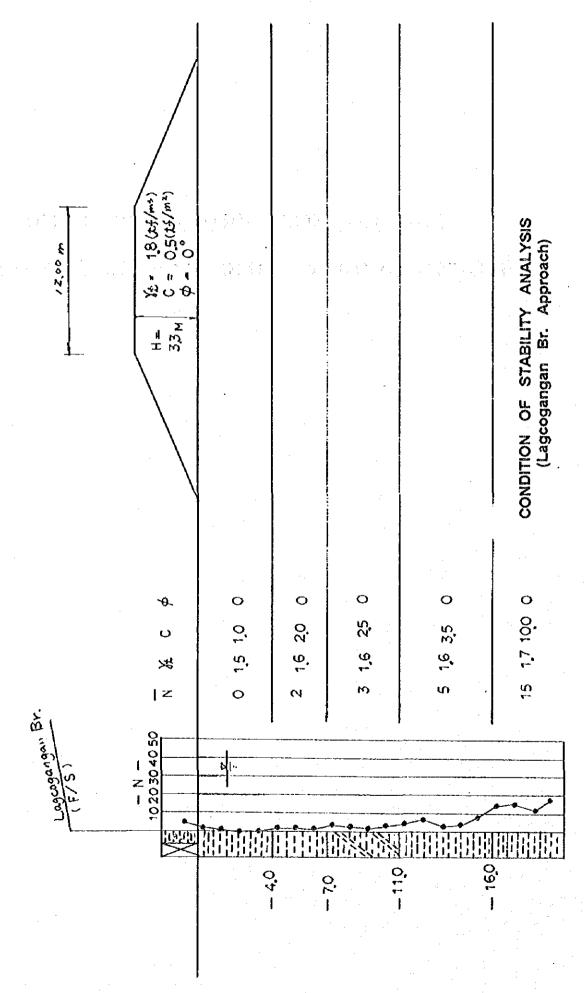
#### APPENDIX 8.7-1

#### EMBANKMENT SLOPE STABILITY AND CONSOLIDATION SETTLEMENT ANALYSIS

# LAGCOGANGAN BRIDGE APPROACH SLOPE STABILITY AND SETTLEMENT ANALYSIS



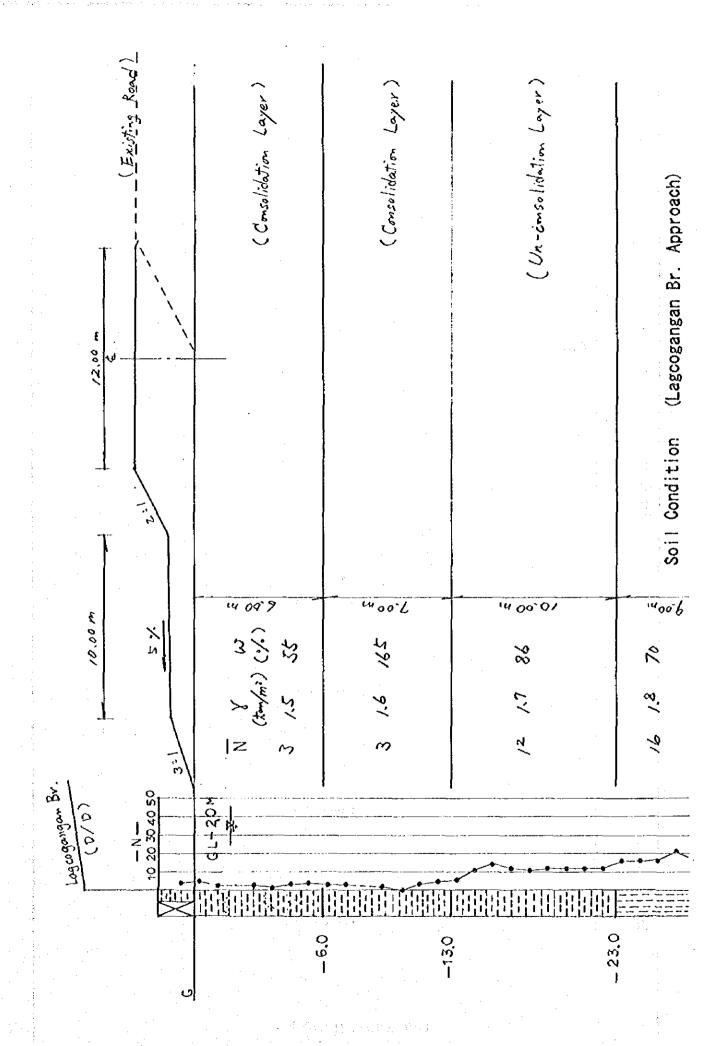
App. 8.7-2

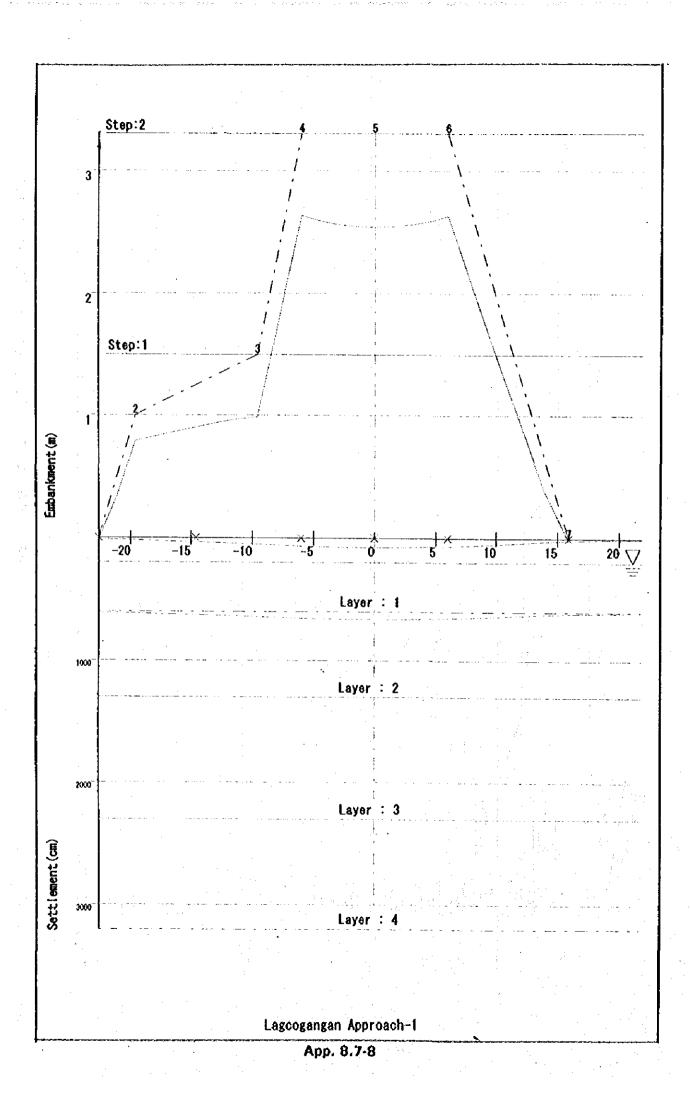
					(t f · m)	f · B)	Cohesion	(#/m²)	0.50	2.00	2.50	3.50	10.50	1.000 (tf/m²)										
	0.918	52.00 (m)	6.00 (m)	10.00 (m)	203, 91 (t	-222.25 (tf	Internal Friction Angle	(degres)	0.0	0.0	0.0	0.0		Water Density = 1.000			. *							
	Ħ	11	ii	ii	11	11	Wet Density	(£/m3)	500	1.600	1.600	1.600	1.700	Wat			12	4.			16			
009	ν Σ S	×	>-	α	Ϋ́	Š	Saturated Density	(#/m3)	200	1.600	1.600	1.600	1.700		• .							· ·	06	
<del></del>	Safety Factor	Circle Coordinates			nent	Moment	No.of Layers	ď	- 2	m	4	5	မ		٠.								08	ANALYSIS
Scale	Minimum Sa			Radius	Resisting Moment	Overturning		20/2			4	\ \[ \]		<u></u>						_ [a			60 70	STABILITY AN
						:							7			n	4	9	7-1	[ و			0.50	
# 3.30 #									7			<b></b>	\	1									- 04	
ikment H	4								·														30	
Lagcogangan Br. Height of Embankment								٠.	•			•	-	1	/	<u>ග</u>	;	13			2.		20	
Lago	Slope											-	.1		1		ï			<u>  :</u>	<b> 3</b>	 		

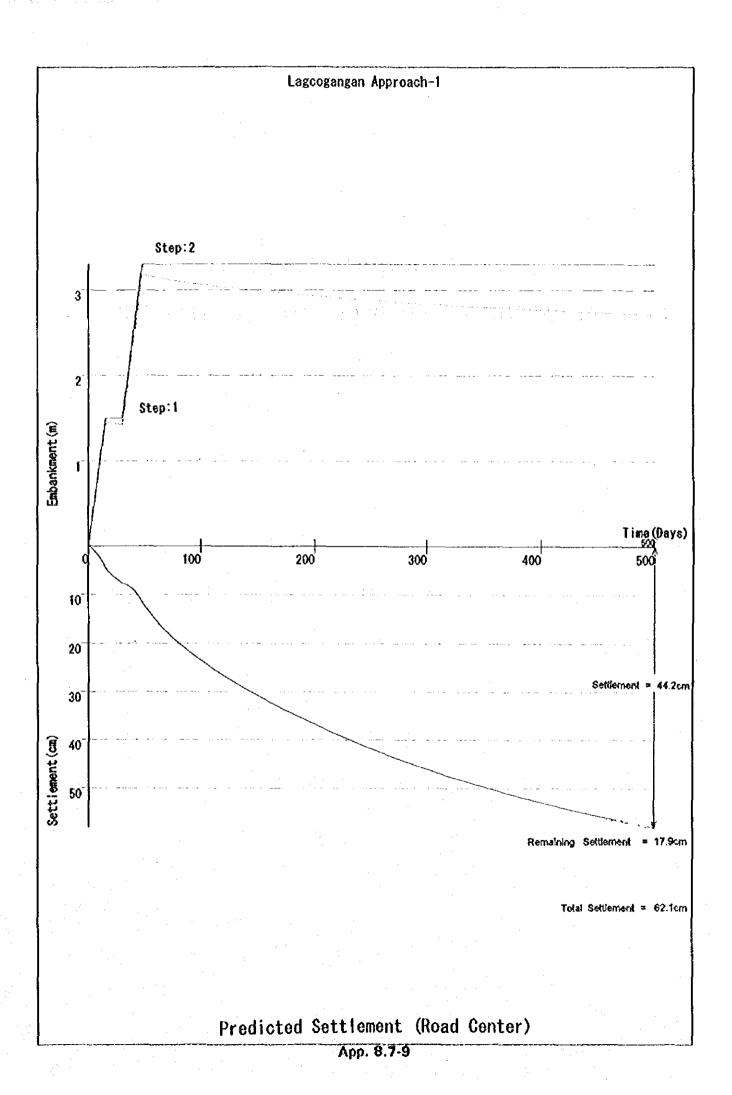
			ç	ĉ	દ	(tf.m)	(t f · m)		0.50	1.00	2.00	2.50	3.50	10.50	1,000 (t/m³)								
		0.965	56.00 (m)	10.00 (m)	14.00 (m)	332.87 (	-344.98 (t	Internal Friction Angle	0.0	0.0	0.0	0.0	0.0	0.0	Water Density = 1.0								
		11	11:	.11	ij	11	11	Wet Density	1.800	1.500	1.600	1.600	1.600	1.700	Wa	•	14			16		000	
0 0	) )	N N	×	<b>&gt;</b>	œ	Z <sub>R</sub>	Μ̈́o	Saturated Density	1.800	1.500	1.600	1.600	1.600	1.700				-				000	
		Safety Factor	Circle Coordinates			пелt	Moment	No.of Layers		7	က	4	SO (	Q								0.80	ANALYSIS
	) P	Minimum S	Center of Cir		Radius	Resisting Moment	Overturning				/	-				4	<b>[</b>		2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	e de la company de la comp		60 70	STABILITY AN
									1	1000			2	   								50	
	3.30 m			÷																	,	40	
an Br	Height of Embankment H	2.5:1									٠				7 2 8	-	8-			3.5		on	
agengangar Br	Height of	Slope					• • • • • •	· · · · · · · · · · · · · · · · · · ·	.l.	··· =				.ŧ		i	·.	· 	1	£		e e	

•					Ê.	Ê	Cohesion	0.50	1.00	2.00	2.50	10.50	(#/m²)									
	0.966	56.00 (m)	10.00 (m)	14.00 (m)	332.87 (tf	-344. 73 (tf	Internal Friction Angle	0.0	0.0	0.0	0.0	000	Water Density = 1,000 (tf/m²)		. ·			٠.	. )		!	
	li	11	, H	H		H	Wet Density	1.800	1.500	1.600	1.600	1.700	Wat		. CV	1 4		·-	<b>?</b>	÷	100	
0000	z s u	× sə	>-	œ	MR	Š	Saturated Density	1.800	1.500	1.600	1.600	1 700									06	
<b>-</b>	Safety Factor	Center of Circle Coordinates X	-		oment	Moment	No.of Layers	-	7	က	4	n 9					1		,		0 8	ANALYSIS
න ම ශ ශ ශ	Minimum	Center of C		Radius	Resisting Moment	Overturning				/		1		ရ	4		· .	9			200	STABILITY AND
								7				/			IJ	S	L		,		80	
3.30 ш				٠											-						4.0	
or. Jankment H	() ()																		***************************************		90	
Lagogangan or. Height of Embankment H	Slope	<del>.</del>										_	10	o	=			40 17			20	
J X	S				i.		· •.• = •••	l	,-	.1		, <u>I</u> .			l_		1	<i>,</i> , I	.L		•	. 4 . 4

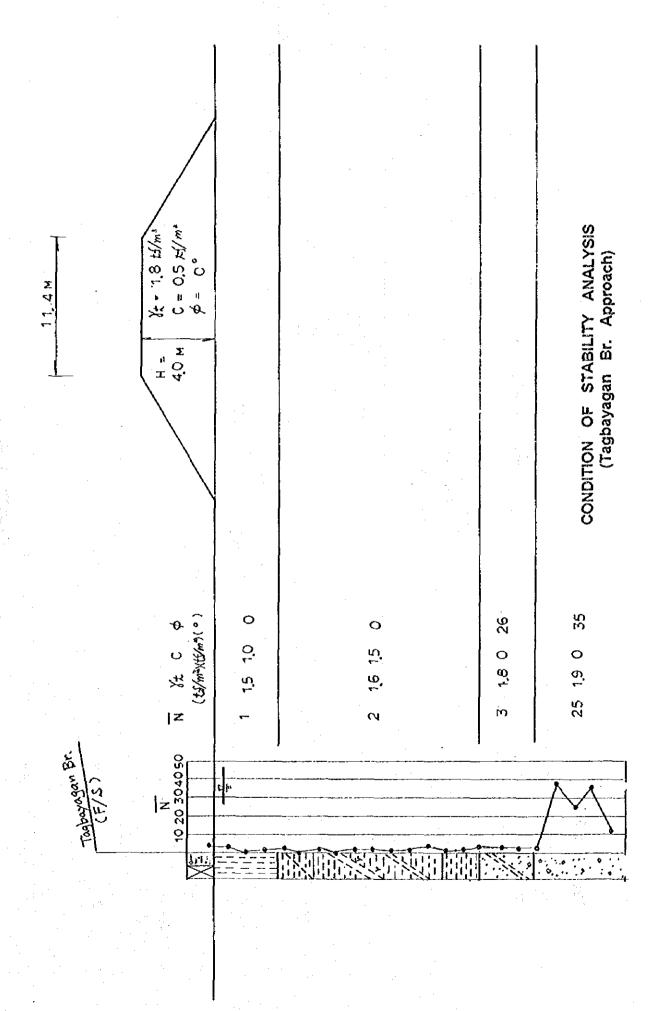
			^	~	^	f · B)	(tf-m)			Cohesion (#/m²)	0.50	1.00	2.00	2.50	3.50	10.00	0.50	1.000 (tf/m³)				-			-					
	•	0 0	50.00 (m)	16.00 (m)	20,00 (m)	562.55 (tf	-465, 68 (t		Internal Friction	Angle (degres)	0.0	0.0	0.0	0:0	0.0	0.0	0	Water Density = 1.00												
		1	<b>II</b>	16_	n	Ħ	11		Wet	Density (ff/m³)	1.800	1.500	1.600	1,600	1.600	1.700	1.800	Wa			 4				16			001		
200	t		×	<b>&gt;</b>	α	ž	Mo		Saturated	Density (#/m³)	1.800	1.500	1.600	1.600	1.600	1.700	1.800	-						*-				0 6		
-		Salety ractor	Center of Circle Coordinates			ment	Moment		1	No.of Layers	-	2	ന	4	c	ø												6.8	ANALYSIS	
Scale			Center of Ci		Radius	Resisting Moment	Overturning					/	/		The state of the s	\ \ \							· · ·	7.		24 13		04 0	STABILITY AN	
	m.h=1.45m								1	7	<i>(</i>			X.		1			\	4	[6]		<b>4</b>	]				50 . 60		
£	H=3.3m ment L=10m														17		1/										1	40		
. Approac	inkment F it Embankm			-					,						\		-   											9.0		
Lagcogangan Br. Approach	Hight of Embankment H=3.	•													•		1,		<b>2</b>	Ξ	 <u>ප</u>				25			20		
Lagco	High			-			·	** · =	f .		l .	-		· •		) O		(-		- 1	<b>1</b> .		100		<b>.i</b>		· 1			
		···· •						:		<u>-</u>		A	þſ	),	8.	7.	6				 									







#### TAGBAYAGAN BRIDGE APPROACH SLOPE STABILITY AND SETTLEMENT ANALYSIS



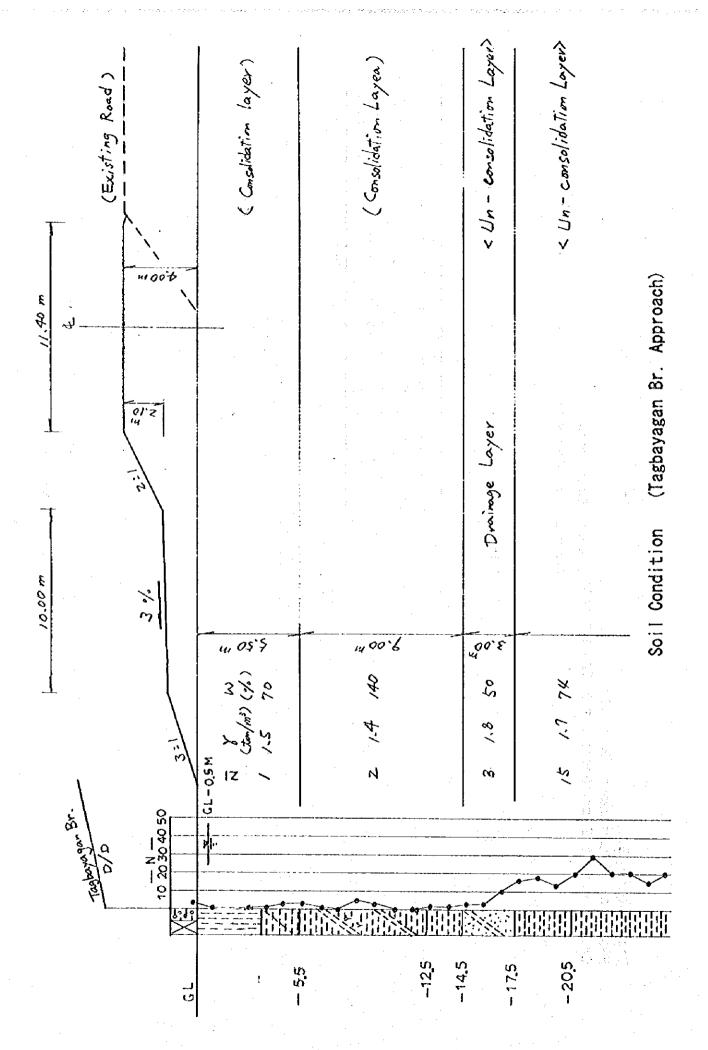
App. 8.7-11

		^	^		f -m)	f·m)		ction			0.50			(a/t+/ 500 . 1											
	0.712	52.00 (m)	10.00 (m)	13.50 (m)	275.63 (tf	387. 20 (tf		Internal Friction	(degres)	0.0	0.0	0.0		Density =		5.							1		
	11		<b>!!</b>	ı	11	Î		Met	はたる	1.800	1.500	009	. 700	#ater					0.	12	<b>.</b>		- 00		
7 500	N M N	nates X	>-	œ	N.	Š			·	1.800	1.500	009	. /œ	÷									06		
Scale	Safety Factor	Center of Circle Coordinates			loment	Moment		adove the chi	10.01	_	2	, ,	4										- CO	ANALYSIS	
	Minimum	Center of (		Radius	Resisting Moment	Overturning							- - - -				[	6		4			90 70	STABILITY A	
														7									- 80		
	# 4.0 m									<u>.                                    </u>	. <b>Z</b> l				/   							•	40		
<u>.</u> .	bankment H	2:1								-								<u>:</u>					30		
Tagbayagan Br.	Height of Embankment H	Slope	* · ·	: ·								1.		•					G.	=			20		
<b>1</b>	æ	w					-				! •	?		(	<u>-</u>			0	t			<u>-</u>	1		

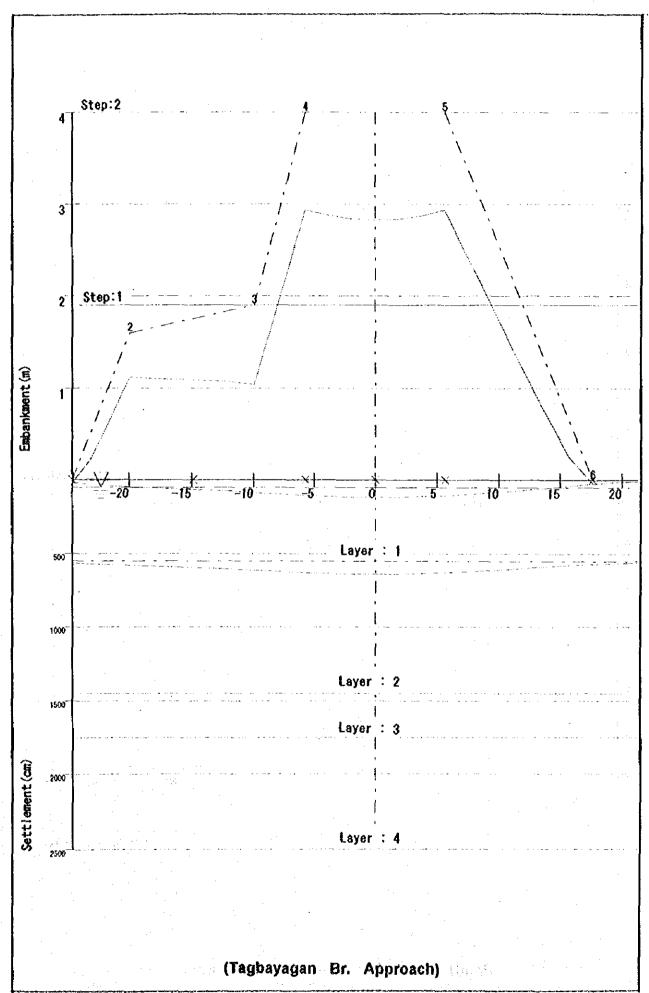
Height of Embankment H = 4.0 m	Minimum Safety Factor FS MIN	ı	0.712
Slope 2.5:1	Center of Circle Coordinates X	II O	56.00 (m)
		ļ	0.00 (m)
	Radius	11	3, 50 (m)
	Resisting Moment MR	= 27	75. 63 (tf·m)
	Overturning Moment Mo	-387	37. 20 (tf·m)
	Saturated	Wet	Internal Friction
	No.of Layers Density	Density	
	008-1	1.800	0.0 0.50
	2 1.500	1.500	
		1 600	
	1.700	1,700	0.0
1			
o.		e r	
	( 1	12	
		<b>!</b>	
The second secon			:
20 30 40 50	60 70 80 90	100	1
	STABILITY ANALYSIS		

Scale : 1 / 500	Minimum Safety Factor $F_{SMIN} = 0.730$ Center of Circle Coordinates $X = 56.00 (m)$ $Y = 10.00 (m)$	Resisting Moment MR = 275, 63 (1f·m)  Overturning Moment Mo =377, 60 (1f·m)	No.of Layers   Density   Angle   Cohesion     (tf/m - (tf/m - (degres) (tf/m - (degres) (tf/m - (degres) (tf/m - (tf/m -	10	50 60 70 80 90 100 STABILITY ANALYSIS
Tagbayagan Br.	Height of Embankment H = 4.0 m Slope 3:1			 9	20 30 40

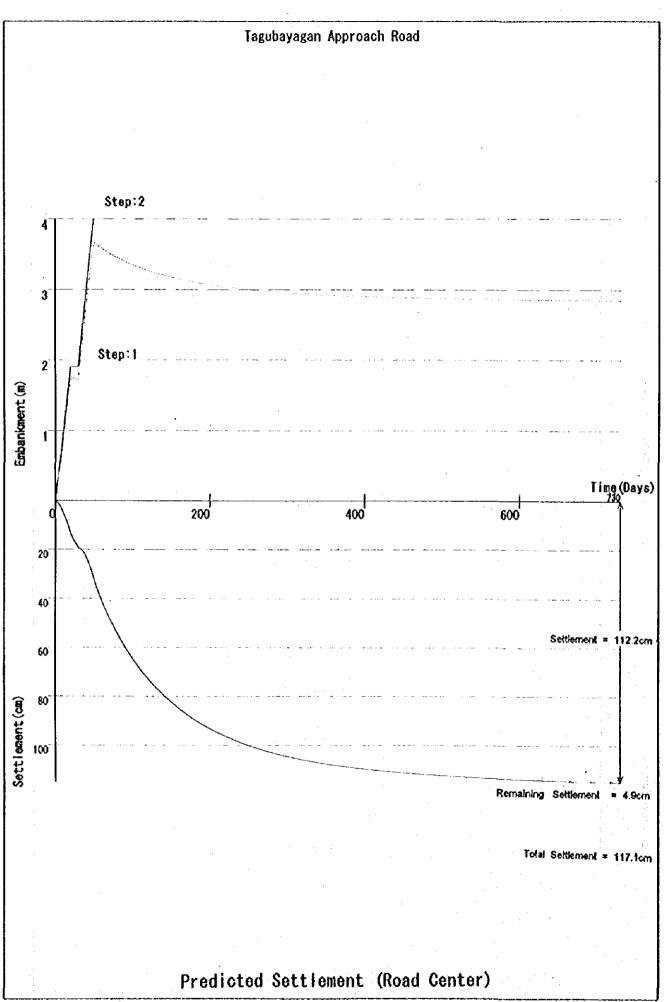
(m) (m) (m) (tf·m) (tf·m)	Ction Cohesion (rf/m²) 0.50 0.90 0.50 0.50 0.50 0.50 0.50 0.50	100
1. 293 44. 00 14. 00 29. 50 2871. 64 2220. 48	aity Angle (degres) (degres) (00 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	00
		0 80
μ×≻αξέ	Layers Density (cf/m²) 1.800 1	0,00
Scale : 1 / Minimum Safety Factor Center of Circle Coordinates Radius Resisting Moment Overturning Moment	MO. 02 12 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	STABILITY ANALYSIS
		40 STABILITY
m 10.0m, h = 2.0m		30
11 -1 6 11		2 0
Br. Embankment eight Embankn		10
Tagbayagan Br. Height of Embankment H Counter Weight Embankment		•
Tag Peig Peig	i l l l l l l l l l l l l l l l l l l l	



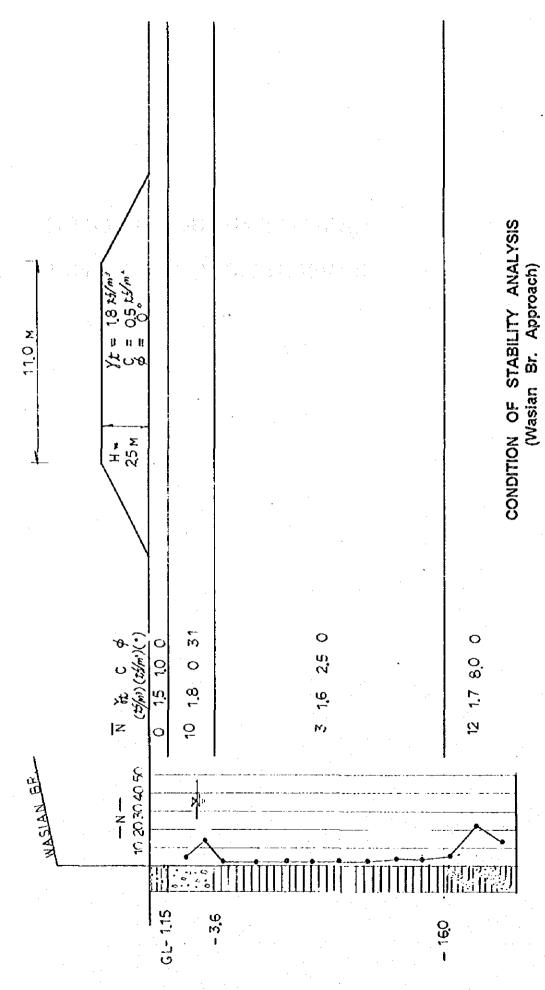
App. 8.7-16



App. 8.7-17



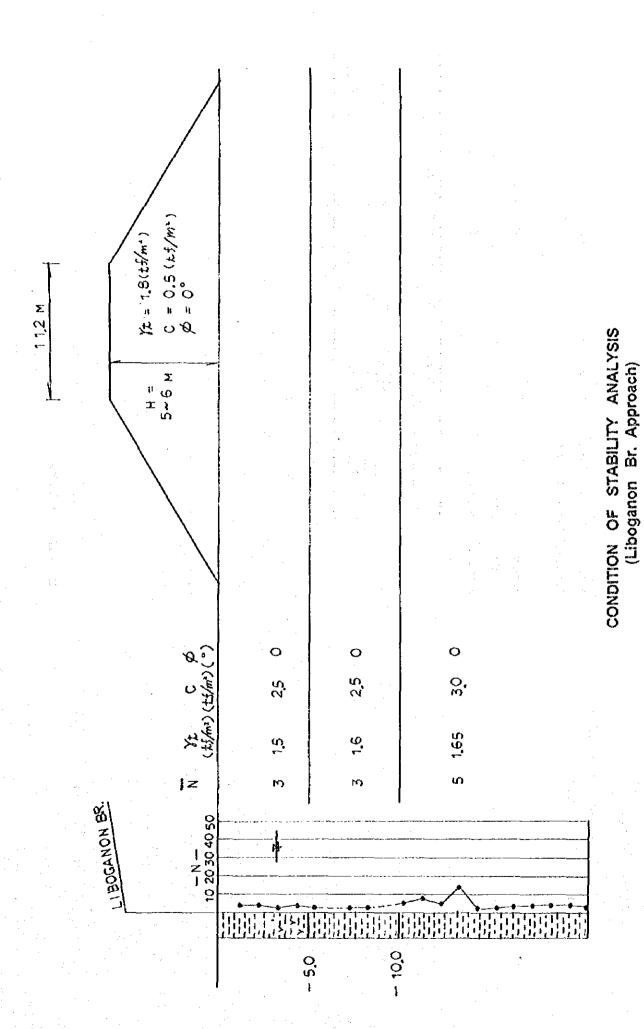
## WASIAN BRIDGE APPROACH SLOPE STABILITY ANALYSIS



App. 8.7-20

Safety Factor Fs ircle Coordinates X  oment MR  Moment Mo  Moment Mo  2 2 1.500 3 1.800 3 1.800 5 1.700 5 1.700 5 1.700	um Safety Factor Fs r of Circle Coordinates X y sing Moment Ms ing Moment Mo iming Moment Mo  2 1.50 3 1.80 3 1.80 5 1.70 5 1.70 5 70 80 90	1.233 = 52.00 (m) = 6.00 (m)	0 0 0	ted Wet Internal Friction (tf. / Christian (degres) (de
	H=2.5m 2.0:1	Safety Factor Fs Circle Coordinates X	oment Moment	No. of Layers Dens (tf. (1.3) 3 1.38 3 1.38 3 1.38 1.38 1.38 1.38 1.3

# LIBOGANON BRIDGE APPROACH SLOPE STABILITY ANALYSIS

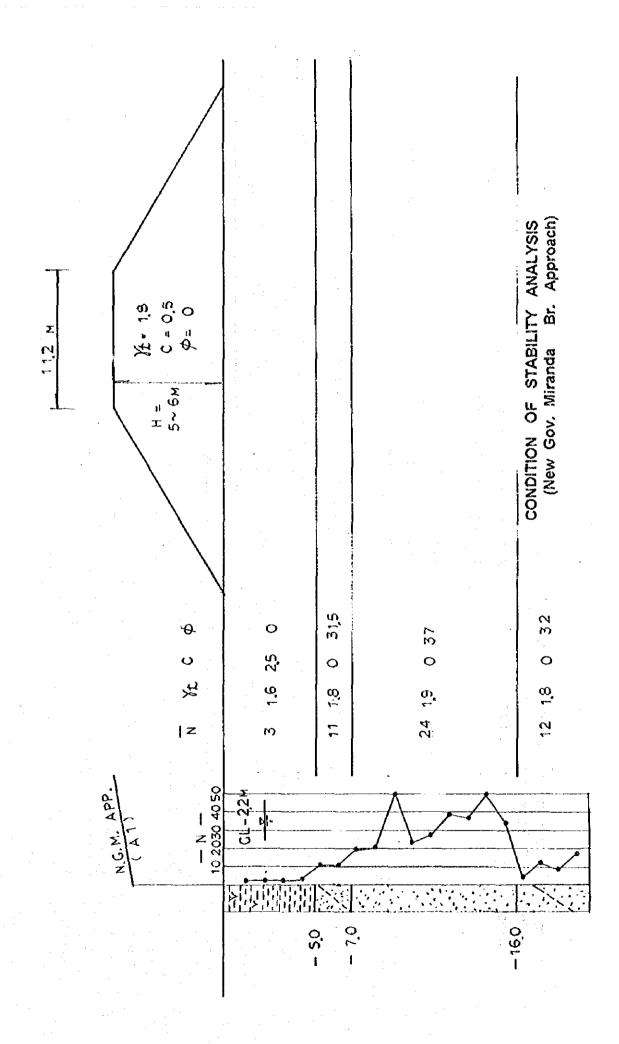


App. 8.7-23

	Safety Factor Fs WIN = 1.203 Circle Coordinates X = 56.00 (m)	Y == 12.00 (m)	R = 14,00 (m)	M <sub>R</sub> = 587, 59 (tf·m)	ent Mo =491, 25 (tf·m)	No.of Layers Density Density Angle Cohesion (t/m³) (t/m³) (degres) (t/m²)	
Scale	6.0 m Minimum Safety Center of Circle C	•	Radius	Resisting Moment	Overturning Moment	No.06	
Liboganon Br. Approach	Height of Embankment H = 6.0 Slope 2.5:1						

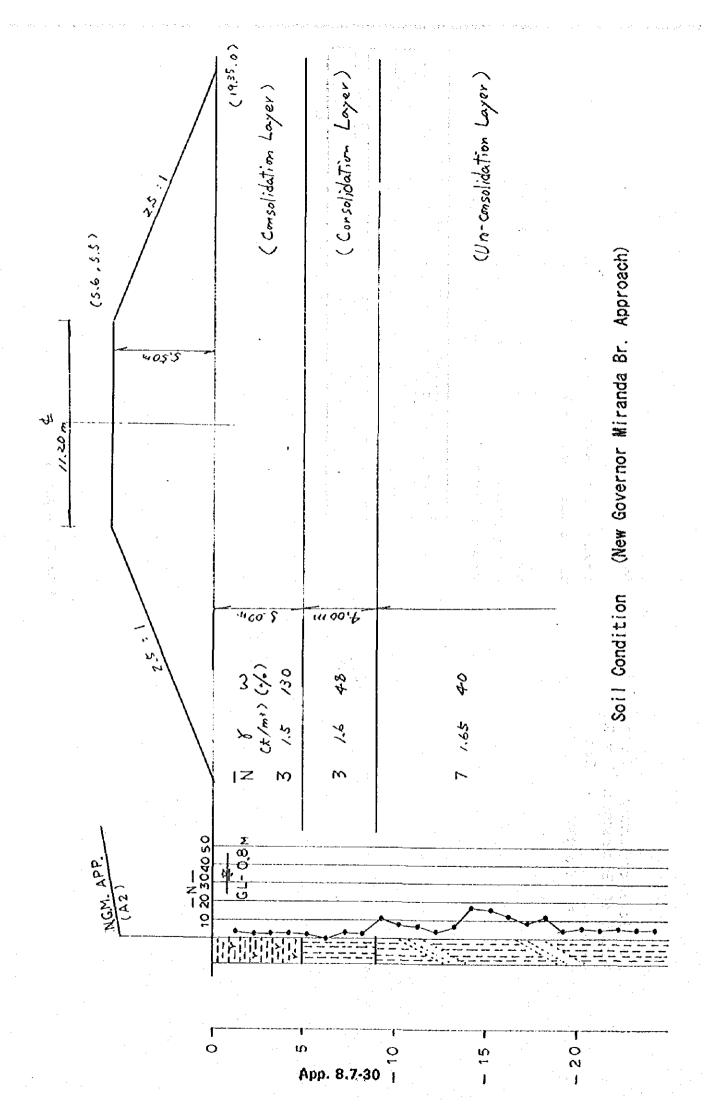
							Cohesion (ff/m²)	0.50	2.50	2.50	3.00	tt/m³)								
	1,344 56.00 (m)	8.00 (m)	0.00 (m)	2.75 (tf·m)	2. 41 (tf·m)	Internal Friction	Angle (degres)	0,0	0.0	0.0	0.0	Water Density = 1.000 (#/m²)				•		<b>.</b>		
7.1		u	11	(C)	-2 <del>6</del>	Wet	Density (ff/m³)	1.800	1.500	1,600	1.650	Water	, ,	9	8	ř		7	÷ ,	100
200	F X Set	<b>&gt;</b> -	œ	R R	Š	Saturated	Density (tf/m³)	1.800	1.500	1.600	1.650		;	2					-	90
	Minimum Safety Factor Center of Circle Coordinates			Resisting Moment	ng Moment		No.of Layers	<b>,</b>	2	ო	4	4					Angelon Company		-	70 ANALYSIS
Scale	Minimum Center of		Radius	Resisting	Overturning				1.	6						8	4		-	STABILITY
	-										1.5						{   		-	50
. 1									•										_	0 4
Liboganon Br. Approach	Embankment H	4								٠			· .		'       				<u>-</u>	08
iboganon l	<u>ទ</u>	9000												- (	11	on.	,	- [		20

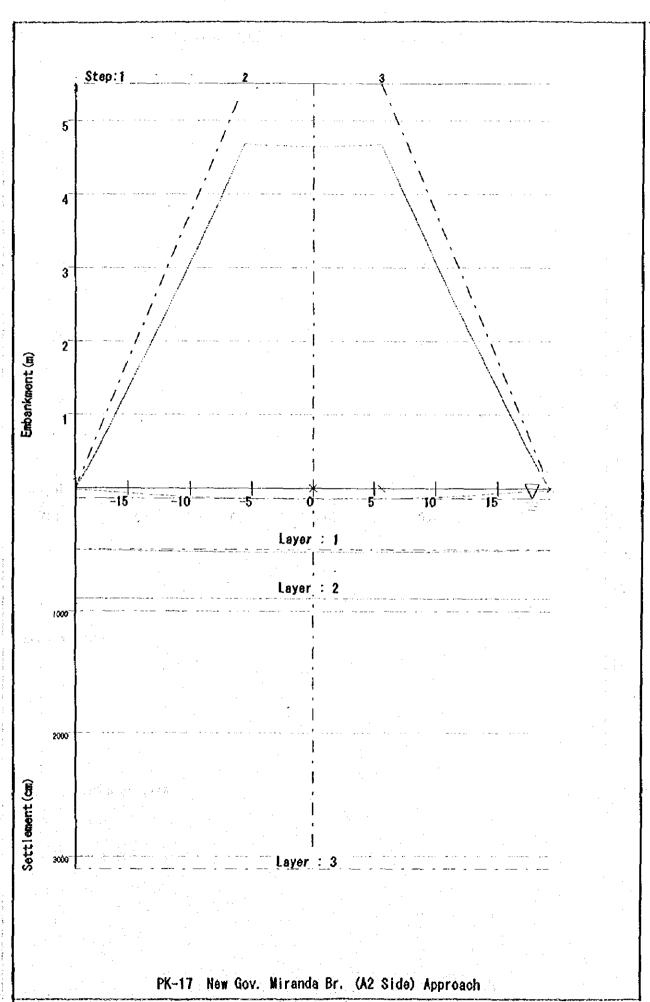
## NEW GOV. MIRANDA BRIDGE APPROACH SLOPE STABILITY AND SETTLEMENT ANALYSIS

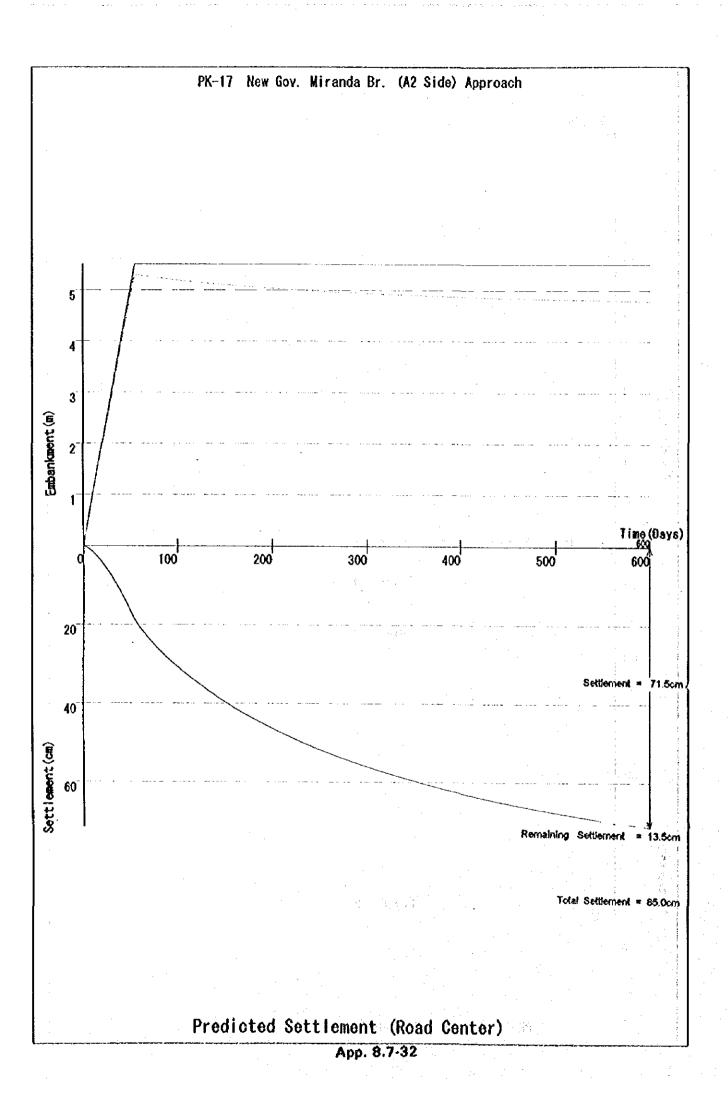


	Cohesion (tf/m²) 0.50 0.00 0.00 0.00 0.00 0.00 (tf/m²) (tf/m²)
1. 204 56. 00 (m) 14. 00 (m) 16. 00 (m) 720. 02 (tf·m) 597. 88 (tf·m)	sity Angle (degres) (degres) (0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
	Wet Density (tf/m³) 1.800 1.800 1.800 1.000 Water
tes X	Saturated Density (tf/m³) 1.800 1.800 1.800 1.900 1.900 1.000
Scale ; 1 / Minimum Safety Factor Center of Circle Coordinates Radius Resisting Moment Overturning Moment	No.of Layers  1 2 2 3 3 3 4 4 4 4 4 5 5 7 ANALYSIS
Scale Minimum Center of Radius Resisting Overturning	00 (( ( / m <sup>2</sup> ) <sub>4</sub> , 6
Side Approach = 6.0m : 1	
£ ± 2,	
New Governor Miranda Height of Embankment Slope	- 47
New Goven Height of Slope	

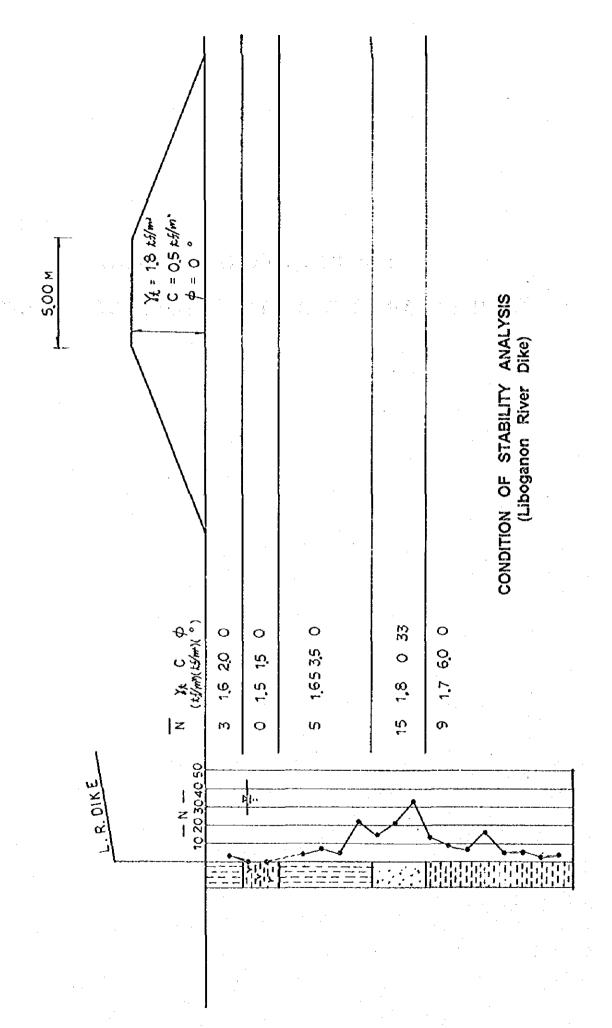
		Cobesion (tf/m²) 0.50 0.00 0.00 0.00 (tf/m³) (tf/m³)
	2.00 (m) 1.52 (tf·m) 9.74 (tf·m)	## Internal Friction Angle /m²) (degres) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.
- W	4 6 6	Wet (tf/m²) 1.800 1.800 1.800 1.800 1.800 1.800 Mater
() () () () () () () () () () () () () (	α Σ Σ α Ν Ι	Saturated Density (tf/m³) 3.800 2.600 1.800 1.800 1.800 1.00
Scale : 1 / Minimum Safety Factor F Center of Circle Coordinates X	Radius Resisting Moment Overturning Moment	No. of Layers  1 2 2 3 3 3 4 4 6 5 5 STABILITY ANALYSIS
Point s	α α ·o	
No. 1 Boring H = 5.0m 2:1		
New Governor Miranda Height of Embankment Slope Load = 0.5 t/m²		30 40
ZIVJ		







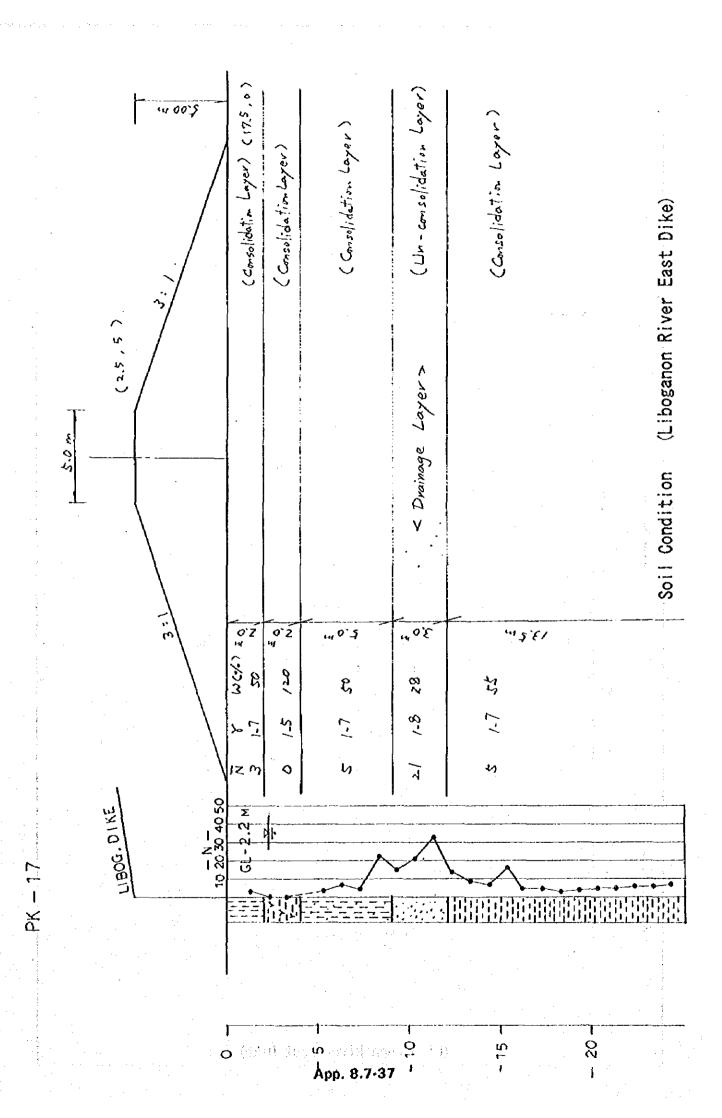
#### LIBOGANON RIVER DIKE SLOPE STABILITY AND SETTLEMENT ANALYSIS

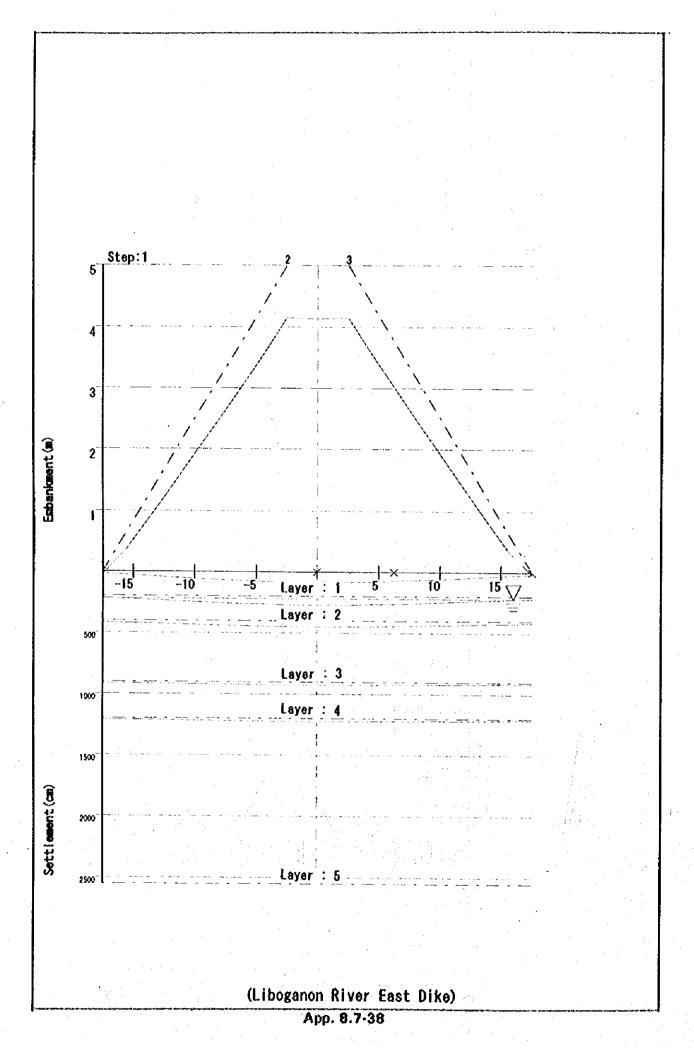


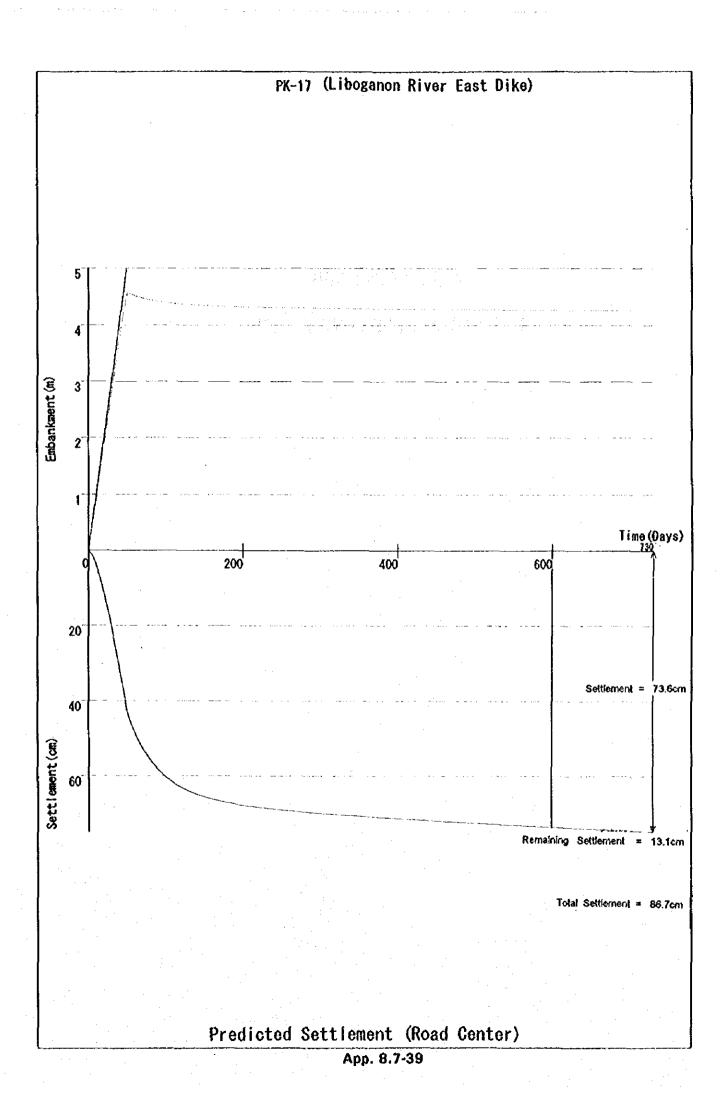
App. 8.7-34

		~			e.	(m· +	riction	Ŏ,	(4/m²/	-	 		00.00		3.50	10.00	0.50	1.000 (tf/m³)						
	1.210	54.00 (m)	14.00 (m)	18.00 (m)	783.78 (t	-647.83 (t	Wet ternal Friction	Density Angle	1 800 O O		1.500 0.0	_	1.800 33.00			1.650 0.0	1.800 0.0	Water Density =						
0 0	ν Σ Σ	×	II ≻-	li cc	M <sub>R</sub>	II Š	Saturated	Density	1 800	1.600	1.500	1.650	1.800	1.700	1.650	1.650	1.800		e.		2	_	0	
	Safety Factor	Center of Circle Coordinates			Moment	y Moment		No.of Layers	-	. 23	3	4	တ	မ	7	ω	တ					-	ANALYSIS	
Scale	Minimum	Center of		Radius	Resisting Moment	Overtuming				-/	/							]				-	STABILITY	
River East Dike Embankment H = 4.30m	Embankment L					2.		6			22.25					<b>1</b>	9			80				
Liboganon Rive	Š Š						•		-		•	2	0	_ <b>-</b>	### ### ### ### ### ### #### #### ######	-10 - 13		18	17					

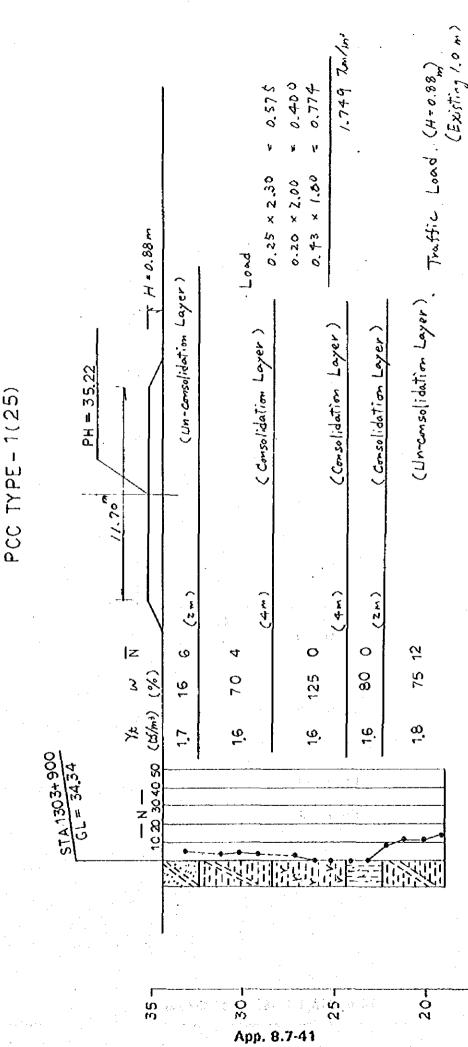
Height of	River East D Embankment	Scale	<b>.</b>	000			
Slope	<b>1</b>	Minimum Safety	sty Factor	       	1. 308	80	
		Center of Circle Coordinates		11 ×	56.	(m) 00	
				<b>1</b>	10.0	(w) 00	
***		Radius		`II	14. 0	(æ) 00	
· 		Resisting Moment	•	MR	547. 4	48 (tf·m)	
		Overturning Mo	Moment	Wo W	-418.6	68 (tf·m)	
1_		2		Saturated	Wet	ternal Friction	Ę
	<		No.of Layers	Density	Density	Angle	Cohesion
	6 /			(tf/m³)	(ft/m³)	(degres)	(t/m²)
			<b>Y</b> -	1.800	1.800	0.0	0.50
_1		4/6	7	1.600	1.600	0.0	2.00
			က	1.500	1.500	0.0	1.50
	72	2	4	1.650	1.650	0.0	3.50
	,		5	1.800	1.800	33.00	0.00
· ·	6	·	Ö	1.700	1.700	0.0	6.00
1		4	7	1.650	1.650	0.0	3.50
			œ	1.650	1.650	0.0	10.0
 	13	5	6	1.800	1.800	0.0	0.50
	\$-	9			Water Density	II	1.000 (tf/m³)
	1.7	<b>-</b>		<b>∞</b>	, w		
l	ō	8		°2 			
_ <b>!</b>				1		-	
:							
				_ (		1	
		STABILITY					







## STA. 1303+900 SETTLEMENT ANALYSIS

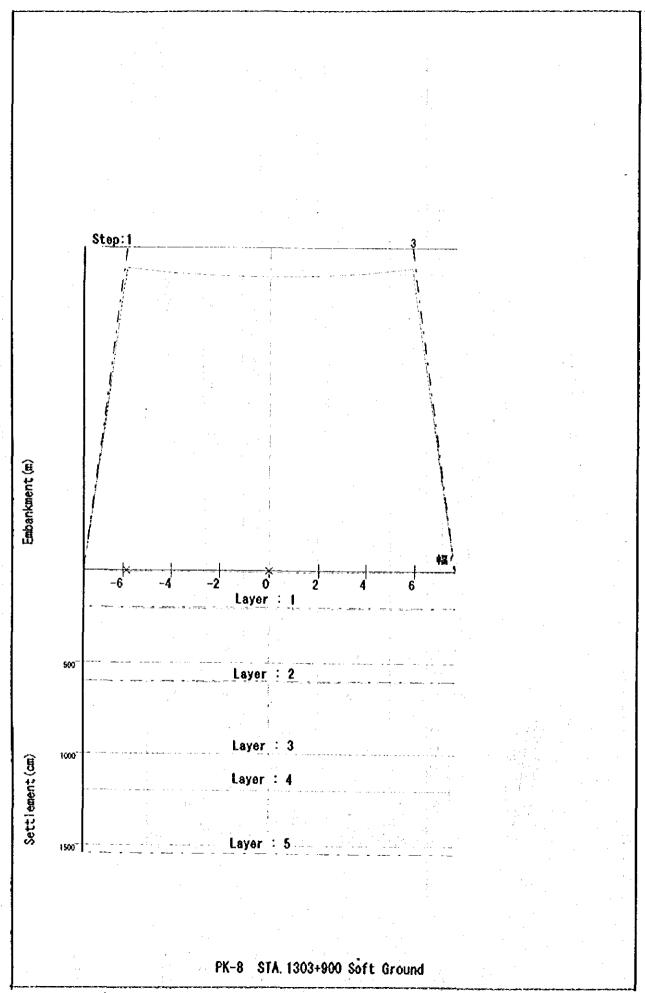


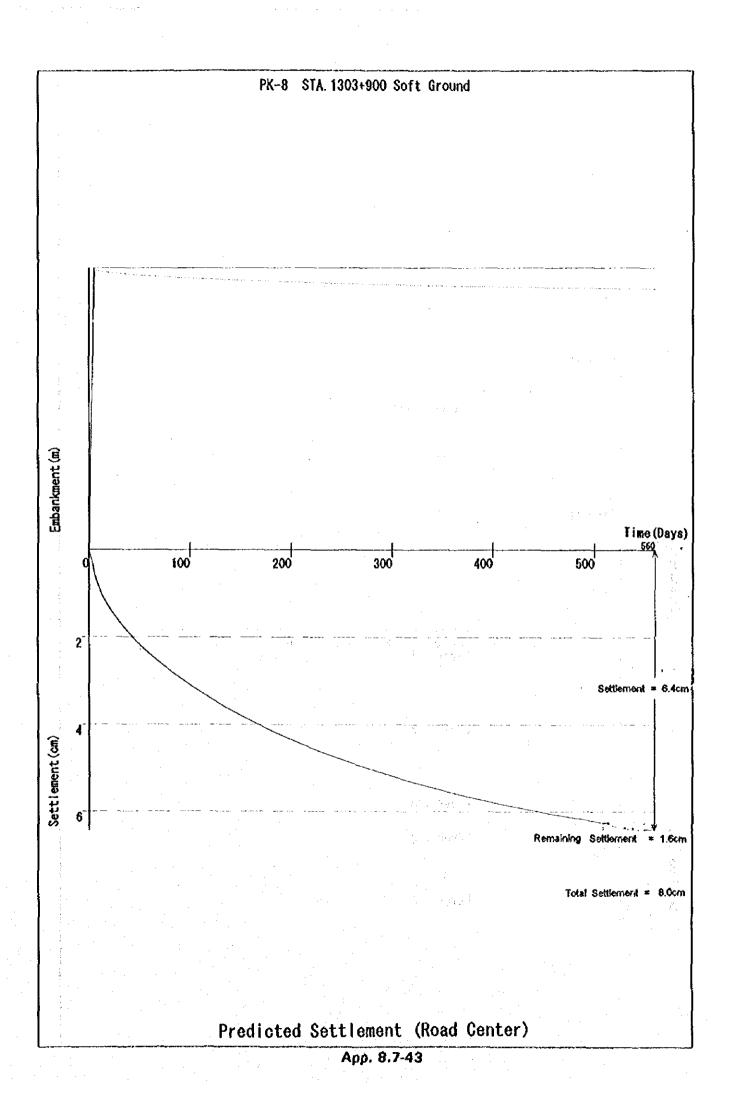
Soil Condition (STA. 1303+900 Soft Ground)

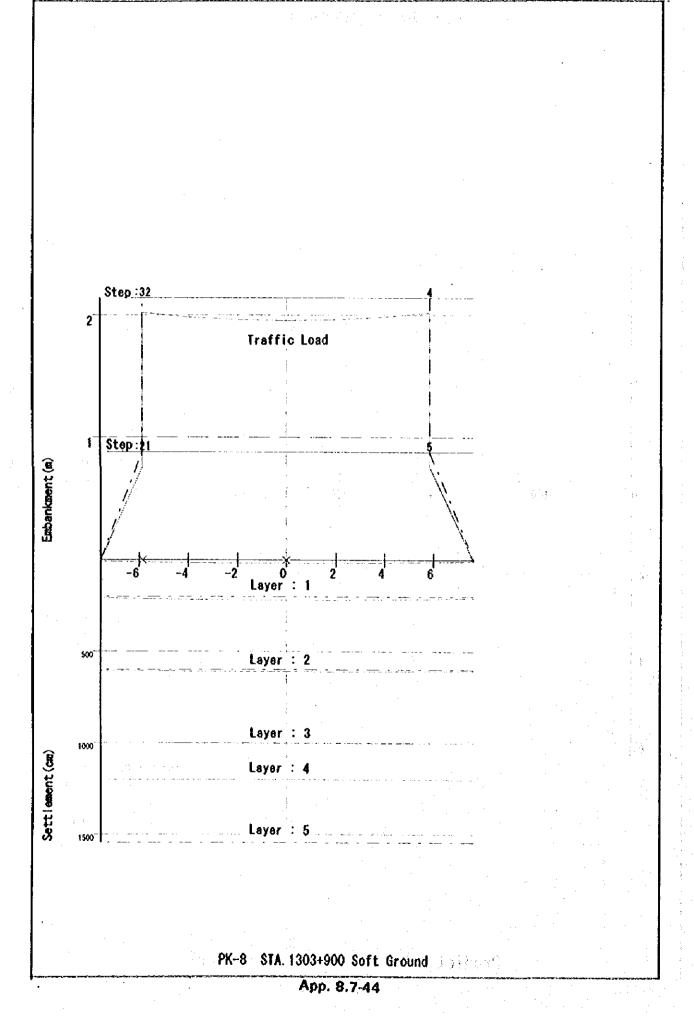
<u>.</u>

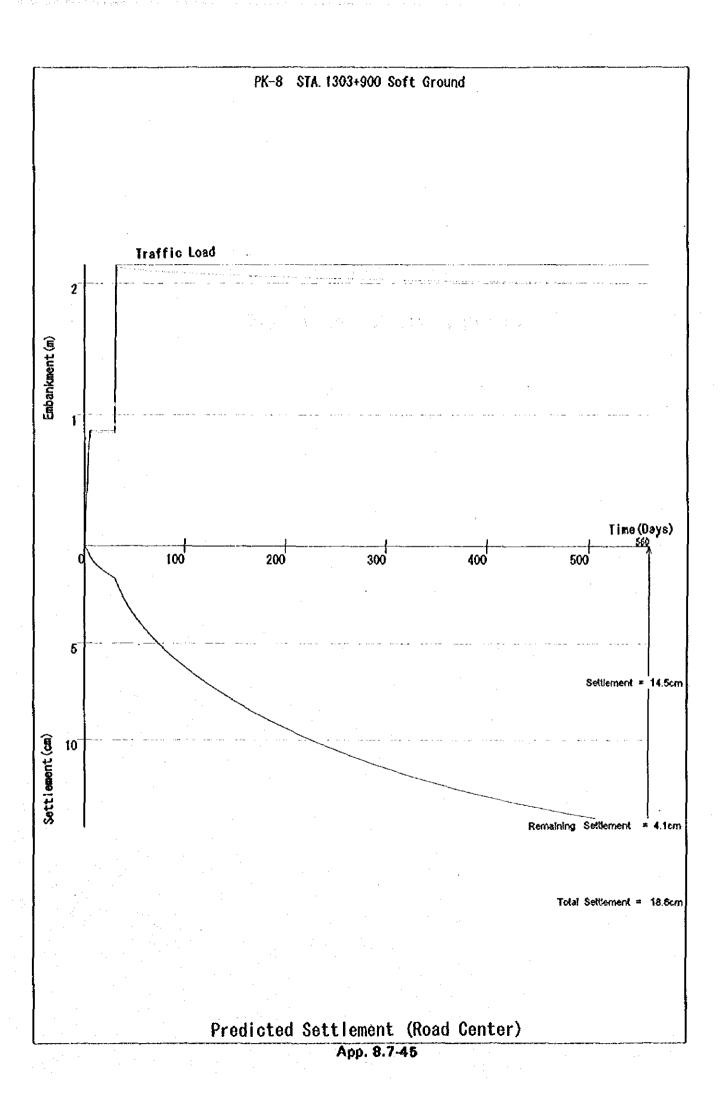
0 P - 4.25 Ten/m.

2.5 ton/100+

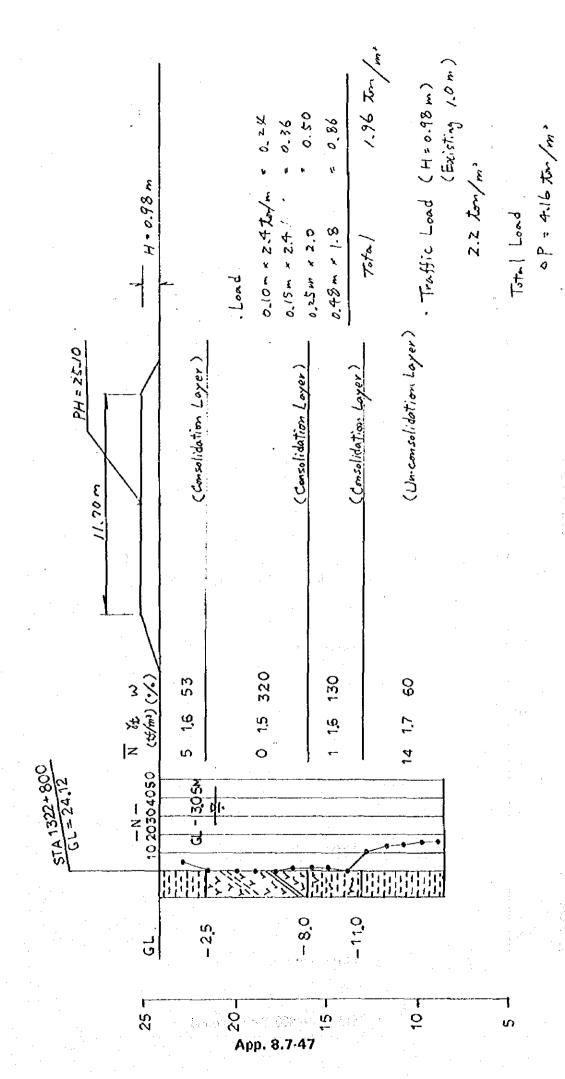




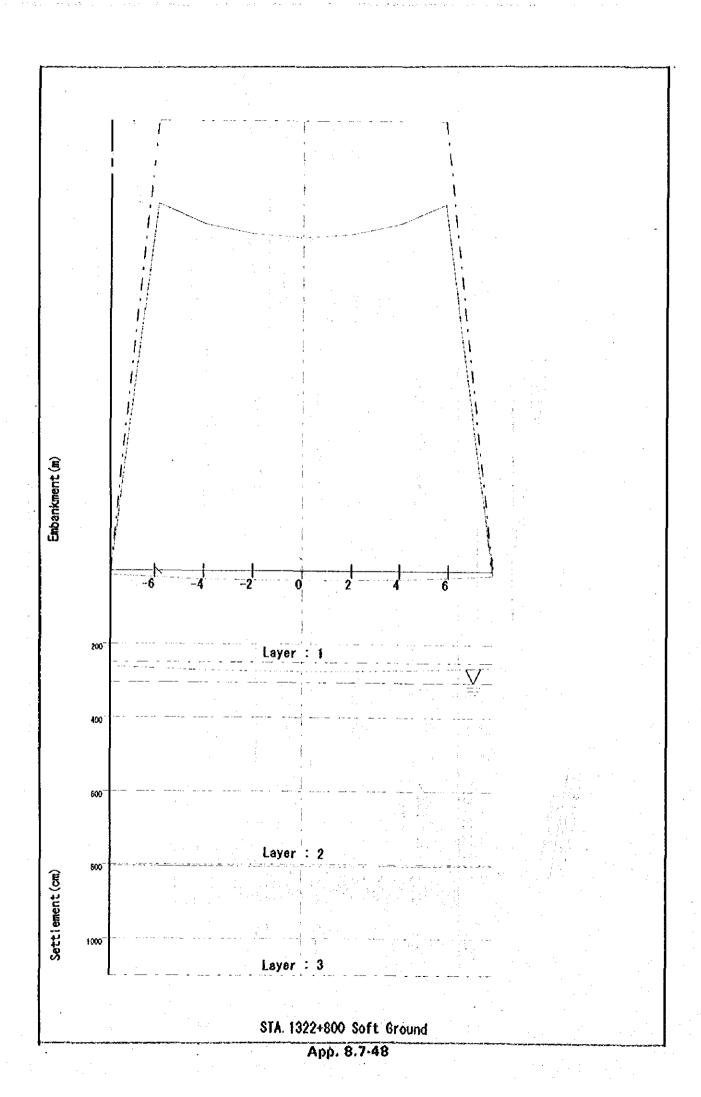


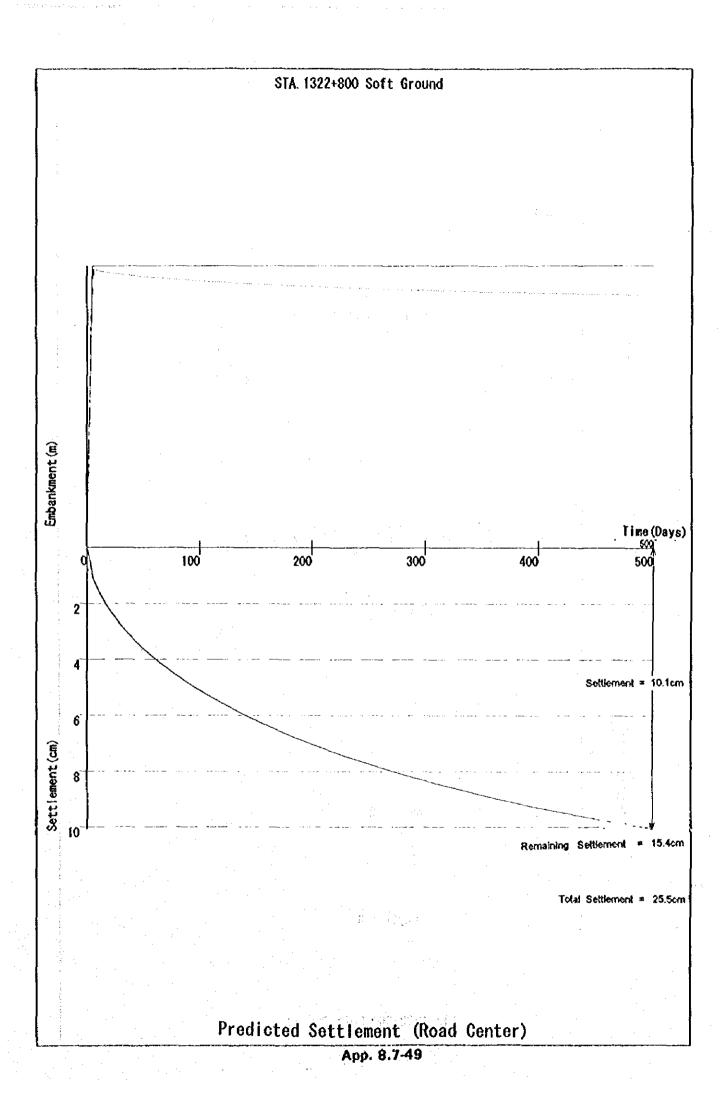


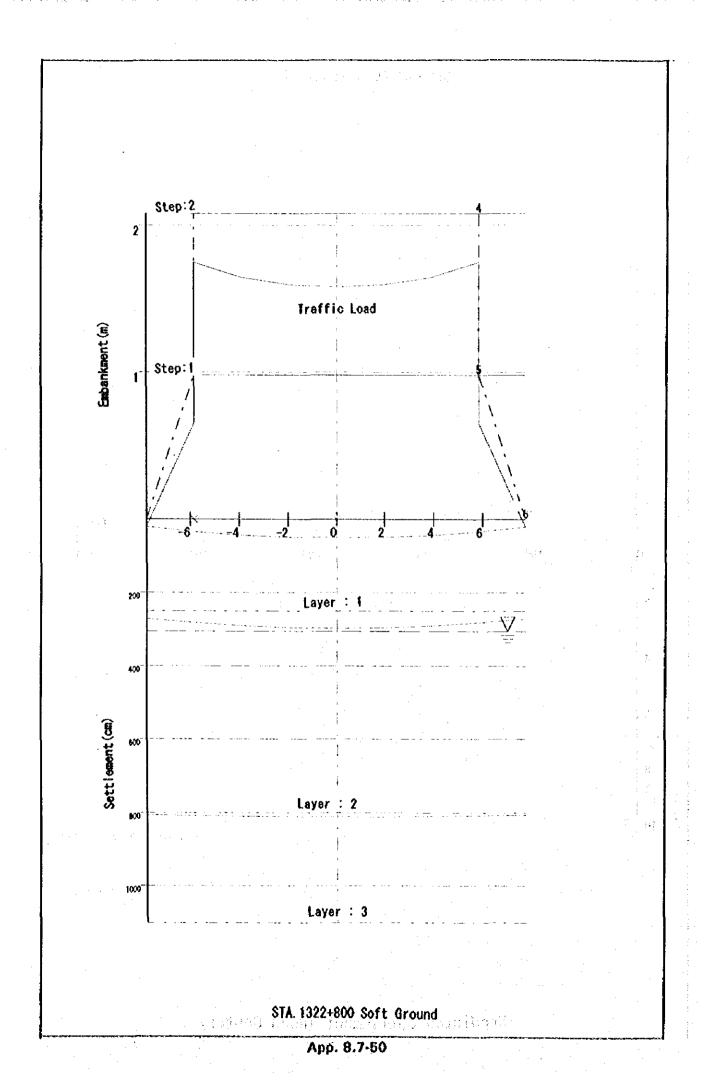
## STA. 1322+800 SETTLEMENT ANALYSIS

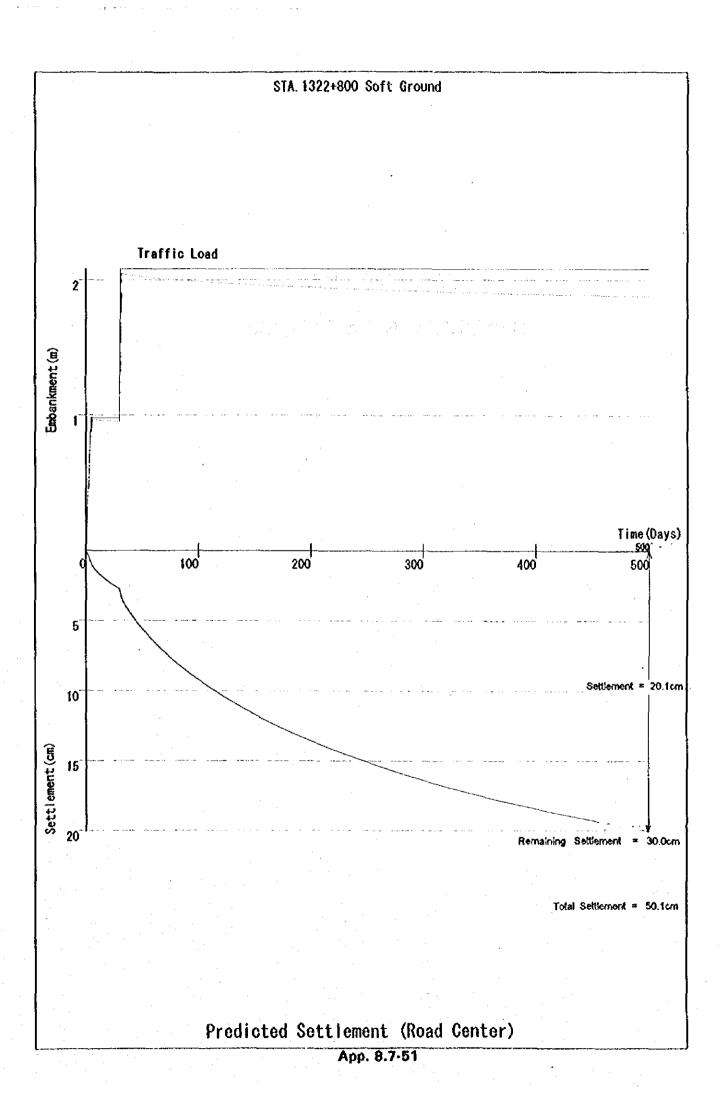


Soil Condition (STA. 1322+800 Soft Ground)

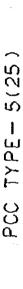


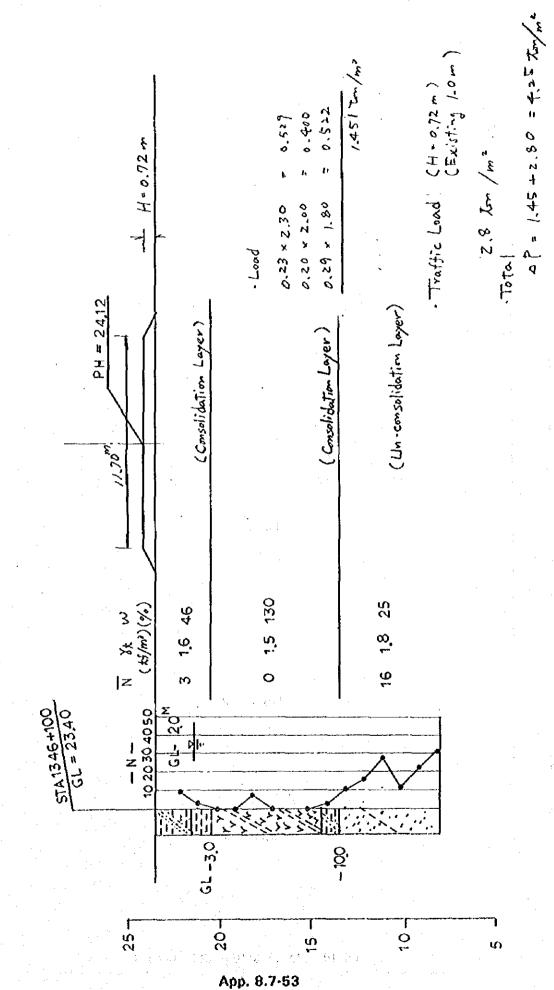




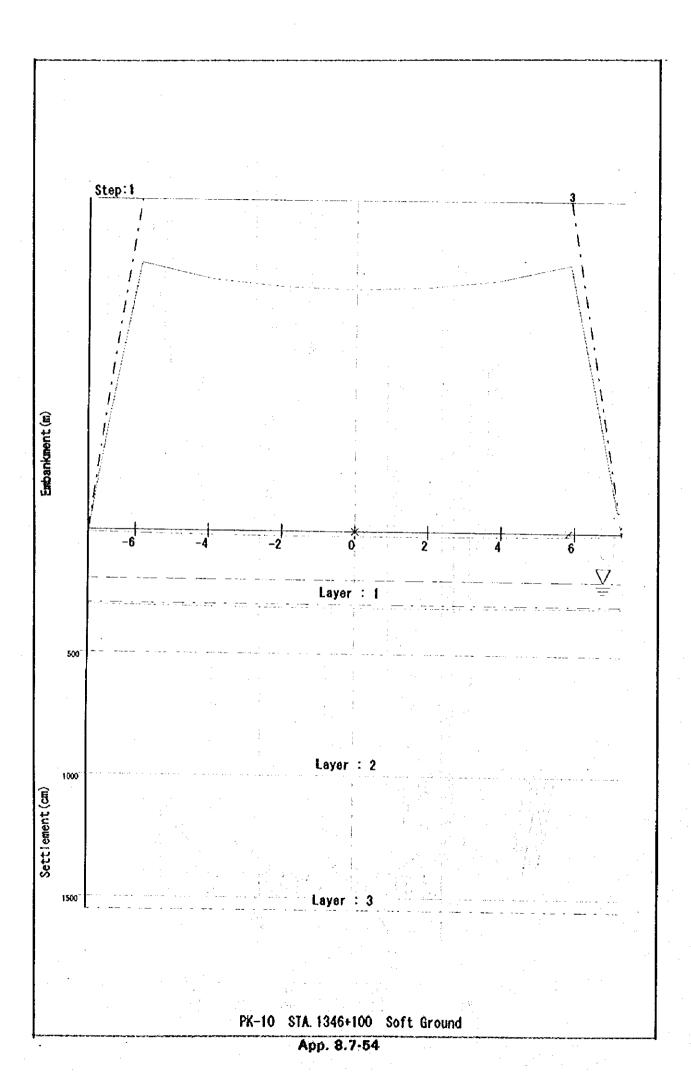


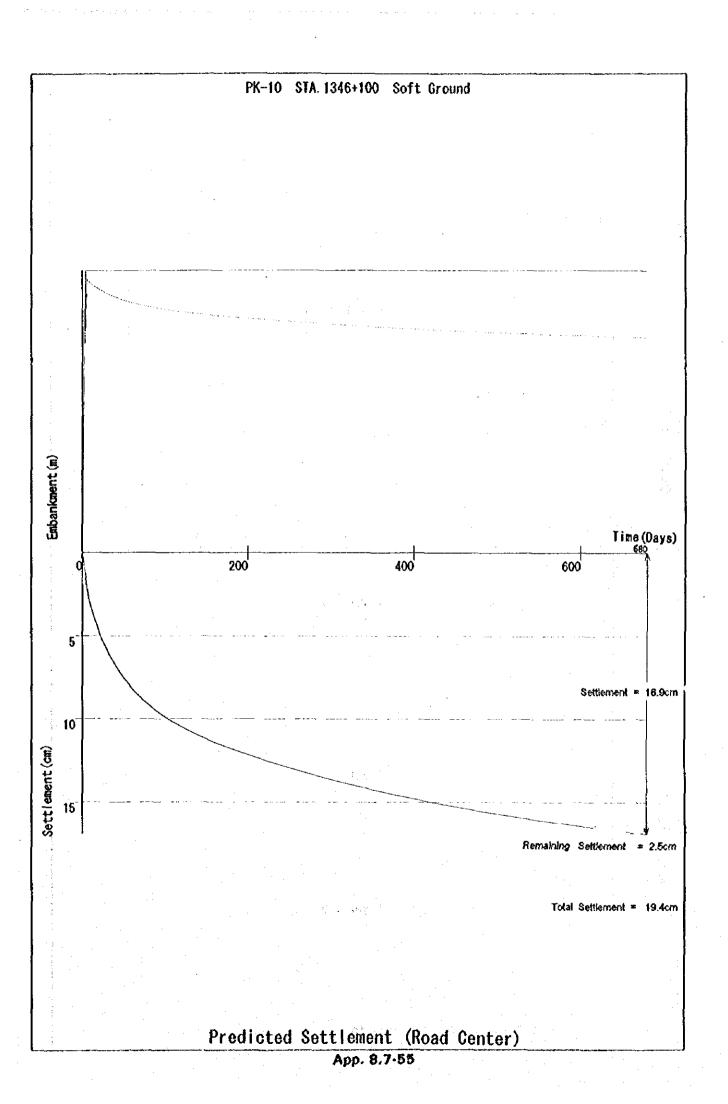
## STA. 1346+100 SETTLEMENT ANALYSIS

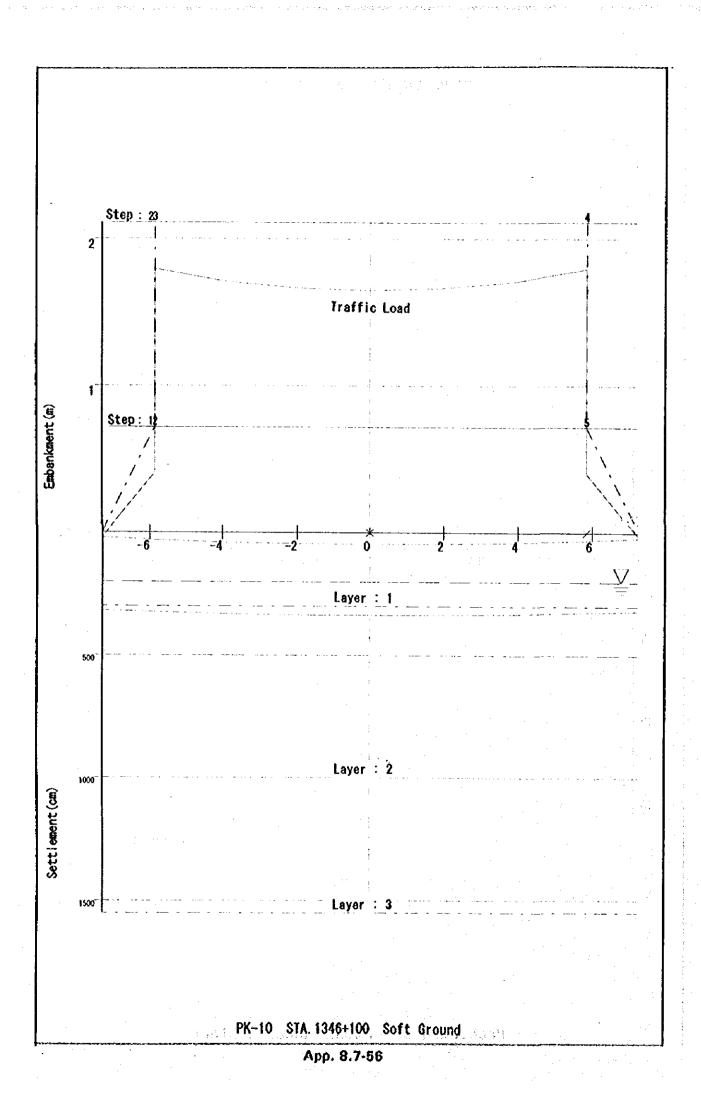


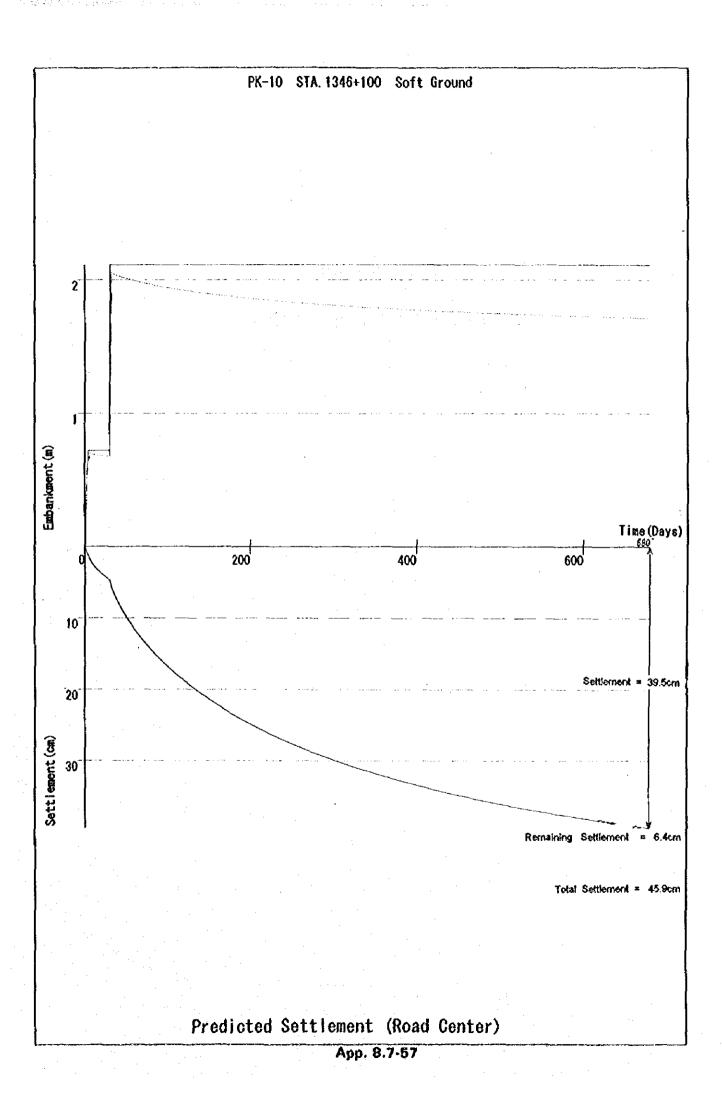


Soil Condition (STA, 1346+100 Soft Ground)









## STA. 1357+300 SETTLEMENT ANALYSIS

Soil Condition (STA. 1357+300 Soft Ground)

0P - 1.85 + 2.5 = 4.4 tor/1.

1.85 1

0.500 0.600

0.240

