

Table 4.9 PILE ARRANGEMENT (1/6)

NA MC	CROSS SECTION	WIDTH	SPAN	ORDER LENGTH	ORDER HEIGHT	LOAD TYPE	REACTION (kN)		No of PILE	PILE ARRANGEMENT		REMARKS	
							ST	ABU		ABUTMENT	PIER		
[1] [12] [13]		8.200	7.000	7.000	0.400	B.M., 70T	1	42.2	64.3	na=2.4 (4)			[1]
							2	0.0	0.0				
							3	40.0	40.0				
							4	82.2	174.3				
							5	18.6	33.3				
							6	100.8	157.6				
[2] [14]		8.200	8.000	8.000	0.450	B.M., 70T	1	52.8	105.6	na=2.5 (4)	same as above	same as above	[2]
							2	0.0	0.0				
							3	40.0	40.0				
							4	92.8	145.6				
							5	18.6	33.3				
							6	100.8	179.2				
[3] [15]		8.200	10.000	10.000	0.450	B.M., 70T	1	64.0	128.0	na=4.3 (6)	same as above	same as above	[3]
							2	0.0	0.0				
							3	40.0	40.0				
							4	104.0	172.0				
							5	18.6	33.3				
							6	124.6	205.3				
[4] [16]		8.200	15.000	15.000	0.600	B.M., 70T	1	103.3	206.7	na=5.0 (6)	same as above	same as above	[4]
							2	0.0	0.0				
							3	40.0	40.0				
							4	143.3	24.6				
							5	33.3	33.3				
							6	174.6	206.0				
[5] [18]		4.000	7.000	7.000	0.400	B.M., 70T	1	24.7	49.4	na=1.3 (2)	same as above	same as above	[5]
							2	0.0	0.0				
							3	20.0	20.0				
							4	44.7	69.4				
							5	10.4	8.0				
							6	55.1	78.0				
[6] [19]		4.000	8.000	8.000	0.500	B.M., 70T	1	33.1	66.3	na=1.3 (2)	same as above	same as above	[6]
							2	0.0	0.0				
							3	20.0	20.0				
							4	53.1	86.3				
							5	10.4	8.0				
							6	63.5	94.9				
[7] [20]		4.000	11.400	11.400	0.450	B.M., 70T	1	39.3	78.5	na=1.9 (4)	same as above	same as above	[7]
							2	0.0	0.0				
							3	20.0	20.0				
							4	59.3	98.5				
							5	18.7	18.0				
							6	78.1	117.2				
NOTES	<p>LOAD TYPE: B.M. 100T; WHEEL LOAD 10.0kN B.M. 70T; WHEEL LOAD 7.0kN PHUMAN/ANIMALS LOAD 0.35kN/m²</p> <p>1. DEAD LOAD 2. PERSON 3. LIVE LOAD 4. SUMMATION(1+2+3) 5. SELF WEIGHT 6. TOTAL</p> <p>na: required spacing for pier pp: required spacing for abutment (1): used numbers</p>												

Table 4.9 PILE ARRANGEMENT (2/6)

NA ME	CROSS SECTION	WIDTH	SPAN	BIRDER LENGTH	ORDER HEIGHT	LOAD TYPE	REACTION (k)		No of PILE	PILE ARRANGEMENT		REMARKS
							ST	ABUTMENT		ABUTMENT	PIER	
I - 2 (WITH)		10,000	11,400	11,900	0.500	B.M., 70T	1	92.0	185.0	na=2.5 (6)		[10]
							2	4.2	8.3			
							3	61.6	61.6			
							4	158.7	255.8			
							5	43.0	33.1			
							6	101.7	288.0			
II - 2 (WITH)		9,600	10,000	10,500	0.650	B.M., 70T	1	78.6	157.2	na=3.5 (4)		[11]
							2	3.5	6.9			
							3	40.0	40.0			
							4	122.1	204.2			
							5	21.8	18.0			
							6	143.9	222.2			
III - 2 (WITH)		9,000	11,400	11,900	0.650	B.M., 70T	1	80.3	160.6	na=4.0 (6)		[12]
							2	3.0	7.9			
							3	40.0	40.0			
							4	124.2	208.5			
							5	38.9	30.0			
							6	163.1	288.5			
IV - 2 (WITH)		9,600	11,850	12,350	0.500	B.M., 70T	1	87.7	175.4	na=4.2 (6)		[13]
							2	4.1	8.2			
							3	40.0	40.0			
							4	131.8	223.6			
							5	38.9	30.0			
							6	178.7	283.6			
V - 2 (WITH)		9,000	15,300	15,800	0.600	B.M., 70T	1	122.2	244.4	na=5.0 (6)		[14]
							2	5.2	10.5			
							3	40.0	40.0			
							4	167.4	294.9			
							5	38.9	30.0			
							6	206.3	324.9			
NOTES	<p>LOAD TYPE B.M. 100T-WHEEL LOAD 10.0M B.M. 70T-WHEEL LOAD 7.0M P-HUMAN/ANIMALS LOAD 0.35M/m²</p> <p>1. DEAD LOAD 2. PERSON 3. LIVE LOAD 4. SUMMATION (1+2+3) 5. SELF WEIGHT 6. TOTAL</p> <p>na: required figure for pier. na: required figure for abutment (): total members</p>											

Table 4.9 PILE ARRANGEMENT (3/6)

NA ME	CROSS SECTION	WIDTH	SPAN	GIRDER LENGTH	GIRDER HEIGHT	LOAD TYPE	REACTION (k)		No. of PILE	PILE ARRANGEMENT		REMARKS
							ABUTMENT	PIER		ABUTMENT	PIER	
B1M-4 B1M-5 (PARTICULAR)		12.200	8.000	8.400	0.650	B.M.	1	75.9	4.1 (6)			[15]
							2	0.0				
							3	67.5				
							4	141.4				
							5	27.7				
							6	169.1				
B2M-11 B2M-12 1 3 (PARTICULAR)		12.200	13.000	13.500	0.550	B.M.	1	116.7	6.8 (6)	same as above	same as above	[16]
							2	0.0				
							3	76.9				
							4	193.6				
							5	60.5				
							6	243.1				
B3M-4 B3M-5 (PARTICULAR)		12.200	9.100	9.600	0.450	B.M.	1	84.4	4.2 (5)			[17]
							2	0.0				
							3	60.0				
							4	144.4				
							5	27.7				
							6	172.1				
B4C-3 B4C-4 B4C-5 B4C-7 (PARTICULAR)		6.600	7.000	7.300	0.400	B.M.	1	30.9	2.1 (3)	same as above		[18]
							2	0.0				
							3	40.0				
							4	70.9				
							5	15.0				
							6	85.9				
B5C-3 B5C-4 B5C-5 B5C-7 (PARTICULAR)		6.600	8.000	8.400	0.650	B.M.	1	39.0	2.3 (3)	same as above	same as above	[19]
							2	0.0				
							3	40.0				
							4	79.0				
							5	15.0				
							6	94.0				
B7M-11		6.600	13.000	13.500	0.500	B.M.	1	64.7	3.2 (6)			[20]
							2	0.0				
							3	40.0				
							4	104.7				
							5	28.8				
							6	131.5				
B8M-5 B8M-4 B8M-8 B8M-9		6.600	15.000	15.800	0.600	B.M.	1	83.0	2.7 (6)	same as above	same as above	[21]
							2	0.0				
							3	40.0				
							4	123.0				
							5	26.8				
							6	149.8				
NOTES	LOAD TYPE B.M. 100T; WHEEL LOAD 10.0H B.M. 70T; WHEEL LOAD 7.0H P. HUMAN/ANIMALS LOAD 0.35T/m2 1. DEAD LOAD 2. PERSON 3. LIVE LOAD 4. SUMMATION (1+2+3) 5. SELF WEIGHT 6. TOTAL No. required figures for pier. No. required figures for abutment. (1) Load numbers											

Table 4.9 PILE ARRANGEMENT (4/6)

NAME	CROSS SECTION	WIDTH	SPAN	ORDER LENGTH	ORDER HEIGHT	LOAD TYPE	REACTION (k)		No. of PILE	PILE ARRANGEMENT		REMARKS
							ST	ABUTMENT		ABUTMENT	PER	
BNC-14 BNC-15		3,000	7,000	7,300	0.400	B.M. TOT	1	17.0	2		[29]	
							2	0.0				
							3	20.0				
							4	37.0				
							5	6.8				
							6	44.6				
BNC-11		3,000	8,000	8,400	0.650	B.M. TOT	1	22.0	2	same as above	[30]	
							2	0.0				
							3	20.0				
							4	42.0				
							5	6.8				
							6	48.8				
BNC-10		3,500	15,800	15,600	0.650	B.M. TOT	1	50.1	2		[31]	
							2	0.0				
							3	20.0				
							4	70.1				
							5	14.2				
							6	84.3				
							1	100.2				
							2	0.0				
							3	20.0				
							4	70.1				
							5	14.2				
							6	84.3				
							1	100.2				
							2	0.0				
							3	20.0				
							4	70.1				
							5	14.2				
							6	84.3				
							1	100.2				
							2	0.0				
							3	20.0				
							4	70.1				
							5	14.2				
							6	84.3				
NOTES							1	100.2				
							2	0.0				
							3	20.0				
							4	70.1				
							5	14.2				
							6	84.3				
LOAD TYPE B.M. TOT=WHEEL LOAD 10.0H B.M. TOT=WHEEL LOAD 7.0H P/HUMAN/ANIMALS LOAD 0.355/1m2							1. DEAD LOAD 2. PERSON 3. LIVE LOAD 4. SUMMATION (1+2+3) 5. SELF WEIGHT 6. TOTAL		max. imposed figure for pier max. imposed figure for abutment (1) used elsewhere			

Table 4.9 PILE ARRANGEMENT (5/6)

NA ME	CROSS SECTION	WIDTH	SPAN	ORDER LENGTH	ORDER HEIGHT	LOAD TYPE	REACTION (K)		No. of PILE	PILE ARRANGEMENT		REMARKS
							ST ABUTMENT	PER		ABUTMENT	PER	
[BNC-16, BNC-17]		2.500	7.000	7.300	0.350	P	1	9.8	19.6	na=0.4 (2)		[22]
							2	2.4				
							3	0.0				
							4	12.3				
							5	5.7				
							6	18.0				
[BNC-8]		2.500	8.000	8.400	0.350	P	1	11.3	22.6	na=0.5 (2)	same as above	[23]
							2	2.8				
							3	0.0				
							4	14.1				
							5	5.7				
							6	19.8				
[BNC-9]		2.500	11.000	11.500	0.400	P	1	17.2	34.5	na=0.7 (2)	same as above	[24]
							2	3.8				
							3	0.0				
							4	21.1				
							5	5.7				
							6	26.8				
[BCM-4, BCM-6, BCM-7]		2.500	11.600	12.150	0.450	P	1	20.1	40.2	na=0.7 (2)	same as above	[25]
							2	4.0				
							3	0.0				
							4	24.1				
							5	5.7				
							6	29.8				
[BCM-7, BCM-8, BCM-9]		2.500	12.100	12.600	0.450	P	1	20.8	41.7	na=0.7 (2)	same as above	[26]
							2	3.1				
							3	0.0				
							4	23.9				
							5	5.7				
							6	29.6				
[BCM-4]		2.500	14.100	14.600	0.450	P	1	21.3	42.6	na=0.8 (2)	same as above	[27]
							2	4.9				
							3	0.0				
							4	26.2				
							5	5.7				
							6	34.9				
[BCM-3]		2.500	15.300	15.800	0.500	P	1	24.5	49.0	na=0.9 (2)	same as above	[28]
							2	5.3				
							3	0.0				
							4	29.7				
							5	5.7				
							6	35.4				
NOTES	LOAD TYPE 8.M 70T:WHEEL LOAD 10.0H 8.M 70T:WHEEL LOAD 7.5H P-HUMAN/ANIMALS LOAD 0.35K/M2							1. DEAD LOAD 2. PERSON 3. LIVE LOAD 4. SUMMATION (1+2+3) 5. SELF WEIGHT 6. TOTAL		na: not required figure per foot. per required figure for abutment (2): used numbers.		

1 2 (PEDESTRIAN)

Table 4.10 POSITION OF BEARING STRATUM (1/3)

BRIDGE	POSITION OF BEARING LAYER			REMARKS
	STRUCTURE	N>20,D=(M)	N>30,D=(M)	
KAMAL				
KSC-9		15		10 TO 16M
BKM 1	KM 2	15		
KSC-8		12		10 TO 16M
BKM 2	KM 9-2	12		
KSC-7	(B-1)	10	34	10 TO 16M
BKM 3	KM 11-1	10		
BKM 4	KM 15	10		
KSC-6		10		10 TO 14M
BKM 5	KM 17-2	12		
KSC-5		13		10 TO 14M
KSC-4	(B-2)	11	13 /24	10 TO 14M
KSC-3		8	8	10 TO 14M
BKM 6	KM 19	9		
BKM 7	KM 20	9		
BKM 8	KM 21-2	9		
KSC-2		9		9 TO 10M
BKM 9	KM 22-3	10		
BKM 10	KM 22-4	10		
BKM 11	KM 23-2	10		
KSC-1		10		9 TO 10M
KAMAL	(BRANCH)			
KSC-4	(B-2)	9	13	7 TO 19M
KSC-12		7		7 TO 19M
BKE 1	KE 1-1	8		
BKE 2	KE 2	9		
BKE 3	KE 3-2	10		
BKE 4	KE 4	11		
KSC-13		11		7 TO 19M
BKE 5	KE 5	11		
BKE 6	KE 6	11		
BKE 7	KE 7	11		
BKE 8	KE 9	11		
BKE 9	KE 10-1	11		
BKE 10	KE 12	11		
BKE 11	KE 14	10		
BKE 12	KE 15-1	10		
BKE 13	KE 15-2	10		
KSC-14		10		7 TO 19M
BKE 14	KE 16	13		
KSC-15		15		7 TO 19M
BKE 15	KE 17-1	16		
BKE 16	KE 18	16		
BKE 17	KE 19	16		
BKE 18	KE 20-1	16		
KSC-16		16		7 TO 19M
BKE 19	KE 22	14		IN-SITU SLAB BR
BKE 20	KE 24-1	12		IN-SITU SLAB BR
KSE-17		9		7 TO 19M

Table 4.10 POSITION OF BEARING STRATUM (2/3)

NO OF; BRIDGE	POSITION OF BEARING LAYER		REMARKS	
	STRUCTURE	N>20,D=(M)		N>30,D=(M)
TANJUNGAN				
TSC-5		17		9TO17M
BTM 1	TM 1	15		
TSC-4		15		9TO17M
BTM 2	TM 2-1	12		
TSC-1	(A-11)	10	14	9TO17M
BTM 3	TM 3-4	11		
TSC-2		12		9TO17M
BTM 4	TM 5	10		
BTM 5	TM 6	9		
TSC-3		9		9TO17M
PIK JUNCTION				
NSC-1		8		8TO11M
BNM 1	NM 5-1	9		
BNM 2	NM 8	10		
NSC-3		11		8TO11M
BNM 3	NM 11	11		
BNM 4	NM/NEW	11		NEWLY ADDED
NSC-4		11		8TO11M
SARURAN CENGKARENG				
BCM 1	CM 1-4	5		
CSC-9	(D-1)	5	12	5 TO 9 M
BCM 2	CM 3	5		
BCM 3	CM 6	5		
CSC-8		5		5 TO 9 M
BCM 4	CM 7	6		
BCM 5	CM 9	7		
CSC-7		8		5 TO 9 M
BCM 6	CM 11	9		
CSC-6		10		5 TO 9 M
BCM 7	CM 13	9		
BCM 8	CM 15	8		
BCM 9	CM 16	7		
CSC-5		6		5 TO 9 M
BCM 10	CM 17-1	8		
CSC-4		9		5 TO 9 M
BCM 11	CM 18-4	8		
BCM 12	CM 19-1	7		
CSC-3		6		5 TO 9 M
BCM 13	CM 20	6		
CSC-2		5		5 TO 9 M
BCM 14	CM 22	7		
CSC-1		8		

Table 4.10 POSITION OF BEARING STRATUM (3/3)

NO OF BRIDGE	POSITION OF BEARING LAYER		REMARKS
	STRUCTURE	N>20,D=(M)	
GEDE/BOR			
KGSC-1	(O-1)	8	24
BGM 1	GM 1-2	8	
BGM 2	GM 1-4	8	
BGM 3	GM 5	8	
BGM 4	GM 6	8	
BGM 5	GM 7	9	
BGM 6	GM 8-1	9	
BGM 7	GM 9	9	
BGM 8	GM 10-2	9	
BGM 9	GM 11-2	9	
KGSC-2		9	9 TO 10 M
BGM 10	GM 13-1	7	
BGM 11	GM 14-1	6	
KGSC-5		6	9 TO 10 M
BGM 12	GM 15-1	6	

NOTE:

- 1) POSITION OF BEARING LAYER INDICATES THE PLACE PENETRATED 1 OR 2M WITH THE PILE TIP FROM THE STARTING OF THE LAYER OF 20 BLOWS OF 20N.
- 2) 1.5M SHALL BE ADDED TO THE DEPTH OF THE LAYER FOR THE PILE LENGTH.
- 3) THE POSITION OF COLOURED LINES IS THE LOCATION OF DUTCH CORN TEST.
- 4) THE DEPTH IN REMARKS INDICATE THE RANGE OF STARTING POSITIN OF BEARING LAYER IN EACH CHANNEL INDICATED BY GEOLOGIST OF THIS PROJECT.

Table 4.11 STANDARD OF GEOMETRIC ROAD ALIGNMENT

DESIGN SPEED (KM/H)	MAX. GRADE (%)	STANDARD MIN. RADIUS OF VERTICAL CURVATURE (M)		STANDER MIN. LENGTH OF VERTICAL CURVE (M)	APPLICATION
		(CREST)	(SAG)		
100	3	6500	3000	85	
80	4	3000	2000	70	
60	5	1400	1000	50	I -1, -2 AND -3.
50	6	800	700	40	II /III-1, -2 AND -3.
40	7	450	450	35	
30	8	250	250	25	III/IV-1, -2 AND -3
20	9	100	100	20	IV-1

NOTE: 1) THIS IS QUOTED FROM INDONESIAN GEOMETRIC DESIGN STANDERD.

2) THE ROAD CLASSES INDICATED IN APPLICATION COLUMN ARE RECOMMENDABLE.

Table 4.12 LENGTH OF APPROACH ROAD (1/8)

No of:	KAMAL	ROAD LENGTH											ENVIRONMENT			NOTE	
		UNIT:M											13	14	15		
		1	2	3	4	5	6	7	8	9	10	11					12
Bridge	FC	Width	BEL	EGE	D	I	LENTH	CREST	ST	SAG	TOTAL	RADIUS (CREST/SAG)	FIELD	RESIDENCE	RESIDENCE	RESIDENCE	
BKM 1	B	4.60	2.283	0.910	1.373	0.09	15.256	15.256	0.000	15.256	30.512	266.229	S.T.ROAD	RESIDENCE	THREE INTER	S.P	FEW TRAFFIC
BKM 2	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	EXCLUDED
BKM 3	B	(7.0) 9.60	2.647	0.850	1.797	0.06	29.950	[30.56] 29.950	0.000	29.950	[60.51]* 59.900	[800][700] 783.976	FIELD S.T.ROAD	RESIDENCE	THREE INTER	R.W	MUCH TRAFFIC
BKM 4	P	2.50	2.81	0.680	2.130	0.1	21.300	-	21.300	-	21.300	-	FIELD S.T.ROAD	RESIDENCE	THREE INTER	S.A	-
BKM 5	B	(7.0) 9.60	3.059	1.900	1.159	0.06	19.317	[30.560] 19.317	0.000	[26.740] 19.317	[57.300]* 38.034	[800][700] 505.645	RESIDENCE C.ROAD	RESIDENCE	C.ROAD	R.W	MUCH TRAFFIC
BKM 6	P	2.50	2.999	1.430	1.569	0.1	15.690	-	15.690	-	15.690	-	RESIDENCE	RESIDENCE	RESIDENCE	S.A	CROWDED RESIDENCE
BKM 7	P	2.50	3.057	0.970	2.087	0.1	20.870	-	20.870	-	20.870	-	RESIDENCE	RESIDENCE	RESIDENCE	S.A	-
BKM 8	B	4.60	3.166	1.060	2.106	0.09	23.400	20.000	3.400	20.000	43.400	349.016	RESIDENCE S.T.ROAD	RESIDENCE	S.T.ROAD	R.W	FEW TRAFFIC
BKM 9	P	2.50	3.185	1.610	1.575	0.1	15.750	-	15.750	-	15.750	-	RESIDENCE	RESIDENCE	RESIDENCE	S.A	-
BKM 10	B	(7.0) 9.60	3.366	2.180	1.186	0.06	19.767	[30.560] 19.767	0.000	[26.740] 19.767	[57.300]* 39.534	[800][700] 517.424	RESIDENCE THREE INTER	RESIDENCE	INTER	R.W	HEAVY CARS
BKM 11	B	(7.0) 9.60	3.716	2.140	1.576	0.06	26.267	[30.560] 26.267	0.000	[26.740] 26.267	[57.300]* 52.534	[800][700] 687.569	RESIDENCE S.T.ROAD	RESIDENCE	THREE INTER	R.W	HEAVY CARS

Table 4.12 LENGTH OF APPROACH ROAD (2/8)

No of:	KAMAL(BRANCH)	ROAD LENGTH											ENVIRONMENT			NOTE	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14		15
BKE 1	B	3.00	IV	3.182	1.440	1.742	0.09	19.356	19.356	0.000	38.712	337.816	RESIDENCE S.T ROAD	RESIDENCE S.T ROAD	R.W	CROWDED RE. FEW TRAFFIC	
BKE 2	B	4.60	IV	3.450	1.920	1.530	0.09	17.000	17.000	0.000	34.000	296.697	RESIDENCE NEW ROAD	RESIDENCE RAMP	R.W	LIGHT CARS FEW TRAFFIC	
BKE 3	(SK) B	6.60	III/IV	3.553	2.160	1.393	0.08	17.413	17.413	0.000	34.826	341.893	RESIDENCE C.ROAD	RESIDENCE C.ROAD	R.W	FEW TRAFFIC	
BKE 4	B	6.60	III/IV	3.649	1.820	1.829	0.08	22.863	22.863	0.000	45.726	448.901	RESIDENCE INTER	RESIDENCE S.T ROAD	R.W	FEW TRAFFIC	
BKE 5	B	6.60	III/IV	3.739	1.890	1.849	0.08	23.113	23.113	0.000	46.226	453.809	RESIDENCE INTER	RESIDENCE S.T ROAD	R.W	FEW TRAFFIC	
BKE 6	B	4.60	IV	3.772	1.920	1.852	0.09	20.578	20.000	0.578	40.578	349.056	RESIDENCE THREE INTER	RESIDENCE S.T ROAD	R.W	FEW TRAFFIC	
BKE 7	B	6.60	III/IV	3.831	1.820	2.011	0.08	25.138	25.000	0.138	50.138	490.859	RESIDENCE INTER	RESIDENCE S.T ROAD	R.W	FEW TRAFFIC	
BKE 8	B	2.50	IV	3.724	1.870	1.854	0.1	18.540	0.000	18.540	18.540		RESIDENCE S.T ROAD	THREE INTER	S.A	FEW TRAFFIC	
BKE 9	B	4.60	IV	3.903	2.360	1.543	0.09	17.144	17.144	0.000	34.288	299.210	RESIDENCE INTER	RESIDENCE S.T ROAD	R.W	FEW TRAFFIC	
BKE 10	B	6.60	III/IV	3.832	2.000	1.832	0.08	22.900	22.900	0.000	45.800	449.627	RESIDENCE THREE INTER	RESIDENCE S.T ROAD	R.W	FEW TRAFFIC	
BKE 11	B	4.60	IV	3.857	2.430	1.427	0.09	15.856	15.856	0.000	31.712	276.731	RESIDENCE S.T ROAD	RESIDENCE S.T ROAD	R.W	FEW TRAFFIC	

Table 4.12 LENGTH OF APPROACH ROAD (3/8)

No of.	KAMAL(BRANCH)	ROAD LENGTH											ENVIRONMENT			NOTE
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Bridge	FC	Width	BEL	E.G.E	D	I	LENTH	CREST	ST	SAG	TOTAL	RADIUS (CREST/SAG)	NORTH	SOUTH	P.T.M	
BKE 12	B	8.20	3.906	2.410	1.496	0.08	18.700	18.700	0.000	18.700	*	367.163	RESIDENCE THREE INTER	RESIDENCE S.T ROAD	R.W	MATCH TRAFFIC
BKE 13	B	8.20	3.918	2.670	1.248	0.08	15.600	15.600	0.000	15.600	31.200	306.296	RESIDENCE S.T ROAD	RESIDENCE S.T ROAD	R.W	MATCH TRAFFIC
BKE 14	B	3.00	3.954	1.750	2.204	0.09	24.489	20.000	4.498	20.000	44.498	349.056	RESIDENCE S.T ROAD	RESIDENCE S.T ROAD	R.W	FEW TRAFFIC CROWD RE.
BKE 15	B	3.00	4.031	1.900	2.131	0.09	23.678	20.000	3.678	20.000	43.678	349.056	RESIDENCE S.T ROAD	RESIDENCE S.T ROAD	R.W	FEW TRAFFIC CROWD RE.
BKE 16	P	2.50	4.034	1.870	2.164	0.1	4.3*	-	21.640	-	21.640	-	RESIDENCE	RESIDENCE	S.A	CROWD RE.
BKE 17	P	2.50	4.070	2.170	1.900	0.1	3.8*	-	19.000	-	19.000	-	RESIDENCE	RESIDENCE	S.A	CROWD RE.
BKE 18	B	4.60	4.198	2.050	2.148	0.09	23.867	20.000	3.867	20.000	43.867	349.056	RESIDENCE S.T ROAD	RESIDENCE S.T ROAD	R.W	FEW TRAFFIC CROWD RE.
BKE 19	B	4.60	2.380	2.380	-	-	-	-	-	-	-	LEVEL	RESIDENCE S.T ROAD	RESIDENCE S.T ROAD	-	FEW TRAFFIC CROWD RE.
BKE 20	B	4.60	2.630	2.630	-	-	-	-	-	-	-	LEVEL	RESIDENCE S.T ROAD	RESIDENCE THREE ROAD	-	FEW TRAFFIC CROWD RE.

Table 4.12 LENGTH OF APPROACH ROAD (4/8)

TANJUNGAN

No of:	ROAD LENGTH										ENVIRONMENT			NOTE		
	1	2	3	4	5	6	7	8	9	10	11	12	13		14	15
Bridge	FC	Width	B.E.L	E.G.E	D	I	LENGTH	CREST	ST	SAG	TOTAL	RADIUS (CREST)[SAG]	NORTH	SOUTH	P.T.M	
BTM 1	B	6.60	2.208	0.240	1.968	0.08	24.600	24.600	0.000	24.600	49.200	483.006	FIELD S.T.ROAD	FIELD S.T.ROAD	S.P	FEW TRAFFIC
BTM 2	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BTM 3	B	(8.00) 10.60	2.375	0.430	1.945	0.05	38.900	[44.565]* 38.900	0.000	38.900	[83.465] 77.800	[1400][1000] 1222.044	FIELD S.T.ROAD	FIELD S.T.ROAD	S.P	HEAVY CARS
BTM 4	B	12.20	2.375	0.310	2.065	0.06	34.417	34.417	0.000	34.417	68.834	901.008	FACTORY S.T.ROAD	FACTORY S.T.ROAD	R.W	NORMAL TRA.
BTM 5	(SK) B	12.20	2.413	0.390	2.023	0.06	33.717	33.717	0.000	33.717	67.434	882.683	FACTORY S.T.ROAD	FACTORY S.T.ROAD	R.W	NORMAL TRA.

PTK JUNCTION

No of:	ROAD LENGTH										ENVIRONMENT			NOTE		
	1	2	3	4	5	6	7	8	9	10	11	12	13		14	15
Bridge	FC	Width	B.E.L	E.G.E	D	I	LENGTH	CREST	STRAIGHT	SAG	TOTAL	RADIUS (CREST)[SAG]	NORTH	SOUTH	P.T.M	
BNM 1	B	8.20	3.612	1.850	1.762	0.06	28.767	[30.560] 28.767	0	28.767	[59.327]* 57.534	[800][700] 753.0960875	FIELD INTER	FIELD S.T.ROAD	S.P	HEAVY CARS
BNM 2	B	4.60	3.733	2.250	1.483	0.08	28.125	25	3.125	25	50.312	490.859375	FIELD RAMP	FIELD S.T.ROAD	R.W	FEW TRAFFIC
BNM 3	B	4.60	3.916	1.490	2.426	0.08	30.325	25	5.325	25	50.525	490.859375	FIELD RAMP	FIELD S.T.ROAD	R.W	FEW TRAFFIC
BNM 4	B	12.20	3.622	1.820	1.802	0.05	36.04	[44.568] 36.04	0	36.04	[80.608] 72.08	[1400][1000] 1132.1966	FIELD INTER	FIELD S.T.ROAD	S.P	FEW TRAFFIC

Table 4.12 LENGTH OF APPROACH ROAD (5/8)

No. of Bridge	ROAD LENGTH														ENVIRONMENT			NOTE
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	P.T.M		
	FC	Width	B.E.L	EDGE	D	I	LENTH	CREST	ST	SAG	TOTAL	RADIUS [CREST]SAG]	NORTH	SOUTH	P.T.M			
BCM 1	B	7 9.60	3.21	2.17	1.04	0.06	17.333	[30.560] 17.333	0	[26.740] 17.333	[57.320]* 34.666	[800]700] 453.711	FIELD S.T.ROAD	FIELD S.T.ROAD	S.P		MUCH TRAFFIC	
BCM 2	B	(7.00) 9.60	3.271	1.330	1.941	0.08	24.263	24.263	0	24.263	48.526	476	RESIDENCE S.T.ROAD	RESIDENCE S.T.ROAD	R.W		FEW TRAFFIC	
BCM 3	B	4.60	3.274	1.730	1.544	0.09	19.3	19.3	0	19.3	38.6	336.8	RESIDENCE THREE INT	RESIDENCE S.T.ROAD	R.W		FEW TRAFFIC	
BCM 4	P	2.50	3.056	1.680	1.376	0.1	13.76	-	13.76	-	13.76	-	RESIDENCE	RESIDENCE	S.A		CROWED RE. FEW TRAFFIC	
BCM 5	B	6.60	3.412	2.000	1.412	0.08	17.65	17.65	0	17.65	35.3	346.507	RESIDENCE THREE INT	RESIDENCE S.T.ROAD	R.W		FEW TRAFFIC	
BCM 6	B	6.60	3.401	1.600	1.801	0.08	22.513	22.513	0	22.513	45.026	441.978	RESIDENCE S.T.ROAD	RESIDENCE S.T.ROAD	R.W		FEW TRAFFIC	
BCM 7	P	2.50	3.404	0.840	2.564	0.1	25.64	-	25.64	-	25.64	-	RESIDENCE	RESIDENCE	S.A			
BCM 8	P	2.50	3.563	1.460	2.103	0.1	21.03	-	21.03	-	21.03	-	RESIDENCE	RESIDENCE	S.A			
BCM 9	P	2.50	3.646	1.050	2.596	0.1	25.96	-	25.96	-	25.96	-	RESIDENCE	RESIDENCE	S.A			
BCM 10	B	6.60	3.857	1.550	2.307	0.08	28.838	25	3.838	25	53.834	490.8	RESIDENCE INTER	RESIDENCE S.T.ROAD	R.W		FEW TRAFFIC	
BCM 11	B	12.20	4.033	3.060	0.973	0.05	19.46	19.46	0	19.46	38.92	611.265	FIELD S.T.ROAD	FIELD S.T.ROAD	S.P		HEAVY CARS	
BCM 12	B	12.20	4.081	1.730	2.351	0.05	47.02	47.02	0	47.02	84.04	1476.964	FIELD S.T.ROAD	FIELD S.T.ROAD	S.P		HEAVY CARS	
BCM 13	B	8.20	4.016	3.170	0.846	0.06	14.1	14.1	0	14.1	28.2	369.083	RESIDENCE S.T.ROAD	RESIDENCE S.T.ROAD	R.W		FEW TRAFFIC	
BCM 14	B	(7.00) 9.60	4.068	3.240	0.828	0.06	13.8	13.8	0	13.8	27.6	361.231	RESIDENCE S.T.ROAD	RESIDENCE S.T.ROAD	R.W		FEW TRAFFIC	

Table 4.12 LENGTH OF APPROACH ROAD (6/8)

No. of Bridge	GEDE/BOR	ROAD LENGTH												ENVIRONMENT			NOTE
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
		FC	Width	B.E.L	E.G.E	D	I	LENTH	CREST	ST	SAG	TOTAL	RADIUS [CREST][SAG]	NORTH	SOUTH	P.T.M	
BGM 1	B	(7.00)	9.60	4.790	4.290	0.500	0.06	8.000	[30.560]	0.000	[26.740]	[57.300]*	[800][700]	SHOP S.T.ROAD	SHOP S.T.ROAD	R.W	HEAVY CARS
BGM 2	B	(7.00)	9.60	4.814	3.800	1.014	0.06	8.900	[30.560]	0.000	[26.740]	[57.300]*	[800][700]	SHOP S.T.ROAD	SHOP S.T.ROAD	R.W	HEAVY CARS
BGM 3	P		2.50	4.702	2.790	1.912	0.1	19.120	-	19.120	-	19.120	-	SHOP	SHOP	S.A	FEW TRAFFIC
BGM 4	B		6.60	4.965	2.080	2.885	0.08	27.063	25.000	2.063	25.000	52.126	490.803	RESIDENCE S.T.ROAD	RESIDENCE S.T.ROAD	R.W	FEW TRAFFIC
BGM 5	B		4.60	4.955	2.080	2.875	0.09	31.944	20.000	11.944	20.000	51.944	349.016	RESIDENCE S.T.ROAD	RESIDENCE S.T.ROAD	R.W	FEW TRAFFIC
BGM 6	B		4.60	4.982	2.750	2.232	0.09	24.8	20	4.8	20	44.8	349.0155556	RESIDENCE THREE INT	RESIDENCE S.T.ROAD	R.W	FEW TRAFFIC
BGM 7	B		4.60	4.982	2.660	2.322	0.09	25.800	20.000	5.800	20.000	45.800	349.016	RESIDENCE THREE INT	RESIDENCE S.T.ROAD	R.W	FEW TRAFFIC
BGM 8	B		6.60	5.054	3.300	1.794	0.08	21.925	21.925	0.000	21.925	43.850	430.434	RESIDENCE THREE INT	RESIDENCE S.T.ROAD	R.W	FEW TRAFFIC
BGM 9	B		6.60	5.099	2.950	2.149	0.08	26.863	25.000	1.863	25.000	51.863	490.803	SHOP THREE INT	SHOP S.T.ROAD	R.W	HEAVY CARS
BGM 10	B		3.50	5.107	2.910	2.197	0.09	24.411	20.000	4.411	20.000	44.411	349.016	RESIDENCE S.T.ROAD	RESIDENCE S.T.ROAD	R.W	FEW TRAFFIC
BGM 11	B		4.60	5.302	2.910	2.392	0.09	26.578	20.000	6.578	20.000	46.578	349.016	FACTORY S.T.ROAD	FACTORY S.T.ROAD	R.W	FEW TRAFFIC
BGM 12	B		8.20	5.390	3.020	2.370	0.06	39.500	39.500	0.000	39.500	79.000	1033.959	RESIDENCE C.ROAD	RESIDENCE C.ROAD	R.W	HEAVY CARS

Table 4.12 LENGTH OF APPROACH ROAD (7/8)

No of		ROAD LENGTH											ENVIRONMENT			NOTE
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Bridge	FC	Width	B.E.L	E.G.E	D	I	LENTH	CREST	ST	SAG	TOTAL	RADIUS (CREST SAG)	NORTH	SOUTH	P.T.M	
BMM1	NO	-														
BMM2	(SL) B	9	UKCMBL 6.49	6.19	-	-	-	-	-	-	-	NO ALLOWANCE	RESIDENCE	FIELD	-	NORMAL TRA. HEIGHT:2.0M
BMM3	(SL) B	9.6	UM 5.83	6.12	-	-	-	-	-	-	-	AS ABOVE	FIELD	FIELD	-	FEW TRA. HEIGHT:2.0M
BMM4	(SL) B	9	UM 6.23	6.26	-	-	-	-	-	-	-	AS ABOVE	FIELD	FIELD	-	FEW TRA. HEIGHT:2.0M
BMM5	(SL) B	7.5	UM 6.7	6.63	-	-	-	-	-	-	-	AS ABOVE	FIELD	FIELD	-	FEW TRA. HEIGHT:2.0M
BMM6	(SL) B	7.5	UM 8.56	7.06	-	-	-	-	-	-	-	AS ABOVE	FIELD	FIELD	-	FEW TRA. HEIGHT:2.0M
BMM7	C	7.5	UM 8.66	8.18	-	-	-	-	-	-	-	AS ABOVE	FIELD	FIELD	-	FEW TRA. HEIGHT:2.0M
BMM8	C	7.5	UM 8.63	8.35	-	-	-	-	-	-	-	AS ABOVE	FIELD	FIELD	-	FEW TRA. HEIGHT:2.0M
BMM9	C	7.5	UM 8.83	8.07	-	-	-	-	-	-	-	AS ABOVE	FIELD	FIELD	-	FEW TRA. HEIGHT:1.8M

Table 4.12 LENGTH OF APPROACH ROAD (8/8)

REMARKS :

a) for each items

1. FA - facilities, B - road bridge, P - pedestrian bridge, (SK) - skew, (SL) - in-situ slab bridge.
2. WD - width of crossing structure and road class.
3. B.E.L - elevation of bridge surface.
4. E.G.E - ground elevation of existing road surface approx. 20m apart from the end of existing bridge.
5. D - elevation gap between B.E.L and E.G.E.
6. I - gradient degree of access road.
7. LENGTH - length of access road computed with Item 6.
8. CREST - transition length by crest curvature, [] - that of allowable min. radius.
9. ST - straight curve length lies between crest and sag curvature.
10. SAG - transition length by sag curvature, [] - that of allowable min. radius.
11. TOTAL - total length of transition length, [] - that of crest plus sag.
12. RADIUS - transition radius by crest and sag, [] - allowable min. radius.
13. NORTH - surrounding situation of north side of bridge, C.ROAD - curve road, S.T. ROAD - straight road. THREE INT- three crossing, INTER - intersection
14. SOUTH - same as above.
15. PTM - protection method of embankment, S.P - slope protection, R.W - retaining wall.

NOTE . CROWDED RE. - crowded residence

b) note for *: proposed length of access road ,i.e. straight curve for few traffic road, stairs for pedestrian road ,insertion of transition curve for National Road and match traffic road.

Table 4.13 ALLOWABLE MAXIMUM GIRDER LENGTH

GIRDER LENGTH(CLASS(WIDTH)	Unit:m															
	7	8	9	10	11	12	13.5	13	14	15	16					
III-1(8. 2m)	7.3[8.4]	8.4[9.3]	10.5[11.3]								15.8[17.8]					
IV-1(4. 6m)	7.3[9.5]	8.4[10.3]	11.9[13.6]					13.5[16.6]			15.8[18.8]					
I-2(10. 6m)			11.9[13.8]													
III-2(9. 6m)			10.5[11.7]	11.9[13]			12.35[14.1]				15.8[18.2]					
I-3(12. 2m)		8.4[9.8]						13.5[15.1]								
II-3(12. 2m)			9.6[11.0]													
III-3(6. 6m)	7.3[8.5]	8.4[9.2]						13.5[14.9]			15.8[17.3]					
P. B(2. 5m)	7.3[8.5]	8.4[9.1]			11.5[12.6]	12.15[13.1]	12.6[14.2]			14.6[16.1]	15.8[17]					
IV-S(3. 0m)	7.3[8.3]	8.4[9.0]														
IV-S(3. 5m)											15.8[17.1]					

Remark::The figure in [] shows the maximum girder length allowed for adjusting with the final channel width.

Table 4.14 STRESS SHEET AT MAXIMUM GIRDER LENGTH (2/8)

KAMAL (BRANCH)

NAME	CROSS SECTION	WIDTH	SPAN	LIMITED GIRDER LENGTH	GIRDER HEIGHT	LOAD TYPE	UPPER STRESS (kgf/cm ²)		LOWER STRESS (kgf/cm ²)		REACTION (tf)				ULTIMATE MOMENT (tf-m)		NOTES
							ST	ALLOWABLE	ST	ALLOWABLE	JU	ST	ABUTMENT	PIER	MU	S-F	
BKE-12		8.200	8.100	8.400	0.400	B.M.	1 54.9	< 160.0	1 -53.0	> -18.0	1 48.5	1 97.0	61.20	45.90	1.33	BM70-01 1:1=1.351	
BKE-13		8.200	8.100	8.400	0.400	70T	2 72.9	> -18.0	2 -71.7	> -18.0	2 0.0	2 0.0	61.20	45.90	1.33		
BKE-18		4.600	9.200	9.500	0.400	B.M.	1 66.2	< 160.0	1 -63.8	> -18.0	1 32.1	1 64.3	61.20	44.10	1.39	BM70-01 1:1=1.351	
BKE-2		4.600	9.200	9.500	0.400	70T	2 63.1	> -18.0	2 -125.9	> -18.0	2 0.0	2 0.0	61.20	44.10	1.39		
BKE-6		4.600	9.900	10.300	0.450	B.M.	1 65.5	< 160.0	1 -63.4	> -18.0	1 37.8	1 75.6	69.90	49.50	1.41	BM70-02 1:1=1.345	
BKE-9		4.600	9.900	10.300	0.450	70T	2 52.7	> -18.0	2 -52.1	> -18.0	2 0.0	2 0.0	69.90	49.50	1.41		
BKE-11		4.600	9.900	10.300	0.450	B.M.	3 118.2	< 160.0	3 -115.5	> -18.0	3 20.0	3 20.0	61.10	47.20	1.29	BM70-01 1:1=1.351	
BKE-10		6.600	8.200	8.500	0.400	70T	4 50.6	> -18.0	4 77.8	< 200.0	4 57.8	4 95.6	61.10	47.20	1.29		
BKE-3		6.600	8.800	9.200	0.450	B.M.	1 49.9	< 160.0	1 -48.1	> -18.0	1 36.0	1 72.0	69.90	52.50	1.33	BM70-02 1:1=1.345	
BKE-4		6.600	8.800	9.200	0.450	70T	2 78.3	> -18.0	2 -77.0	> -18.0	2 0.0	2 0.0	69.90	52.50	1.33		
BKE-5		6.600	8.800	9.200	0.450	B.M.	3 115.6	< 160.0	3 -113.2	> -18.0	3 40.0	3 40.0	24.800	18.40	1.35	PB-02 PERSON LOAD 0.35tf/m ² 1:1=1.000	
BKE-8		2.500	8.700	9.100	0.350	P	4 42.0	> -18.0	4 85.9	< 200.0	4 82.7	4 125.5	24.800	18.40	1.35		
BKE-16		2.500	8.200	8.500	0.350	B.M.	1 63.4	< 160.0	1 -61.9	> -18.0	1 12.2	1 24.5	22.800	16.30	1.40	PB-01 PERSON LOAD 0.35tf/m ² 1:1=1.000	
BKE-17		2.500	8.200	8.500	0.350	P	2 14.3	> -18.0	2 -14.0	> -18.0	2 3.0	2 6.1	22.800	16.30	1.40		
NOTES							ST: STATE		JU: JUDGMENT		1. DEAD LOAD				MU: ULTIMATE MOMENT	1:1=FACTOR OF IMPACT	
							1. STRESS OF DEAD LOAD		1. STRESS OF LIVE LOAD		2. PERSON				MU: RESISTANT MOMENT		
							2. STRESS OF LIVE LOAD		3. SUMMATION (1+2)		3. LIVE LOAD						
							3. SUMMATION (1+2)		4. AT IMMEDIATELY AFTER PRESTRESSING		4. SUMMATION (1+2+3)						
							4. AT IMMEDIATELY AFTER PRESTRESSING		5. STRESS OF SERVICE STATE		5. SUMMATION (1+2+3+4)						
							5. STRESS OF SERVICE STATE										

Table 4.14 STRESS SHEET AT MAXIMUM GIRDER LENGTH (3/8)

KAMAL (BRANCH)

NAME	CROSS SECTION	WIDTH	SPAN	LIMITED GIRDER LENGTH	GIRDER HEIGHT	LOAD TYPE	UPPER STRESS (kgf/cm ²)		LOWER STRESS (kgf/cm ²)		REACTION (t)		ULTIMATE MOMENT (t-ft)		NOTES
							ST. STRESS	ALLOWABLE	ST. STRESS	ALLOWABLE	JU ST. ABUTMENT	PIER	MU	M. S-F	
BKE-14 BKE-15		3.000	8.000	8.300	0.400	B.M. 70T	1	54.0	1	-52.1	1	20.2	40.4	61.20 46.40 1.32	BKE-01 1+1=1.351
							2	74.4	2	-73.2	2	0.0	0.0		
							3	128.3	3	-125.3	3	20.0	20.0		
							4	39.1	4	> -18.0	4	40.2	60.4		
							5	135.8	5	< 160.0	5				
BKE-1		3.000	8.600	9.000	0.450	B.M. 70T	1	54.0	1	-52.9	1	23.6	47.1	69.90 52.10 1.34	BKE-02 1+1=1.345
							2	59.8	2	-60.9	2	0.0	0.0		
							3	113.8	3	-113.8	3	20.0	20.0		
							4	40.6	4	> -18.0	4	43.6	87.1		
							5	122.0	5	< 160.0	5				
NOTES						LOAD TYPE B.M. 100T: WHEEL LOAD 10.0t B.M. 70T: WHEEL LOAD 7.0t P-HUMAN/ANIMALS LOAD 0.35t/m ²	ST. STATE 1. STRESS OF DEAD LOAD 2. STRESS OF LIVE LOAD 3. SUMMATION (1+2) 4. AT IMMEDIATELY AFTER PRESTRESSING 5. STRESS OF SERVICE STATE	JU: JUDGEMENT	1. DEAD LOAD 2. PERSON 3. LIVE LOAD 4. SUMMATION (1+2+3)	MU: ULTIMATE MOMENT MO: RESISTANT MOMENT	1+1=FACTOR OF IMPACT				

Table 4.14 STRESS SHEET AT MAXIMUM GIRDER LENGTH (4/8)

TANJUGAN


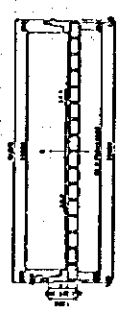

NAME	CROSS SECTION	WIDTH	SPAN	LIMITED GIRDER LENGTH	GIRDER HEIGHT	LOAD TYPE	UPPER STRESS (kgf/cm ²)		LOWER STRESS (kgf/cm ²)		REACTION (tf)		ULTIMATE MOMENT (tf-m)		NOTES	
							ST	STRESS	ALLOWABL	JU	ST	STRESS	ALLOWABL	JU		ST
BTM-3		10.600	13.300	13.800	0.500	B.M. 100T	1	93.0			1	107.2	214.4	88.90	1.30	BM100-02 1.1=1.326 (16)
							2	78.6			2	4.8	9.7			
							3	171.6			3	64.5	64.5			
							4	37.5	> -18.0	○	4	176.5	288.6			
							5	153.8	< 160.0	○	5					
BTM-4 BTM-5		12.200	10.500	11.000	0.450	B.M. 70T	1	68.5			1	90.8	193.5	81.40	1.37	BM70-03 1.1=1.338 (17)
							2	65.1			2	0.0	0.0			
							3	133.6			3	60.0	60.0			
							4	51.8	> -18.0	○	4	156.8	253.5			
							5	128.5	< 160.0	○	5					
BTM-1		6.600	14.400	14.900	0.550	B.M. 70T	1	103.0			1	74.8	149.6	132.90	1.30	BM70-07 1.1=1.317 (18)
							2	69.8			2	0.0	0.0			
							3	172.8			3	40.0	40.0			
							4	39.2	> -18.0	○	4	114.8	189.6			
							5	144.5	< 160.0	○	5					
NOTES							ST: STATE	1. STRESS OF DEAD LOAD	JU: JUDGMENT	1. DEAD LOAD	MU: ULTIMATE MOMENT	1.1=FACTOR				
								2. STRESS OF LIVE LOAD		2. POISON						
								3. SUMMATION (1+2)		3. LIVE LOAD						
								4. AT IMMEDIATELY AFTER PRESTRESSING		4. SUMMATION (1+2+3)						
								5. STRESS OF SERVICE STATE								

Table 4.14 STRESS SHEET AT MAXIMUM GIRDER LENGTH (5/8)

PIK JUNCTION

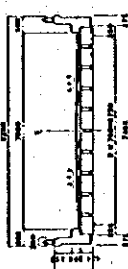
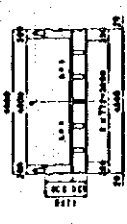

NAME	CROSS SECTION	WIDTH	SPAN	LIMITED GIRDER LENGTH	GIRDER HEIGHT	LOAD TYPE	UPPER STRESS (ksf/cm ²)		LOWER STRESS (ksf/cm ²)		REACTION (k)		ULTIMATE MOMENT (k-ft-m)		NOTES	
							ST	STRESS	ALLOWABL.	JU	ST	STRESS	ALLOWABL.	JU		ST
BNM-1		8.200	8.900	9.300	0.450	B.M. 70T	1	56.1		1	-54.4	1	58.5	116.9	BM70-02 1+1=1.345	
							2	61.6		2	-60.9	2	0.0	0.0		
							3	117.8		3	-115.3	3	40.0	40.0		
							4	42.7	> -18.0	4	85.2	< 200.0	4	98.5		156.9
							5	125.9	< 160.0	5	-17.8	> -18.0	5			
BNM-2 BNM-3		4.600	9.900	10.300	0.450	B.M. 70T	1	65.5		1	-63.4	1	37.8	75.6	BM70-02 1+1=1.345	
							2	52.7		2	-62.1	2	0.0	0.0		
							3	118.2		3	-115.5	3	20.0	20.0		
							4	50.6	> -18.0	4	77.8	< 200.0	4	57.8		95.6
							5	126.4	< 160.0	5	-17.6	> -18.0	5			
BNM-4		12.200	9.400	9.800	0.450	B.M. 100T	1	53.8		1	-51.6	1	86.2	172.4	BM100-01 1+1=1.345	
							2	73.9		2	-72.5	2	0.0	0.0		
							3	127.7		3	-124.1	3	70.1	70.1		
							4	36.3	> -18.0	4	124.5	< 200.0	4	156.3		242.5
							5	129.0	< 160.0	5	3.1	> -18.0	5			
NOTES						LOAD TYPE B.M. 100T: WHEEL LOAD 10.0k B.M. 70T: WHEEL LOAD 7.0k P: HUMAN/ANIMALS LOAD 0.35k/m ²	ST-STATE 1. STRESS OF DEAD LOAD 2. STRESS OF LIVE LOAD 3. SUMMATION (1+2) 4. AT IMMEDIATELY AFTER PRESTRESSING 5. STRESS OF SERVICE STATE	JU: JUDGMENT	1. DEAD LOAD 2. PERSON 3. LIVE LOAD 4. SUMMATION (1+2+3)	MU: ULTIMATE MOMENT M: RESISTANT MOMENT	1+1=FACTOR OF IMPACT					

Table 4.14 STRESS SHEET AT MAXIMUM GIRDER LENGTH (7/8)

SALURAN

NAME	CROSS SECTION	WIDTH	SPAN	LIMITED GIRDER LENGTH	GIRDER HEIGHT	LOAD TYPE	UPPER STRESS (kgf/cm ²)		LOWER STRESS (kgf/cm ²)		REACTION (t)		ULTIMATE MOMENT (t-m)		NOTES		
							ST	ALLOWABL	ST	ALLOWABL	JU	ST	ABUTMENT	PIER		MU	M
BOH-7 BOH-8 BOH-9		2.500	13.700	14.200	0.450	P	1	117.9	1	-114.2	1	23.5	46.9	81.50	54.10	1.51	PB-05 PERSON LOAD 0.35t/m ² 1+1=1.000
							2	21.5	2	-21.8	2	4.7	9.4				
							3	139.4	3	-136.1	3	0.0	0.0				
							4	84.1	4	68.2	4	28.2	56.4				
							5	144.5	5	-17.0	5						
BOH-4		2.500	15.600	16.100	0.450	P	1	138.4	1	-132.7	1	23.4	46.9	84.50	63.30	1.33	PB-06 PERSON LOAD 0.35t/m ² 1+1=1.000
							2	28.5	2	-28.9	2	5.4	10.7				
							3	166.9	3	-161.5	3	0	0				
							4	71.8	4	97.5	4	28.8	57.6				
							5	155.7	5	-16.4	5						
NOTES		LOAD TYPE	B.M. 1001: WHEEL LOAD 10.0t B.M. 701: WHEEL LOAD 7.0t P: HUMAN/ANIMALS LOAD 0.35t/m ²	ST-STATE	1. STRESS OF DEAD LOAD 2. STRESS OF LIVE LOAD 3. SUMMATION (1+2) 4. AT IMMEDIATELY AFTER PRESTRESSING 5. STRESS OF SERVICE STATE	JU-JUDGMENT	1. DEAD LOAD 2. PERSON 3. LIVE LOAD 4. SUMMATION (1+2+3)	MU-ULTIMATE MOMENT MU-RESISTANT MOMENT	1+1-FACTOR OF IMPACT								

Table 4.14 STRESS SHEET AT MAXIMUM GIRDER LENGTH (8/8)

NAME	CROSS SECTION	WIDTH	SPAN	LIMITED GIRDER LENGTH	GIRDER HEIGHT	LOAD TYPE	UPPER STRESS (kgf/cm ²)		ALLOWABLE		LOWER STRESS (kgf/cm ²)		ALLOWABLE		REACTION (t)		ULTIMATE MOMENT (t-m)		NOTES
							ST	STRESS	ST	STRESS	ST	STRESS	ST	STRESS	ST	ABTMENT	PIER	MU	
BGM-12 CANCELLED		8.200	17.300	17.800	0.650	B.M.	1 120.5 2 51.8 3 172.3 4 49.1 5 157.3	> -18.0	1 115.0 2 -53.0	1 121.2 2 0.0 3 40.0 4 151.2	242.3 0.0 40.0 282.3	174.20	127.60	1.37	BM70-08 1:1=1.306				
BGM-5 BGM-6 BGM-7 BGM-11 CANCELLED		4.600	18.300	18.800	0.650	B.M.	1 129.8 2 44.2 3 174.0 4 57.0 5 158.9	> -18.0	1 -124.7 2 -45.3 3 -169.9 4 124.7 5 -12.2	1 73.2 2 0.0 3 20.0 4 92.2	146.4 0.0 20.0 166.4	174.30	128.20	1.36	BM70-08 1:1=1.306				
BGM-1 BGM-2		9.600	17.700	18.200	0.650	B.M.	1 124.9 2 49.3 3 174.2 4 52.7 5 159.1	> -18.0	1 -120.2 2 -50.4 3 -170.6 4 124.8 5 -13.7	1 146.2 2 6.0 3 40.0 4 192.2	292.4 12.0 40.0 344.4	174.10	128.20	1.36	BM70-08 1:1=1.306				
BGM-4 BGM-8 BGM-9		6.600	16.800	17.300	0.650	B.M.	1 114.3 2 60.0 3 174.3 4 45.3 5 159.4	> -18.0	1 -110.1 2 -61.4 3 -171.5 4 134.9 5 -16.3	1 94.6 2 0.0 3 40.0 4 134.6	189.2 0.0 40.0 299.2	174.10	132.20	1.32	BM70-08 1:1=1.308				
BGM-3		2.500	16.500	17.000	0.500	P	1 135.7 2 26.3 3 162.0 4 69.9 5 91.9	> -18.0	1 -130.3 2 -26.7 3 -157.0 4 150.7 5 -16.8	1 26.3 2 5.7 3 0.0 4 31.9	92.5 11.3 0 63.8	97.500	74.300	1.31	FB-07 PERSON LOAD 0.35t/m ² 1:1=1.000				
BGM-10		3.600	16.600	17.100	0.700	B.M.	1 118.3 2 52.0 3 170.3 4 38.2 5 154.5	> -18.0	1 -115.0 2 -53.5 3 -168.5 4 134.7 5 -16.5	1 56.3 2 0.0 3 20.0 4 76.3	112.1 0.0 20.0 192.7	191.80	144.40	1.33	BM70-09 1:1=1.306				
NOTES		LOAD TYPE		B.M. 100T:WHEEL LOAD 10.0t B.M. 70T:WHEEL LOAD 7.0t P. HUMAN/ANIMALS LOAD 0.35t/m ²			ST:STATE	1. STRESS OF DEAD LOAD 2. STRESS OF LIVE LOAD 3. SUMMATION (1+2) 4. AT IMMEDIATELY AFTER PRESTRESSING 5. STRESS OF SERVICE STATE		JU:JUDGMENT	1. DEAD LOAD 2. PERSON 3. LIVE LOAD 4. SUMMATION (1+2+3)		MU:ULTIMATE MOMENT MU:RESISTANT MOMENT		1:1=FACTOR OF IMPACT				

Table 4.15 PRINCIPAL DIMENSIONS OF BRIDGES (1/10)

CHANNEL : KAMALOMAIN

No of Bridge	Existing Structure			New Bridges (Basic Plan)					New Bridge (Final Plan)			Limit		Remarks
	No of Structure	Facility	Width (m)	Length (m)	Width (m)	C. Width	Span		7	8	9	10		
BKM 1	KM 2	B	2.63	11.75	4.60	37.7	0.25+13.00+0.53+13.00	0.25+14.4+0.53+14.4	13.50	14.90	16.6	49.86		
BKM 2	KM 9 - 2	B	4 Lanes (5.50)	10.80	-	-	0.25+11.85+0.53+11.85	0.25+12.85+0.53+12.85	-	-	-	-	Jasa Marga	
BKM 3	KM 11 - 1	B	7.40	13.70	9.60	34.2	0.53+11.85+0.25=37.11	0.53+12.85+0.25=40.11	12.350	13.350	13.6	40.86		
BKM 4	KM 15	P	2.69	5.93	2.50	34.2	0.25+11.65+0.53+11.65	0.25+12.60+0.53+12.60	12.150	13.100	13.1	39.96		
BKM 5	KM 17 - 2	B	7.95	13.90	9.60	34.2	0.25+11.85+0.53+11.85	0.25+13.65+0.53+13.65 + 0.53+13.65+0.53+	12.350	13.350	14.1	56.69	Skew 43deg.	
BKM 6	KM 19	P	1.96	10.35	2.50	34.2	0.25+11.65+0.53+11.65	same as left	12.150	same	13.1	39.96		
BKM 7	KM 20	P	1.94	7.07	2.50	34.2	0.25+11.65+0.53+11.65	same as left	12.150	same	13.1	39.96		
BKM 8	KM 21 - 2	B	3.15	5.70	4.60	32.2	0.25+11.40+0.53+11.40	0.25+12.4+0.53+12.4+	11.90	same	13.6	40.86		
BKM 9	KM 22 - 3	P	2.31	16.60	2.50	32.2	0.25+11.00+0.53+11.00	-	11.50	-	-	-	Cancel	
BKM 10	KM 22 - 4	B	8.93	16.70	9.60	32.2	0.25+11.40+0.53+11.40	same as left	11.90	same	13	39.06		
BKM 11	KM 23 - 2	B	8.98	13.70	9.60	32.2	0.25+11.40+0.53+11.40	same as left	11.90	same	13	39.06		

Table 4.15 PRINCIPAL DIMENSIONS OF BRIDGES (2/10)

CHANNEL : KAMAL (BRANCH)

No of: Bridge	Existing Structure			New Bridge(Basic Plan)					New Bridge(Final Plan)			Remarks
	No of: Structure	Facility	Width (m)	Length (m)	Width (m)	4	5	6	7	8	9	
BKE 1	KE 1-1	B	2.63	11.75	3.00	IV	14.60	Span 0.20+8.00+0.43+8.00 +0.20 = 16.83	8.40	same	9	18.030
BKE 2	KE 2	B	3.80	6.80	4.60	IV	14.60	0.20+8.00+0.43+8.00 +0.20 = 16.83	8.40	same as left	10.3	20.630
BKE 3	KE 3-2	B (Skew)	5.70	5.60	6.60	III/IV	14.60	0.20+8.00+0.43+8.00 +0.20 = 16.83	8.40	same as left	9.2	18.430
BKE 4	KE 4	B	5.10	5.10	6.60	III/IV	14.60	0.20+8.00+0.43+8.00 +0.20 = 16.83	8.40	same as left	9.2	18.430
BKE 5	KE 5	B (Skew)	5.05	4.80	6.60	III/IV	14.60	0.20+8.00+0.43+8.00 +0.20 = 16.83	8.40	same as left	9.2	18.430
BKE 6	KE 6	B	3.20	4.30	4.60	IV	14.60	0.20+8.00+0.43+8.00 +0.20 = 16.83	8.40	same as left	10.3	20.630
BKE 7	KE 7	B	5.00	3.10	6.60	III/IV	14.60	0.20+8.00+0.43+8.00 +0.20 = 16.83	8.40	same as left	9.2	18.430
BKE 8	KE 9	P	1.27	3.50	2.50	P	14.60	0.20+8.00+0.43+8.00 +0.20 = 16.83	8.40	same as left	9.10	18.230
BKE 9	KE 10-1	B	4.45	3.05	4.60	IV	14.60	0.20+8.00+0.43+8.00 +0.20 = 16.83	8.40	same as left	10.3	20.630
BKE 10	KE 12	B	5.50	3.00	6.60	III/IV	12.40	0.15+7.00+0.33+7.00 +0.15 = 14.63	7.3	same as left	8.5	17.030
BKE 11	KE 14	B	3.00	2.40	4.60	IV	12.40	0.15+7.00+0.33+7.00 +0.15 = 14.63	7.3	same as left	9.5	19.030

Table 4.15 PRINCIPAL DIMENSIONS OF BRIDGES (3/10)

CHANNEL : KAMAL (BRANCH)

No of: Bridge	Existing Structure		New Bridge(Basic Plan)			New Bridge(Final Plan)			Limit		Remarks		
	No of: Structure	Facility	Width (m)	Length (m)	3	4	5	6	7	8		9	10
BKE 12	KE 15 - 1	B	7.40	2.70	8.20	8.20	III/IV	12.40	0.15+7.00+0.33+7.00 +0.15 = 14.63	7.30	-	-	Cancel
BKE 13	KE 15 - 2	B	7.40	2.70	8.20	8.20	III/IV	12.40	0.15+7.00+0.33+7.00 +0.15 = 14.63	7.30	same as left	16.830	
BKE 14	KE 16	B	2.60	1.90	3.00	3.00	IV	12.40	0.15+7.00+0.33+7.00 +0.15 = 14.63	7.30	same as left	16.630	
BKE 15	KE 17 - 1	B	2.90	1.70	3.00	3.00	IV	12.40	0.15+7.00+0.33+7.00 +0.15 = 14.63	7.30	same as left	16.630	
BKE 16	KE 18	P	1.45	1.40	2.50	2.50	P	12.40	0.15+7.00+0.33+7.00 +0.15 = 14.63	7.30	same as left	17.030	
BKE 17	KE 19	P	1.65	1.25	2.50	2.50	P	12.40	0.15+7.00+0.33+7.00 +0.15 = 14.63	7.30	same as left	17.030	
BKE 18	KE 20 - 1	B	4.50	1.08	4.60	4.60	IV	12.40	0.15+7.00+0.33+7.00 +0.15 = 14.63	7.30	same as left	19.030	In-situ Slab/Cul.
BKE 19	KE 22	B	4.60	1.90	4.60	4.60	IV	3.80	0.15+3.50+0.15 = 3.80	3.80	0.15+2.0+0.15=2.3	3.000	In-situ Slab/Cul.
BKE 20	KE 24 - 1	B	3.74	1.69	4.60	4.60	IV	3.80	0.15+3.50+0.15 = 3.80	3.80	0.15+2.0+0.15=2.3	3.000	In-situ Slab/Cul.

Table 4.15 PRINCIPAL DIMENSIONS OF BRIDGES (4/10)

CHANNEL : TANJUNGAN

No of: Bridge	Existing Structure			New Bridge(Basic Plan)				New Bridge (Final Plan)				Remarks		
	No of: Structure	Facility	Width (m)	Length (m)	Width (m)	C. Width	Span	G.L	Span	G.L	Limit			
											8		9	
BTM 1	TM 1	B	5.63	4.88	6.60	-3	23.90	+0.25 = 27.03	13.50	0.25+13.0+0.53+ 13.0+0.53+13.0+0.25= 40.560	same	14.9	40.560	74deg Jasa/Varga
BTM 2	TM 2-1	C	24.40	3.35	-	-	-	-	-	-	-	-	-	-
BTM 3	TM 3-4	B	8.50	9.90	10.60	-2	23.90	0.25+11.40+0.53+11.40 +0.35 = 23.83	11.90	sameas left	same	13.8	27.630	BM-100
BTM 4	TM 5	B	12.70	2.00	12.20	-3	16.90	0.25+9.10+0.53+9.10 +0.25 = 19.23	9.60	sameas left	same	11	22.030	53deg
BTM 5	TM 6	B (Skew)	11.80	3.00	12.20	-3	16.90	0.25+9.10+0.53+9.10 +0.25 = 19.23	9.60	sameas left	same	11	22.030	69deg
BTM 6	-	P	-	-	2.5	-	-	-	-	0.20+8.00+ 0.43+8.00+0.20= 16.83	8.4	9.1	19.03	Newly added

CHANNEL : PIK JUNCTION DRAINAGE

No of: Bridge	Existing Structure			New Bridge(Basic Plan)				New Bridge (Final Plan)				Remarks		
	No of: Structure	Facility	Width (m)	Length (m)	Width (m)	C. Width	Span	G.L	Span	G.L	Limit			
											8		9	
BNM 1	NM 5-1	C	8.10	0.60	8.20	-1	6.0	0.20+8.00+0.20 = 8.40	8.40	0.15 +2.2+0.15=2.5	2.5	3	3	In-situ Slab/Cul.
BNM 2	NM 8	C	3.10	0.60	4.60	-1	6.0	0.20+8.00+0.20 = 8.40	8.40	0.15 +2.2+0.15=2.5	2.5	3	3	In-situ Slab/Cul.
BNM 3	NM 11	B	4.00	1.70	4.60	-1	6.0	0.20+8.00+0.20 = 8.40	8.40	0.15 +2.2+0.15=2.5	2.5	3	3	In-situ Slab/Cul.
NNM 4	Nothing	Road	2 lanes	-	12.20	-1	6.0	0.20+8.00+0.20 = 8.40	8.40	0.15 +2.2+0.15=2.5	2.5	3	3	BM-100

Table 4.15 PRINCIPAL DIMENSIONS OF BRIDGES (5/10)

CHANNEL : SALURAN CENKARENG

No of Bridge	Existing Structure			New Bridge (Basic Plan)				New Bridge (Final Plan)			Limit		Length	Remarks
	No of Structure	Facility	Width (m)	Length (m)	3	4	5	6	7	8	9	10		
BCM 1	CM 1-4	C	2 lanes	5.60	9.60	II/III	-2	12.30	0.25+15.30+0.25 = 15.80	15.80	-	-	-	Cancel
BCM 2	CM 3	B	8.70	3.55	9.60	II/III	-3	12.30	0.25+15.30+0.25 = 15.80	15.80	same	18.2	18.2	
BCM 3	CM 6	B	4.15	9.60	4.60	IV	-1	12.30	0.25+15.30+0.25 = 15.80	15.80	same	18.8	18.8	
BCM 4	CM 7	P	1.00	9.80	2.50	P		12.30	0.25+14.10+0.25 = 14.60	14.60	same	16.1	16.1	
BCM 5	CM 9	B	6.20	11.30	6.60	III/IV	-3	12.30	0.25+15.30+0.25 = 15.80	15.80	same	17.3	17.3	
BCM 6	CM 11	B	6.25	11.20	6.60	III/IV	-3	10.30	0.25+13.00+0.25 = 13.50	13.50	0.25+13.6+0.25 = 14.10	14.9	14.9	
BCM 7	CM 13	P	2.20	8.50	2.50	P		10.30	0.25+12.10+0.25 = 12.60	12.60	0.25+15.3+0.25 = 15.80	17	17	
BCM 8	CM 15	P	1.50	8.40	2.50	P		10.30	0.25+12.10+0.25 = 12.60	12.60	same as left	14.2	14.2	
BCM 9	CM 16	P	1.50	8.35	2.50	P		10.30	0.25+12.10+0.25 = 12.60	12.60	same as left	14.2	14.2	
BCM 10	CM 17-1	B	6.40	5.60	6.60	III/IV	-3	10.30	0.25+13.00+0.25 = 13.50	13.50	0.25+14.4+0.25 = 14.9	14.9	14.9	75deg.
BCM 11	CM 18-4	B	14.50	5.58	12.20	I	-3	10.30	0.25+13.00+0.25 = 13.50	13.50	same as left	15.1	15.1	BM-100
BCM 12	CM 19-1	B	17.00	9.70	12.20	I	-3	10.30	0.25+13.00+0.25 = 13.50	13.50	same as left	15.1	15.1	BM-100
BCM 13	CM 20	B	7.10	8.90	8.20	II/III	-1	8.20	0.25+10.00+0.25 = 10.50	10.50	0.25+10.8+0.25 = 11.3	11.3	11.3	
BCM 14	CM 22	B	9.10	9.40	9.60	II/III	-3	8.20	0.25+10.00+0.25 = 10.50	10.50	same as left	11.7	11.7	

Table 4.15 PRINCIPAL DIMENSIONS OF BRIDGES (6/10)

CHANNEL : GEDE/BOR

No of: Bridge	Existing Structure			New Bridge(Basic Plan)					New Bridge (Final Plan)			Limit		Remarks
	No of: Structure	Facility	Width (m)	Length (m)	3	4	5	6	7	8	9	10		
BGM 1	GM 1-2	B	2 lanes	2.90	7.00	II/III	12.90	0.25+15.30+0.25 = 15.80	15.80	same	18.2	18.200		
BGM 2	GM 1-4	B	2 lanes	2.90	7.00	II/III	12.90	0.25+15.30+0.25 = 15.80	15.80	same	18.2	18.200		
BGM 3	GM 5	P	1.35	4.25	2.50	P	12.90	0.25+15.30+0.25 = 15.80	15.80	same	17	17.000		
BGM 4	GM 6	B	5.10	2.20	6.60	III/IV	12.90	0.25+15.30+0.25 = 15.80	15.80	same	17.3	17.300		
BGM 5	GM 7	B	3.95	4.00	4.60	IV	12.90	0.25+15.30+0.25 = 15.80	15.80	same	18.8	18.800		
BGM 6	GM 8-1	B	3.10	3.90	4.60	IV	12.90	0.25+15.30+0.25 = 15.80	15.80	same	18.8	18.800		
BGM 7	GM 9	B	4.90	2.70	4.60	IV	12.90	0.25+15.30+0.25 = 15.80	15.80	same	18.8	18.800		
BGM 8	GM 10-2	B	6.40	4.60	6.60	III/IV	12.90	0.25+15.30+0.25 = 15.80	15.80	same	17.3	17.300		
BGM 9	GM 11-2	B	6.24	4.60	6.60	III/IV	12.90	0.25+15.30+0.25 = 15.80	15.80	same	17.3	17.300		
BGM 10	GM 13-1	B	3.45	3.10	3.50	IV	12.40	0.25+15.30+0.25 = 15.80	15.80	same	17.1	17.100		
BGM 11	GM 14-1	B	4.90	7.70	4.60	IV	12.40	0.25+15.30+0.25 = 15.80	15.80	-	-	-	No Widening	
BGM 12	GM 15-1	B	8.10	1.90	8.20	III/III	12.40	0.25+15.30+0.25 = 15.80	15.80	-	-	-	No Widening	

Table 4.15 PRINCIPAL DIMENSIONS OF BRIDGES (7/10)

CHANNEL : GEDE/BOR (BRANCH)

No of Bridge	No of Structure	Existing Structure		New Bridge(Basic Plan)			New Bridge (Final Plan)			Limit		Remarks
		1	2	3	4	5	6	7	8	9	10	
	Structure	Facility	Width (m)	Length (m)	Width (m)	C. Width	Span	Span	G.L	G.L	B.L	
BGA-1	GA-2	B	4.10	0.85	-	-	-	-	-	-	-	
BGA-2	GA-3-2	B	4.20	0.85	-	-	-	-	-	-	-	

Table 4.15 PRINCIPAL DIMENSIONS OF BRIDGES (8/10)

No. of Bridge	Existing Structure			New Bridge(Basic Plan)				New Bridge(Final Plan)				Limit		Remarks		
	No. of Structure	Facility	Width (m)	Length (m)	Width (m)	C. Width	Span	G.L	Span	G.L	G.L	G.L	B.L			
															1	2
MBC 1*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Culvert New add.
MBC 2*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Culvert New add.
MBC 3L*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Culvert New add.
MBC 3R*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Culvert New add.
BMM 1	MM 1-1	B	4 lanes	-	-	-	-	-	-	-	-	-	-	-	-	Cancel
BMM 2	MM 2-3	B	7.5	2.06	9	III/V	3.0	-	-	-	-	-	-	-	-	Cancel
[1](BMM1*)	-	C	-	-	10	-	-	-	-	-	-	-	-	-	-	Culvert New add.
BMM3(BMM2*)	MM 4-3	B	7.1	2.30	15	III/V	3.0	-	-	-	-	-	-	-	-	Culvert
BMM4(BMM3*)	MM 6	B	6.7	2.60	15	III/V	3.0	-	-	-	-	-	-	-	-	Culvert Culvert New add.
[2](BMM4*)	-	C	-	-	15	III/V	3.0	-	-	-	-	-	-	-	-	Culvert New add.
[3](BMM5*)	-	C	-	-	15	III/V	3.0	-	-	-	-	-	-	-	-	Culvert New add.
[4](BMM6*)	-	C	-	-	15	III/V	2.5	-	-	-	-	-	-	-	-	Culvert New add.
[5](BMM7*)	-	C	-	-	10	III/V	2.5	-	-	-	-	-	-	-	-	Culvert New add.
[6](BMM8*)	-	C	-	-	10	III/V	2.5	-	-	-	-	-	-	-	-	Culvert New add.

MBC and [1] to [13] indicate new crossing structures brought about due to new alignment.

*marks: new numbering for final structures.

Remarks

Table 4.15 PRINCIPAL DIMENSIONS OF BRIDGES (9/10)

No. of Bridge	CHANNEL : MERUYA										Remarks				
	Existing Structure			New Bridge(Basic Plan)			New Bridge (Final Plan)			Limit					
	No of Structure	Facility	Width (m)	Length (m)	Width (m)	C. Width	Span	G.L	Span	G.L		9	10		
[7](BMM9*)	-	C	-	-	10	III/IV	-	-	-	0.15+1.25+0.15=1.55	-	-	-	-	Culvert New add.
[8](BMM10*)	-	C	-	-	10	III/IV	-	-	-	0.15+1.25+0.15=1.55	-	-	-	-	Culvert New add.
[9](BMM11*)	-	C	-	-	10	III/IV	-	-	-	0.15+1.25+0.15=1.55	-	-	-	-	Culvert New add.
[10](BMM12*)	-	C	-	-	10	III/IV	-	-	-	0.15+1.25+0.15=1.55	-	-	-	-	Culvert New add.
[11](BMM13*)	-	C	-	-	10	III/IV	-	-	-	0.15+2.2+0.15=2.50	-	-	-	-	Slab New add.
[12](BMM14*)	-	C	-	-	10	III/IV	-	-	-	0.15+2.2+0.15=2.50	-	-	-	-	Slab New add.
MBC 4L*	-	C	-	-	-	-	-	-	-	2.2(width)	-	-	-	-	Culvert New add.
BMM 5	MM 10	B	6.5	0.75	7.6	III/IV	2.5	-	-	-	-	-	-	-	Cancel
BMM 6	MM 12	B	7.0	1.30	7.6	III/IV	2.5	-	-	-	-	-	-	-	Cancel Slab
[13](BMM15*)	-	-	-	-	10	-	-	-	-	0.15+1.20+0.15=1.50	-	-	-	-	New add.
BMM7(BMM16*)	MM 14-1	B	7.2	0.75	10	III/IV	1.5	-	-	0.15+1.20+0.15=1.50	-	-	-	-	Culvert
BMM 8	MM 14-2	B	7.0	7.00	7.6	III/IV	3.0	-	-	-	-	-	-	-	Cancel
BMM 9	MM 16	C	7.1	0.56	7.6	III/IV	3.0	-	-	-	-	-	-	-	Cancel

MBC and [1] to [13] indicate new crossing structures brought about due to new alignment.
 *marks.new numbering for final structures.

Remarks

Table 4.15 PRINCIPAL DIMENSIONS OF BRIDGES (10/10)

Explanatory notes:

1 (Facility) indicates sorts of existing facilities; B-Road Bridge, P-Pedestrian Bridge and C-Culvert

2 (Width) is the total width of existing facilities.

3 (Length) is the total length of existing facility.

4 (Width) is the total width of new bridge and road classification observed at site survey.

5 (C.Width) indicates the channel width at bottom.

6 (Span Length); shows span division and total bridge length studied in the basic design.

7 (G.L); indicates that of unit span length plus retained girder length.

8 (Span Length); is same as item 6, but reviewed and modified in detailed design with reference to the drawing of channel widening plan.

9 (G.L); indicates the allowable girder length designed with ab. 10% allowance for adjusting with the variety of widening detail.

10 (B.L); is the total bridge length corresponding to item 9.

Remarks: (1) National Highways are designed with Live Load BM 100 as indicated in the column and other local roads designed with BM70.

(2) All other bridges except In-situ slab bridges noted in the column are designed as Pre-Tension girders.


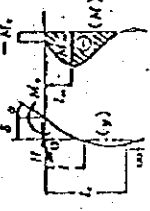
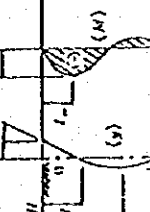
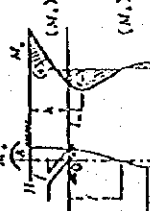
Table 4.16 FINAL CLASSIFICATION OF GIRDER LENGTH IN RESPECT OF WIDTH

ROAD CLASS (width)	KAMAL (MAIN)	KAMAL (BRANCH)	TANJUNGAN PIK JUNCTION	SARURAN CENGKARENG	CEDE/BOR	MERYUA	TOTAL OF STRUCTURE NUMBER	TOTAL OF DIFFERENCE BRIDGES
III-1(8.2m)		7.3 (1)		11.3 (1)			2 (2)	1
IV-1(4.6m)	12.9 (1) 14.9 (1)	7.3 (2) 8.4 (3)		15.8 (1)	15.8 (3)		6 (11)	5
I-2(10.6m)			11.9 (1)				1 (1)	1
III-2(9.6m)	11.9 (2) 13.35 14.15 (1)			10.5 (1) 15.8 (1) 13.5 (2)	15.8 (2)		6 (8)	5
I-3(12.2m)							1 (2)	1
II-3(12.2m)			9.6 (2)				1 (2)	1
III-3(6.6m)		7.3 (1)	13.5 (1)	14.1 (1) 14.9 (1) 15.8 (1)	15.8 (3)		7 (12)	6
P.B.(2.5m)	12.15 (2) 13.1 (1)	8.4 (4) 7.3 (2) 8.4 (1)	9.2 (1)	12.6 (2) 14.6 (1) 15.8 (1)	15.8 (1)		9 (12)	8
IV-S(3.0m)		7.3 (2) 8.4 (1)					2 (3)	2
IV-S(3.5m)					15.8 (1)		1 (1)	1
SLAB BR.(4.6m)		2.3 (2)					4 (8)	3
SLAB BR.(8.2m)			2.8 (3) 2.8 (1)			2.5 (2)		
CULVERT						1.5(2),1.55(4),1.8(8)	6 (19)	7
BURIED CUL.						1.5(2),2.2(1),3(2)		
SUM. BRIDGE	7 (9)	9 (17)	4 (5)	11 (13)	5 (10)		36 (54)	31
SLAB BRIDGE		1 (2)	2 (4)			1 (2)	4 (8)	3
CULVERT						7 (19)	7 (19)	6
TOTAL	7 (9)	10 (19)	4 (5)	11 (13)	5 (10)	8 (21)	47 (81)	40

NOTES : 1 Total number of structure : 81 (girder bridge-54,slab bridge-8,culvert-19)

2 Total number of bridges with different dimension : 40 (girder bridge-31,slab-bridge-3,culvert-6)

Table 4.17 EQUATION FOR SECTION FORCE OF PILE BY EARTHQUAKE

<p>Differential Equation for Deformation</p>		<p> $EI \cdot d^4 y_1 / dx^4 = 0$ for on land $EI \cdot d^4 y_2 / dx^4 + p = 0$ for under ground where $p = kDy_2$ H: transverse force to pile (kg) Mt: moment loaded at pile top (kgf.cm) D: diameter of pile (cm) </p>	<p> E: elastic modulus of pile (kg/cm²) I: moment of inertia of pile (cm⁴) k: transverse reaction coefficient (kg/cm³) h: height of loading H and Mt (cm) $F = (kD/4EI)^{1/4}$ (cm⁻¹) $h_0 = Mt/H$ (cm) </p>
<p>Calculation Method</p>	<p>METHOD-1 (Rough computation with manual) Fundamental System for Pier</p>	<p>Hinge Connection for Abutment</p>	<p>METHOD-2 (Detailed computation with computer) Hinge Connection for Single Squad</p>
<p>Section Force</p>	 <p> $M_{max} = -0.3224H/f - Mt$ where $Mt = H \cdot h/2$ $S_{max} = H$ </p>	 <p> $M_{max} = -0.3224H/f$ same as left </p>	 <p> $M_{max} = -H/2f \{ (1+2\Omega)^2 + 1 \}^{1/2}$ * exp(-f·h), where $\Omega = 1/f \tan^{-1} (1+2\Omega)$ for under ground same as left </p> <p> $M_{max} = (1+f \cdot h) \cdot H/2f$ for pile top same as left </p>

Reference: Japan Bridge Standard

Table 4.18 SECTION FORTH OF PILE BY EATHQUAKE (METHOD-1) (1/5)

CLASS	NAME	WIDTH/ SPAN (m)	REACTION AT/PR (t)	H-FORCE AT/PR (t)	Mmax AT/PR (tm)	Smax AT/PR (t)	REMARK
III-I	[BKE-12 BKE-13]	8.2 7	60.8 117.6	9.485 18.346	1.698 6.776	2.371 3.064	
	[BNM-1]	8.2 8	81.4 -	12.698 -	2.272 -	3.175 -	
	[BCM-13]	8.2 10	84.6 -	13.198 -	1.575 -	3.3 -	
	[BGM-12]	8.2 15.3	136.6 -	21.31 -	2.543 -	3.552 -	
IV-1	[BKE-18]	4.6 7	35.1 68	5.476 10.608	1.307 3.918	1.825 1.768	
	[BMN-2, BNM-3]	4.6 8	43.5 84.9	6.786 13.244	1.62 4.892	2.262 2.207	
	[BKM-8]	4.6 11.4	58.1 87.1	9.063 13.588	1.622 5.019	2.266 2.265	
IV-1	[BKM-1]	4.6 13	65.3 111.8	10.187 17.441	1.823 6.442	2.547 2.907	
	[BCM-13] [BGM-5, BGM-6, BGM-7, BGM-11]	4.6 15.3	78.1 -	12.184 -	2.181 -	3.046 -	
I-2 (WITH SIDE WALK)	[BTM-3]	10.6 11.4	136 219	21.216 34.164	2.532 8.632	3.536 4.271	

Table 4.18 SECTION FORTH OF PILE BY EATHQUAKE (METHOD-1) (2/5)

CLASS	NAME	WIDTH/ SPAN (m)	REACTION AT/PR (t)	H-FORCE AT/PR (t)	Mmax AT/PR (tm)	Smax AT/PR (t)	REMARK
III-2 (WITH SIDE WALK)	[BCM-14]	9.6 10	100.4 -	15.662 -	8.677 -	3.916 -	
	[BKM-10, BKM-11]	9.6 11.4	119.2 190.6	18.592 29.734	2.219 8.236	3.099 3.717	
	[BKM-3, BKM-5]	126.6 205.4	126.6 205.4	19.75 32.042	2.357 9.43	3.292 4.005	
	[BCM-1, BCM-2] [BGM-1, BGM-2]	9.6 15.3	161.1 -	25.21 -	3.008 -	4.202 -	
I-3 (PARTI- CULAR)	[BNM-4]	12.2 8	101.6 -	19.812 -	1.773 -	2.477 -	
	[BCM-11, BCM-12]	12.2 13	166.2 -	32.409 -	2.901 -	4.051 -	
II-3 (PARTI- CULAR)	[BTM-4, BTM-5]	12.2 9.1	112.1 207.3	17.488 32.339	2.504 8.958	3.498 5.39	
III-3 (PARTI- CULAR)	[BKE-10]	4.75 7	45.9 82.5	7.16 12.87	1.709 4.753	2.387 2.145	
	[BKE-3, BKE-4, BKE-5, BKE-7]	6.6 8	54 98.6	8.424 15.382	1.967 5.681	2.808 2.564	
	[BTM-1]	6.6 13	91.5 150.1	14.274 23.416	1.703 8.648	2.374 3.903	
	[BCM-5] [BGM-4, BGM-8, BGM-9]	6.6 15	109.8 -	17.129 -	2.044 -	2.855 -	

Table 4.18 SECTION FORTH OF PILE BY EATHQUAKE (METHOD-1) (3/5)

CLASS	NAME	WIDTH/ SPAN (m)	REACTION AT/PR (t)	H-FORCE AT/PR (t)	Mmax AT/PR (tm)	Smax AT/PR (t)	REMARK
III-2 (PEDES- TRIAN)	[BKE-16, BKE-17]	2.5 7	15.5 24.3	2.418 3.791	0.866 4.2	1.209 1.996	
	[BKE-8]	2.5 8	17 24.3	2.652 3.791	0.949 4.2	1.326 1.996	
	[BKE-9]	2.5 11	22.9 42.3	3.572 6.599	1.279 7.311	1.296 3.299	
	[BKM-4, BKM-6, BKM-7]	2.5 11.65	25.8 47.9	4.025 7.472	1.441 8.279	2.013 3.736	
	[BCM-7 BCM-8 BCM-9]	2.5 12.1	26.5 -	4.134 -	1.48 -	2.067 -	
	[BCM-4]	2.5 14.1	27 -	4.212 -	1.508 -	2.106 -	
	[BGM-3]	2.5 15.3	30.2 -	4.711 -	1.686 -	2.356 -	
IV-S	[BKE-14, BKE-15]	3 7	24.6 44.9	3.838 7.004	1.374 3.88	1.919 3.502	
	[BKE-1]	3 8	28.8 53.4	4.493 8.33	1.608 4.615	2.247 4.17	
	[BGM-10]	3.5 15.3	64.3 -	10.031 -	3.591 -	5.016 -	

Table 4.18 SECTION FORTH OF PILE BY EATHQUAKE (METHOD-1) (4/5)

Commentary notes:

1 Remarks for column:

Reaction; indicates the total reaction of Dead Load on the foundation.

AT/PR; is an abbreviation of abutment and pier respectively.

H-Forth; means horizontal force by earthquake loaded onto pile tips.

Mmax ,Smax; means maximum moment and sear force of pile by earthquake.

2 Calculation method

(1) Equivalent horizontal seismic coefficient (Kh)

This is estimated according to Indonesian Stander ,SNI 03-2833-1992, "Procedure of Designing Earthquake Proof for Highway Bridges"

I.e.: $K_h = K_r \cdot f \cdot p \cdot b$

Where,

$K_r = 0.15$ (combined response coefficient, $T_g < 0.4$ in Zone 4 for the evaluation of safer side)

$f = 1.0$ (structural factor)

$p = 1.3$ for PC structure (material factor)

Consequently

$K_h = 0.15 \cdot 1.0 \cdot 1.0 \cdot 1.3 = 0.195$ for BM100

$K_h = 0.15 \cdot 1.0 \cdot 0.8 \cdot 1.3 = 0.156$ for BM70

(2) Pile Section Force

This is computed subject to the equation introduced on the condition that column stands vertically in soil with elastic support where the boundary condition of pile tip is to be loaded by bending moment.

a) Horizontal Reaction Coefficient of Soil (k)

$$k = k^0 \cdot y^{-1/2}$$

$$k^0 = e E_0 D^{-3/4}$$

Where,

k^0 : horizontal reaction coefficient when 1cm deformed

E_0 : deformation coefficient of soil reaction = $28N = 28 \cdot 3 = 84$ (3blows for Nvalue is taken for safer side.)

$e = 0.2$ for 28N: indicated a coefficient depend upon pre-condition of calculation base

$D = 35$ cm: diameter of pile

As a results

$$k_0 = 0.2 \cdot 84 \cdot 35^{-3/4} = 1.168$$

b) Characteristic Value of Pile (f)

Table 4.18 SECTION FORTH OF PILE BY EATHQUAKE (METHOD-1) (5/5)

$$f = (k^0 D / 4EI)$$

E: Elastic Modulus = 4×10^5 for concrete of 500K Class

I: moment of inertior = $0.0491(35^4 - 22^4) = 6.216 \times 10^4 \text{ cm}^4$

Cosequently,

$$f = (1.168 \times 35 / 4 \times 4.0 \times 10^5 \times 6.216 \times 10^4)^{1/4} = 0.4502 \text{ m}^{-1}$$

c) Mmax and Smax

Mmax = $0.3224H/f = 0.716H$ for abutment (hinge support at pile top)

Mmax = $0.3224H/f + H \cdot h/2 = 0.716 + 1.5H = 2.216H$ for pier (the moment at pile top showned latter is computed as that of portal)

H: horizontal forth by earthquake(t) which can be obtained by $K_h \cdot V_d$. It is noted that the bearing type anchor filled with epoxy resin can deliver the horizontal force equally to any bearings.

Vd: shows the reaction by dead load.

h: height of pile from earth surface = $1.5\text{m} + 1.5\text{m} = 3.0\text{m}$

Smax = H: horizontal forth by eathquake (t)

Table 4.19 INPUT DATD FOR SEISMIC DESIGN (METHOD-2) (1/4)

CLASS	NAME	WIDTH/ SPAN (m)	REAO AT/PR (t)	H-FORCE AT/PR (t)	NO AT/PR (no)	H/PILE AT/PR (t)	HEIGHT AT/PR (m)	S/ D	N- BLOW (no)	k _o	PILE LENGTH (m)
III-1	[BKE-12 BKE-13]	8.2 7	60.8 117.6	9.485 18.346	4 6	2.3713 3.0577	0.65 3.349	S D	3, 19 3, 19	1.168, 7.40 1.168, 7.40	5, 10 25, 125
	[BNM-1]	8.2 8	81.4 -	12.698 -	4 -	3.1745 -	0.65 -	S -	2, 4 -	0.78, 1.56 -	1.5, 9 -
	[BCM-13]	8.2 10	84.8 -	13.198 -	4 -	3.2995 -	0.65 -	S -	2, 4 -	0.78, 2.34 -	1.0, 6 -
	[BGM-12]	8.2 15.3	136.6 -	21.31 -	6 -	3.5517 -	0.65 -	D -	5 -	1.95 -	6 -
IV-1	[BKE-18]	4.6 7	35.1 68	5.476 10.608	3 6	1.8253 1.768	0.65 3.664	S D	5, 18 5, 18	1.95, 7.01 1.95, 7.01	5.0, 16 25, 18.5
	[BNM-2, BNM-3]	4.6 8	43.5 -	6.786 -	3 -	2.262 -	0.65 -	S -	11, 3 -	4.28, 1.168 -	10 -
	[BKM-8]	4.6 11.4	58.1 87.1	9.063 13.588	3 6	3.021 2.2647	0.65 2.591	D D	8, 16 8, 16	3.12, 6.23 3.12, 6.23	5.0, 9 9.0, 11.5
IV-1	[BKM-1]	4.6 13	65.3 111.8	10.187 17.441	4 6	2.5468 2.9068	0.65 1.61	D D	7, 3 7, 3	2.73, 1.168 2.73, 1.168	3.0, 15 0.5, 16.5
	[BCM-3] [BGM-5, BGM-6, BGM-7, BGM-11]	4.6 15.3	78.1 -	12.184 -	4 -	3.046 -	0.61 -	D -	4, 7 -	1.56, 2.73 -	4.0, 5 -
I-2 [WITH]	[BTM-3]	10.6	136	21.216	6	3.536	0.65	D	6, 4	2.34, 1.56	3.0, 11
		11.4	219	34.164	8	4.2705	1.75	D	6, 4	2.34, 1.56	0.5, 13.5

Table 4.19 INPUT DATD FOR SEISMIC DESIGN (METHOD-2) (2/4)

CLASS	NAME	WIDTH/ SPAN(m)	REACTI AT/PR (t)	H-FORCE AT/PR (t)	PILE NO AT/PR (no)	H/PILE AT/PR (t)	HEIGHT AT/PR (m)	S/ D	N- VALUE (no)	k _o	PILE LENGTH (m)
III-2 (WITH)	[BCM-14]	9.6 10	100.4 -	15.662 -	4 -	3.9155 -	0.65 -	S	2, 7 -	0.78, 2.73 -	2.0, 7 -
	[BKM-10, BKM-11]	9.6 11.4	119.2 190.6	18.592 29.734	6 8	3.0987 3.7168	0.65 2.891	D D	4, 16 4, 16	1.56, 6.23 1.56, 6.23	4.0, 10 1.5, 12.5
	[BKM-3, BKM-5]	126.6 205.4	126.6 205.4	19.75 32.042	6 8	3.2917 4.0053	0.65 1.992	D D	5, 3 3	1.95, 1.168 1.168	2.0, 10 12.5
	[BCM-1, BCM-2] [BGM-1, BGM-2]	9.6 15.3	161.1 -	25.21 -	6 -	4.2017 -	0.65 -	D -	4, 7 -	1.56, 2.73 -	2.0, 5 -
I-3 (PARTI CULAR)	[BNM-4]	12.2 8	101.6 -	19.812 -	8 -	2.4765 -	0.65 -	D -	3, 6 -	1.168, 2.34 -	1.0, 11 -
	[BCM-11, BCM-12]	12.2 13	166.2 -	32.409 -	8 -	4.0511 -	0.65 -	D -	2, 5 -	0.78, 1.95 -	2.0, 7 -
II-3 (PARTI CULAR)	[BTM-4, BTM-5]	12.2 9.1	112.1 207.3	17.488 32.339	5 8	3.4976 4.0424	0.65 1.725	S D	6 6	2.34 2.34	9 11.5
	III-3 (PARTI CULAR)	[BKE-10]4	6.6 7	45.9 82.5	7.16 12.87	3 6	2.3867 2.145	0.65 3.288	S D	5, 8 5, 8	1.95, 3.11 1.95, 3.11
[BKE-3, BKE-4, BKE-5, BKE-7]		6.6 8	54 98.6	8.424 15.382	3 6	2.808 2.5637	0.65 3.188	S D	8, 15 8, 15	3.11, 5.84 3.11, 5.84	5.0, 10 2.5, 12.5
[BTM-1]		6.6 13	91.5 150.1	14.274 23.416	6 6	2.379 3.9027	0.65 1.518	D D	2 2	0.78 0.78	11 13.5
[BCM-5] [BGM-4, BGM-8, BGM-9]		6.6 15	109.8 -	17.129 -	6 -	2.8548 -	0.65 -	D -	3, 7 -	1.168, 2.73 -	4.0, 7 -

Table 4.19 INPUT DATD FOR SEISMIC DESIGN (METHOD-2) (3/4)

CLASS	NAME	WIDTH/ SPAN(m)	REACTI AT/PR (t)	H-FORCE AT/PR (t)	PILE NO AT/PR (no)	H/PILE AT/PR (t)	HEIGHT AT/PR (m)	S/ D	N- VALUE (no)	k ₀	PILE LENGTH (m)
III-2 (PEDES TRIAN)	{BKE-16, BKE-17}	2.5 7	15.5 24.3	2.418 3.791	2 2	1.209 1.8955	0.65 3.626	S S	5, 6 5, 6	1.95, 2.34 1.95, 2.34	4.0, 16 1.5, 18.5
	{BKE-8}	2.5 8	17 24.3	2.652 3.791	2 2	1.326 1.8955	0.65 3.28	S S	3, 19 3, 19	1.168, 7.4 1.168, 7.4	4.0, 11 1.5, 13.5
	{BKE-9}	2.5 11	22.9 42.3	3.572 6.599	2 2	1.786 3.2995	0.65 3.319	S S	3, 19 3, 19	1.168, 7.4 1.168, 7.4	4.0, 11 1.5, 13.5
	{BKM-4, BKM-6, BKM-7}	2.5 11.65	25.8 47.9	4.025 7.472	2 2	2.0125 3.736	0.65 2.522	S S	5, 3 5, 3	1.95, 1.168 1.168	2.0, 9 11.5
	{BCM-7 BCM-8 BCM-9}	2.5 12.1	26.5 -	4.134 -	2 -	2.067 -	0.65 -	S -	2, 7 -	0.78, 2.73 -	4.0, 7 -
	{BCM-4}	2.5 14.1	27 -	4.212 -	2 -	2.106 -	0.65 -	S -	4, 7 -	1.56, 2.73 -	4.0, 6 -
	{BGM-3}	2.5 15.3	30.2 -	4.711 -	2 -	2.3555 -	0.65 -	S -	3, 18 -	1.168, 7.01 -	4.0, 8 -
IV-S	{BKE-14, BKE-15}	3 7	24.6 44.9	3.838 7.004	2 4	1.919 1.751	0.65 3.517	S D	7, 5 5	2.73, 2.34 2.34	2.0, 13 15.5
	{BKE-1}	3 8	28.8 53.4	4.493 8.33	2 4	2.2465 2.0825	0.65 2.618	S D	8, 5 8	3.11, 1.95 1.95	1.0, 8 10.5
	{BGM-10}	3.5 15.3	64.3 -	10.031 -	2 -	5.0155 -	0.65 -	S -	14 -	5.45 -	7 -

Table 4.19 INPUT DATD FOR SEISMIC DESIGN (METHOD-2) (4/4)

Remarks:

WIDTH: total width of bridge.

SPAN: bridge span.

REAC: reaction

AT/PR: abutment/pier

H-FORC: horizontal forth by seismic per one pier

PILE NO: number of pile

H/PILE: horizontal force by seismic per one pile

HEIGH: height of pile over ground level

S/D: single squad piles/double squad piles

N-BLO: number of blow for N value. in case of two layers, left figure indicates that of upper layer and right one lower layer.

$$k_0 = eE_0D^{-3.4}$$

Where

k_0 : coefficient of horizontal reaction when 1cm deformed.

E_0 : deformation coefficient of soil by reaction=28 N blows

e: this is given depend upon calculation base, 0.2 for 28N

D: diameter of pile =35 cm

$$\text{Ex.: } k_0 = 0.2 * 3 * 28 * 35^{-3.4} = 1.168$$

PILE LENGTH: pile length under ground, two layers depth are shown corresponding to E-blow.

Table 4.20 STABILITY OF PILE TO SEISMIC FORCE (1/4)

CLASS	NAME	TYPE	METHOD -1			METHOD-2			PILE		
			SQUAD SINGLE OR DOUBLE	Mmax (tm)	Smax (t)	HINGE	FIX		Mult (tm)	Qu (t)	APPLIED PILE
						Mmax(tm) UNDER GROUND	Mmax(tm) PILE TOP	Mmax(tm) UNDER GROUND			
III-I	[BKE-12 BKE-13]	ABUT	S	1.698	2.371	*2.38	2.64	1.22	5.3	10	350-A
		PIER	D	6.776	3.064	10.67	*7.54	4.69	9	13	350-B
	[BNM-1]	ABUT	S	2.272	3.175	*3.33	3.84	1.73	5.3	10	350-A
	[BCM-13]	ABUT	S	1.575	3.3	*3.47	3.99	1.84	5.3	10	350-A
	[BGM-12]	ABUT	D	2.543	3.552	*3.32	3.7	1.68	5.3	10	350-A
IV-1	[BKE-18]	ABUT	S	1.307	1.825	*1.71	1.84	4.45	5.3	10	350-A
		PIER	D	3.918	1.768	6.66	*4.25	2.96	5.3	10	350-A
	[BNM-2, BNM-3]	ABUT	S	1.62	2.262	*2.38	2.74	1.26	5.3	10	350-A
	[BKM-8]	ABUT PIER	D D	1.622 *5.019	2.266 2.265	2.68 6.11	*2.81 4.3	1.32 2.69	5.3 5.3	10 10	350-A 350-A
IV-1	[BKM-1]	ABUT	D	1.823	2.547	2.29	*2.42	1.14	5.3	10	350-A
		PIER	D	*6.442	2.907	5.14	4.16	2.25	9	13	350-B
	[BCM-3] [BGM-5, BGM-6, BGM-7, BGM-11]	ABUT	D	2.181	3.046	2.82	*3.17	1.46	5.3	10	350-A
I-2 [WITH]	[BTM-3]	ABUT	D	2.532	3.536	3.24	*3.45	3.58	5.3	10	350-A
		PIER	D	*8.632	4.271	8.16	6.52	2.19	9	13	350-B

Table 4.20 STABILITY OF PILE TO SEISMIC FORCE (2/4)

CLASS	NAME	TYPE	METHOD -1			METHOD-2			PILE		
			SQUAD SINGLE OR DOUBLE	Mmax (tm)	Smax (t)	HINGE	FIX		Mult (tm)	Qu (t)	APPLIED PILE
						Mmax(tm) UNDER GROUND	PILE TOP	UNDER GROUND			
III-2 (WITH)	[BCM-14]	ABUT	S	*8.677	3.916	4.11	4.74	2.19	9	13	350-B
	[BKM-10, BKM-11]	ABUT PIER	D D	2.219 *8.236	3.099 3.717	2.98 11.25	*3.27 8.09	1.52 4.93	5.3 9	10 13	350-A 350-B
	[BKM-3, BKM-5]	ABUT PIER	D D	2.357 *9.43	3.292 4.005	*3.27 8.78	3.67 7.16	1.7 3.86	5.3 13.5	10 18	350-A 400-B
	[BCM-1, BCM-2] [BGM-1, BGM-2]	ABUT	D	3.008	4.202	4.03	*4.44	2.07	5.3	10	350-A
I-3 (PARTI CULAR)	[BNM-4]	ABUT	D	1.773	2.477	2.07	*2.06	0.99	5.3	10	350-A
	[BCM-11, BCM-12]	ABUT	D	2.901	4.051	4.25	*4.9	2.26	5.3	10	350-A
II-3 (PARTI CULAR)	[BTM-4, BTM-5]	ABUT PIER	S D	2.504 *8.958	3.498 5.39	*3.2 7.62	3.42 6.13	1.6 3.34	5.3 9	10 18	350-A 350-B
	III-3 (PARTI CULAR)	[BKE-10]	ABUT PIER	S D	1.709 4.753	2.387 2.145	*2.12 7.24	2.22 *4.82	1.04 3.22	5.3 5.3	10 10
[BKE-3, BKE-4, BKE-5, BKE-7]		ABUT PIER	S D	1.967 *5.681	2.808 2.564	*2.49 8.4	2.6 5.63	1.22 3.37	5.3 9	10 13	350-A 350-B
[BTM-1]		ABUT PIER	D D	1.703 *8.648	2.374 3.903	2.49 7.02	*2.87 6.41	1.32 3.2	5.3 9	10 13	350-A 350-B
[BCM-5] [BGM-4, BGM-8, BGM-9]		ABUT	D	2.044	2.855	*2.84	3.19	1.48	5.3	10	350-A

Table 4.20 STABILITY OF PILE TO SEISMIC FORCE (3/4)

CLASS	NAME	TYPE	METHOD -1			METHOD-2			PILE		
			SQUAD SINGLE OR DOUBLE	Mmax (tm)	Smax (t)	HINGE	FIX		Mult (tm)	Qu (t)	APPLIED PILE
						Mmax(tm) UNDER GROUND	Mmax(tm) PILE TOP	Mmax(tm) UNDER GROUND			
III-2 (PEDES TRIAN)	[BKE-16, BKE-17]	ABUT PIER	S S	0.866 4.2	1.209 1.996	*1.13 *7.07	1.22 4.74	0.06 3.14	5.3 9	10 10	350-A 350-B
	[BKE-8]	ABUT PIER	S S	0.949 4.2	1.326 1.996	*1.31 *6.49	1.48 4.61	0.69 2.85	5.3 9	10 10	350-A 350-B
	[BKE-9]	ABUT PIER	S S	1.279 7.311	1.296 3.299	*1.78 *11.42	1.99 8.08	0.92 5.01	5.3 13.5	10 13	350-A 400-B
	[BKM-4, BKM-6, BKM-7]	ABUT PIER	S S	1.441 8.279	2.013 3.736	*1.79 *9.82	1.87 6.97	0.88 4.31	5.3 13.5	10 13	350-A 400-B
	[BCM-7 BCM-8 BCM-9]	ABUT	S	1.48	2.067	*2.17	2.5	11.5	5.3	10	350-A
	[BCM-4]	ABUT	S	1.508	2.106	*2.02	2.22	1.03	5.3	10	350-A
	[BGM-3]	ABUT	S	1.686	2.356	*2.34	2.63	1.22	5.3	10	350-A
IV-S	[BKE-14, BKE-15]	ABUT PIER	S D	1.374 3.88	1.919 3.502	*1.79 6.34	1.94 *4.28	0.91 2.81	5.3 5.3	10 10	350-A 350-A
	[BKE-1]	ABUT PIER	S D	1.608 *4.615	2.247 4.17	2 5.67	*2.09 3.98	0.98 2.49	5.3 5.3	10 10	350-A 350-A
	[BGM-10]	ABUT	S	3.591	5.016	*4.21	4.22	2.10	5.3	10	350-A

Table 4.20 STABILITY OF PILE TO SEISMIC FORCE (4/4)

Commentary notes:

1 SQUAD; indicates the type of pile deployment i.e. single or double

2 METHOD-1; is the calculation results roughly computed by manual with the boundary condition that a pile lies up and down in soil loaded with bending moment at tip situated at land surface.

3 METHOD-2; is the calculation results of computer with the boundary conditions that a pile stands perpendicularly in pierce condition on land supported elastically with soil.

For the boundary condition at pile tip two cases are considered as follows:

Case-1 Hinge support to be used for single squad piles

Case-2 Fix support to be used for double squad piles

4 Mult; indicates the ultimate bending moment of pile according to JIS A5335.

5 Qu; indicates shearing strength obtained by the test data referring to company's brochure.

6 APPLIED PILE: 350 and 400 indicate the outside diameter of pile and A and B is a type of pile.

7 *mark: shows selected maximum moment for checking pile stability..

8 Strength of pile: According to JIS A 5335, the strength of PC PILE is as follows:

	Moment for crack (tf.m)	Moment* for destruction (tf.m)
350 Dia.Type A	3.5	5.3
Type B	5	9
400Dia Type A	5.5	8.3
Type B	7.5	13.5

Remarks for *: Moment for destruction can be obtained 1.5 times Of Momnt for crack of Type A and 1.8 for Type B.

Table 4.21 SUMMARY OF STRESS CHECK OF HAMMER HEAD (1/2)

CASE-1 SWRVICE LOAD		Load and Remarks	Case 1 (BCM- 14) Abutment Single Squad BM70	Case 2 (BCM- 11) Abutment Double Squad BM100	Case 3 (BTM-4) Pier Double Squad BM70
M max (tf . m)		Dead Load + Live Load	19.61	33.21	43.26
S max (tf)		Same as above	25.57	35.43	46.14
Section Modulus (cm ³)	Kc	for concrete	55287	83399	88240
	Ks	for re-bar	1653	2566	2813
Area (cm ²)	Ac	of concrete	9300	13700	11700
Bending Stress (kgf/ cm ²)	σ_c	for concrete	35.5	39.8	49.0
	σ_s	for re-bar	1186	1294	1538
Shear Stress (kgf/ cm ²)	τ	for concrete	3.0	2.6	3.9
Allowable Stress (kgf/ cm ²)	σ_{ca}	for concrete	80	80	80
	σ_{sa}	for re-bar	1800	1800	1800
	τ_a	for concrete	3.9	3.9	3.9

Table 4.21 SUMMARY OF STRESS CHECK OF HAMMER HEAD (2/2)

CASE-2 EATHQUAKE		Load	Case 1 (BCM-14) Abut, Single, 70	Case 2 (BCM-11) Abut, Double, 100	Case 3 (BTM-4) Pier, Double, 70
M d (tf . m)		Dead Load	12.02	20.37	23.98
M s (tf . m)		Seismic Load	8.67	19.6	35.84
M (tf . m)		Dead Load	20.69	39.97	59.82
S max (tf)		Same as above	16.53	21.73	35.18
Section	Kc	for concrete	55287	83399	88240
Modulus (cm ³)	Ks	for re-bar	1653	2566	2813
Area (cm ²)	Ac	for concrete	9300	13700	11700
Bending Stress (kgf/ cm ²)	σc	for concrete	37.4	47.9	67.8
	σs	for re-bar	1252	1557	2127
Shear Stress (kgf/ cm ²)	τ	for concrete	1.8	1.6	3.01
Allowable Stress(x1.5) (kgf/ cm ²)	σca	for concrete	120	120	120
	σsa	for re-bar	2700	2700	2700
	τa	for concrete	5.9	5.9	5.9

Table 4.22 FINAL PILE ARRANGEMENT (1/6)

NA MC	CROSS SECTION	WIDTH	SPAN	ORDER LENGTH	ORDER HEIGHT	LOAD TYPE	REACTION (kN)		No of PILE	PILE ARRANGEMENT		REMARKS
							ST	AU		ABUTMENT	PIER	
18K-12 18C-13		8.200	7.000	7.300	0.400	70T	1	42.2	na=2.4 (4)	350-A		
							2	0.0				
							3	40.0				
							4	87.2				
							5	18.6				
							6	100.0				
18M-11		8.200	8.000	8.400	0.450	70T	1	52.8	na=2.5 (4)	350-A	same as above	
							2	0.0				
							3	40.0				
							4	97.0				
							5	19.6				
							6	100.0				
18M-13		8.200	10.000	10.500	0.450	70T	1	66.0	na=4.3 (6)	350-A	same as above	
							2	0.0				
							3	40.0				
							4	106.0				
							5	18.6				
							6	124.6				
18M-12		8.200	15.300	15.000	0.600	70T	1	103.3	na=3.0 (6)	350-A		
							2	0.0				
							3	40.0				
							4	143.3				
							5	33.3				
							6	176.6				
18K-16		4.600	7.000	7.300	0.400	70T	1	24.7	na=1.3 (3)	350-A		
							2	0.0				
							3	20.0				
							4	44.7				
							5	10.4				
							6	55.1				
18M-2 18M-3		4.600	8.000	8.400	0.500	70T	1	33.1	na=1.3 (2)	350-A	same as above	SAME AS ABOVE FOR 18K2.6.9 AND 11
							2	0.0				
							3	20.0				
							4	50.1				
							5	10.4				
							6	63.5				
18M-8		4.600	11.400	11.900	0.450	70T	1	37.3	na=1.9 (4)	350-A		
							2	0.0				
							3	20.0				
							4	50.3				
							5	10.7				
							6	70.1				
18M-10		4.600	10.000	10.500	0.450	70T	1	66.0	na=2.5 (4)	350-A	same as above	
							2	0.0				
							3	40.0				
							4	97.0				
							5	19.6				
							6	100.0				

Table 4.22 FINAL PILE ARRANGEMENT (2/6)

NA DE	CROSS SECTION	WDM	SPAN	GIRDER LENGTH	GIRDER HEIGHT	LOAD TYPE	REACTION (k)		No of PILE	PILE ARRANGEMENT		REMARKS	
							ADJUTMENT	PIER		ADJUTMENT	PIER		
(100H11M) 1 - 2		4,000	13,000	13,500	0.500	B.M. 70T	1	48.6	93.2	350-A			
							2	0.0	0.0				same as above
							3	20.0	20.0				
							4	66.6	113.2				
							5	18.7	18.0				
							6	85.3	127.6				
BOM-3 BOM-5 BOM-6 BOM-7 BOM-11		4,000	15,300	15,000	0.600	B.M. 70T	1	59.4	116.9	350-A			
							2	0.0	0.0				
							3	20.0	20.0				
							4	79.4	138.9				
							5	18.7	18.6				
							6	90.1	157.5				
NOTES						LOAD TYPE B.M. WHEEL LOAD 10.0T B.M. 70T WHEEL LOAD 7.0T PEDESTRIAN/ANIMALS LOAD 0.35T/m ²	1	DEAD LOAD	1. DEAD LOAD 2. PEDESTRIAN 3. LIVE LOAD 4. SUMMATION (1+2+3) 5. SELF WEIGHT 6. TOTAL				
							2	PERSON					
							3	LIVE LOAD					
							4	SUMMATION (1+2+3)					
							5	SELF WEIGHT					
							6	TOTAL					

Table 4.22 FINAL PILE ARRANGEMENT (3/6)

NA ME	CROSS SECTION	WIDTH	SPAN	ORDER LENGTH	ORDER HEIGHT	LOAD TYPE	REACTION (k)		No of PILE	PILE ARRANGEMENT		REMARKS	
							ST	PIER		ABUTMENT	PIER		
RIM-31		10.600	11.400	11.900	0.500	B.M.	1	93.0	na=2.5 (0)	350-A		350-B	
							2	4.0					
							3	41.6					
							4	150.7					
							5	41.0					
							6	101.7					
RIM-14		9.600	10.1800	10.500	0.600	B.M.	1	70.6	na=3.5 (4)	350-B		350-B	
							2	3.5					
							3	40.0					
							4	172.1					
							5	21.0					
							6	143.9					
RIM-10, RIM-11		9.600	11.400	11.900	0.650	B.M.	1	98.3	na=4.0 (0)	350-A		350-B	
							2	3.9					
							3	40.0					
							4	174.2					
							5	30.9					
							6	163.1					
RIM-3, RIM-5		9.600	11.050	12.350	0.500	B.M.	1	87.2	na=4.2 (0)	350-A		400-B	same as above
							2	4.1					
							3	40.0					
							4	131.0					
							5	30.9					
							6	170.7					
RIM-1, RIM-2 RIM-1, RIM-2		9.600	15.300	15.000	0.600	B.M.	1	127.2	na=5.0 (0)	350-A		400-B	same as above
							2	5.2					
							3	40.0					
							4	167.4					
							5	30.9					
							6	206.3					
NOTES							1						
							2						
							3						
							4						
							5						
							6						

LOAD TYPE B.M. 100% WHEEL LOAD 10.0k
 B.M. 70% WHEEL LOAD 7.0k
 P-HUMAN/ANIMALS LOAD
 0.35k/m²

1. DEAD LOAD
 2. PERSON
 3. LIVE LOAD
 4. SUMMATION (1+2+3)
 5. SELF WEIGHT
 6. TOTAL

Table 4.22 FINAL PILE ARRANGEMENT (4/6)

NA MC	CROSS SECTION	WIDTH	SPAN	GIRDER LENGTH	ORDER HEIGHT	LOAD TYPE	REACTION (k)		No of PILE	PILE ARRANGEMENT		REMARKS
							ST	ABUTMENT		ABUTMENT	PIER	
BOM-4		12.200	8.000	8.000	0.450	100T	1	73.9	na=4.1 (b)	350-A		
							2	0.0				
							3	47.5				
							4	141.4				
							5	77.7				
							6	149.1				
BOM-11, BOM-12		12.200	13.000	13.500	0.550	100T	1	116.7	na=4.0 (b)	350-A	same as above	
							2	0.0				
							3	76.9				
							4	193.6				
							5	49.5				
							6	243.1				
BOM-4, BOM-5		12.200	9.100	9.000	0.450	70T	1	94.4	na=4.2 (b)	350-B		
							2	0.0				
							3	60.0				
							4	146.4				
							5	27.2				
							6	172.1				
BOM-10		6.600	7.000	7.300	0.400	70T	1	30.9	na=2.1 (b)	350-A		
							2	0.0				
							3	40.0				
							4	70.9				
							5	15.0				
							6	65.9				
BOM-3, BOM-4, BOM-5, BOM-7		6.600	8.000	8.400	0.450	70T	1	39.0	na=2.3 (b)	350-B	same as above	
							2	0.0				
							3	40.0				
							4	79.0				
							5	15.0				
							6	94.0				
BOM-10, BOM-11		6.600	13.000	13.500	0.500	70T	1	66.7	na=3.2 (b)	350-B		
							2	0.0				
							3	40.0				
							4	104.7				
							5	26.0				
							6	131.5				
BOM-3, BOM-4, BOM-5, BOM-9		6.600	15.000	15.000	0.400	70T	1	83.0	na=3.7 (b)	350-A	same as above	
							2	0.0				
							3	40.0				
							4	123.0				
							5	26.0				
							6	149.0				
NOTES	<p>LOAD TYPE (B.M. 100T=WHEEL LOAD 100kN B.M. 70T=WHEEL LOAD 70kN P=HUMAN/ANIMALS LOAD Q=JVM/C</p> <ol style="list-style-type: none"> DEAD LOAD TRUCK LIVE LOAD SUMMATOR (1+2+3) SELF WEIGHT TOTAL 											

Table 4.22 FINAL PILE ARRANGEMENT (5/6)

NA #C	CROSS SECTION	WIDTH	SPAN	ORDER LENGTH	ORDER HEIGHT	LOAD TYPE	SECTION (11)		No. of PILE	PILE ARRANGEMENT		REMARKS		
							ST	ADULT/CHILD		ABUTMENT	PIER			
BNC-16, BNC-17		2.500	7.000	7.300	0.350	P	1	9.0	17.6	350-A		350-B		
							2	2.4	4.9					na=0.4 (2)
							3	0.0	0.0					
							4	12.3	24.5					
							5	5.7	4.7					np=0.7 (2)
							6	10.0	22.2					
BNC-8		2.500	0.000	0.400	0.350	P	1	11.3	22.6	350-A	same as above	350-B	same as above	
							2	2.0	5.6					na=0.5 (2)
							3	0.0	0.0					
							4	14.1	20.2					
							5	5.7	4.7					np=0.8 (2)
							6	19.0	32.9					
BNC-9		2.500	11.000	11.500	0.400	P	1	12.2	34.5	350-A	same as above	400-B	same as above	
							2	3.0	7.6					na=0.7 (2)
							3	0.0	0.0					
							4	21.1	42.1					
							5	5.7	7.0					np=1.2 (2)
							6	26.0	49.9					
BNC-4, BNC-6, BNC-7		2.500	11.050	12.150	0.450	P	1	20.1	40.2	350-A	same as above	400-B	same as above	
							2	4.0	8.1					na=0.7 (2)
							3	0.0	0.0					
							4	24.1	48.2					
							5	5.7	7.0					np=1.4 (2)
							6	29.0	58.0					
BNC-2, BNC-8, BNC-9		2.500	12.100	12.600	0.450	P	1	20.8	41.7	350-A	same as above	400-B	same as above	
							2	3.1	7.0					na=0.7 (2)
							3	0.0	0.0					
							4	23.9	47.5					
							5	5.7	7.0					
							6	29.6	57.3					
BNC-4		2.500	14.100	14.600	0.450	P	1	21.3	42.6	350-A	same as above	400-B	same as above	
							2	4.9	9.7					na=0.8 (2)
							3	0.0	0.0					
							4	26.2	42.3					
							5	5.7	7.0					
							6	34.9	68.1					
BNC-3		2.500	15.300	15.000	0.500	P	1	24.5	48.9	350-A	same as above	400-B	same as above	
							2	5.3	10.5					na=0.9 (2)
							3	0.0	0.0					
							4	29.7	59.4					
							5	5.7	7.0					
							6	35.4	71.2					

(PEDESTRIAN)

NOTES

- 1. DEAD LOAD
- 2. PERSON
- 3. LIVE LOAD
- 4. SUMMATION (1+2+3)
- 5. SELF WEIGHT
- 6. TOTAL

LOAD PER B.M. 1000:WHEEL LOAD 10.0ft
 B.M. 705:WHEEL LOAD 7.0ft
 P: HUMAN/ANIMALS LOAD
 0.35ft/m²

Table 4.22 FINAL PILE ARRANGEMENT (6/6)

NA MC	CROSS SECTION	WIDTH	SPAN	PIER LENGTH	PIER HEIGHT	LOAD TYPE	REACTION (k)		No. of PILE	PILE ARRANGEMENT		REMARKS
							ST	ABUTMENT		ABUTMENT	PIER	
194C-14 194C-15I		3.000	2.000	7.300	0.400	70T	1	17.0	35.5	350-A		-
							2	0.0				
							3	20.0				
							4	32.0				
							5	6.0				
							6	64.6				
194E-11		3.000	6.000	6.400	0.450	70T	1	22.0	44.0	350-A	same as above	same as above
							2	0.0				
							3	20.0				
							4	42.0				
							5	6.0				
							6	60.0				
190M-10I		3.500	15.000	15.800	0.650	70T	1	50.1	100.2	350-A		-
							2	0.0				
							3	20.0				
							4	20.1				
							5	14.2				
							6	84.3				
							1					
							2					
							3					
							4					
							5					
							6					
							1					
							2					
							3					
							4					
							5					
							6					
NOTES						LOAD TYPE B.M. 100T; WHEEL LOAD 10.0T B.M. 70T; WHEEL LOAD 7.0T P. HUMAN/ANIMALS LOAD 0.35/0.2	1					
							2					
							3					
							4					
							5					
							6					

(100T) (k)

N = 2

Table 4.23 CLASSIFICATION OF EMBANKMENT HEIGHT AND ROAD SIDE PROTECTION

CLASS height of embankment (m)	[A] 0<h<0.5 and h=0	[A] 0.5<h<1.0 and h=1.0	[B] 1.0<h<1.5 and h=1.5	[C] 1.5<h<2.0 and h=2.0	[D] 2.0<h<2.5 and h=2.5	[E] 2.5<h<3.0 and h=3.0	TOTAL
KAMAL(MAIN)	0	0	3(1)	3(2**)	3(2**)	0	9(1),(4**)
KAMAL(BRANCH)	2(2*)	0	3	9(1**)	5(1**)	0	19(2*),(2**)
TANJUNGAN	0	0	0	2(1)	3(1**)	0	5(1**)
PIK JUNCTION	0	0	1	2(2)	1	0	4(2)
CENGKARENG	0	3(1)	2(1**)	3	3(1),(1**)	2(2**)	13(2),(4**)
GEDEBOR	0	1	1	2(1**)	4	2	10(1**)
MERUYA	16(16*)	0	0	0	0	0	16(16*)
TOTAL	18(18*)	4(1)	10(1),(1**)	21(3),(4**)	19(1),(5**)	4(2**)	76(6),(18*),(12**)

Remarks:1) The number shown in parenthesis, i.e.() indicates that of sod facing.

2) One asterisk is the number of no protection.

3) Two asterisk is that of stairs for pedestrian bridge.

4) No mark is the number of retaining wall.

5) Above all, the number of every protection method are as follows:
no embankment ;23 sod facing ;6, stairs;12 and retaining wall;43.

6) The total number of bridge from 1.0 to 2.5 m height except pedestrian bridge are 41 ,which occupies 71% of road bridge;58.

Table 4.24 REMARKS ON TECHNICAL SPECIFICATION (1/3)

1 General description

The technical specification has been compiled from viewpoint of design work for the construction to proceed the construction smoothly so that he shall understand the meanings of the specification prior to the construction and submit necessitated document and drawings for the approval of the Engineer.

2 Structure

The specification covers the crossing structures and their belongings of the following:

- (1) Pre-tension girder bridge and substructures composed of pile trestle
- (2) In situ bridge and substructure of culvert type

(3) Culvert

(4) Approach road

3 Standard and code

Indonesian Code and Standard are used with the supplement of Japn Standard properly.

4 Specification for each structures

As stated below:

Table 4.24 REMARKS ON TECHNICAL SPECIFICATION (2/3)

No	Item	Standard and Code	Specification	Remarks
[A]	Structure			
1	Superstructure			
1.1	Main Girder	<p>1) Load: Guideline of Loads in Highway Bridges in Indonesia</p> <p>2) Design Code: Japan Concrete Bridge Design Standard</p> <p>3) Quality: JIS A 5311</p> <p>4) Reference: Japan Standard Design of Civil-engineering Structure</p>	<p>1) Prestressed concrete girder for bridge produced with pre-tension method</p> <p>2) Concrete strength: 50K class</p> <p>3) $L_{max} < 17m$</p>	<p>1) There exist two factories producing Pre-Ten girder in Indonesia.</p> <p>2) After the installation of all girders on substructure at site filling concrete is cast in the space between adjacent girders and transverse tendons are tensioned until specific stress.</p> <p>3) Camber for dead load shall be pre-bent at factory.</p>
1.2	Structure on deck			
-1	Guardrail and Wall	<p>Indonesian Standard Drawings</p>	<p>Concrete wall with steel coping on it.</p>	<p>1) Concrete : 24K class</p>
-2	Walkway	<p>Indonesian Standard Drawing.</p>	<p>1) Width: 1.0m</p> <p>2) Height: 30cm</p>	<p>2) Steel coping: galvanized circular pipe</p> <p>1) Curb stone: concrete block standardized in local</p>
-3	Pavement	<p>Material: Indonesian Standard</p>	<p>1) Carriage-way: 50mm depth</p> <p>2) Side walk: 30mm depth</p>	<p>1) Crossfall: 1.5% is adjusted with the depth of pavement.</p>
-4	Drainage	<p>Japan Standard Design of Civil Structures</p>	<p>1) Fabricated metal with water gathering basin</p>	<p>1) Galvanized metal structure.</p>
-5	Expansion	<p>Market standard products</p>	<p>1) Rubber type backed up with steel</p>	<p>1) Contractor shall submit detailed specification for the approval of the Engineer</p>

Table 4.24 REMARKS ON TECHNICAL SPECIFICATION (3/3)

No	Item	Standard and Code	Specification	Remarks
1.5	Structure under girder			
-1	Bearing	Market standard products	Laminated rubber with steel plate	1) Contractor shall submit detailed specification for the approval of the Engineer
-2	Bearing Seat	JIS related to non-shrink mortar	Non-shrink mortar reinforced with steel grid	Same as above
2	Substructure	Indonesian Standard	Trestle type	
2.1	Hammer Head	Standard Drawing Collection of Indonesia	Reinforced concrete: 24K class concrete	1) Specification and test record of D-25 re-bar carried out by third party official organization shall be submitted for the approval of the Engineer.
2.2	Pile	JIS A 5335	Grade: Dia. 350 A, B and 400 B	Same as above
[B]	Others			
1	Supplementary Investigation	AASHTO	Additional drilling and testing	1) One boring and testing is carried out at per one bridge site except pedestrian bridges, of which the pile capacity and length are estimated based on the test of nearest road bridges. 2) One test pile shall be considered for each bridge. 3) Judgment of test data on the pile capacity and length are entirely responsible to the Contractor.
2	Topographic Survey		Topographic survey of 1/250 scale supplemented with plane surveying along with access road.	1) Survey plans shall be submitted for the approval of the Engineer.
3	Construction Drawing			1) Construction drawing shall reflect any details required for successful construction according to tender document, which shall be previously submitted for the approval of the Engineer.