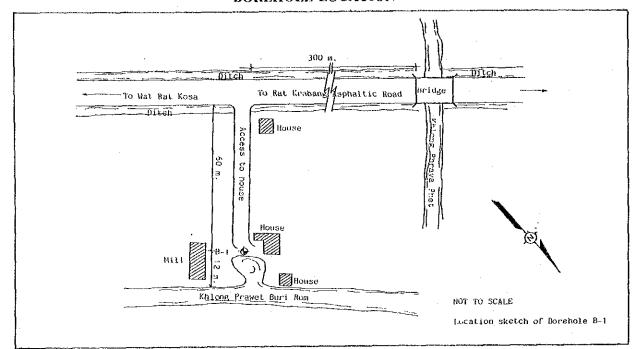
BOREHOLE LOCATION



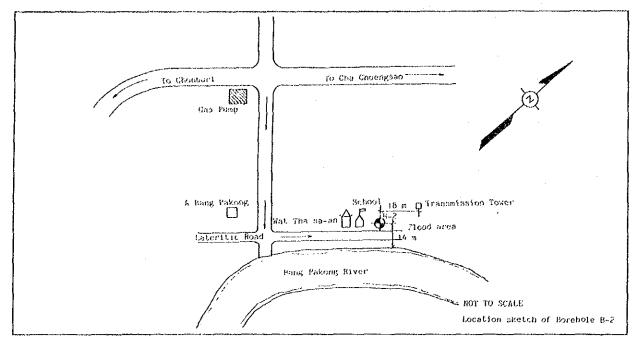
SUMMARY OF TEST RESULTS

DEL	PIII	百	AT	I LRBERG (HMIT	SCHI		SIEV	E ANA	LYSIS		NOL	UND	RAINED S	LIEAR ST	RENCTH	1	g z
	d.	20 £		36	,	INIT WI		9	e EINEI	R	,—	STFICA	l		-		S A S A S A S A S A S A S A S A S A S A	STANDARD PENETRATION (N)
FROM	70	WAT	LL.	PL.	Pi	NET L	Ho. 3/8	No.	10 10	No.	No. 100	वै	Qu⁄3	Qu'n	Qv	Qv	10° 5°	PENET
1.50	2,00	76.1				1.49						СН	1.3				1.2	
3.00	3,50		~110	Recovi	ry-							(CH)						
4.50	5,00	128.3				1.38						CII					1.2	
6.00	6,50	132.3				1.37						CH	0.8		•-		1.2	1
7.50	8.00		-140	Recovi	ty-							(CH)						
9.00	9.50	114.1	60.5	24.9	35.6	1.42						CH	1.8				1.2	
10,50	11.00	81.7				1,51						CII	1.0				1,2	
12.00	12.50	77.0				1.53						CII	0.9			ļ	1.2	
13,50	14.00	86.7				1.48					 	CII	1.6				2.5	
15.00	15,50	67.9	67.1	26.4	40.7	1.58					<u> </u>	CH	2.5			Ĺ	2.5	
16.50	17.00		-110	Recovi	ry-							(CII)					-	
10,00	18,50	77.2				1.54						СП	2.1				2.5	
19,50	20,00	73.9				1,63						CIL	2.7				3.7	
21.00	21,45											CII					3.7	6
22.50	22.95	29.6	58.4	23.7	34.7	1.99			100	99	91	CII	4.5				8.7	11
24.00	24,45											CH					3.7	7
25.50	25.95											CH					2.5	6
27.00	27.45	31.7	33.2	15.5	17.7	1.92			100	99	92	CL	3.6				2.5	. 9
20.50	28.95											CL					2.5	10
10,00	10.45											ѕи/	CII				<u> </u>	13
31.50	31.95											SM/	CII					24
33.00	33.45	24,6	34.6	20.8	13,0	į	100	91	9	97	25	sc/	CI.					21
34.50	34.95										J	sc/	Cl			1		30
36.00	36.45											SH		i				36
37,50	37.95											SM						45
		20		-110-					100	96	20	SM						43
	•	====																
	FROM 1.50 3.00 4.50 6.00 7.50 9.00 10.50 12.00 13.50 15.00 16.50 16.50 21.00 22.50 24.00 25.50 27.00 20.50 33.00 34.50 37.50	1.50 2.00 3.00 3.50 4.50 5.00 6.00 6.50 7.50 8.00 9.00 9.50 10.50 11.00 12.00 12.50 13.50 14.00 15.00 15.50 16.50 17.00 18.50 19.50 20.00 21.00 21.45 22.50 22.95 24.00 24.45 25.50 25.95	HROM TO \$\frac{1}{5}\$ 1.50	1.50 2.00 76.1 -No 3.00 3.50 -No 4.50 5.00 128.3 -No 6.00 6.50 132.3 -No 7.50 8.00 -No 9.00 9.50 114.1 60.5 10.50 11.00 81.7 -No 13.50 14.00 86.7 -No 15.00 15.50 67.9 67.1 16.50 17.00 -No 18.50 77.2 -No 18.50 20.00 73.9 -No 21.00 21.45 -22.50 22.95 29.6 58.4 24.00 24.45 25.50 25.95 -22.00 27.45 31.7 33.2 20.50 28.95	1.50 2.00 76.1	1.50	1.50	1.50 2,00 76.1 1.49 3.00 3,50 Recovery ry 4.50 5,00 128.7 1.38 6.00 6.50 132.3 1.38 7.50 8.00 -No Recovery cy 9.00 9.50 114.1 60.5 24.9 35.6 1.42 10.50 11.00 81.7 1.53 12.00 12.50 77.0 1.53 13.50 14.00 86.7 1.48 15.00 15.50 67.9 67.1 26.4 40.7 1.58 16.50 17.00 -No Recover ry 1.54 19.50 20.00 73.9 1.63 21.00 21.45 22.50 22.95 29.6 58.4 23.7 34	1.50	1.50	1.50	1.50	1.50 2.00 76.1	1.50 2.00 76.	1.50	1.50	1.50	1.50

BORING LOG

1			Γ	П							0 9	u/2	•	04/2]
. ≆.	Z.	TYPE OF SAMPLE	7.					al War o Lim	ter Conter vit	π	ه د		٨	Qv'	
DEPTH, M. ELEVATION,M.		SAS	S	ERY.	DESCRIPTION OF MATERIAL								(1/m²)		1
F 2	ᇍ	å	S	Š	Depositi (101) or matternia	Δ	Liquk	i Lim	ilt		2.	5 5	. t:	5 10	_
8 3	SAMPLE	ķ	SAMPLE DIST	2				(%)			១ទ	T.N (Blow / ft	1)	ı
		Σ				24	j 40) 60	, ao k	00	24	-			,
				H	Clay dark gray (Top Soil)					1					
					1,00 m										
	1	ST		Ħ	Clay trace peat and sand seam, dark				<u> </u>	ļ	P				
	-				gray, very soft.					<u> </u>					
	2	ST			(OH)			. \			\\\				
	_			Ц			ĺ		128	2					
5	3	ST	=	1						T					
	4	ST							1	25	\dagger				-
		_		П						┼┼-	-				
	5	ST		1						₩-	1			 	
										Ш			-,1 		
10	6	ST		Ħ	•		X		2 114	ندو	1 9				
	_		Ļ	Ц		Virgoria co			8	1	13				
	7	ST	F	Ħ	,				1	1	17				
	8	ST								╁──	14				
	Ĭ			П	13.50 m.		<u> </u>		}- -	├	+			 	
	9	ST			at the second section of the section of the second section of the section of the second section of the section o						1-8			 -	
15]]	Clay trace peat, dark gray, soft.				4	<u> </u>	\perp]]	<u></u>
	10	ST.			(લ્સ)		X		9		() . 			
	11.	ST	F				†			1					
	12	ST	L				 -		- 6	+	1 0		 		_
	•	.	F		10 50 0		ļ <u>.</u>				<u> </u>	\ -	 -	 -	H
20	13	ST			19,50 m.		 		_ اعر		 	<u>}</u>	 		-
			L		Clay trace peat, dark gray, medium.		ļ			<u> </u>	<u> </u>	ļ	<u> </u>		_
	14	ss	P	2	(CH) 22.50 m.)				19	<u> </u>	<u> </u>	·	
	15	SS	L		Clay dark gray, stiff.(CH)		*4	1			1 91	ū	,		ļ
	1,7	33	12	ľ	23.50 m.			Ī		j -					Γ
	16	SS		 	Clay' trace sand seam, dark gray,	}	 	-			+47	Γ	 	 	-
25			ſ		medium.(CH)	ļ	 	ļ _.	L	+-	 	 	 -	 	<u> </u>
	17	SS	Þ	Z	Clay trace sand seam, dark gray,		<u> </u>			ļ	Q 6	<u> </u>	<u> </u>		_
					medium, (CH) 27,00 m.	}				1	\prod_{α}		1		_
	18	ss	2	Z	Clay trace sand seam dark gray,	X	-02				والم				
			L		stiff. (CL) 28.50 m.	}	-		 	1	1	d	1	1	
	19	55	K	7	Fine sandy clay trace to some clay		 			-	+3,	 		 	-
30			L	L	pocket li-brownish gray, stiff. (CL)		<u> </u>				 \	18	 	 	ļ
	20	SS	1	F	Silty fine sand alternated with clay						<u> </u>	<u> </u>	<u> </u>		L_
	21	ss	F		seam and pocket, brown some gray,							24			
		້	ľ	ſ	medium dense. (SMACL) 53,00 m.		Ī								
	22	SS	Z	Z	:		KO:-2	-		1	1	H21	1		Γ
					Clayey fine sand with clay seam	ļ	+-		 	+-		 _	 	 	<u>'</u>
35	23	ss	P	2	and pocket, gray and brownish gray,				 			b :		 	├-
	~.		Ļ	L	medium and change to dense.(SCACL) 36.00 m.		<u> </u>					+	736	ļ	<u></u>
	24	SS	۴	12	Silty fine sand trace clay seam and					1_		<u> </u>	<u> </u>	<u> </u>	L
	25	SS	-	-	pocket, brownish gray, dense.			1			1		Q 45		
	زه	33	٢	1	(SM)					T			II		
	26	ss		b	39,45 m,		ф —			1	-	1	P 42	1	T
40				[.					 	+-	+		 		 -
		Ì			END OF BORING.		 				 -	 	 	 	1
!		1	1	}	•	•	,	•		-					

BOREHOLE LOCATION



SUMMARY OF TEST RESULTS

	l	1.2	1			(T	(1
1.	, bersel	18	AT	TERMERG	LIMIT	ğ		SIEV	E ሂዛሃ	l.YSIS		Ž Ž	UHD	RADIEDS	HEAR ST	RENGTH		2
2. 3. mar. 2.	и.	CONTENT		16		TENT SECURI	ļ	1	¢ E EL JE	R		NOTADRISAL	ÚHCO	แหเอ	BELD	VANE	14 Q	3 6
, , ,		- 18		1	i	3 8		J				SSF	, 21 II	r Ar	51 10	AR	83	3 3
a	TRUM TO	E7.4.72	H.	n.	Pi.	ر د د	1/8"	tin 4) la 10	116. 40) No	ี ปี	(Jw)	Qua	Q٧	9,	C POCKET	STANDARD PENETRATION (
5T-1	1.50 2.0											~~						
		-]	\	 	}		 -					CII					1,2	
51-2	7,00 7,5	0			ļ	<u>-</u> -						CII					2.5	
5T-3	4.50 5.0	9	-110	Recov	ry-]]				(CII)						
53-4	6.00 6.5	0 115.0	78.0	32.1	46.7	1.46	ļ	ļ	100	_99	-96	CH	1.1				2.5	
ST-5	7.50 0.0	0 64.4	1	.		1,70	ļ					CII	1.0				2.5	
ST-6	9.00 9.5	73.0				1,50	 					CIL	1.0				1.2	·
37-7	10.50 11.0	0					<u></u> _					CH					-	
54-0	12.00 12.5	0 60				1.65				 		Cil	2.1			l	2.5	
57-9	13.50 14.0	0 44.0	,			1.77						CII	1.4				12.5	
99-10	15.00 15.4	5 29.	79.5	21.9	57.6	1.06			100	99	93	CH	9.9				10.0	10
55-11	16.50 16.9	5										CL					12.5	17
55-12	18,00 10,4	5 15.1				2,20]					CL	15.4				16.2	22
1	19.50 19.9											СL	·				20.0	45
35-14	21.00 21.4	19.6	14.0	15.2	29.6	2.06		100	99	98	05	CI.	22.2			***********	20.0	41
	22.50 22.9								-	m#1		CI,					20.0	37
	24.00 24.4	-				2,04						CL	19.9	 		 -	16,2	38
		.				- 104				1		1		 -				
1	25,50 25,0	1	.	l	J		ļ		l	ļ	ļ	CI	ļ	ļ	ļ	<u> </u>	15.0	36
	37.99 27.4		ļ		}	2.17						CI	28.1	<u> </u>	}		20,0	41
	20,50 20,9	-		<u> </u>		 -	ļ	100	95	_32	2	SM-S			 		<u> </u> -	67
5-20	10.00. 30.4				ļ·							<u> 54-8</u>	<u> </u>			<u> </u>		47
L		l	l	(i.	ł	ı	1	l	•	i	ł	Í		l	ľ	1	

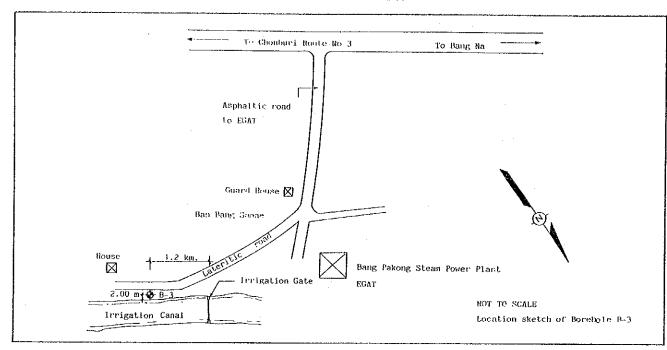
9-6

BORING LOG

DEPTH, M.	SAMPLE Na		FIE	RECOVERY	DESCRIPTION OF MATERIAL.	х Δ	Pk	estica puld (Water Limit Limit %)		nt ico	0	Qu/2 Qv Qp/2 US PT, H	(1/m 5 (Blow/	7.5	2 10
	1				Clay trace to some root dark brown. (Top Soil)							<u> </u>				
	<u> </u>	ST			1,50 m.				1.		1					
 	-				Clay trace to some peat, dark gray very soft to soft.		-				1			T	T	T
	2	ST	F				_						Ī	T	1	Ť
5	3	ST			(CH)		_	1		1				1	 	1
	1	J.			6,00 m.	-	-	+	\top	†	 	 		1	†	
	4	ST	Ħ				X	+	===	क्र	†	P		 	 	+
	1	1			Clay trace peat and shell fragment,			+	+>	4		╁╂			 -	-i
	5	ST	Ħ	=	gray soft with very soft layer			+-	18	 	-	10	1	 	1 .	+-
<u></u>	6	ST		╛	(CH)			-	+	,	ļ	-	 	 	 	+
10	-			1	1			 	/-	 		17	<u> </u>	<u> </u>	 	<u> </u>
	7	ST	Ħ		·		· · · · · · · · · · · · · · · · · · ·	┼		 		1		<u> </u>	<u> </u>	
	1 8	ST	Ц	╛				-	<u> </u>					<u> </u>	ļ	上
				7	13.00 m.			1	4_	<u> </u>		ľ		<u> </u>		\perp
	9	ST	H	╡	Clay gray, medium stiff.			Ø				්		1		
15					15.00 m.			1_					_	ļ		
	10	SS	7	4	Clay gray, stiff. (CH) 16.50 m.	· [7			9		7				
	11	ss	4	4	(CH) 16.50 m. Silty clay trace from concretion		$\int_{-\infty}^{\infty}$		T			<u>. </u>	17			Ī
					li-brownish li-gray trace black							1				
	12	SS	4	<i>^</i> }	spotted very stiff, (CL)	Ŷ	-	1				ĺ	22			-
20	13	ss	1	1	19.50 m.			 	1.	1				45		-
				7	Silty clay trace silt and same seam	7		1	1					" —		╁╴
	14	ss	7	4	brown to li-brown and li-brownish	-		4	1					<u> </u>		
	15	ss			li-gray, hard.			†	 				/	57		+-
	ڊ،	33	1		(CL)				+	 		:) <i>I</i>		!
25	16	ss	#	4	<u> </u>		<u></u>	├	 			<u>-</u>		38		
					<u></u>			1	1-1	1			}	į	ı	<u> </u>
	17	ss .	7	1	Silty clay trace silt and sand seam brown to li-brown and						_		٩ <u>۶</u>	6		
]	18	SS			li-brownish li-gray, hard.	9					_					
			7	1	(CL) 28.50 m.	1		······································				<u> </u>				
	19	ss	7	1	Medium sand some fine sand brown,								I	1	767 EP	
30	_	20			dense to very dense. (SP-SM) 30.45 m.									1		\neg
	20	ss E	7	1	30.43 (1)							T		G 47		
				l		[_	[T		Ī				\dashv
	Ì	Ì	})	END OF BORING.						1			 		-

(2) Boring Results

BOREHOLE LOCATION



SUMMARY OF TEST RESULTS

	bti	FILE	5	ATI	LERUERG I	TRAL	wacht		SIEVI	E ANA	YSIS		Z 0	UND	RAINLD S	LIEAR STI	RENGTH		2
SAMPLE No.	,, A		CONTENT		96		تسالاسا دسا			HINE			CLASSIFICATION	UNCO	HEINED	FIELD Shie	VANE AR	YOKET ATION	STANDARD PENETRATION (N)
SAM	FROM	το	WATER	tt.	₽L.	PI.	WET U	No. 3/8*	No.	10. No.	No. 40	ĭuu No∵	CLAS!	Gn ₂	Qu'A	Qv	Q√	2 FOCKET PENETRATION	PENET.
ST-1	1.50	2.00	 .										CH					8.7	
S'r-2	3.00	3,50											CII					2.5	
ST-3	4.50	5.00											CII					-	
ST-4	6,00	6.50	51.8	71.0	28.2	42,8	1.75			100	99	95	CII	1.0			·	2.5	
ST-5	7.00	8.00											CH					1.2	
ST-6	9.00	9.50	54.7	68.4	23,9	44.5	1.67			100	99	93	CH	0.9				1.2	
ST-7	10,50	11,00									-		CII					2.5	
ST-8	12.00	12,50	24.4	56.6	24,5	32,1	2.03			100	99	95	CII	3.1				5.0	
ss-9	13.50	13.95	16.4	32.7	14.2	18.5	2.05		100	99	64	25	CH	13.6				17.5	20
SS-10	15.00	15.45								;			sc	ļ					25
ss-11	16.50	16.95							100	97	52	12	SP-	SM					17
55-12	18,00	18,45											sp-	SM					55
SS-13	19.50	19,95						100	- 99	92	45	10	SP-	SM					44
SS-14	21.00	21.45											SM						26
SS-15	22.50	22.95										ļ	SP~	зм					48
SS-16	24.00	24.45	15,4	42.4	18.9	23,5	2.13		100	95	71	52	sc-	сь21.0				20.0	67
58-17	25.50	25.95											SM]		<u> </u>	86/10
	i						İ												 i

9-7

BORING LOG

DEPTH, M. ELEVATION, M.	SAMPLE Na	TYPE OF SAMPLE	SAMPLE DIST	RECOVERT.	DESCRIPTION OF MATERIAL	х Д	Natur Plasti Liqui	نا ہ اب اہ	mit mit		nf 100		Qu/2 Qv Qp/2 2.5 SPT, N	£17 m	75) (0
0		_		+		2	0 4	0 1	<u> </u>	0	1		"	Ť	Ť	Ť
				١	Clay li-gray. (Top Soil)					<u> </u>		ļ				
				_	V.50 m. Clay li-gray, medium to stiff.				ŀ		1	<u> </u>				
	1	ST		=₹	(CH) 2.50 m.				1				T			
	2	ST	Щ		Clay trace peat and shell fragment				 			 	- 	+	_	
	•	ັ'	M		dark gray. soft with very soft layer		<u> </u>	<u> </u>	 	-		 		-		
- 5	3	ST		ļ	•					<u> </u>		<u> </u>				
			П	1	(CH)		1						1			
	4	·ST			Ì		X	P			Τ-	P				
			П	٦	·			-	╂╼╼╍			+ +	_	<u>-i </u>	Ť	
	5	ST		╛		· · · · · ·	ļ	}	<u> </u>	-		╁╂	_}			
			П	-			1		<u> </u>			Ш				
	6	ST					X	7	7-2	T		19				
10				١	1			1	 	╁	1-	1-7				
	7	ST	Ħ	╡			 		-	╫		+	\forall		+-	
			П		12,00 m.		1	ļ		<u> </u>	<u> </u>	 	15			
	8	ST	Ħ	╡	Clay dark gray, medium, (CH)12.50m.		7		1			<u> </u>				
	•				Clayey fine sand some				1	T	T		j 20	Ì		
	9	SS	P	4	medium sand with medium thick layer		1-	1	 	┿		1	1		1	
15			Ц					 		┼	-		10 2			
	10	SS		4	of stiff clay.li-gray to gray, modium		<u> </u>	_		1_			/			
	11	cc			(30)		1						d17		_L	
	 ''	"	H	7	Fine to medium sand, li-gray medium dense.(SP-SM)18.00 m.			1	1	1	1	7		_	-	
	12	00					┪	┼		╁┈	+-	+	i	-) ⁵⁵	- -
	j 12	33	П		Fine to medium sand. li-brownish		<u> </u>	ـــ	-	 	-					
20	j 13	SS			li-gray dense to very dense.(SP-SM)				ŀ					<u> 25 4</u>	4	
	1	•			21.00 m.								٠,	/		
	14	SS			Silty fine sand trace medium sand		1	T	_	1			100	6		
	1				gray, medium dense.(SM) 22,50 m.	\vdash	+	+	+	+-		-	-	1	48	_
	15	SS	Z	\mathbb{Z}	Fine to medium sand li-gray, dense.		 	 -		<u> </u>			!	. 3		
	1				(co.cu) 24.00 ms		l					_ _	i		λ	67
	16	ss			Clayey sand to sandy clay, medium sa some fine sand, li-gray hard, no p. Silty fine sand trace to some medium sand li-gray, very dense. (SM)25.95m.	(10 (3								ļa	
25	1				Silty fine sand trace to some medium	1	+	╅┈	-†	†	1	1		i	<u>_</u>	- <u>7</u> -21
	17	l s	Z		sand li-gray, very dense. (SM) 25.95m.			_l								<u> </u>

3.2 Preliminary Design

(1) Geometric Design Criteria

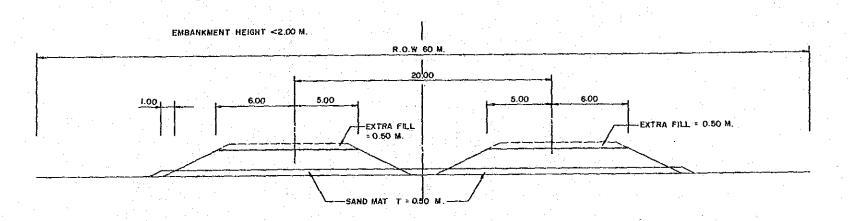
Design Standard :

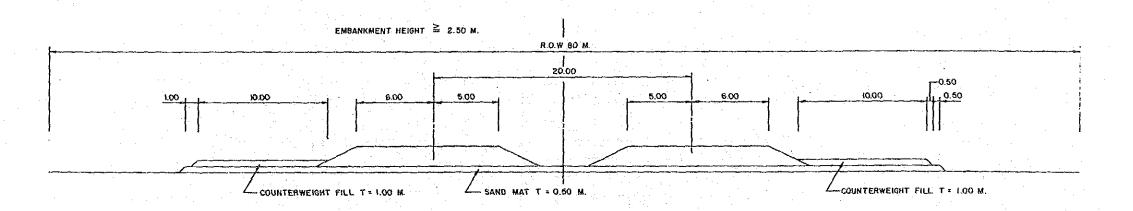
Design Speed : 100 km/h

Geometric Design Criteria

	Design Speed (km/h)
Description	100 (120)
Minimum Radius & Curvature (m) Minimum Stopping Sight Distance (m) Maximum Gradient (%)	360 710 160 210 6 5

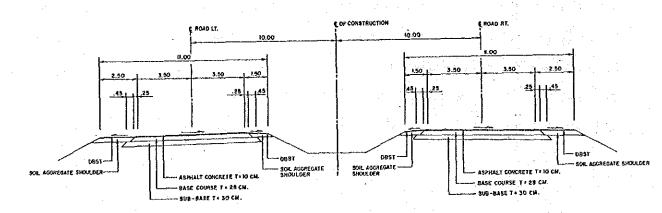
PD





(2) Pavement Design

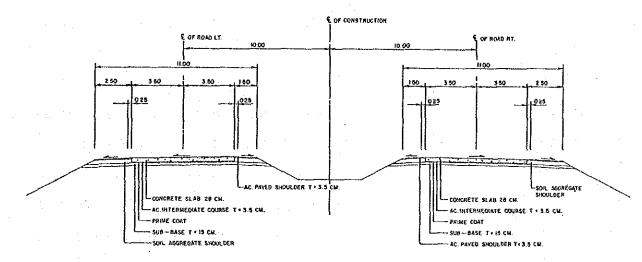
Design CBR of Subgrade	Cumulative No. of ESA W18 x 10 (10 years)		nickness of ment Structure (cm)	
4.23	20,659	Surface Base Subbase	25	



STA 0+774.552 TO STA 25+000

FIGURE TYPICAL PAVEMENT STRUCTURE FOR FLEXIBLE PAVEMENT ML-9.1
NEW CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT

Design CBR of Subgrade	Cumulative No. of ESA W18 x 10 (10 years)	Thickness of Pavement Structure (cm)	
4.23	51,901	Intermediate AC Concrete Slab 3.5	_
		Subbase 15	



STA 66+950 TO 82+523,969

FIGURE TYPICAL PAVEMENT STRUCTURE FOR RIGID PAVEMENT ML-9.3
NEW CONSTRUCTION OF CONCRETE PAVEMENT

(3) Culverts

1	l l	SALOWANG GIT REDA	NE	W CULVERT !
NO.	CHAINAGE	EXISTING CULVERT		RT ROADWAY
1	7+504	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
2	7+655	<u></u>	1-Dia 1.00x16.00	1-Dia 1.00x16.00
3	7+714		1-Dia 1.00x16.00	1-Dia 1.00x16.00
4	7+720		1-Dia 1.00x16.00	1-Dia 1.00x16.00
5	7+817	se.	1-Dia 1.00x16.00	1-Dia 1.00x16.00
6	10+600	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
7	14+075		1 1 1	-
8	15+095	-	2-Dia 1.00x19.00	2-Dia 1.00x19.00
9	16+200	. -	- -	-
10	16+350	i . ¹ i. -	_	•
11	18+300	. -	1-Dia 1.00x16.00	1-Dia 1.00x16.00
12	18+800	, su	1-Dia 1.00x16.00	1-Dia 1.00x16.00
13	19+900	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
14	23+100	_	1-Dia 1.00x16.00	1-Dia 1.00x16.00
15	23+700	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
16	26+500	- -	1-Dia 1.00x16.00	1-Dia 1.00x16.00
17	27+300	 .	1-Dia 1.00x16.00	1-Dia 1.00x16.00
18	28+800	80	1-Dia 1.00x16.00	1-Dia 1.00x16.00
19	30+150	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
20	31+100	• • • • • • • • • • • • • • • • • • •	1	-
21	31+700	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00

))	ann ann ann ann ann ann an ann an an an	NEW	CULVERT
NO.	CHAINAGE	EXISTING CULVERT	LT ROADWAY	RT ROADWAY
22	32+300	دیده مدین این این این این این این این این این ا	1-Dia 1.00x16.00	1-Dia 1.00x16.00
23	36+500		1-Dia 1.00x16.00	1-Dia 1.00x16.00
24	38+150		- 1	
25	40+200	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
26	40+700	: •	1-Dia 1.00x16.00	1-Dia 1.00x16.00
27	43+100	<u>.</u>	1-Dia 1.00x16.00	1-Dia 1.00x16.00
28	44+200	-	- -	-
29	46+600	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
30	47+100	· · · · · · · · · · · · · · · · · · ·	1-Dia 1.00x16.00	1-Dia 1.00x16.00
31	50+150	~	-	-
32	51+100	-	_	**
33	51+350		_	
34	51+410	-	-	-
35	51+600	-	-	-
36	52+500		-	**
37	52+620			-
38	52+850	, -	-	-
39	53+000		• • • • • • • • • • • • • • • • • • •	~
40	53+130	-		-
41	53+450	<u>-</u>) 3 1	-
42	57+650	- -	- -	-

 ! !	l l	THE COLUMN CHE HAD COLUMN TO THE COLUMN THE	NEW	CULVERT
NO.	CHAINAGE	EXISTING CULVERT	LT ROADWAY	RT ROADWAY
43	59+600		1-Dia 1.00x16.00	1-Dia 1.00x16.00
44	61+800	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
45	62+500		1-Dia 1.00x16.00	1-Dia 1.00x16.00
46	63+300	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
47	64+300	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
48	65+200	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
49	66+100	- -	1-Dia 1.00x16.00	1-Dia 1.00x16.00
50	67+500	•	1-Dia 1.00x26.00	1-Dia 1.00x26.00
51	68+200		1-Dia 1.00x16.00	1-Dia 1.00x16.00
52	68+800	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
53	69+500	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
54	69+900	-	1-Dia 1.00x16.00	1-Dia 1.00x16.00
55	70+600	-		-
56	71+100	· -	1-Dia 1.00x16.00	1-Dia 1.00x16.00
57	71+900	sa sa	1-Dia 1.00x16.00	1-Dia 1.00x16.00
58	72+300		1-Dia 1.00x16.00	1-Dia 1.00x16.00
59	73+800		2-Dia 1.00x16.00	2-Dia 1.00x16.00
60	74+900	-		-
61	75+350	-		-
62	75+900	-	.	-
63	76+800	-	2-Dia 1.00x16.00	2-Dia 1.00x16.00

		nutantito durittim	NE	EW CULVERT
NO.	CHAINAGE	EXISTING CULVERT	LT ROADWAY	RT ROADWAY
64	77+300		- 1	_
65	78+000		2-Dia 1.00x16.00	2-Dia 1.00x16.00
66	78+900	-	2-Dia 1.00x16.00	2-Dia 1.00x16.00
67	79+800	-	1	-
68	80+800	<u></u>	i !	7
69	81+300	-	2-Dia 1.00x16.00	2-Dia 1.00x16.00
70	81+900	-	-	-

(4) Bridges

***	NO	CHAINAGE	PROPOSEI	D BRIDGE	түре	REMARK		 .	**************************************	NO	CHAINAGE	PROPOSEI	BRIDGE	TYPE
		1.	LT ROADWAY	RT ROADWAY			· · · · · · · · · · · · · · · · · · ·	_				LT ROADWAY	RT ROADWAY	يين پيٽر ويند مين پيٽر ويند مين پيٽر ويند مين مين ويند ويند مين مين ويند ويند مين پي
,	1	1+116	11x12	11x12	SLAB TYPE				· . ·	25	39+350	11x32	11x32	SLAB TYPE
	2	2+626	11x10	11x10	SLAB TYPE	•				26	41+900	11x18	11x18	SLAB TYPE
	3	3+325	11x12	11x12	SLAB TYPE				÷	27	45+350	11x19	11x19	SLAB TYPE
	4	4+356	11x12	11x12	SLAB TYPE					28	45+600	11x31	11x31	SLAB TYPE
	5	5+768	11x10	11x10	SLAB TYPE					29	47+700	11x64	11x64	PC GIRDER
	6	6+606	11x26	11x26	SLAB TYPE	$\mathcal{F}_{\mathcal{F}} = \mathcal{F}_{\mathcal{F}}$		•	•	30	49+165	11x590	11x590	PC GIRDER
	7	8+013	11x13	11x13	SLAB TYPE			e jak		31	51+550	11x7	11x7	SLAB TYPE
	8	9+710	11x21	11x21	SLAB TYPE					32	51+800	11x10	11x10	SLAB TYPE
	9	11+353	11x18	11x18	SLAB TYPE					33	54+600	11x8	11x8	SLAB TYPE
	10	12+166	11x22	11x22	PC GIRDER	CROSS R. 3119	•			34	54+900	11x10	11x10	SLAB TYPE
	11	12+985	11x12	11x12	SLAB TYPE					35	55+700	11x14	11x14	SLAB TYPE
	12	14+634	11x12	11x12	SLAB TYPE					36	57+200	11x8	11x8	SLAB TYPE
	13	17+300	11x52	11x52	SLAB TYPE					37	58+200	11x8	11x8	SLAB TYPE
	14	21+500	11x40	11×40	SLAB TYPE					38	58+800	11x60	11x60	SLAB TYPE
	15	22+400	11x36	11x36	PC GIRDER	CROSS RAILWAY				39	60+800	11x40	11x40	SLAB TYPE
	16	24+400	11x39	11x39	SLAB TYPE					40	66+950	11x32	11x32	PC GIRDEH
	17	24+950	11x55	11x55	SLAB TYPE					41	67+300	11x20	11x20	PC GIRDER
	18	27+800	11x24	11x24	SLAB TYPE					42	74+300	11x38	11x38	PC GIRDER
	19	29+600	11x80	11x80	SLAB TYPE									
	20	32+850	11x42	11x42	SLAB TYPE									
	21	33+850	11x40	11x40	SLAB TYPE	5 ·					÷			
	22	34+650	11x12	11x12	SLAB TYPE						grafie de la companya			
	23	35+300	11x35	11x35	SLAB TYPE					٠.	. ·			
	24	37+300	11x33	11x33	SLAB TYPE			÷						

REMARK

CROSS R. 314

CROSS R. 315

CROSS RAILWAY

CROSS R. 344

CROSS BANG PAKONG RIVER

(1) CONSTRUCTION QUANTITIES AND COSTS

(Project ML-9 (I) Length = 24.2 km)

		Financial		Financial	Econ	omic Cost	Resi	dual Value
on the many control of the second of the sec	Unit	Unit Rate Baht	Quantity	Total Cost 1000 Baht	%	1000 Baht	%	1000 Baht
ARTHWORK								
Clearing & Grubbing	ha .	10,000	196	1,960	85	1,666	90	1,499
Roadway Excavation (Unclassified)	m 3	18	-	e de la Companya de l	84		90	· · ·
Roadway Excavation (Classified Unsuitable Material below Grade)	m 3	51	22,400	1,142	84	959	90	863
Embankment (Common)	m ³	33			86	-	90	
Embankment (Borrow)	m 3	187	1,600,800	299,350	86	257,441	90	231,69
Sand Mat	m 3	309	380,300	117,513	. 86	101,061	90	90,95
Removal of Existing Structure (+Detour)	each	60,000	***		84	· · · · · · · · · · · · · · · · · · ·	90	
Sub Total				419,965		361,127		325,014
DEPARTS I DAGE COUDERS				•				
UBBASE and BASE COURSES Subbase	m 3	229	133,000	30,457	83	25,279	50	12,640
Aggregate base	m 3	348	113,400	39,463	84	33,149	50	16,57
Shoulder (Soil Aggregate)	m 3	265	56,900	15,079	83	12,516	50	6,25
Sub Total		•	. *	84,999		70,944		35,47
				•				
URFACE COURSES Asphaltic Prime Coat	m ²	11	444,400	4,888	93	4,546	50	2,27
Asphaltic Tack Coat	m ²	5	305,700	1,529	93	1,422	50	71
Double Bituminous Surface Treatment	m 2	33		6,894	91	6,274	50	3,13
Asphalt Concrete Surfacing	ton	926	89,600	82,970	90	74,673	50	37,33
Portland Cement Concrete Pavement	m 3	1,665	_		90		50	
Sub Total				96,281	•	86,915		43,45
TRUCTURES (Equivalent)								
RC Pipe Culvert (D=1.00 m)	m .	1,800	428	770	88	678	50	339
RC Box Culvert (2-2.40x 2.40 m)	m	13,000	33	429	90	386	50	19
RC Bridge (W=11.0 m)	m	69,000	688	47,472	87	41,301	- 50	20,65
PC Bridge (W=11.0 m)	m	105,000	3,284	344,820	87	299,993	50	149,99
	m ²	1,600	12,100	19,360	87	16,843	50	8,42
Sub Total	1.1			410,787		357,405		178,70
Total (al)				1,012,032		876,391		582,649
The first was about the same and the same has the same that the same tha								
AND ACQUISITION		er en grand de en						-
Developed Land	ha	2,000,000	129	258,000				
	1	1,000,000	66	66,000				4
Less Developed Land	ha	1,000,000	UU	00,000	•			

CONSTRUCTION QUANTITIES AND COSTS

(Project ML-9 (II) Length = 22.7 km)

		Financial		Financial	Econ	omic Cost	Resi	dual Value
Item	Unit	Unit Rate Baht	Quantity	Total Cost	%	1000 Baht	%	1000 Baht
هه بحد خد بعد جد بعد بعد بعد بعد بعد بعد بعد بعد بعد بع								
EARTHWORK								1 200
Clearing & Grubbing	ha	10,000	182	1,820	85	1,547	90	1,392
Roadway Excavation (Unclassified)	m ³	18	 ,	•	84		90	
Roadway Excavation (Classified Unsuitable	_				• •			4 6 6
Material below Grade)	m 3	51	4,400	224	84	188	90	169
Embankment (Common)	m 3	33	-	-	86		90	~
Embankment (Borrow)	m ³	177	1,187,300	210,152	86	180,731	90	162,658
Sand Mat	լը 3	275	364,900	100,348	86	86,299	90	77,669
Removal of Existing Structure (+Detour)	each	60,000	- ,	-	84	***	9.0	e e e e e e e e e e e e e e e e e e e
Sub Total				312,544	**	268,765		241,888
SUBBASE and BASE COURSES								
Subbase	m 3	221	120,100	26,542	83	22,030	50	11,015
Aggregate base	m 3	339	89,500	30,341	84	25,486	50	12,743
Shoulder (Soil Aggregate)	m 3	256	42,800	10,957	83	9,094	50	4,547
Sub Total	м.		.5,000	67,840		56,610		28,305
SURFACE COURSES			÷			• .		•
Asphaltic Prime Coat	m 2	11	378,500	4,164	93	3,873	50	1,937
Asphaltic Tack Coat	m 2	5	301,200	1,506	93	1,401	50	701
Double Bituminous Surface Treatment	m ²	33	183,500	6,056	91	5,511	50	2,756
		927	77,500	71,843	90	64,659	50	32,330
Asphalt Concrete Surfacing	ton m ³		11,500	11,040	90	04,000	50	02,000
Portland Cement Concrete Pavement	W o	1,668	-	00 800	90	75 444	50	20 704
Sub Total		•		83,569		75,444		37,724
STRUCTURES (Equivalent)			601	201		000	<i>c</i> 0	004
RC Pipe Culvert (D=1.00 m)	m	1,800	384	691	88	608	50	304
RC Box Culvert (2-2.40x 2.40 m)	m	13,000	26	338	90	304	50	152
RC Bridge (W=11.0 m)	m	69,000	732	50,508	87	43,942	50	21,971
PC Bridge (W=11.0 m)	m	105,000			87	1	50	
Bearing Unit	m ²	1,600	7,260	11,616	87	10,106	50	5,053
Sub Total		·	·	63,153		54,960		27,480
Total (a2)				527,106		455,779		335,397
	. —					•		
LAND ACQUISITION								
Developed Land	ha	1,250,000	_					
Less Developed Land	ha	625,000	182	113,750		من الله الله الله الله الله الله الله الل		ن سان چېره وين دين دهنه دينه دين وين دين دين د
Total (e2)				113,750	100	113,750	100	113,750

CONSTRUCTION QUANTITIES AND COSTS

(Project ML-9 (III) Length = 34.8 km)

		Financial		Financial	Econ	omic Cost	Resid	dual Value
Item	Unit	Unit Rate Baht	Quantity	Total Cost 1000 Baht	%	1000 Baht	%	1000 Baht
EARTHWORK	-						estable of	
Clearing & Grubbing	na	10,000	282	2,820	85	2,397	90	2,157
Roadway Excavation (Unclassified)	m ³	18	- -	-	84	-	90	
Roadway Excavation (Classified Unsuitable								
Material below Grade)		38	253,500	9,633	84	8,092	90	7,283
Embankment (Common)	m 3	33		***	86		90	
Embankment (Borrow)	m³	95	1,797,100	170,725	86	146,824	90	132,142
Sand Mat	m ³	252	363,300	91,552	86	78,735	90	70,86
Removal of Existing Structure (+Detour)	each	60,000		-	84	 *	90	* .
Sub Total	* * * * * * * * * * * * * * * * * * *			274,730		236,048		212,44
	1							
UBBASE and BASE COURSES			i de la companya de					
Subbase	m ³	145	141,200	20,474	83	16,993	50	8,49
Aggregate base	m 3	266	75,800	20,163	84	16,937	50	8,46
Shoulder (Soil Aggregate)	m ³	170	76,200	12,954	83	10,752	50	5,37
Sub Total				53,591		44,682		22,34
URFACE COURSES			•					
Asphaltic Prime Coat	m 2	11	602,800	6,631	93	6,167	50	3,084
Asphaltic Tack Coat	m ²	5	241,200	1,206	93	1,122	50	56
Double Bituminous Surface Treatment	m ²	32	153,500	4,912	91	4,470	50	2,23
		898	110,500	99,229	90	89,306	50	44,65
Asphalt Concrete Surfacing	ton m³				90	92,375	50	46,18
Portland Cement Concrete Pavement	m "	1,567	65,500	102,639	90	193,440	30	96,72
Sub Total				214,617		193,440		30,12
mpulcosumpo (p. 21 ()			•	4.5				
TRUCTURES (Equivalent)		4 000	.000	1 457.0	0.0	1 000	·ελ	e c
RC Pipe Culvert (D=1.00 m)	m	1,800	820	1,476	88	1,299	50	.65
RC Box Culvert (2-2.40x 2.40 m)	m	13,000	158	2,054	90	1,849	50	92
RC Bridge (W=11.0 m)	m.	69,000	330	22,770	87	19,810	50	9,90
PC Bridge (W=11.0 m)	m	105,000	1,488	156,240	87	135,929	50	67,96
Bearing Unit	m 2	1,600	11,440	18,304	87	15,924	50	7,96
Sub Total		·		200,844		174,811		87,40
Total (a3)				743,782		648,981		418,91
			gain ann ben pigh han man grup ann hann barr abru			and and also seen over box announced progress took and		
AND ACQUISITION								
Developed Land	ha	1,500,000						
Less Developed Land	ha	625,000	282	176,250	-			
Total (e3)				176,250	100	176,250	100	176,250

CONSTRUCTION QUANTITIES AND COSTS

(Project ML-9 Length = 81.7 km)

	***	Financial	A	Financial	Econo	omic Cost	Resid	ual Value
Item	Unit	Unit Rate Baht	Quantity	Total Cost 1000 Baht	%	1000 Baht	%	1000 Baht
CONSTRUCTION COST		THE THE STEE AND SHAPE SHAPE AND STEE AND STEE AND STEE AND STEE AND STEE		and the same and the same and the same and the same and		and their first free City, and they good agg, was size		
(I) (a1)				1,012,032		876,391		582,649
(II) (a2)				527,106		455,779		335,397 418,914
(III) (a3)				743,782		648,981		410,014
Total $((a1) + (a2) + (a3))$ (a)			port in the	2,282,920	•	1,981,151		1,336,960
Miscellaneous Work ((a) x 7%)	1s			159,804	87	139,029	0	0
CONTRACT AMOUNT (b)		THE TAX THE TAX THE COST OF THE COST OS THE COST OF THE COST OS THE COST OF TH		2,442,724		2,120,180		1,336,960
HYSICAL CONTINGENCIES ((b) x 10%) (c) is			244,272		212,018		133,696
NGINEERING AND SUPERVISION						100		
(((b) + (c)) x 10%) (d)	1s			268,700	100	268,700	0	0
AND ACQUISITION				. *				
(I) (e1)				324,000	100	324,000	100	324,000
(II) (e2)				113,750	100	113,750	100	113,750
(III) (e3)				176,250	100	176,250	100	176,250
Total ((e1) + (e2) + (e3)) (e)				614,000	100	614,000	100	614,000
ROJECT COST ((b) + (c) + (d) + (e))				3,569,696		3,214,898		2,084,656
((9) + (D) + (C) + (d)) 1600 LOGUUM				0,000,000		0,214,030		4,004,000
VERAGE COST PER KM				43,693				

(2) Road Maintenance Costs

(Unit: Baht/Year)
Without Project With Project

1994 - 1,302,929 2004 - 1,817,604

3.4 Construction Schedule

Year and	- 1					19	91						E L.						199	72					1						199	73				
Month Work Items	ì i	1;	2¦	3¦	4¦	5¦	6;	7;	8;	9;	10;	11;12	1 1	1 2	2; 3	1 4	1; 5);	b; 7	7;	8¦ 9	110	:11	112	1 1	2	; 3	; 4	; 5	: (; ; ;	7; {	8;	9¦1	0;1	1;12
Land Acquisition	-		1	į	1		1	 I	: !	1	:	1	1	1	1	:	1	1	:	1	:	1	1	i.	: ;	;	·	:	;	1	į,	1	;	;	;	;
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Preparatory Works	! i	-	4	+	4		1	ļ	1	ŀ	-	. !	!	1.	ŧ	1	1	I.	1	;	. 1	:	t t	t	1	1	i -	l I	:	1	į		L	ŀ	. i	ŀ
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A BENEFITS

ROAD CONDITIONS

														(unit	: km)	
and the first time the pass was also the time out the			With	out Pr	roject								With P	roject		
			Pave	 ed			La	terite		No of	No. of			No. of	No of	
Section	Road Length	Good	Good /Fair	Fair	Fair /Poor	Poor	Good	Fair	Poor	Narrow	Wooden	Road	Paved	Narrow Bridge	Wooden	
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Section-1	7.0		-		· · · · · · · · · · · · · · · · · · ·		-	.			· · · · · · · · · · · · · · · · · · ·	7.0	7.0			:
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Section-3	13.0	, -	-	<u>-</u>	******	· · · · · ·	· · · · · · ·	_	***	, , , ,	· · · · -	13.0	13.0	- .		
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Section-5	19.2	_		_	-	· ·						19.2	19.2			
Section-6	7.4		· ~	. ' -			· · · · ·	-	-	-		7.4	7.4			
Section-7	8.1				-		_	_	-	•		8.1	8.1	-	-	٠,

VOC AND TIME SAVINGS

		 C Savings		 Time	s Savings		Total	(10 Savings	00 BAHT)
Year	Normal Traffic	Induced Traffic	Total	Normal Traffic	Induced Traffic	Total	Normal Traffic	Induced Traffic	Total
1994	540,204	- -	540,204	864,164		864,164	1,404,368		1,404,368
2000	2,097,793	- 2	2,097,793	1,635,826		1,635,826	3,733,619	-	3,733,619
2008	6,044,138	- (5,044,138	3,780,942		3,780,942	9,825,080		9,825,080

5. ECONOMIC EVALUATION

COST AND BENEFIT STATEMENT

(1000 BAHT)

	COST		BENEFITS			DISCOUNTED	(12%)
YEAR	CONST.	VOC SAVING	TIME SAVING	MAINT. SAVING	TOTAL	COST	BENEFIT
1991	642,980		en final feet alle dens appen ware door yaar unity nies einer zijn e		0	903,341	(
1992	1,446,704					1,814,745	(
1993	1,125,214				and the second of the second o	1,260,240	i - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
1994		540,205	864,164	(1,303)	1,403,066		1,252,73
1995		799,803	992,774		1,791,240		1,427,96
1996		1,059,401	1,121,385	(1,371)	2,179,415	0	1,551,26
1997		1,318,999	1,249,995	(1,405)	2,567,589	0	1,631,74
1998		1,578,597	1,378,606	(1,439)	2,955,764	0	1,677,18
1999	Maria de Caración	1,838,195	1,507,216	(1,473)	3,343,938	0	1,694,14
2000		2,097,793	1,635,826	(1,507)	3,732,112	0	1,688,21
2001		2,591,086	1,903,966	(1,541)	4,493,511	0	1,814,85
2002		3,084,379	2,172,105	(1,575)	5,254,909	0	1,894,97
2003		3,577,672	2,440,245	(1,609)	6,016,308	0	1,937,09
2004	187,544	4,070,965	2,708,384	(1,643)	6,777,706	60,384	1,948,42
2005		4,564,258	2,976,524	(1,677)	7,539,105	0	1,935,10
2006		5,057,551	3,244,663	(1,711)	8,300,503	. 0	1,902,26
2007		5,550,845	3,512,802	(1,745)	9,061,902	0	1,854,24
2008	(2,084,656)	6,044,138	3,780,942	(1,818)	9,823,262	(426,562)	1,794,67
1000			The state of the s				
TOTAL	1,317,786	43,773,887	31,489,597	(23,154)	75,240,330	3,612,148	26,004,88

NET PRESENT VALUE:
BENEFIT COST RATIO:
INTERNAL RATE OF RETURN:
FIRST YEAR RATE OF RETURN:

22,392,735 7.20 39.6% 31.5%

6. DRAWINGS

ABBREVIATIONS AND SYMBOLS FOR PLAN AND PROFILE

	NEW CONSTRUCTION SECTION OF STUDY ROUTE
	IMPROVEMENT SECTION OF STUDY ROUTE
	BRIDGE (PROPOSED, EXISTING)
	BOX CULVERT (PROPOSED, EXISTING)
• 0	PIPE CULVERT (PROPOSED, EXISTING)
- HML	HIGH WATER LEVEL
HWY	HIGHWAY
PI	POINT OF HORIZONTAL INTERSECTION
NO. or #	NUMBER
Δ	DEFLECTION ANGLE
R	RADIUS OF CURVATURE
T .	TANGENT LENGHT
L	LENGHT OF CURVE
RT	RIGHT
LT	LEFT
EXIST.	EXISTING
EXTD.	EXTEND
RC-P-n-Øaxl	PIPE CULVERT, n (ROW), Ø a (DIAMETER, m), I (LENGTH, m)
RC-B-n-axbxl	BOX CULVERT, n (NO. OF CELLS), axbx1 (CLEAR SPAN x DEPTH x LENGTH, m)
BR-T-axl-n	TIMBER BRIDGE, axI (WIDTH x LENGTH, m), n (NO. OF SPANS)
BR-RC-axi-n	CONCRETE BRIDGE, axi (ROADWAY WIDTH x LENGTH, m) n(NO. OF SPANS)

