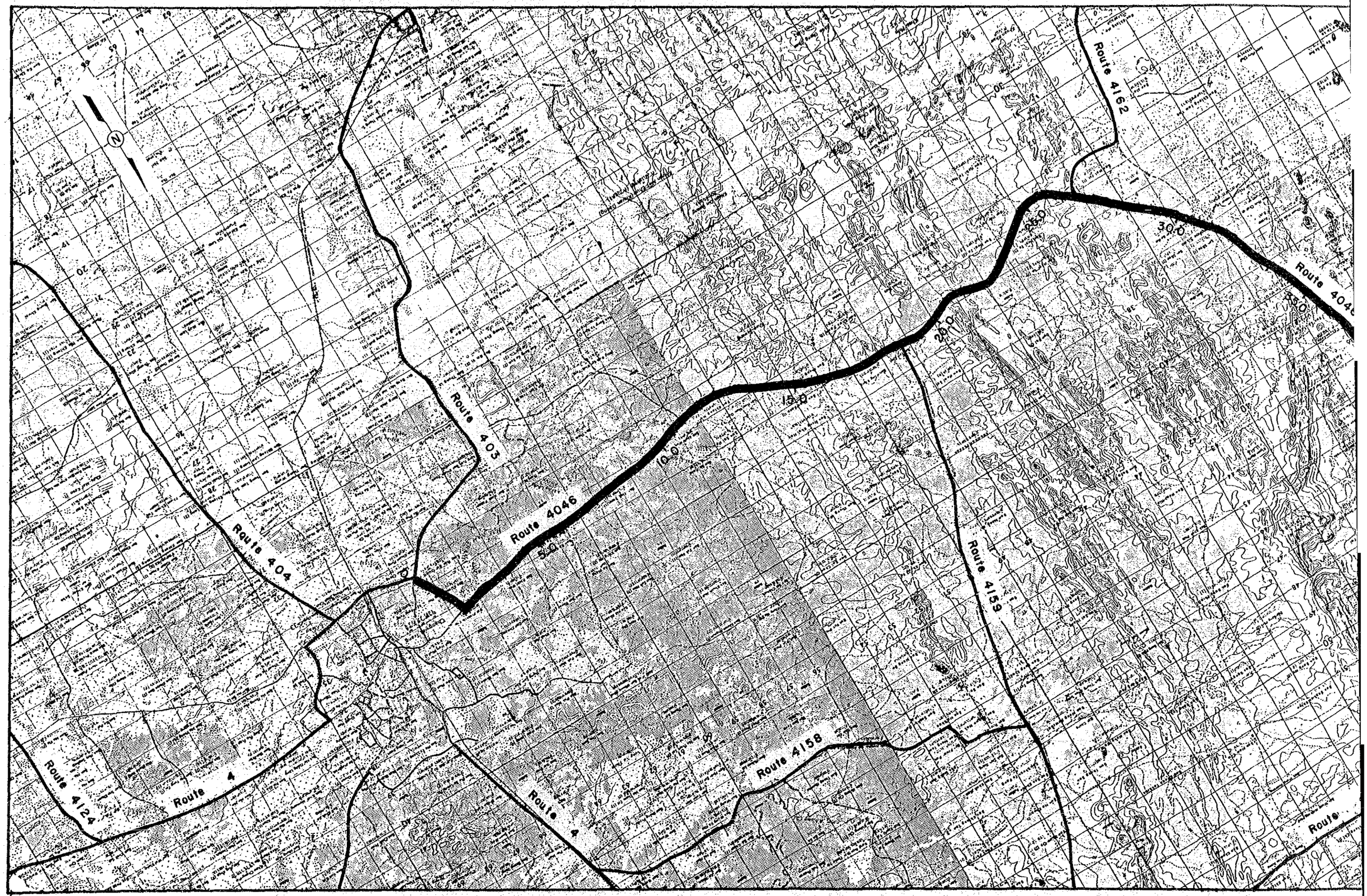
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Route 403
Route 404
Route 4046
Route 4159
Route 4158
Route 4124
Route 4
Route 4
Route
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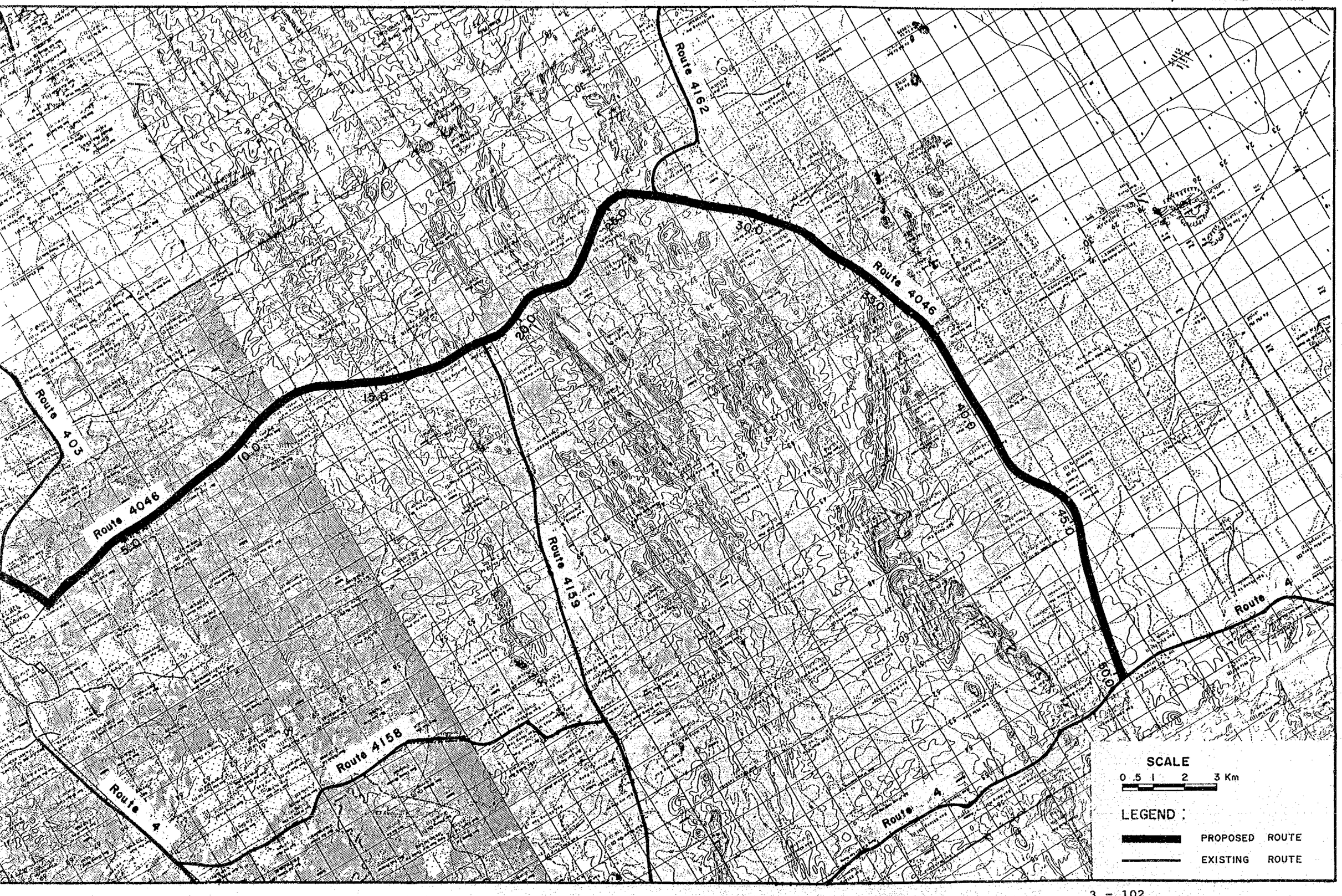
10.0
15.0
20.0
25.0
30.0


Route 4162
Route 4046
Route 403
Route 4046
Route 4159
Route 4158
Route 4
Route 4
Route 4
0.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
50.0
SCALE
0 .5 1 2 3 Km
LEGEND :
PROPOSED ROUTE
EXISTING ROUTE

4) PROFILE OF PROJECT

PROJECT NO. WD 7-3 ROUTE NO. 4046 TRANG - KHUAN KUN

(1/2)

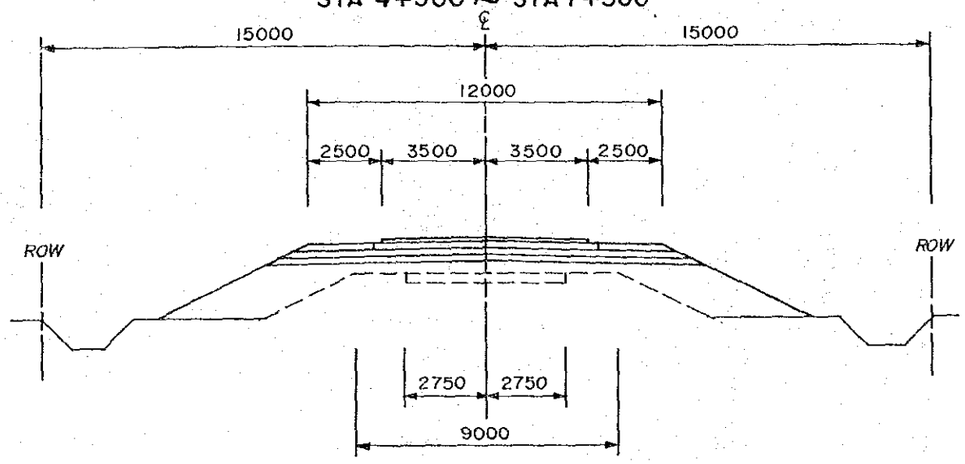
STATION (Km)		0 · 2 · 4 · 5+179 · 6 · 8+250 · 9+979 · 12 · 13+050 · 14 · 16 · 17+203 · 18 · 20 · 22 · 24 · 25+360 · 26 · 28 · 29+329 · 30
VILLAGE ROAD INTERSECTION		TRANG; NA TO MING; BAN NA TO MING; HUAI NAM DAM; BAN HUAI NAM DAM; J. Rt. 4159; J. Rt. 4126; SIKAO
LAND USE		RICE, UPLAND RICE, RUBBER AND FOREST , 21 KM (71%) ALREADY DEVELOPED
TERRAIN		FLAT 5.0 KM ROLLING 24.3 KM
FLOODING LENGTH (STA.)		0+000 ~ 3+904, 4+104 ~ 6+254, 6+479 ~ 6+699, 6+929 ~ 7+779 TOTAL 7.1 KM
EXISTING CONDITIONS	RIGHT OF WAY	30.00 M (15.00+15.00)
	ALIGNMENT HOR.	NUMBER OF HORIZONTAL CURVES 103
	ALIGNMENT VER.	NUMBER OF VERTICAL CURVES 80
	CROSS SECTION	F 4 1.75 + 5.50 + 1.75 = 9.00 M
	SURFACE	SA + SGST (FAIR) + SA
	BRIDGES AND (Type – Width – Length (m)) BOX CULVERTS (Width – Height – Length (m))	0+051 RC 7.0 x 11 x 9.3; 0+564 RC 7.0 x 4 x 8.0; 2+379 BX 4-3.0x2.7x12.0; 2+680 RC 7.0 x 4 x 10.0; 2+779 BX 3-2.7x2.7x12.0; 4+299 RC 7.0 x 3 x 5.7; 7+830 RC 7.0 x 3 x 9.0; 8+268 RC 7.0 x 3 x 5.7; 9+255 RC 7.0 x 3 x 5.0; 12+111 RC 7.0 x 3 x 5.0; 13+027 BX 2-2.1x2.1x21.0; 13+859 RC 7.0 x 3 x 7.0; 16+513 RC 7.0 x 3 x 10.0; 19+632 BX 2-1.5x1.5x17.0; 21+107 RC 7.0 x 3 x 5.3; 26+883 RC 7.0 x 3 x 5.0; BX 2-2.7x2.7x21.0; MUNICIPAL ROAD 1,834 M
PROPOSED CONDITIONS	CROSS SECTION	F 1 2.50 + 7.00 + 2.50 = 12.00 M
	TYPE OF IMPROVEMENT	RA 1,800 M; WD (1) 2,700 M; RB 3,000 M; WD (2) 10,600 M; RA 900 M; WD 700 M; RA 1,000 M; WD (3) 8,629 M; RA 1200 M
	BRIDGES (Type – Width – Length (m))	0+000; 1+800; 4+500; 7+500; 18+100; 19+000; 19+700; 20+700; 29+329; 30+529 RC 12.0 x 4 x 10.0; RC 12.0 x 3 x 5.7; RC 12.0 x 3 x 9.0; RC 12.0 x 3 x 5.7; RC 12.0 x 3 x 5.0; RC 12.0 x 3 x 5.0; RC 12.0 x 3 x 7.0; RC 12.0 x 3 x 10.0; RC 12.0 x 3 x 5.3; RC 12.0 x 3 x 5.0; DOH ROAD 1,200 M

PROJECT NO. WD 7-3 ROUTE NO. 4046 TRANG - KHUAN KUN

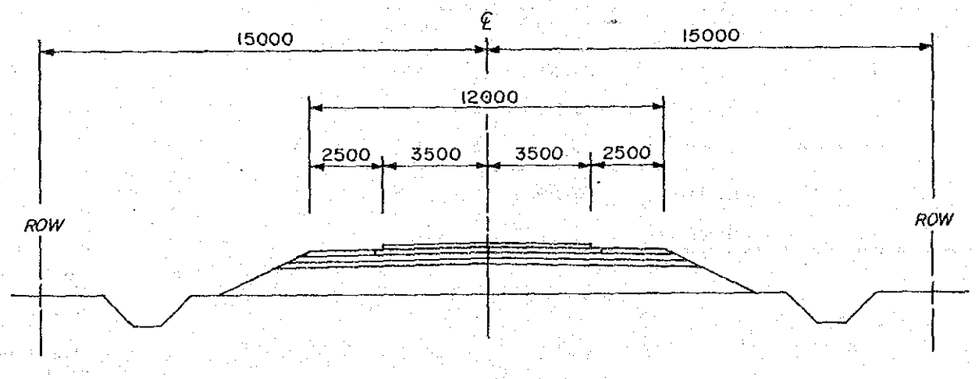
STATION (Km)			30 · 31+163 (30+529) · 32 · 34 · 36 · 38 · 40 · 42 · 44 · 46 · 48 · 49+685 · 50 · 49+051 · 52
VILLAGE ROAD INTERSECTION			J. Rt. 4
LAND USE			RUBBER, FOREST , 11 KM (61%) ALREADY DEVELOPED
TERRAIN			FLAT 18.5 KM
FLOODING LENGTH			NO FLOODING REPORTED
EXISTING CONDITIONS	RIGHT OF WAY		40.00 M (20.00+20.00)
	ALIGNMENT	HOR.	NUMBER OF HORIZONTAL CURVES 58
		VER.	NUMBER OF VERTICAL CURVES 71
	CROSS SECTION		F 4 1.75 + 5.50 + 1.75 = 9.00 M
	SURFACE		SA + SGST (GOOD/FAIR) + SA
	BRIDGES AND (Type – Width – Length (m)) BOX CULVERTS (Width – Height – Length (m))		31+199 · 31+633 · 34+212 · 38+332 · 39+074 · 39+312 · 40+689 · 42+034 · 42+895
			MUNICIPAL ROAD 1,834 M · BX 2-2.1x1.8 x14.00 · RC 9.0 x 3 x 6.0 · BX 2-2.4 x2.1 x15.0 · RC 9.0 x 3 x 5.0 · RC 9.0 x 3 x 5.0 · BX 2-2.4 x2.1 x14.0 · RC 9.0 x 3 x 5.0 · RC 7.0 x 3 x 8.3 · RC 7.0 x 5 x 7.0
PROPOSED CONDITIONS	CROSS SECTION		F 1 2.50 + 7.00 + 2.50 = 12.00 M
	TYPE OF IMPROVEMENT		WD (4) 18,522 M
	BRIDGES (Type – Width – Length (m))		30+529 · 49+051
			DOH ROAD 1,200 M · RC 12.0 x 3 x 6.0 · RC 12.0 x 3 x 5.0 · RC 12.0 x 3 x 5.0 · RC 12.0 x 3 x 5.0 · RC 12.0 x 3 x 8.3 · RC 12.0 x 5 x 7.0

5) TYPICAL CROSS SECTION

STA 4+500 ~ STA 7+500



STA 18+100 ~ STA 19+000
STA 19+700 ~ STA 20+700
STA 29+329 ~ STA 30+529



6) CONSTRUCTION QUANTITIES AND COSTS

CONSTRUCTION QUANTITIES AND COSTS
(Project WD7-3 Length = 49.685 Km)
(Improved Length 49.051 Km)

ITEM	Unit	Financial Unit Cost Baht	Quantity	Financial Total cost 1000 Baht	Economic cost %	Economic cost 1000 Baht	Residual Value %	Residual Value 1000 Baht
EARTH WORK					83		90	
Clearing & Grubbing	SQ.M	1	239,853	240				
Roadway Excavation(Unclassified)	CU.M	30	0	0				
Embankment(Borrowed Material)	CU.M	100	282,600	28,260				
Slope Protection(Stripe Sodding)	SQ.M	6	212,479	1,275				
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	121,395	1,700				
SUB TOTAL				31,474		26,124		23,511
SUBBASE AND BASE					83		50	
Subbase(Selected Material)	CU.M	190	53,791	10,220				
Subbase(Soil Aggregate)	CU.M	190	59,479	11,301				
Base Coarses(Crush Stone)	CU.M	280	32,995	9,239				
Shoulder(Soil Aggregate)	CU.M	190	25,058	4,761				
SUB TOTAL				35,521		29,483		14,741
SURFACE					83		50	
Asphaltic Prime coat	SQ.M	13	147,890	1,923				
Asphaltic Tack coat	SQ.M	7	195,467	1,368				
Asphalt concrete Surfacing	CU.M	1,900	17,168	32,619				
SUB TOTAL				35,910		29,805		14,903
STRUCTURES(Equivalent)					83		50	
RC Pipe Culvert(D= 600 m)	M	1,380	279	385				
(D= 800 m)	M	1,950	73	142				
(D=1000 m)	M	2,650	64	170				
RC Box Culvert(2-2.40*2.40 m)	M	11,400	39	445				
RC Bridge Wideing	SQ.M	9,600	2,561	24,586				
PC Bridge (W= m)	M		0	0				
SUB TOTAL				25,727		21,354		10,677
TOTAL (a)				128,632		106,765		63,832
Miscellaneous Works [(a)*7%]	Ls	1		9,004		7,474		4,468
CONTRACT AMOUNT (b)				137,637		114,238		68,300
PHYSICAL CONTINGENCIES [(b)*10%] (c)	Ls	1		13,764		11,424		6,830
ENGINEERING & SUPERVISION [((b)+(c))*10%] (d)	Ls	1		15,140	85	12,869	0	0
LAND ACQUISITION(Average) (e)	SQ.M	15	147,000	2,205	100	2,205	100	2,205
PROJECT COST [(b)+(c)+(d)+(e)]				168,745		140,736		77,335
AVERAGE COST PER KM				3,440				

MAINTENANCE BUDGET CALCULATION

Project Road No, WD 7-3 (Existing Road)
Na= 9,300 Baht/Km/year
Km= 1.16
Length = 49.685 Km

Laterite Surface

	ITEMS		Existing Condition	Factor
1.	A.D.T	A1	100	0.00
2.	Width Of Embankment (Surface & Shoulder)	A3	9 m	0.55
3.	R-O-W 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) = 1.45
Maintenance cost + Overhead = KS * Km * Na * 1.28 = 19,988 Baht/Km/year
Total Cost(Existing) = Length *(Baht/Km/year)= 993,098 Baht/year
Financial Cost = 993,000 Baht/year
Economic Cost = 824,000 Baht/year
(824,190)Baht/year

Project Road No, WD 7-3 (Proposed Road)
Na= 8,200 Baht/Km/year
Km= 1.00
Length = 49.685 Km

Asphalt Pavement

	ITEMS		Existing 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	40 m	0.00
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(Existing) =1+0.5(X1+X2+X3+X4+X5+Y1+Y2+Y3+Y4+Y5)= 2.50
Maintenance cost + Overhead= Ka * Km * Na * 1.28 = 26,266 Baht/Km/year
Total Cost(Existing) =Length *(Baht/Km/year)= 1,305,038 Baht/year
Financial Cost = 1,305,000 Baht/year
Economic Cost = 1,083,000 Baht/year
(1,083,150)Baht/year

7) Construction Schedule

Project WD7-3 Route No. 4046 to Trang

year and Month	First Year												Second Year												Third Year											
Work Items	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 (%)	24 %												49 %												27 %											

8) Economic Evaluation

Project WD7-3 Route No. 4046 to Trang

(unit ; 1000 Baht)

Year	Construction Cost	Maintenance Cost	Total Cost	VOC Saving	Time Saving	Balance	Benefit= / Cost=	Sensi. Analysis 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	33,734	0	33,734	0	0	(33,734)		(40,481)
1994	72,564	0	72,564	0	0	(72,564)		(87,077)
1995	34,439	0	34,439	0	0	(34,439)		(41,327)
1996	0	43	43	2,838	15,842	18,637		14,892
1997	0	43	43	3,109	16,296	19,362		15,473
1998	0	43	43	3,380	16,750	20,087		16,053
1999	0	43	43	3,652	17,204	20,813		16,633
2000	0	43	43	3,923	17,658	21,538		17,213
2001	0	43	43	4,194	18,112	22,263		17,793
2002	0	43	43	5,137	24,699	29,793		23,817
2003	0	43	43	6,080	31,286	37,323		29,841
2004	0	43	43	7,022	37,874	44,853		35,865
2005	0	43	43	7,965	44,461	52,383		41,889
2006	0	43	43	8,908	51,048	59,913		47,913
2007	0	43	43	8,908	51,048	59,913		47,913
2008	0	43	43	8,908	51,048	59,913		47,913
2009	0	43	43	8,908	51,048	59,913		47,913
2010	0	43	43	8,908	51,048	59,913		47,913
Total	140,738	645	141,383	91,840	495,422	445,879		300,150
				IRR =		16.02%		10.74%
				NPV (i;12%) =		28,473		
				B/C (i;12%) =		1.35		

PROJECT WD7-4

RT. 408 HUA SAI - SONGKHLA

CHANGWAT: NAKHON SI THAMMARAT, SONGKHLA

3.14 Route No. 408 Hua Sai - Songkhla (WD7-4)

1) Summary

The aim of the project is to facilitate inter-provincial traffic between a regional urban center of Songkhla and an urban growth center of Nakhon Si Thammarat. The distance between these two cities by this route is about 156 kilometers which is shorter than the mainstay of Route 403 - 41 - 4 - 407 by 80 kilometers.

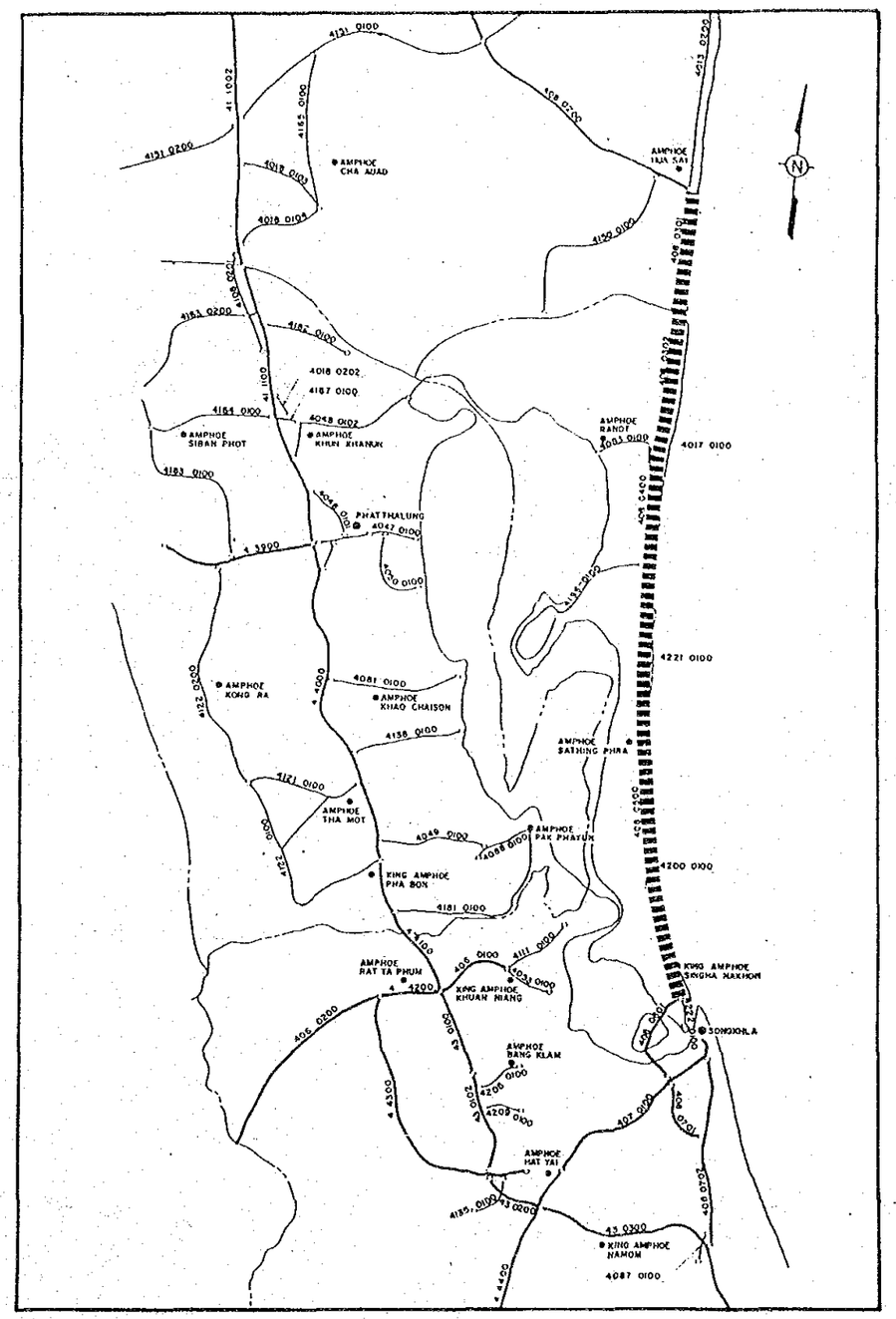
The existing route is of "S3" or "F3" standard with paved carriageway width of 6 meters. Surface condition is good to fair. There is no large bridge in this route. The proposed highway is of "S1" standard with carriageway width of 7.0 meters and shoulder of 2.5 meters on both sides.

The project starts from Amphoe Hua Sai and ends at the intersection with Route 4222 in King Amphoe Singha Nakhon near Songkhla by way of amphoe Ranot and Sathing Phra. Total length of the project is 95.4 kilometers. The terrain is mostly flat. Land use along the highway is largely paddy field and fruit orchard.

WD7-4	Description
Changwat	: Nakhon Si Thammarat and Songkhla
Name or Location	: Rt. 408 Hua Sai - Songkhla
Road Class	: S1 (S3 and F3)
Cross Section (m)	: 2.50+7.00+2.50 (2.00+6.00+2.00)
Surface Type	: SA /ASC / SA (SA /ASC / SA)
Surface Condition	: (G/F and F)
Length: Total	: 95.4 km
DOH Road	: 95.4 km
AADT<'96/'01/'06>	: 5,400 / 8,200 / 10,000
Financial Cost	: 140.4 million baht
NPV	: 532 million baht (12% discount rate)
B/C	: 8.9 (12% discount rate)
EIRR	: 46.3 %

( ): Existing Condition or Value

2) ROUTE MAP




Route 4013
Route 408
Route 4017
Route 408
Route 4150
Route 4083
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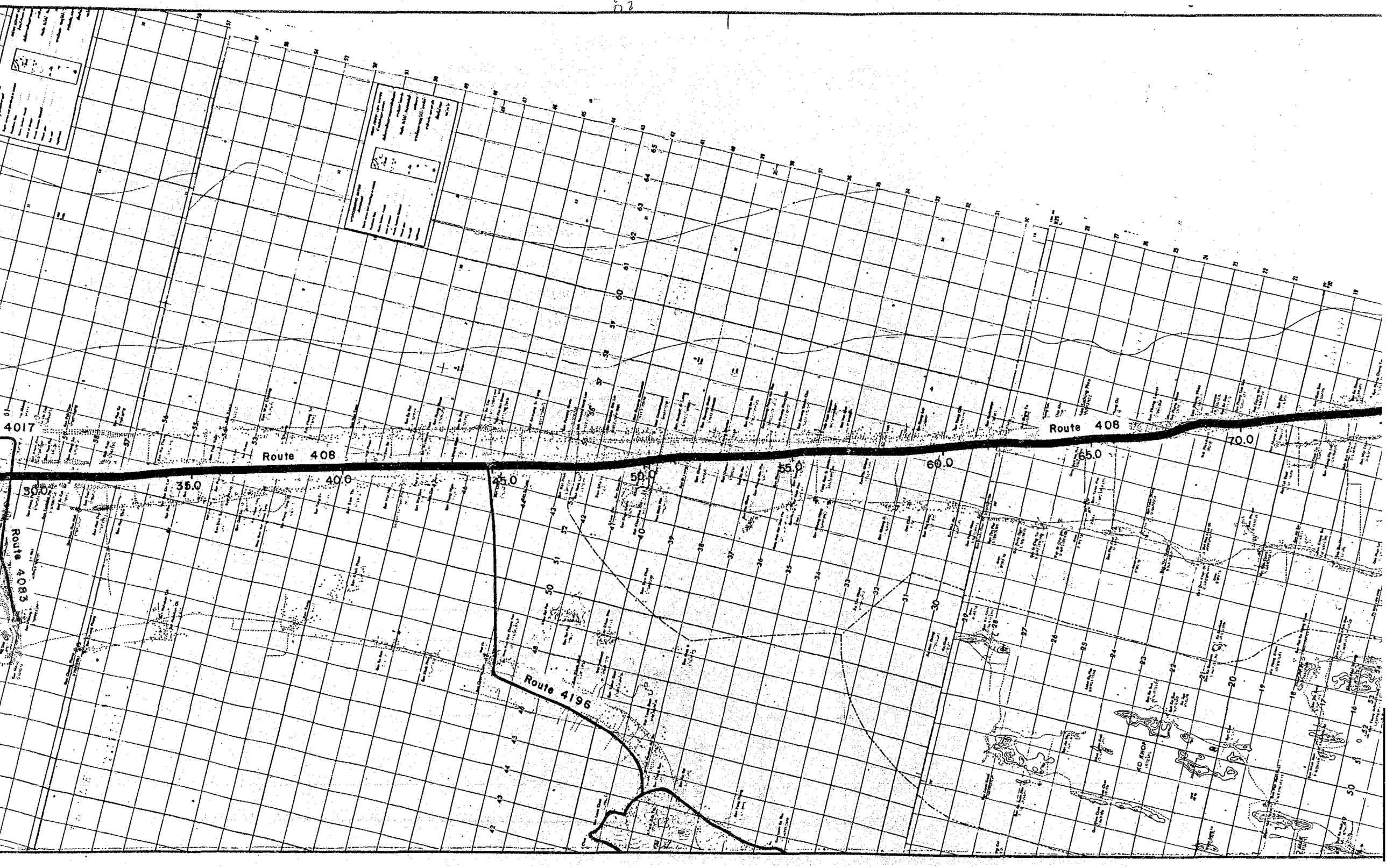
15.0
20.0
25.0
30.0
35.0


4017
Route 408
Route 408
Route 4083
Route 4196
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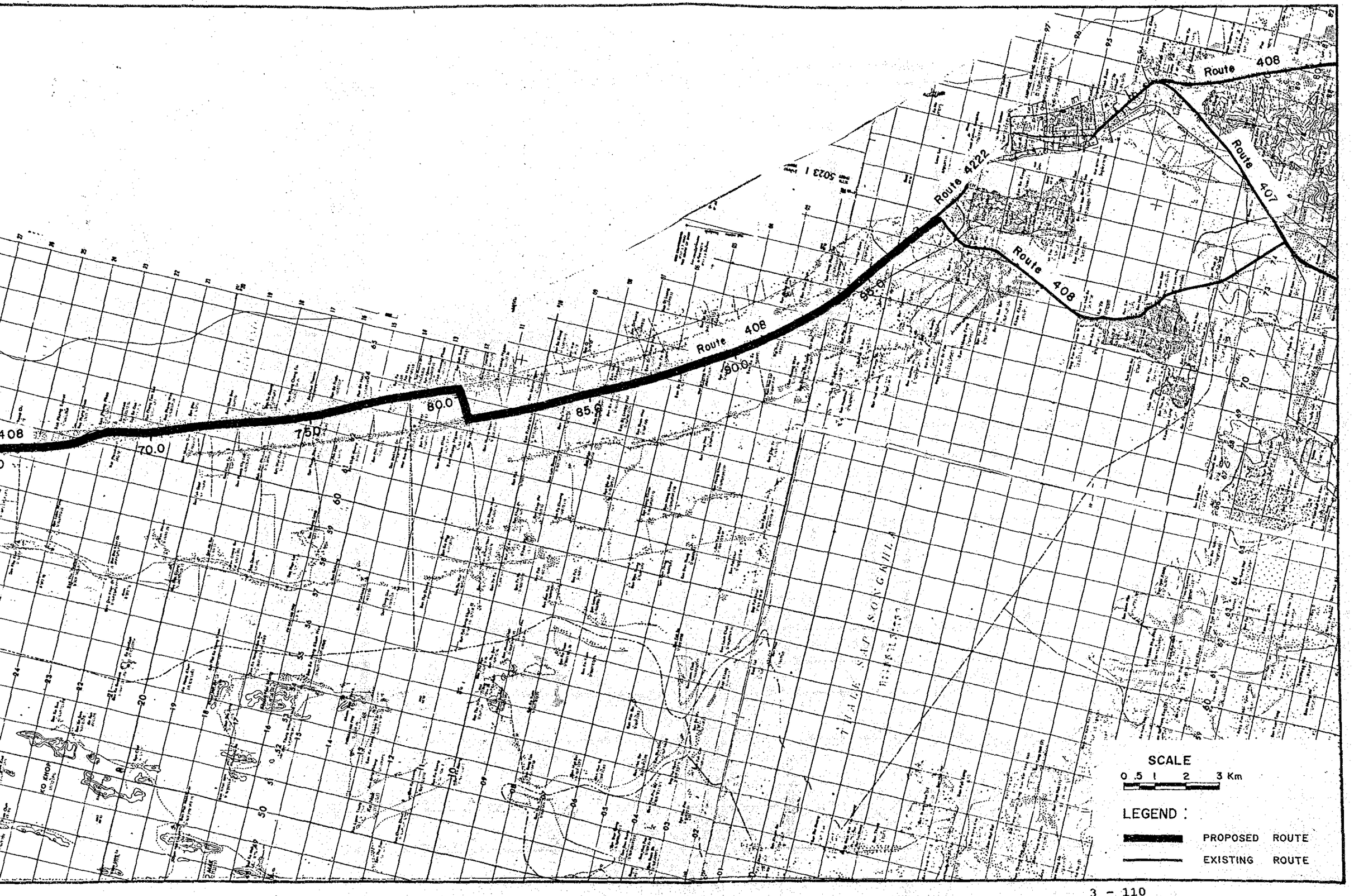
70.0


Route 408
Route 407
Route 4222
Route 408
Route 408
408
70.0
75.0
80.0
85.0
90.0
95.0
SCALE
0 .5 1 2 3 Km
LEGEND :
PROPOSED ROUTE
EXISTING ROUTE

4) PROFILE OF PROJECT

PROJECT NO. WD 7-4 ROUTE NO. 408 HUA SAI - SONGKHLA

(1/4)

STATION (Km)			0 2 4 6 8 10 11+904 14 15+928 18 19+228 20 21+828 22 24 25+928 26 26+464 28 29+017 30
VILLAGE ROAD INTERSECTION			HUA SAI; PAK RAWA; HUA KHUNG; MABBUA; SALALUANGBON; THA BON; J. Rt. 4017; RANOT
LAND USE			RICE 100% DEVELOPED | RICE 95 % DEVELOPED
TERRAIN			FLAT 11.9 KM | FLAT 17.1 KM
FLOODING LENGTH			NO FLOODING REPORTED | NO FLOODING REPORTED
EXISTING CONDITIONS	RIGHT OF WAY		50.00 M (15.00+35.00) | 50.00 M (15.00+35.00)
	ALIGNMENT	HOR.	NUMBER OF HORIZONTAL CURVES 19 | NUMBER OF HORIZONTAL CURVES 17
		VER.	NUMBER OF VERTICAL CURVES 6 | NUMBER OF VERTICAL CURVES 5
	CROSS SECTION		S 3 1.00 + 6.00 + 1.00 = 8.00 M | F 3 2.00 + 6.00 + 2.00 = 10.00 M
	SURFACE		SA + DBST (GOOD/FAIR)+SA | SA + ASC (FAIR) + SA
	BRIDGES AND (Type — Width — Length (m)) BOX CULVERTS (Width — Height — Length (m))		11+775; 12+265; 12+563; 14+420; 15+206; 17+043; 18+140; 21+929; 28+889; 28+999
			RC 9.2 x 7 x 8.4; RC 9.0 x 3 x 9.0; BX 4-2.1x1.8x12.0; RC 8.0 x 5 x 10.0; BX 4-2.1x1.8x14.0; BX 4-2.1x1.8 x 13.0; BX 4-1.8x1.2x 13.0; BX 2-1.8x1.5x13.0; BX 3-1.8x1.8x 13.0; BX 3-3.0x2.7x 13.0
PROPOSED CONDITIONS	CROSS SECTION		S 1 2.50 + 7.00 + 2.50 = 12.00 M
	TYPE OF IMPROVEMENT		WD (1) 11, 904 M | WD (2) 17, 113 M | WD (3)
	BRIDGES (Type — Width — Length (m))		0+000; 11+904; 29+017
			RC 12.0 x 7 x 8.4; RC 12.0 x 3 x 9.0; RC 12.0 x 5 x 10.0

PROJECT NO. WD 7-4 ROUTE NO. 408 HUA SAI - SONGKHLA

STATION (Km)			30 · 32 · 34+760 · 36 · 38 · 39+600 · 40 · 42 · 42+928 · 43+650 · 44 · 46 · 47+300 · 48 · 50+250 · 52 · 53+150 · 54 · 56 · 58 · 60
VILLAGE ROAD INTERSECTION			KRA DANG NGA · SANARMCHAI · CHEDI NGAM · DE LUANG · CHUMPHON · CHEDI NGAM · SAMBO
LAND USE			RICE FRUIT 95 % DEVELOPED
TERRAIN			FLAT 39.3 KM
FLOODING LENGTH			FLOODING REPORTED BUT NOT IN DETAIL
EXISTING CONDITIONS	RIGHT OF WAY		30.00 M (15.00+15.00)
	ALIGNMENT	HOR.	NA
		VER.	NA
	CROSS SECTION		F 3 2.00 + 6.00 + 2.00 = 10.00 M
	SURFACE		SA + ASC (GOOD/FAIR) + SA
	BRIDGES AND (Type — Width — Length (m)) BOX CULVERTS (Width — Height — Length (m))		RC 8.0 x 10.00 · RC 8.0 x 10.0
PROPOSED CONDITIONS	CROSS SECTION		S 1 2.50 + 7.00 + 2.50 = 12.00 M
	TYPE OF IMPROVEMENT		WD (3) 66,391 M
	BRIDGES (Type — Width — Length (m))		RC 12.0 x 10.0 · RC 12.0 x 10.0

PROJECT NO. WD 7-4 ROUTE NO. 408 HUA SAI - SONGKHLA

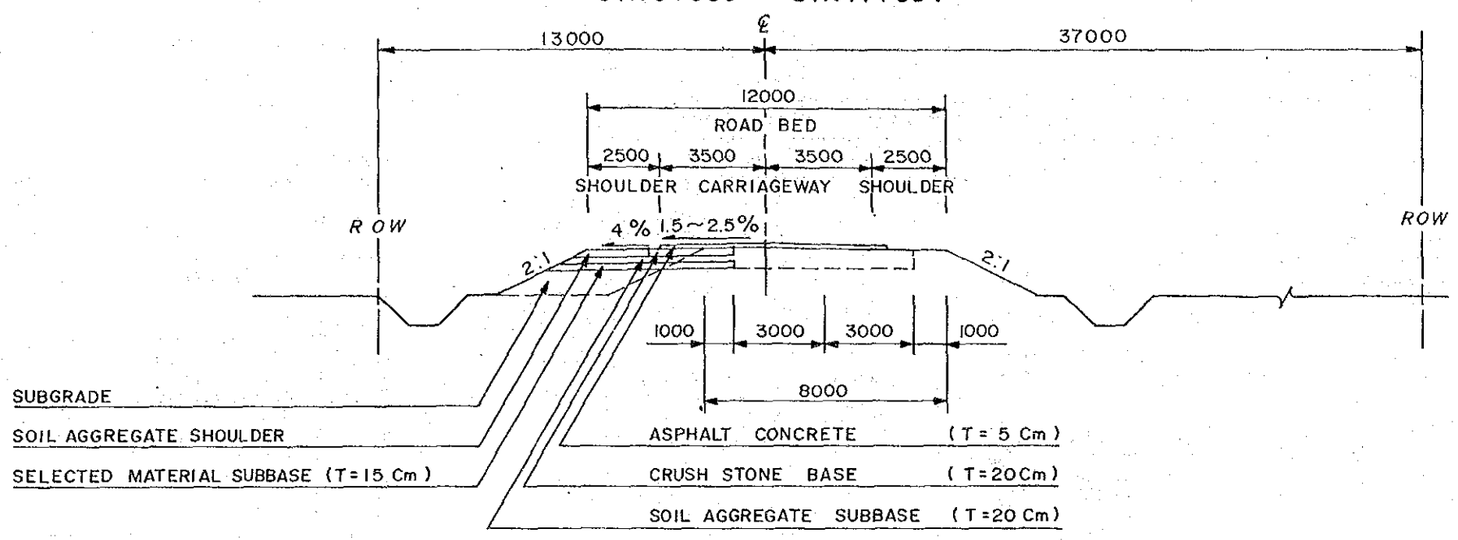
STATION (Km)			60 62 63+534 64 66 67+104 68 70+114 72 72+634 74 76 78 78+934 80 82 82+834 84 86 88 89+434 90
VILLAGE ROAD INTERSECTION			SATHING PHRA; BO DAN; BO DAENG; WAT CHAN; MUANG NGAM; WAT KHANUN; CHING KO
LAND USE			RICE, FRUIT 95 % DEVELOPED
TERRAIN			FLAT 33.4 KM
FLOODING LENGTH			SLIGHT FLOODING REPORTED
EXISTING CONDITIONS	RIGHT OF WAY		30.00 M (15.00+15.00)
	ALIGNMENT	HOR.	NA
		VER.	NA
	CROSS SECTION		F 3 2.00 + 6.00+2.00 = 10.00 M
	SURFACE		SA + ASC (GOOD/FAIR) +SA
	BRIDGES AND (Type – Width – Length (m)) BOX CULVERTS (Width – Height – Length (m))		RC 8.0 x 10.0; RC 8.0 x 10.0
PROPOSED CONDITIONS	CROSS SECTION		S I 2.50 + 7.00 + 2.50 = 12.00 M
	TYPE OF IMPROVEMENT		WD (3)
	BRIDGES (Type – Width – Length (m))		RC 12.0 x 10.0; RC 12.0 x 10.0

PROJECT NO. WD 7-4 ROUTE NO. 408 HUA SAI - SONGKHLA

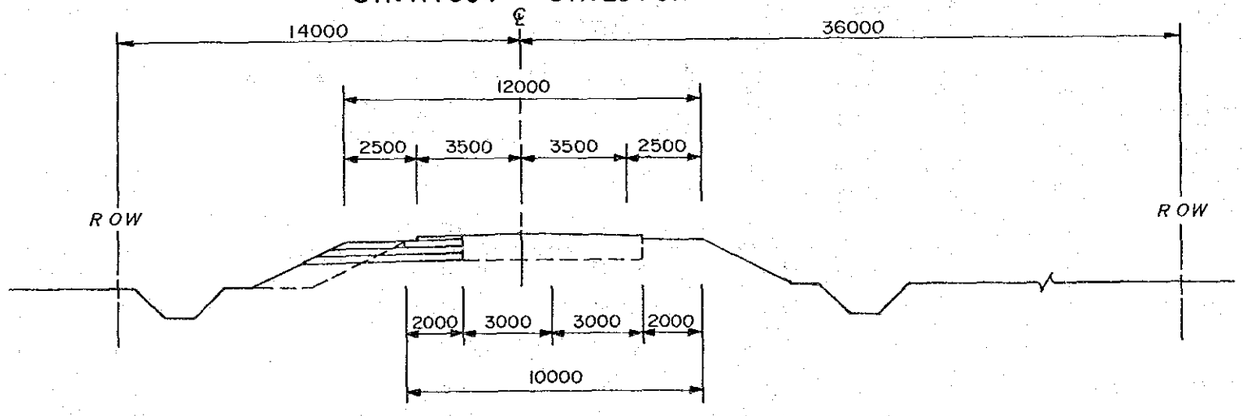
STATION (Km)		90 · 92 · 93+784 · 94 · 95+408 · 96
VILLAGE ROAD INTERSECTION		HUAKHAO · SONGKHLA
LAND USE		
TERRAIN		
FLOODING LENGTH		
EXISTING CONDITIONS	RIGHT OF WAY	30.00 M (15.00+15.00)
	ALIGNMENT HOR.	
	ALIGNMENT VER.	
	CROSS SECTION	F 3 2.00 + 6.00 + 2.00
	SURFACE	
	BRIDGES AND (Type – Width – Length (m)) BOX CULVERTS (Width – Height – Length (m))	
PROPOSED CONDITIONS	CROSS SECTION	S I 2.50 + 7.00 + 2.50
	TYPE OF IMPROVEMENT	WD (3)
	BRIDGES (Type – Width – Length (m))	95+408

5) TYPICAL CROSS SECTION

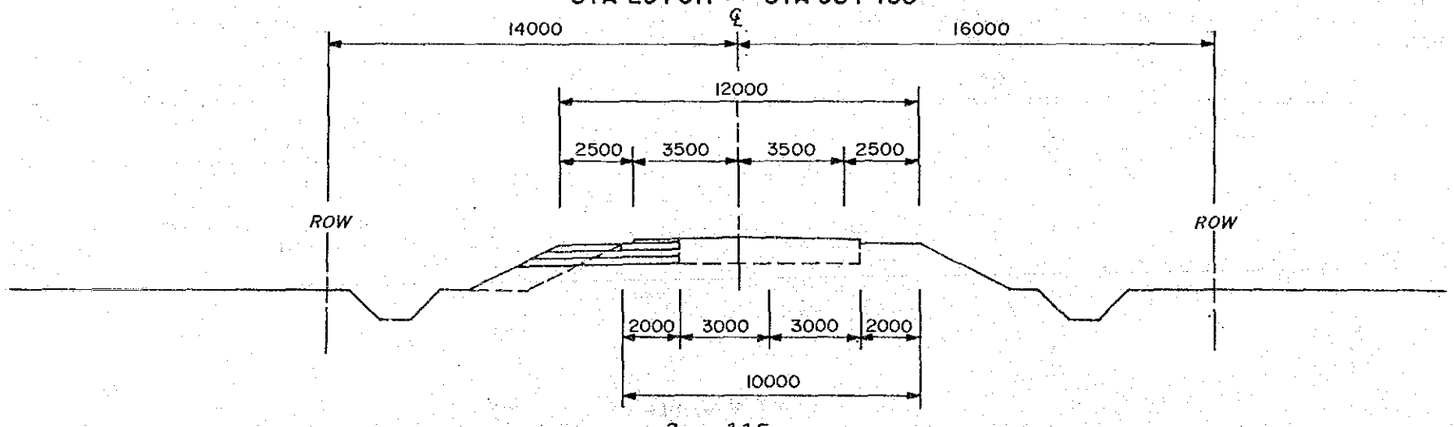
STA 0+000 STA 11+904



STA 11+904 ~ STA 29+017



STA 29+017 ~ STA 95+408



CONSTRUCTION QUANTITIES AND COSTS
(Project WD 7-4 Length = 95.408 Km)
(Improved Length 95.408 Km)

ITEM	Unit	Financial Unit Cost Baht	Quantity	Financial Total cost 1000 Baht	Economic cost %	Economic cost 1000 Baht	Residual Value %	Residual Value 1000 Baht
EARTH WORK					83		90	
Clearing & Grubbing	SQ.M	1	214,624	215				
Roadway Excavation(Unclassified)	CU.M	30	0	0				
Embankment(Borrowed Material)	CU.M	100	193,162	19,316				
Slope Protection(Stripe Sodding)	SQ.M	6	319,998	1,920				
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	236,157	3,306				
SUB TOTAL				24,757		20,548		18,493
SUBBASE AND BASE					83		50	
Subbase(Selected Material)	CU,M	190	76,204	14,479				
Subbase(Soil Aggregate)	CU.M	190	101,605	19,305				
Base Coarses(Crush Stone)	CU.M	280	36,728	10,284				
Shoulder(Soil Aggregate)	CU.M	190	41,980	7,976				
SUB TOTAL				52,044		43,196		21,598
SURFACE					83		50	
Asphaltic Prime coat	SQ.M	13	155,016	2,015				
Asphaltic Tack coat	SQ.M	7	53,568	375				
Asphalt concrete Surfacing	CU.M	1,900	10,429	19,815				
SUB TOTAL				22,206		18,431		9,215
STRUCTURES(Equivalent)					83		50	
RC Pipe Culvert(D= 600 m)	M	1,380	326	450				
(D= 800 m)	M	1,950	119	232				
(D=1000 m)	M	2,640	54	143				
RC Box Culvert(3-2.40*2.40 m)	M	17,100	16	274				
RC Bridge (W=15.0 m)	M	96,000	0	0				
RC Bridge Wideing	SQ.M	9,600	869	8,342				
PC Bridge (W=15.0 m)	M	150,000	0	0				
SUB TOTAL				9,440		7,836		3,918
TOTAL (a)				108,447		90,011		53,225
Miscellaneous Works [(a)*7%]	Ls	1		7,591		6,301		3,726
CONTRACT AMOUNT (b)				116,038		96,312		56,950
PHYSICAL CONTINGENCIES [(b)*10%] (c)	Ls	1		11,604		9,631		5,695
ENGINEERING & SUPERVISION [((b)+(c))*10%] (d)	Ls	1		12,764	85	10,850	0	0
LAND ACQUISITION(Average) (e)	SQ.M	50	0	0	100	0	100	0
PROJECT COST [(b)+(c)+(d)+(e)]				140,406		116,792		62,645
AVERAGE COST PER KM				1,472				

MAINTENANCE BUDGET CALCULATION

Project Road No, WD 7-4 Na= 8,200 Baht/Km/year
(Existing Road) Km= 1.00
Length = 95.408 Km

Asphalt Pavement

	ITEMS		Existing Road Condition	Factor
1.	Surface /Base Type	X1	AC	0.00
2.	Subgrade CBR	X2	4 %	0.50
3.	A.D.T	X3	5,300	2.00
4.	Service Life (year)	X4	5	0.40
5.	Pavement Width (m)	X5	6 m	0.05
6.	R-O-W Width (m)	Y1	50 m	0.05
7.	Shoulder,Access,Median Width (m)	Y2	2.00m	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	2	0.00
11.	NO. Of Lanes		2	

Ka(Existing) =1+0.5(X1+X2+X3+X4+X5+Y1+Y2+Y3+Y4+Y5)= 2.50
Maintenance cost + Overhead= Ka * Km * Na * 1.28 = 26,266 Baht/Km/year
Total Cost(Existing) =Length *(Baht/Km/year)= 2,506,009 Baht/year
Financial Cost = 2,506,000 Baht/year
Economic Cost = 2,080,000 Baht/year
(2,079,980)Baht/year

Project Road No, WD 7-4 Na= 8,200 Baht/Km/year
(Proposed Road) Km= 1.00
Length = 95.408 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	5,800	2.25
4.	Service Life (year)	X4	10	1.40
5.	Pavement Width (m)	X5	7 m	0.19
6.	R-O-W Width (m)	Y1	50 m	0.05
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	2	0.00
11.	NO. Of Lanes		2	

Ka = 1+0.5(X1+X2+X3+X4+X5+Y1+Y2+Y3+Y4+Y5)= 3.22
Maintenance cost + Overhead= Ka * Km * Na * 1.28 = 33,831 Baht/Km/year
Total Cost =Length *(Baht/Km/year)= 3,227,740 Baht/year
Financial Cost = 3,228,000 Baht/year
Economic Cost = 2,679,000 Baht/year
(2,679,240)Baht/year

7) Construction Schedule

Project WD7-4 Route No. 408 Hua Sai - Songkhla

year and Month	First Year												Second Year												Third Year											
Work Items	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 (%)	31 %												47 %												22 %											

8) Economic Evaluation

Project WD7-4 Route No. 408 Hua Sai - Songkhla

(unit ; 1000 Baht)

Year	Construction Cost	Maintenance Cost	Total Cost	VOC Saving	Time Saving	Balance Benefit= Cost=	Sensi. Analysis 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	40,665	0	40,665	0	0	(40,665)	(48,798)
1994	54,131	0	54,131	0	0	(54,131)	(64,957)
1995	21,997	0	21,997	0	0	(21,997)	(26,396)
1996	0	17	17	6,306	30,557	36,846	29,470
1997	0	17	17	8,015	49,544	57,542	46,027
1998	0	17	17	9,724	68,531	78,238	62,584
1999	0	17	17	11,434	87,517	98,934	79,140
2000	0	17	17	13,143	106,504	119,630	95,697
2001	0	17	17	14,852	125,491	140,326	112,254
2002	0	17	17	19,156	170,804	189,944	151,948
2003	0	17	17	23,460	216,118	239,561	191,642
2004	0	17	17	27,765	261,431	289,179	231,336
2005	0	17	17	32,069	306,745	338,796	271,030
2006	0	17	17	36,373	352,058	388,414	310,724
2007	0	17	17	36,373	352,058	388,414	310,724
2008	0	17	17	36,373	352,058	388,414	310,724
2009	0	17	17	36,373	352,058	388,414	310,724
2010	0	17	17	36,373	352,058	388,414	310,724
Total	116,793	255	117,048	347,789	3,183,532	3,414,273	2,684,599
				IRR =		46.31%	37.79%
				NPV (i;12%) =		531,721	
				B/C (i;12%) =		8.85	