303	20,651
<b>STRUCTURES(Equivalent)</b>						
RC Pipe Culvert( D= 600 m)	M	1,380	274	378	83	50
( D= 800 m)	M	1,950	816	1,591		
( D=1000 m)	M	2,650	399	1,057		
( D=1200 m)	M	3,850	46	177		
RC Box Culvert(3-2.10*2.10 m)	M	11,400	120	1,368		
RC Bridge Widening	SQ.M	9,600	1,893	18,173		
RC Bridge (W=13.0 m)	M	83,200	198	16,474		
PC Bridge (W=13.0 m)	M	130,000	0	0		
SUB TOTAL				39,218	32,551	16,276
<b>TOTAL (a)</b>				<b>182,801</b>	<b>151,725</b>	<b>90,426</b>
Miscellaneous Works [(a)*7%]	Ls	1		12,796	10,621	6,330
<b>CONTRACT AMOUNT (b)</b>				<b>195,597</b>	<b>162,346</b>	<b>96,755</b>
PHYSICAL CONTINGENCIES [(b)*10%] (c)	Ls	1		19,560	16,235	9,676
ENGINEERING & SUPERVISION [(b)+(c)*10%] (d)	Ls	1		21,516	18,288	0
LAND ACQUISITION(Average) (e)	SQ.M	15	970,000	14,550	100	14,550
<b>PROJECT COST [(b)+(c)+(d)+(e)]</b>				<b>251,223</b>	<b>211,419</b>	<b>120,981</b>
<b>AVERAGE COST PER KM</b>				<b>3,173</b>		

MAINTENANCE BUDGET CALCULATION

Project Road No, WD 6-1 Na= 9,300 Baht/Km/year  
(Existing Road) Km= 1.162  
Length = 98.234 Km

Laterite Surface

ITEMS	Existing		
	Condition	Factor	
1. A.D.T	A1	260	0.47
2. Width Of Embankment (Surface & Shoulder)	A3	8.0 m	0.33
3. R-O-U Width	B1	40 m	0.13
4. Traffic Service Operation Topography	B2	0 - 3 %	0.05
5. Drainage Topography	B3	0 - 3 %	0.00
6. Bridge Quantity (m/Km)	B4	7	0.02
7. NO. Of Lanes		2	

Ks (Existing)= 1+0.7(A1+A3)+0.3(B1+B2+B3+B4) = 1.620  
Maintenance cost + Overhead = Ks \* Km \* Na \* 1.28 = 22,409 Baht/Km/year  
Total Cost(Existing) = Length \* (Baht/Km/year) = 2,201,283 Baht/year  
Financial Cost = 2,201,000 Baht/year  
Economic Cost = 1,827,000 Baht/year  
( 1,826,830 )Baht/year

Project Road No, WD 6 -1 Na= 8,200 Baht/Km/year  
(Proposed Road) Km= 1.001  
Length = 98.234 Km

Asphalt Pavement

ITEMS	Proposed Road		
	Condition	Factor	
1. Surface /Base Type	X1	AC	0.00
2. Subgrade CBR	X2	4 %	0.50
3. A.D.T	X3	400	0.00
4. Service life (year)	X4	10	1.40
5. Pavement Width (m)	X5	6.0 m	0.05
6. R-O-U Width (m)	Y1	40 m	0.00
7. Shoulder, Access, Median Width (m)	Y2	2.0 m	0.00
8. Traffic Service Operation Topography	Y3	0 - 3 %	0.00
9. Drainage Topography	Y4	0 - 3 %	0.00
10. Bridge Quantity (m/Km)	Y5	7	0.00
11. NO. Of Lanes		2	

Ka(Existing) =1+0.5(X1+X2+X3+X4+X5+Y1+Y2+Y3+Y4+Y5)= 1.975  
Maintenance cost + Overhead= Ka \* Km \* Na \* 1.28 = 20,750 Baht/Km/year  
Total Cost(Existing) =Length \* (Baht/Km/year)= 2,038,388 Baht/year  
Financial Cost = 2,038,000 Baht/year  
Economic Cost = 1,692,000 Baht/year  
( 1,691,540 )Baht/year

### 7) Construction Schedule

Project WD6-1 Route 417 (4078) Palian - Khuan Don

year and Month	First Year												Second Year												Third Year											
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Land Acquisition	=====																																			
Preparatory Works	=====																																			
Earth Works													=====																							
Pavement Works																									=====											
Bridge Works													=====																							
Miscellaneous Works													=====												=====											
Clearing -Up																									=====											
Percentage Of Disbursement (%)	26 %												47 %												27 %											

### 8) Economic Evaluation

Project WD6-1 Route 417 (4078) Palian - Khuan Don

(unit ; 1000 Baht)

Year	Const- ruction Cost	Mainte- nance	Total Cost	VOC Saving	Time Saving	Balance	Sensl. Analysis Benefit= Cost=
1990	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0
1993	56,969	0	56,969	0	0	(56,969)	(68,363)
1994	104,865	0	104,865	0	0	(104,865)	(125,839)
1995	49,585	0	49,585	0	0	(49,585)	(59,502)
1996	0	1,263	1,263	3,690	44,303	46,730	36,879
1997	0	1,263	1,263	5,400	45,058	49,195	38,851
1998	0	1,263	1,263	7,110	45,813	51,660	40,823
1999	0	1,263	1,263	8,821	46,567	54,125	42,795
2000	0	1,263	1,263	10,531	47,322	56,590	44,767
2001	0	1,263	1,263	12,241	48,077	59,055	46,739
2002	0	1,263	1,263	15,982	54,449	69,168	54,829
2003	0	1,263	1,263	19,723	60,821	79,281	62,920
2004	0	1,263	1,263	23,464	67,193	89,394	71,010
2005	0	1,263	1,263	27,205	73,565	99,507	79,100
2006	0	1,263	1,263	30,946	79,937	109,620	87,191
2007	0	1,263	1,263	30,946	79,937	109,620	87,191
2008	0	1,263	1,263	30,946	79,937	109,620	87,191
2009	0	1,263	1,263	30,946	79,937	109,620	87,191
2010	0	1,263	1,263	30,946	79,937	109,620	87,191
<b>Total</b>	<b>211,420</b>	<b>18,945</b>	<b>230,365</b>	<b>288,897</b>	<b>932,853</b>	<b>991,385</b>	<b>700,962</b>
						IRR =	22.38%
						NPV (i;12%) =	116,756
						B/C (i;12%) =	1.93

PROJECT WD7-1

**YALA - NARATHIWAT LINK**

**CHANGWAT: YALA, NARATHIWAT**

2) ROUTE MAP

3.18 Yala - Narathiwat Link (RW7-1)

1) Summary

The aim of the project is to support development of the Southern Border Provinces through constructing a direct highway link between the cities of Yala and Narathiwat.

The project which is to develop a "F1" standard highway in the above section comprises the following three sections:

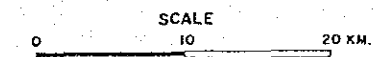
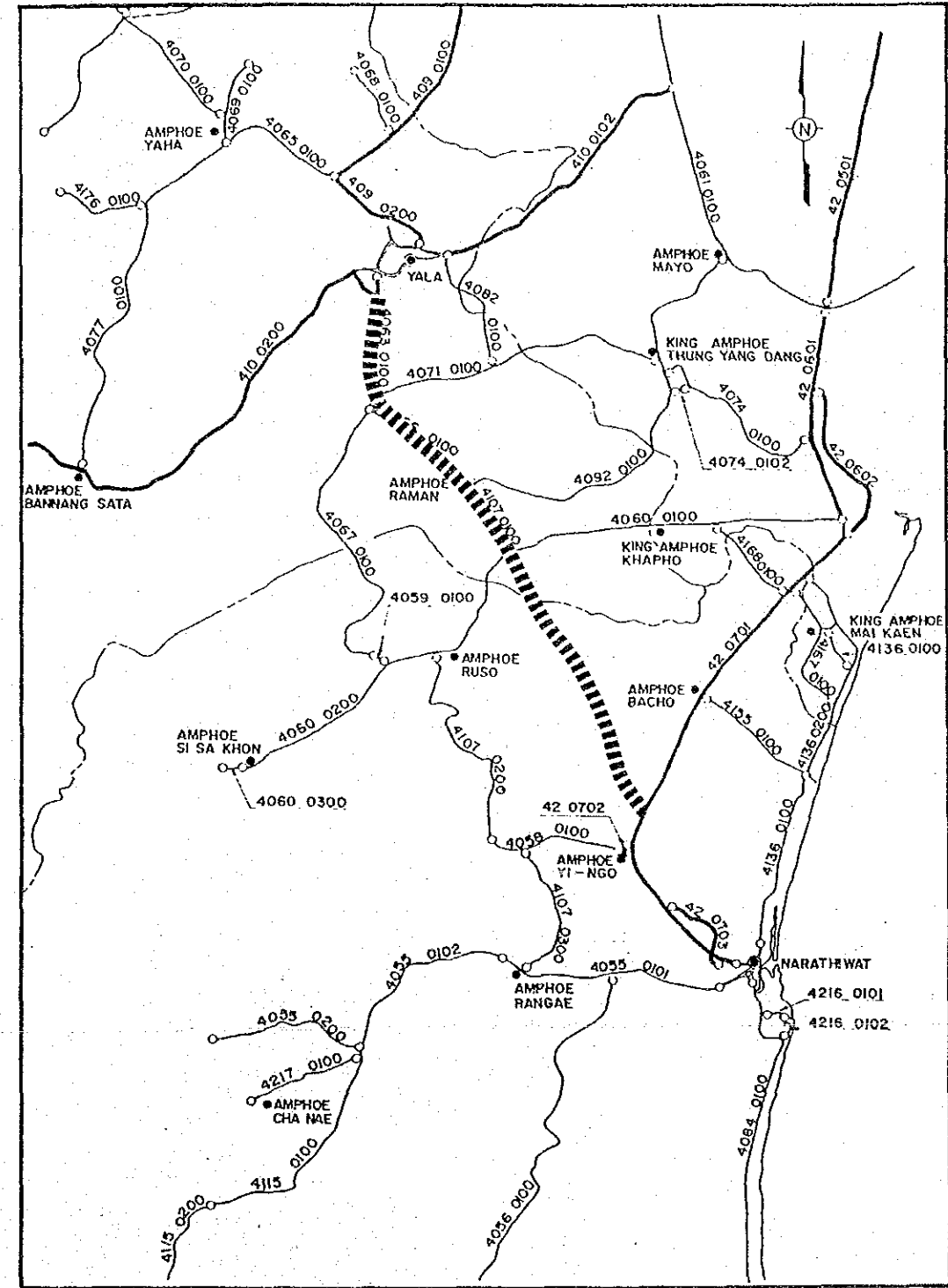
- widening of the existing highways of 4063, 4066 and 4107;
- reconstruction of the existing ARD roads between Route 4060 and 42; and
- new construction of missing links between the above ARD roads.

The existing highways are of "F4" standard with carriageway width of 5.0 meters, accounting for about half of the total project length. The widening section includes realignment of about 2.0 kilometers near Kota Baru and reconstruction of embankment of 3.4 kilometers at the crossing point with the Sai Buri River. Reconstruction of the ARD roads of unpaved surface of 5 meter width amounts to 15.8 kilometer while new construction does to 9.7 kilometers.

The project starts from amphoe Yala and ends at the intersection with Route 42 in amphoe Yi-Ngo. The total length of the project is 51.7 kilometers.

RW7-1	Description
Changwat	: Yala and Narathiwat
Name or Location	: Rt.4063/4066/4107 Yala-Narathiwat
Road Class	: F1 (F4)
Cross Section (m)	: 2.50+7.00+2.50 (1.50+5.00+1.50)
Surface Type	: SA /ASC / SA ( SA /PMC / SA )
Surface Condition	: ( G/F and G )
Length: Total	: 51.7 km
DOH Road	: 24.2 km + 11.7 km:New
Others	: 15.8 km:ARD
-----	
AADT<'96/'01/'06>	: 3,200 / 4,500 / 5,900
-----	
Financial Cost	: 309.1 million baht
NPV	: 283 million baht (12% discount rate)
B/C	: 2.9 (12% discount rate)
EIRR	: 26.7 %

( ): Existing Condition or Value



LEGEND :

	PROJECT ROUTE		PROVINCIAL HIGHWAYS
	DIVIDED HIGHWAYS		CHANGWAT, AMPHOE
	NATIONAL HIGHWAYS		